Ochlockonee River State Park, Florida

# ESA Biological Assessment for Clean Water Act Section 404 Assumption by the State of Florida

July 24, 2020

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Supplemental information prepared by the Florida Department of Environmental Protection to assist in the evaluation of impacts to species listed and considered by the Endangered Species Act.

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Note for printing: Pages for Appendix C are 8.5" x 14"

# Executive Summary

In accordance with the Endangered Species Act of 1973 (ESA) and its implementing regulations, the purpose of this Biological Assessment (BA) is to evaluate the potential effects of the United States Environmental Protection Agency's (EPA) potential approval of the State of Florida's Assumption and administration of Section 404 of the Clean Water Act (CWA) on ESA-listed species, proposed species, designated critical habitat and proposed critical habitat (50 Code of Federal Regulations [CFR] § 402.12). The BA will consider whether EPA's approval of the Assumption request (Action) is likely to adversely affect any species or habitat. EPA is the federal agency charged with approving or denying the state's request, pursuant to the CWA implementing regulations (40 CFR § 233 *et seq*). The Florida Department of Environmental Protection (FDEP) is the state agency requesting administration of the CWA Section 404 Program (Assumption).

On July 17, 2019, the FDEP sent a request to EPA that sought designation, pursuant to 50 CFR §402.08, to serve as a non-federal representative to prepare the subject BA for possible ESA section 7 consultation. The EPA designated FDEP as the non-federal representative to prepare this BA in a letter dated December 12, 2019, consistent with 50 CFR § 402.08. In a separate letter to the U.S. Department of Commerce and the Department of the Interior dated December 13, 2019, the EPA stated that it would voluntarily engage in informal consultation with the Services (the United States Fish and Wildlife Service [USFWS] and the National Oceanic and Atmospheric Administration [NOAA] National Marine Fisheries Service [NMFS]).

FDEP requested input on a draft species list for Florida's BA from the USFWS and the NMFS on November 22, 2019. On April 15, 2020, NMFS responded to FDEP that ESA-listed species under NMFS' jurisdiction do not occur in waters that are assumable by the state (see Appendix A). They stated that based on their review, while there is shared jurisdiction for the Gulf Sturgeon between NMFS and USFWS, the USFWS is responsible for consultations regarding sturgeon and critical habitat in riverine habitat units. NMFS further states that the riverine critical habitat units and river areas where Gulf Sturgeon are known to occur are all listed by the USACE as retained waters. Based on NMFS' determination, this BA makes a "no effect" determination for NMFS jurisdictional species.

If approved, the State's Assumption of the dredge and fill permitting program under Section 404 of the CWA for waters assumable by the State would be implemented by processes and procedures described in state regulations (Chapters 62-330, and 62-331, Florida Administrative Code [F.A.C.]), Memorandums of Agreement with EPA and the United States Army Corps of Engineers (USACE), and a Memorandum of Understanding with the Florida Fish and Wildlife Conservation Commission (FWC) and the USFWS. Should EPA request formal consultation with USFWS at the time of EPA's review of whether to approve Assumption of the State 404 program, USFWS may issue a programmatic biological opinion (Program assumption BiOp). The opinion may include conditions that guide implementation of the State 404 program. If the USFWS determines that the Action is not likely to jeopardize the continued existence of ESA-listed species and is not likely to destroy or adversely modify designated critical habitat, the Program assumption BiOp may also include an incidental take statement (ITS) with reasonable and prudent measures and terms and conditions that must be complied with during the implementation of the State 404 program, as well as description of triggers for reinitiation of the Program assumption BiOp.

Florida's request to assume the administration of the CWA Section 404 permit program only includes those Waters of the United States (WOTUS) not retained by the USACE; referred to as assumed waters or State-assumed waters. The USACE will retain permitting responsibility for the discharge of dredged or fill material in those waters defined as "Retained Waters". This definition can be found in the State 404 Handbook in



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Chapter 2.0 and the process to determine whether a project is in retained, or assumed waters, is described in Chapter 4.1 of the Handbook. In addition, Appendix A of the State 404 Handbook includes the Retained Waters List maintained by the USACE. The administrative boundary demarcating the adjacent wetlands over which jurisdiction is retained by the USACE is a 300-foot guide line established from the ordinary high water mark or mean high tide line of the retained water. In the case of a project that involves discharges of dredged or fill material both waterward and landward of the 300-foot guide line, the USACE will retain jurisdiction to the landward boundary of the project for the purposes of that project only.

In accordance with section 7 regulations, this BA only evaluates effects to ESA-considered species, which includes ESA-listed species, their critical habitats, those species proposed to be listed and their proposed critical habitat, candidate species, petitioned species, and those otherwise under review for potential ESA listing. For the sake of clarity in understanding the State's implementation of the State 404 program and the ERP program, the State 404 program would address species that may not be listed under the ESA, but are protected under other federal or state laws. Examples of these types of laws include the Bald and Golden Eagle Protection Act (16 USC § 668 et seq.) and the Migratory Bird Treaty Act of 1918 (16 USC §§ 703-712 (§ 709 omitted). Also, all ESA proposed, candidate, and petitioned plant and animal species with ranges within Florida are discussed in this BA, to provide a thorough review of Florida's potentially at-risk species, and because the lists of threatened and endangered species may be modified to include some or all of the petitioned species, depending upon the outcome of those status reviews. This BA evaluates the effects of the that EPA's approval for the State of Florida Assumption of Section 404 of the CWA would have on listed species in present time, and analyzes effects into the future. All species that are currently listed, proposed to be listed or might be listed in the future are discussed, with evaluations of effects on respective guilds. At bottom, this review evaluates the effects the State's 404 program would have on any species that are currently listed or may become listed in the future because implementation of the State's 404 program is the direct effect of EPA's approval of Florida's Assumption of Section 404 of the CWA.

This BA analyzes a total of 235 plant and animal species in the State of Florida that are federally listed as endangered (95), threatened (44), or is ESA-considered (96). Species that must be addressed pursuant to Section 404 of the CWA and Chapter 62-331, F.A.C. for the State 404 program, are federally listed species or species proposed to be listed under the ESA (a total of 141 species). If these listed species have designated critical habitats, or critical habitats proposed to be designated, the adverse effects and impacts to those habitats must also be analyzed and addressed in the State 404 program. See Table 3-1 for the list of species discussed in this BA.

Because of the statewide nature of this request, the numerous covered species and diverse habitats, as well as lack of knowledge with respect to where and what type of future permits may be requested, a meaningful site-specific and species-specific analysis is not possible this BA. Since the State 404 program is implemented through future state-issued 404 permits authorizing activities, a programmatic BA is appropriate to describe the regulatory process by which the State of Florida will make determinations on the issuance of State 404 permits. The BA will address how the process will consider effects to listed endangered and threatened species or species proposed to be listed so that the effects of this Action may be analyzed. The BA describes the effects of the Action, which includes a broad array of activities that are likely to be authorized in the future and a general description of the ESA-listed species and their habitat ranges and critical habitats that are likely to be affected by such activities. These descriptions include baseline discussions, historical perspectives of previous permitting by the USACE, an estimate of the physical, chemical, or biotic stressors to species that are likely to be produced, and a description of the processes and



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mechanisms to avoid and minimize the adverse effects of these activities on ESA-listed species and designated critical habitats.

In implementing the State 404 program, FDEP will send copies of all permit applications and its preliminary site-specific determination of potential effects to listed species to the USFWS for review and comment (see Chapter 7 for details). This coordination is to ensure that any permit issued by FDEP is not likely to jeopardize the continued existence of any listed or proposed species, or adversely modify or destroy designated critical habitat (pursuant to 40 CFR § 233.20(a)). Upon coordination, FDEP will consider any information that USFWS provides as technical assistance and will include all species protection measures that the USFWS may recommend as permit conditions or deny the request for a permit, whether the permit conditions are designed to avoid jeopardizing an ESA-listed species or adverse modification of designated critical habitat, or whether permit conditions are designed to avoid or minimize the amount of incidental take when the take or other effects would not be likely to jeopardize a species or adversely modify designated critical habitat. This exchange of information between USFWS and FDEP falls within the broad scope of "technical assistance" as described in the ESA's implementing regulations and the USFWS' Interagency Consultation Handbook.

The FWC will partner with FDEP to assist in the coordination of federally listed species reviews with the USFWS, expanding FWC's current review of impacts to federally listed and State-listed species during the Environmental Resource Permitting (ERP) process (Chapter 62-330, F.A.C.). The interactions between agencies will inform applicants of the importance of implementing impact avoidance and minimization measures on listed species in order to be eligible for authorization of their proposed activities, all while maintaining compliance with the ESA.

The State 404 program rule [Rules 62-331.053(3)(a)4, 62-331.201(3)(k), and 62-331-248(3)(k) F.A.C.] and EPA regulations (40 CFR 233.20, 40 CFR 230.10(b)(3)) prohibits issuance of a permit that will likely jeopardize the continued existence of endangered or threatened species, or result in the likely destruction or adverse modification of habitat designated as critical for these species as determined by USFWS and confirms that USFWS conclusions about the effects of State 404 permits on listed species are determinative (40 CFR § 230.30(c). FDEP will monitor adverse effect determinations on listed species and critical habitat by incorporating information into their permit tracking database, similar to the information collected by the USACE. This data collection will assist in facilitating compliance with permit conditions and can also be shared with USFWS. Failure to include the protection measures as permit conditions that are designed to avoid jeopardy or adverse modification of designated critical habitat would ultimately result in the State either denying the permit or the State informing EPA that it will neither issue nor deny the permit, which would result in EPA transferring the permit to the USACE for processing in accordance with 40 CFR 233.50(j).

It is the intent of the FDEP to resolve all disputes and objections with USFWS prior to EPA's review during the public noticing process. FDEP, FWC and USFWS are entering into a Memorandum of Understanding which includes a resolution process. This process, and the State's rule requirement that USFWS's recommendations and conditions are determinative, it is unlikely that issues would need to be elevated to EPA. During their review, EPA may comment upon, object to, or make recommendations with respect to a permit pursuant to 40 CFR § 233.50. As stated in 40 CFR § 233.50(j), in the event a state that has assumed CWA Section 404 responsibilities neither satisfies EPA's objections or requirements for a permit condition, nor denies the permit, the EPA will transfer the permit to the USACE and the USACE shall process the permit application, which would trigger a section 7 consultation between USACE and USFWS and NMFS

During the analysis of existing Florida permitting data provided by the USACE for fiscal years 2014 through 2018, approximately 7% of past USACE Section 404 permit application reviews were formal consultations. It is reasonable to anticipate that the past number of applications submitted for that five-year period provides an approximation of the number and types of proposed permitting activities that may occur over the next five-year period. Further analysis of this data shows that a small proportion of the total number of ESA-listed species accounted for the majority of consultations. Many of the species subject to frequent ESA consultation have programmatic consultation keys or programmatic biological opinions, which can help guide or inform future reviews and impact assessments by FDEP, FWC and USFWS. See Chapter 4.2.1 regarding the limitations of the USACE queried data used in the analyses of this BA, and interpretation using the USACE database and shapefile.

Historical CWA Section 404 permitting by the USACE resulted in issuance of permits for one or more projects that adversely affected one or more listed species and their critical habitats. The USACE Section 404 process, in accordance with section 7 of the ESA, employed various conservation measures to avoid and minimize adverse effects. Because of the reasonable and prudent measures and terms and conditions anticipated in the Program assumption BiOp and its Incidental Take Statement (ITS), the State 404 program would not issue a permit that would jeopardize the continued existence of a species or adversely modify designated critical habitats. Similar to the USACE Section 404 program, however, the State 404 program may result in the issuance of one or more permits with projects that "may adversely affect" an ESA-listed species and/or designated critical habitat. These adverse effects would be addressed during the technical assistance process between FDEP and USFWS.

This BA is provided to assist in the review of potential effects to ESA-listed endangered and threatened species anticipated with the State of Florida's request for the Assumption of Section 404 of the CWA.



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# Acronyms

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|---|---|
| Wildlife Plan | Florida's State Wildlife Action Plan (FWC) |
| assumption | Assumption of Section 404 of CWA by the State of Florida |
| BA | Biological Assessment |
| BMP | Best Management Practices |
| BiOp | Biological Opinion |
| C&SF | Central and Southern Florida |
| CERP | Comprehensive Everglades Restoration Plan |
| CFR | Code of Federal Regulations |
| CWA | Clean Water Act |
| CWIS | Cooling Water Intake Structure |
| EIS | Environmental Impact Statement |
| ECOS | Environmental Conservation Online System |
| EPA | United States Environmental Protection Agency |
| ERP | Environmental Resource Permit |
| ESA | Endangered Species Act |
| F.A.C. | Florida Administrative Code |
| FDEP | Florida Department of Environmental Protection |
| FEMA | Federal Emergency Management Agency |
| FLCCS | Florida Land Cover Classification System |
| FNAI | Florida Natural Areas Inventory |
| F.S. | Florida Statutes |
| FWC | Florida Fish and Wildlife Conservation Commission |
| GIS | Geographic Information Systems |
| HCP | Habitat Conservation Plan |
| IPaC | Information for Planning and Consultation |
| ITS | Incidental Take Statement |
| MOA | Memorandum of Agreement |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NWP | Nationwide Permit |



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| | |
|---|---|
| PEM | Palustrine Emergent |
| PFO | Palustrine Forested |
| PSS | Palustrine Shrub Scrub |
| RAI | Request for Additional Information |
| SFWMD | South Florida Water Management District |
| SLOPES | Standard Local Operating Procedures for Endangered Species |
| USACE | United States Army Corps of Engineers |
| USC | United States Code |
| USFWS | United States Fish and Wildlife Service |
| WMDs | Water Management Districts |
| WOTUS | Waters of the United States |



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# Glossary

**CWA** means the Clean Water Act (also known as the Federal Water Pollution Control Act or FWPCA) Pub. L. 92–500, as amended by Pub. L. 95–217, 33 USC 1251, et seq. (Rule 62-331.030, F.A.C., State 404 Handbook section 2.0(b)1).

**Action** means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon high seas (50 CFR § 402.02). For the purposes of this document, the Action would be the EPA's approval of the State of Florida's request for the assumption of the administration and permitting of Section 404 of the CWA.

**Action Area** means all areas to be affected directly or indirectly by the Federal Action, and not merely the immediate area involved in the Action (50 CFR § 402.02).

**Activity** for the purposes of the State 404 program only, means "discharge of dredged material" and/or "discharge of fill material" as those terms are defined in 40 CFR § 232.2 (Rule 62-331.030, F.A.C.).

**Administratively complete** means an application that contains all the items required under the public noticing requirements of Rule 62-331.060, F.A.C.

**Affect/effect** as a verb, to "affect" means is to bring about a change. The "effect" (usually a noun) is the result of a change. "Affect" appears in section 7 of the ESA (16 USC § 153) and "Effect" appears throughout ESA section 7 regulations (50 CFR § 402 *et seq*) and guidance documents (ESA section 7 Consultation Handbook).

**Assumed waters** (or **State-assumed waters)** State-assumed waters are all waters of the United States that are not retained waters (as identified in Chapter 62-331, F.A.C., and State 404 Handbook).

**Avoidance** means mitigating a resource impact by selecting the least-damaging project type, spatial location and extent compatible with achieving the purpose of the project. Avoidance is achieved through an analysis of appropriate and practicable alternatives and a consideration of impact footprint.

**Assumption** means a state has requested and the EPA has approved a state dredge and fill permitting program to be administered in lieu of, Section 404 program administered by the USACE for discharges into assumed waters.

**Best available data** to assure the quality of the science used to establish official positions, decisions, and actions taken by the State of Florida during the review of State 404 program permit applications, the quality of the biological, ecological, technical, and other relevant information that is used will only be that which is reliable, credible and represents the best data available. Under statute 7(a)(2), the USFWS is required to use the best available science. In the context of the ESA, the USFWS and NMFS has a policy statement that further describes best available data (see Notice of Interagency Cooperative Policy on Information Standards Under the Endangered Species Act 1994).

**Biological opinion** means a document which includes 1) the opinion of the Fish and Wildlife Service or the National Marine Fisheries Service as to whether or not a federal action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of designated critical habitat; 2) a summary of information on which the opinion is based; and 3) a detailed discussion of the effects of the action on listed species or designated critical habitat (50 CFR § 402.02, 50 CFR § 402.14(h)).

**Candidate species** means a plant and animal taxa considered for possible addition to the list of Endangered and Threatened Species. These are taxa for which USFWS as on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently



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precluded by higher priority listing actions (50 CFR § 424.02, ESA section 7 Consultation Handbook).

**Conservation** means to use all methods and procedures which are necessary to bring any [ HYPERLINK "https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=16-USC-1967162425-1049675790&term_occur=999&term_src=title:16:chapter:35:section:1532" ] or[ HYPERLINK "https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=16-USC-965320510-1819788802&term_occur=999&term_src=title:16:chapter:35:section:1532" ]to the point at which protective measures are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking (ESA 16 U.S.C. § 1532(3)).

**Critical habitat** for a threatened or endangered species means 1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 1533, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and 2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 1533, upon a determination by the Secretary of the Interior or the Secretary of Commerce that such areas are essential for the conservation of the species (ESA 16 U.S.C. § 1532(5)).

**Cumulative effects** are those effects of future State or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the action subject to coordination. For the purposes of this document, this definition only applies to ESA section 7 analyses (50 CFR § 402.02).

**Destruction or adverse modification of critical habitat** means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species (50 CFR § 402.02).

**Effects of the action** are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR § 402.02).

**Endangered species** means any species which is in danger of extinction throughout all or a significant portion of its range other than a species of Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of the ESA would present an overwhelming and overriding risk to man (ESA 16 U.S.C. § 1532(6)).

**Endangered or threatened species** in this document refers to those animal species that are identified as federally endangered or threatened by the USFWS or NMFS, and those animal species that are identified as State-listed by the FWC; it also means plant species identified as endangered or threatened by the USFWS or by the Florida Department of Agriculture and Consumer Services when such plants are located in a wetland or other surface water (Rule 62-330.021, F.A.C.).

**Environmental baseline** refers to the condition of the listed species or its designated critical habitat in the Action Area, without the consequences to the listed species or designated critical habitat caused by the proposed Action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early ESA section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR § 402.02).

**ESA-considered** refers to species that are either listed, proposed, petitioned, or considered candidates for listing under the Endangered Species Act.

**Fish or wildlife** means any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, nonmigratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof. (ESA 16 U.S.C. § 1532(8)).

**Incidental take** refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by a federal agency or applicant (50 CFR § 402.02).

**Jeopardize the continued existence of** means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 404.02).

**Listed species** refers to any species of fish, wildlife or plant which has been determined to be endangered or threatened under section 4 of the ESA or under Chapter 68A-27, F.A.C.

**May affect** is the appropriate conclusion made by a federal action agency in the context of the ESA or by the State in the context of the State 404 program when a proposed activity is reasonably certain to affect any ESA-listed listed species or designated critical habitat.

**Minimization** means mitigating an aquatic resource impact by managing the severity of a project's impact on resources at the selected site. Minimization is achieved through the incorporation of appropriate and practicable design and risk avoidance measures.

**No effect** is the appropriate conclusion when the action agency determines its action will not affect a listed species or designated critical habitat per ESA.

**Practicable** means available and capable of being done after taking into consideration cost, existing technology, and logistics considering overall project purposes (Rule 62-331.030, F.A.C.).

**Programmatic consultation** (under ESA implementing regulations 50 CFR § 402.02) is a consultation addressing an agency's multiple actions on a program, region, or other basis. Programmatic consultations allow the USFWS to consult on the effects of programmatic actions such as:

(1) Multiple similar, frequently occurring, or routine actions expected to be implemented in particular geographic areas; and
(2) A proposed program, plan, policy, or regulation providing a framework for future proposed actions.

**Project area** or **Project site** means that a portion of the State-assumed waters where specific dredging or filling activities are permitted and consist of a bottom surface area, any overlying volume of water, and any mixing zones. In the case of wetlands on which surface water is not present, the project area consists of the wetland surface area (Rule 62-331.030, F.A.C.). In the context of the review of State 404 permit applications for endangered and threatened species, also includes those areas outside the immediate area of activity which may affect listed species using those areas.

**Protection measures** means those avoidance and minimization measures to address adverse impacts to listed species and critical habitat under the State 404 program. Protection measures recommended by the USFWS are incorporated as conditions to the State 404 permit. Examples of protection measures include, but are not limited to, project design changes and operational restrictions for the protection of species (i.e., seasonal restrictions for construction work). (as used in Chapter 62-331, F.A.C.).

**Proposed species** any species of fish, wildlife or plant that is proposed in the Federal Register to be listed under section 4 of the Endangered Species Act (50 CFR § 402.02).

**Reasonable potential to affect** for the purposes of this document and for the State of Florida's 404 program, refers to a project that has a reasonable potential for affecting endangered or threatened species (40 CFR § 233.51(b)(2)) where it has been determined during the species coordination process that the project may affect federally listed species or their critical habitat.

**Retained Waters** means those waters which are presently used, or are susceptible to use in their natural condition or by reasonable improvement as a means to transport interstate or foreign commerce shoreward to their ordinary high water mark, including all waters which are subject to the ebb and flow of the tide shoreward to their mean high water mark, including wetlands adjacent thereto. The USACE will retain responsibility for permitting for the discharge of dredged or fill material in those waters identified in the Retained Waters List (Appendix A of State 404 Handbook), as well as all waters subject to the ebb and flow of the tide shoreward to their mean high water mark that are not specifically listed in the Retained Waters List, including wetlands adjacent thereto landward to the administrative boundary. The administrative boundary demarcating the adjacent wetlands over which jurisdiction is retained by the USACE is a 300-foot guide line established from the ordinary high water mark or mean high tide line of the retained water. In the case of a project that involves discharges of dredged or fill material both waterward and landward of the 300-foot guide line, the USACE will retain jurisdiction to the landward boundary of the project for the purposes of that project only (Rule 62-331.030, F.A.C.).

**Section 7 consultation** refers to section 7(a)(2) of the ESA that requires federal agencies to use their authorities to further the conservation of listed species, including the requirement to consult with the USFWS to ensure that they are not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.

**Section 404** a section of the federal CWA that establishes a program to regulate the discharge of dredged and fill material into the WOTUS, including wetlands.

**Services(s)** describes the USFWS and/or the NMFS.

**Species coordination** is a process to address potential adverse effects to threatened or endangered species, ensuring compliance with Florida Chapter 62-331, F.A.C., and the ESA. This process includes coordination between the FDEP, FWC, and the USFWS during the review of submitted State 404 permit applications. Recommendations for avoiding and minimizing the effects of a project to federally listed species and their critical habitat is provided by technical assistance from the USFWS.

**Species coordination lead or State species lead** is the designated FDEP or FWC staff person who coordinates with the USFWS and is the point of contact for all ESA species issues during the review of a specific State 404 application. FDEP and FWC staff will decide on a project by project basis which agency will act as the State's species lead on the project when coordinating with the USFWS. Factors that will be considered in this decision include the complexity of the coordination and relative workloads.

**State 404 program** is the FDEP permitting program (Chapter 62-331, F.A.C.) that fulfills the requirements of the Section 404 of the CWA in a similar manner as the USACE 404 program, post-assumption, if approved by the EPA.

**Stream** means any river, creek, slough, or natural watercourse in which water usually flows in a defined bed or channel. It is not essential that the flowing be uniform or uninterrupted. The fact that some part of the bed or channel shall have been dredged or improved does not prevent the watercourse from being a stream (§ 373.019(20), F.S.).

**Stressors** are any physical, chemical, or biological alteration of resources (i.e., increase, decrease, or introduction) that can induce an adverse organism response. Stressors can act directly on an individual, or indirectly through impacts to resources.

**Surface water** means water upon the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs shall be classified as surface water when it exits from the spring onto the earth's surface (§ 373.019(21), F.S.).

**Take** means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. (ESA 16 U.S.C. § 1532(19)) **Harass** is further defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include but are not limited to, breeding, feeding, or sheltering. **Harm** is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (ESA implementing regulations 50 CFR § 17.3).

**Technical assistance** refers to a coordination process described in the ESA section 7 Consultation Handbook (1998) that outlines a variety of ways in which the USFWS provide expertise and guidance on an individual project basis. In the context of State 404 permit application reviews, the USFWS assists the State of Florida by providing information, reviews, and recommendations on effect determinations and protective measures to ensure compliance with the ESA and Chapter 62-331, F.A.C.

**Technically complete** means a State 404 application where each application item is adequate to allow the FDEP to determine if the proposed project complies with Chapter 62-331, F.A.C. If a project requires both an ERP and a State 404 program authorization, the State 404 program review shall not be considered complete until the ERP review is complete. This is to satisfy the requirement for reasonable assurance that State water quality standards and coastal zone consistency requirements will be met (Rule 62-331.030, F.A.C.).

**Threatened species** means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (ESA 16 U.S.C.§ 1532(20)).

**Uplands** means areas that are not wetlands or other surface waters, as delineated pursuant to Rules 62-340.100 through 62-340.550, F.A.C., as ratified by § 373.4211, F.S.

**USACE 404 program** refers to the administration and permitting responsibilities by the USACE for Section 404 of the CWA, prior to any assumption by the State of Florida.

**Waters of the State** are as defined in § 403.031(13), F.S.

**Waters of the United States (WOTUS)** means those waters defined in the regulations under 40 CFR 230(s).

**Wetland** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas ( 40 CFR § 232.2).

**Works** means all artificial structures, including, but not limited to, ditches, canals, conduits, channels, culverts, pipes, and other construction that connects to, draws water from, drains water into, or is placed in or across the waters in the State [§ 373.403(5), F.S.] and includes all types of dredging and filling to create, remove, or locate structures in, on, or over wetlands or other surface waters (Rule 62-330.021, F.A.C.).

# 1. Purpose of Biological Assessment

The purpose of this BA is to evaluate the effects of the EPA potential approval of the State of Florida's request for Assumption and administration of Section 404 of the CWA. The BA will consider whether EPA's approval of the Assumption request (Action) is likely to adversely affect species listed, or proposed to be listed under the Endangered Species Act (ESA), as well as designated critical habitat and proposed critical habitat for those species (50 Code of Federal Regulations [CFR] § 402.12). EPA is the federal agency charged with approving or denying the state's request, pursuant to the CWA implementing regulations (40 CFR § 233 *et seq*). The FDEP is the state agency requesting administration of Section 404 of the CWA (Assumption).

Florida's request to assume the administration of Section 404 of the CWA only includes those WOTUS not retained by the USACE, referred to as assumed waters or State-assumed waters. The USACE will retain permitting responsibility for the discharges of dredged or fill material into those waters defined as "Retained Waters". The definition of retained waters can be found in the State 404 Handbook in Chapter 2.0 and the process to determine whether a project is located in retained, or assumed waters, is described in Chapter 4.1 of the State 404 Handbook. In addition, Appendix A of the Handbook includes the Retained Waters List maintained by the USACE.

## 1.1 Objectives of Action

By assuming permitting responsibilities under Section 404 of the CWA, the State of Florida would be able to have an active, major role in the implementation of the CWA within its jurisdiction. This would allow the State to more effectively and efficiently address regional issues by permitting both State and Federal (assumed waters) discharges of dredged or fill material through the Florida Environmental Resource Permitting program (ERP) per Chapter 62-330, F.A.C. and State 404 program per Chapter 62-331, F.A.C. authorizations. The ability to review these two regulatory requirements by the State, at the same time, is expected to provide consistency, certainty, and timeliness to the regulated community.

For Florida to assume administration of Section 404 of the CWA, pursuant to the provisions of 40 CFR §233.10, the State must submit an application for Assumption package to the EPA Region IV Administrator:

1. Letter from the Governor of Florida requesting program approval;
2. Complete program description as set forth in 40 CFR § 233.11;
3. Attorney General's statement, as set forth in 40 CFR § 233.12;
4. Memorandum of Agreement (MOA) with the EPA Regional Administrator, as set forth in Section 40 CFR § 233.13;
5. MOA with the Secretary of the Army, as set forth in 40 CFR § 233.14; and
6. Copies of all applicable state statutes and regulations, including those governing applicable state administrative procedures.

The EPA has stated that it will voluntarily engage in consultation with the United State Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) under section 7 of the ESA in their letter dated December 15, 2019 to FDEP. This allows FDEP to act as a non-federal representative to develop this



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BA to assist in EPA's review of potential impacts to ESA-listed species. If approved, the State's Assumption of the dredge and fill permitting program under Section 404 of the CWA for waters assumable by the State would be implemented by processes and procedures described in state regulations (Chapters 62-330, and 62-331, Florida Administrative Code [F.A.C.]), Memorandums of Agreement with EPA and the United States Army Corps of Engineers (USACE), and a Memorandum of Understanding with the Florida Fish and Wildlife Conservation Commission (FWC) and the USFWS. Should EPA request formal consultation with USFWS at the time of their review of whether to approve Assumption of the State 404 program, USFWS may issue a programmatic biological opinion (Program assumption BiOp). The opinion may include conditions that guide implementation of the State 404 program. If the USFWS determines that the Action is not likely to jeopardize the continued existence of ESA-listed species and is not likely to destroy or adversely modify designated critical habitat, the Program assumption BiOp may also include an incidental take statement (ITS) with reasonable and prudent measures and terms and conditions that must be complied with in the implementation of the State 404 program, which would trigger a section 7 consultation between USACE and USFWS and NMFS

*The Programmatic Biological Assessment*

In accordance with section 7 regulations, this BA only evaluates effects to ESA-listed species and those species proposed to be listed and their critical habitat or proposed critical habitat. For the sake of clarity in understanding the State's implementation of the State 404 program and the ERP program, the State 404 program would address species that may not be listed under the ESA, but are protected under other federal or state laws. Examples of these types of laws include the Bald and Golden Eagle Protection Act (16 USC § 668 et seq.) and the Migratory Bird Treaty Act of 1918 (16 USC §§ 703-712 (§ 709 omitted).

Also ESA proposed, candidate, and petitioned plant and animal species with ranges within Florida are discussed in this BA, to provide a thorough review of Florida's potentially at-risk species, and because the lists of species that are listed as threatenedmay be modified to include some or all of these petitioned species, depending on the outcome of the status review. This BA analyzes a total of 235 plant and animal species in the State of Florida that are federally listed as endangered (95), threatened (44), or is ESA-considered (96). The effects of the potential approval by EPA for the State of Florida assuming Section 404 of the CWA on listed species is discussed in present time, and are estimated for the future. All species that are currently listed, proposed to be listed or that might be listed in the future are discussed, with evaluations of effects on respective guilds. This review helps evaluate the effects of the State 404 program on any species that are currently listed or those we are aware of that may become listed in the next 10 to 20 years.

Because of the statewide nature of this request, the numerous covered species and diverse habitats, as well as lack of knowledge with respect to where and what type of future permits may be requested, a meaningful site-specific and species-specific analysis is not possible. Since the State 404 program is implemented through future State-issued 404 permit actions, a programmatic BA is appropriate to describe the regulatory process by which the State of Florida will make determinations on the issuance of State 404 permits. The BA will address how that subsequent process will consider effects to listed endangered and threatened species, or species proposed to be listed so that the effects of this Action may be analyzed.

This BA and any future Program assumption BiOp will address future impacts and effects programmatically, through assessing the regulatory process by which the State of Florida will issue Section 404 permits, and by establishing a technical assistance process with the USFWS for species coordination. More specifically, the components of State 404 program establish the process and responsibilities for FDEP to follow to effectively

implement the State 404 program. This programmatic consultation would examine whether and to what degree EPA's review and approval of the State 404 program ensures that implementation of the program is not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of critical habitat.

As recently recognized by the USFWS, "various forms of programmatic consultations have been successfully implemented for many years now" (84 CFR 44996). To help guide development of a biological assessment, Florida considered prior examples of programmatic consultation that involved rules applicable to large areas that also involved state-issued permits. For example, in 2013, EPA developed a programmatic biological evaluation for a rulemaking under Section 316(b) of the CWA that revised requirements for Cooling Water Intake Structures (CWIS) at existing facilities. This proposed rule change, called the 316(b) rule, governs permits issued by states, so it was national in scope and covered a large number (312) of ESA-listed species. In 2014, the USFWS and NMFS responded with a programmatic Biological Opinion that the action was not likely to jeopardize the continued existence of ESA-listed species, and was not likely to destroy or adversely modify designated critical habitat, and included an ITS. EPA issued the final rule in 2014.

The 316(b) Rule and the Biological Opinion were challenged in the United States Court of Appeals for the Second Circuit (*Cooling Water Intake Structure Coal. v. EPA*, 905 F.3d 49 (2d Cir. 2018). The Court rejected the petitioner's challenges, most of which it deemed challenges to the Biological Opinion's "programmatic" approach, and upheld the rule and the Biological Opinion. The petitioners also alleged that the Services failed to comply with the statutory requirements for an ITS. However, the Court found that given their commitment to the technical assistance process, the agencies' justification for not immediately quantifying take was adequate. Upon implementation of the rule, any potential incidental take would be monitored through the permitting process. The Court also found that the ITS's reasonable and prudent measure specifying that EPA exercise its oversight authority in connection with the technical assistance process set forth in the rule to address impacts on listed species, was adequate.

This BA adopts a similar approach. However, post-assumption implementation in the case of an Assumption under CWA Section 404 is also guided by regulations found at 40 CFR § 233, which contain specific requirements regarding the issuance of permits by a State 404 program. The State of Florida's 404 program (Chapter 62-331, F.A.C.) has a structure and technical assistance process that requires a review of species listed by the ESA at the time future permit applications are received. This approach ensures that if a new species is listed or a listed species' status changes after the EPA's review of this BA and application Assumption package, the effects of any State 404 permit on the new species or its status change would be reviewed by USFWS. If the State 404 program's processes are proposed to be changed significantly in the future, those proposed changes would be submitted to EPA for review before implementation and may trigger reinitiation of consultation with USFWS.

## 1.2 The History of Florida's Request for Assumption

On March 23, 2018, the Florida Governor signed into law Rule 2018-88, Laws of Florida, granting FDEP with the power and authority to adopt rules to assume and implement the Section 404 dredge and fill program (creating § 373.4146, F.S.). Since that time, FDEP has drafted Chapter 62-331, F.A.C. to implement the State 404 program, and drafted Memorandums of Agreement with the EPA and the USACE, as required by 40 CFR § 233.13. In addition, a Memorandum of Understanding has been drafted between FDEP, FWC and USFWS to better facilitate post-assumption implementation



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On July 17, 2019, the FDEP sent a request to EPA that sought designation, pursuant to 50 CFR §402.08, to serve as a non-federal representative to prepare the subject BA for possible ESA section 7 consultation. The EPA designated FDEP as the non-federal representative to prepare this BA in a letter dated December 12, 2019, consistent with 50 CFR § 402.08. This designation allowed FDEP to consult informally with the USFWS and NMFS, to coordinate on the list of species that may be affected and to coordinate on potential processes for the review of State 404 permits.

FDEP requested input on a draft species list for Florida's application package for Assumption from the USFWS and the NMFS on November 22, 2019. On April 15, 2020, NMFS responded to FDEP with the conclusion that ESA-listed species under NMFS jurisdiction do not occur in waters that are assumable by the state. Based on their review, they stated that where there is shared jurisdiction for the Gulf Sturgeon between NMFS and USFWS, and the USFWS is responsible for consultations regarding sturgeon and critical habitat in riverine habitat units. NMFS further states that the riverine critical habitat units and river areas where Gulf Sturgeon are known to occur are all listed by the USACE as retained waters. Based on their determination, this BA makes a "no effect" determination for NMFS jurisdictional species.

A brief sequence of recent events and actions by the State of Florida pertaining to the Assumption are as follows:

- On March 23, 2018, the Governor signed into law Rule 2018-88, Laws of Florida, which created § 373.4146, F.S., granting FDEP with the power and authority to adopt rules to assume and implement the Section 404 dredge and fill program.
- In 2018 FDEP began work with both EPA and the USACE to draft separate memorandums of agreement that describe the commitments and responsibilities of each agency, should the Assumption be approved by the EPA. FDEP also began assembly of other required components that will constitute a complete Assumption request package per 40 CFR § 233.10-14(b).
- In May 2018, FDEP published a Notice of Rule Development to implement the State 404 program and held three rulemaking workshops to collect public comment on the draft rule, Chapter 62-331, F.A.C. The workshops were held on May 5th, May 31st and June 1st, 2018. This rule has been created to implement the State 404 program and to include federal requirements that are not currently covered under the ERP program.
- On July 17, 2019, the FDEP sent a request to EPA that sought designation, pursuant to 50 CFR § 402.08, to serve as a non-federal representative for ESA section 7 consultation to prepare the subject BA.
- On September 18, 2019, EPA, FDEP, United States Department of Interior, USFWS, and USACE members attended a meeting to discuss Florida's proposal to use programmatic consultation for ESA purposes under the Section 404 Assumption.
- On November 22, 2019, FDEP sent a request to USFWS and NMFS to review a preliminary list of affected species for the BA.
- On December 12, 2019, the FDEP Secretary received a response from the EPA Region IV Administrator approving the requested non-federal representative designation, allowing FDEP to move forward with the development of this BA. The letter indicated that at the request of FDEP, EPA would voluntarily engage in consultation with the Services on approving Florida's program.

- In February 2020, FDEP published a Notice of Proposed Rule to implement the State 404 program and in April, held five rulemaking hearings to collect public comment on the draft rule, Chapter 62-331, F.A.C. The hearings occurred on April 2nd, April 6th, April 10th, April 24th, and April 27th.
- In February 2020, FDEP, FWC and USFWS began work to draft a Memorandum of Understanding (MOU) to describe commitments, roles and responsibilities in the State 404 program's species coordination process, should the Assumption be approved by the EPA.
- Additional public hearings were held in March and April 2020 regarding rulemaking for Chapter 62-331, F.A.C.
- On April 15, 2020, NMFS responded to FDEP's November 22, 2019 letter with the conclusion that ESA-Listed species under NMFS' jurisdiction do not occur in waters that are assumable by the State.
- On June 8th, 2020, the Final Notice of Proposed Rule Change for Chapter 62-331, F.A.C. was published.

## 1.3 Organization of the Document

This BA is organized as follows:

- **Chapter 1** provides an overview of the objectives of the Action, whereby the State of Florida would assume the administration of Section 404 of the CWA in those waters not retained by the USACE and offers a history (timeline) of actions leading up to FDEP's request for Assumption.
- **Chapter 2** provides descriptions and details of the request for Assumption and describes the Action Area. It also identifies the ecosystems/habitats evaluated in the remainder of the document.
- **Chapter 3** identifies ESA-listed species evaluated in the remainder of the document and describes sources of information for the ESA-listed, NMFS-listed, State-listed species, and critical habitat within the Action Area.
- **Chapter 4** develops the baseline environmental conditions prior to the Action. Further, it provides a brief history of the regulatory framework prior to (and leading up to) the Action.
- **Chapter 5** analyzes the potential effects of the Action on ESA-listed species and designated critical habitat.
- **Chapter 6** considers the cumulative effect of non-Federal actions that are reasonably certain to occur within the Action Area in the foreseeable future.
- **Chapter 7** discusses species coordination, avoidance and minimization measures, obtaining USFWS technical assistance, and discusses various tools and guidelines for species review and decision making.
- **Chapter 8** provides an effects determination for ESA-listed species and their critical habitat and concluding remarks regarding subsequent actions that will be required.
- **Chapter 9** provides a listing of the references/citations utilized to prepare this document.

The April 15, 2020 letter from NMFS to FDEP stating that it does not have assets (ESA-listed species) that may be affected by this Action is provided in Appendix A. Species accounts on those ESA-listed, candidate, or under review species in Florida potentially affected by the Section 404 Assumption are contained in

Appendix B. Additional information pertaining to the effects of the Action on ESA-listed species, map figures, and a list of dredge and fill activities as described in the USACE database are contained in Appendices C, D, and E respectively.

# 2. Action & Action Area

## 2.1 Description of Action

This BA analyzes the potential EPA Action; approval of Florida's Assumption for administration of Section 404 of the CWA in State-assumed waters. If the State of Florida's request for Assumption is approved, FDEP would assume regulatory responsibility over all dredging and filling activities in WOTUS not retained by USACE pursuant to 33 USC § 1344(g) (see Chapter 2.3, Description of Action Area). The subsequent issuance of State 404 permits and any ensuing adverse effects to ESA-listed species or critical habitat caused by permitted activities is an effect or consequence of EPA's approval of the State 404 program.

Per Section 404(g) of the CWA, 33 USC. § 1344(g), a state, with approval from the EPA, may be authorized to administer its own permit program for the discharge of dredge or fill material into certain WOTUS in lieu of the permitting program implemented by the USACE. The EPA has promulgated regulations at 40 CFR § 233 outlining, among other things, its requirements for approving a State 404 program.

The Secretary of FDEP is the State official charged with administering the State 404 program when the program is approved in accordance with 40 CFR § 233 and has authority to issue permits pursuant to Part IV of § 373, F.S. In accordance with § 373.4146, F.S., FDEP has the power and authority to issue permits for regulated activities conducted in State assumed waters.

The FDEP, the water management districts (WMDs) and certain local governments delegated by FDEP jointly implement Florida's Environmental Resource Permitting (ERP) program. The agencies' responsibilities are divided according to the Operating and Delegation Agreement (operating agreements) and the geographic regions of the WMDs. At this time, the administration and implementation of the State 404 program is limited to the FDEP. It is anticipated that the State 404 program may be delegated to the WMDs by FDEP in the future. If this is considered, approval from the EPA will be required prior to implementation. Upon approval, these agencies' will be provided training and will be required to follow the same procedures outlined for the State 404 program.

If approved, Florida's State 404 program will regulate discharges of dredge or fill material in those areas where USACE does not retain jurisdiction (assumed waters). EPA's review of the proposed State 404 program includes Chapter 62-331, F.A.C., which will include requirements of federal law that are not addressed in the existing state regulations for dredge and fill permitting (such as noticing provisions, alternatives analysis, and the federal mitigation hierarchy, etc.). The State 404 rule, Chapter 62-331, F.A.C., also includes definitions, procedures for review and agency action on exemption requests, processes for Individual Permits, public notice requirements, procedures regarding mitigation banking, and procedures and descriptions for General Permits created to correspond to the federal Nationwide Permits and appropriate regional general permits as granted by the USACE. EPA's review of this program will also include the State 404 program's Handbook (State 404 Handbook) and new forms, incorporated by rule reference.



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## 2.2 Types of Future Activities to be Authorized by Florida's 404 Program

This chapter discusses the different types of future proposed activities that may be issued by the State of Florida as State 404 program permits. A list of the types of future activities that may be authorized under the Section 404 Assumption is included below. A more expansive list is available in Appendix E, which was derived from the USACE project information database. All the activities in the Appendix E list, however, may not be applicable to the State 404 program. Dredging and filling activities include but are not limited to:

- Discharge of fill material
- Dredging
- Ecological restoration
- Discharge of dredged material
- Excavation associated with the discharge of dredged or fill material
- Other (Aquaculture, Work, Aerial or Submarine cable crossings)
- Conversion of waters type (forested wetland to emergent wetland, stream to lake)
- Commercial developments
- Residential developments
- Single-family residence
- Agriculture
- Utilities
- Roadways
- Airports
- Marinas
- Docks
- Piers
- Boat Ramps
- Dams
- Levees
- Mining activities
- Mitigation
- Restoration

*Proposed Activities Authorized or Exempt Under Program*

Types of activities the State 404 program will regulate include all dredge and fill activities within the State assumed waters. Construction activities, including excavation and filling of wetlands, may impact ESA-listed species and habitat occurring in those areas. Other effects associated with dredge and fill construction include, but are not limited to, turbidity, decreased water quality, noise, pollution (including exhaust and new sources of light), short- or long-term hydrodynamic changes in the area and its surroundings, and changes in wet and dry periodicity. Permitted projects may have adverse impacts, and those impacts will be taken into consideration during the permitting process, with protection measures identified and implemented to avoid or reduce those impacts. The proposed activities and exemptions below are excerpts from 40 CFR § 232 and select definitions from 40 CFR § 232.2, also summarized in Appendix B of the State 404 Handbook:

*Discharge of dredged material.*

(1) Except as provided below in paragraph (2), the term "discharge of dredged material" means any addition of dredged material into, including redeposit of dredged material other than incidental fallback within, the waters of the United States. The term includes, but is not limited to, the following:
   (i) The addition of dredged material to a specified discharge site located in waters of the United States;

(ii) The runoff or overflow, associated with a dredging operation, from a contained land or water disposal area; and

(iii) Any addition, including redeposit other than incidental fallback, of dredged material, including excavated material, into waters of the United States which is incidental to any activity, including mechanized land clearing, ditching, channelization, or other excavation.

(2) The term discharge of dredged material does not include the following:

(i) Discharges of pollutants into waters of the United States resulting from the onshore subsequent processing of dredged material that is extracted for any commercial use (other than fill). These discharges are subject to Section 402 of the Clean Water Act even though the extraction and deposit of such material may require a permit from the Corps or applicable state.

(ii) Activities that involve only the cutting or removing of vegetation above the ground (e.g., mowing, rotary cutting, and chain sawing) where the activity neither substantially disturbs the root system nor involves mechanized pushing, dragging, or other similar activities that redeposit excavated soil material.

(iii) Incidental fallback.

(3) Section 404 authorization is not required for the following:

(i) Any incidental addition, including redeposit, of dredged material associated with any activity that does not have or would not have the effect of destroying or degrading an area of waters of the U.S. as defined in paragraphs (4) and (5) of this definition; however, this exception does not apply to any person preparing to undertake mechanized land clearing, ditching, channelization and other excavation activity in a water of the United States, which would result in a redeposit of dredged material, unless the person demonstrates to the satisfaction of the Corps, or EPA as appropriate, prior to commencing the activity involving the discharge, that the activity would not have the effect of destroying or degrading any area of waters of the United States, as defined in paragraphs (4) and (5) of this definition. The person proposing to undertake mechanized land clearing, ditching, channelization or other excavation activity bears the burden of demonstrating that such activity would not destroy or degrade any area of waters of the United States.

(ii) Incidental movement of dredged material occurring during normal dredging operations, defined as dredging for navigation in navigable waters of the United States, as that term is defined in 33 CFR part 329, with proper authorization from the Congress or the Corps pursuant to 33 CFR part 322; however, this exception is not applicable to dredging activities in wetlands, as that term is defined at §232.2(r) of this chapter.

(iii) Certain discharges, such as those associated with normal farming, silviculture, and ranching activities, are not prohibited by or otherwise subject to regulation under Section 404. See 40 CFR 232.3 for discharges that do not require permits.

(4) For purposes of this section, an activity associated with a discharge of dredged material destroys an area of waters of the United States if it alters the area in such a way that it would no longer be a water of the United States.

Note: Unauthorized discharges into waters of the United States do not eliminate Clean Water Act jurisdiction, even where such unauthorized discharges have the effect of destroying waters of the United States.

(5) For purposes of this section, an activity associated with a discharge of dredged material degrades an area of waters of the United States if it has more than a de minimis (i.e., inconsequential) effect on the area by causing an identifiable individual or cumulative adverse effect on any aquatic function.

*Discharge of fill material.*

(1) The term "discharge of fill material" means the addition of fill material into waters of the United States. The term generally includes, without limitation, the following activities: Placement of fill that is necessary for the construction of any structure or infrastructure in a water of the United States; the building of any structure, infrastructure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, or other uses; causeways or road fills; dams and dikes; artificial islands; property protection and/or reclamation devices such as riprap, groins, seawalls, breakwaters, and revetments; beach nourishment; levees; fill for structures such as sewage treatment facilities, intake and outfall pipes associated with power plants and subaqueous utility lines; placement of fill material for construction or maintenance of any liner, berm, or other infrastructure associated with solid waste landfills; placement of overburden, slurry, or tailings or similar mining-related materials;" after the words "utility lines; and artificial reefs.

(2) In addition, placement of pilings in waters of the United States constitutes a discharge of fill material and requires a Section 404 permit when such placement has or would have the effect of a discharge of fill material. Examples of such activities that have the effect of a discharge of fill material include, but are not limited to, the following: Projects where the pilings are so closely spaced that sedimentation rates would be increased; projects in which the pilings themselves effectively would replace the bottom of a waterbody; projects involving the placement of pilings that would reduce the reach or impair the flow or circulation of waters of the United States; and projects involving the placement of pilings which would result in the adverse alteration or elimination of aquatic functions.

    (i) Placement of pilings in waters of the United States that does not have or would not have the effect of a discharge of fill material shall not require a Section 404 permit. Placement of pilings for linear projects, such as bridges, elevated walkways, and powerline structures, generally does not have the effect of a discharge of fill material. Furthermore, placement of pilings in waters of the United States for piers, wharves, and an individual house on stilts generally does not have the effect of a discharge of fill material. All pilings, however, placed in the navigable waters of the United States, as that term is defined in 33 CFR part 329, require authorization under section 10 of the Rivers and Harbors Act of 1899 (see 33 CFR part 322).

*40 CFR § 232.3 Activities not requiring permits.*

Except as specified in paragraphs (a) and (b) of this section, any discharge of dredged or fill material that may result from any of the activities described in paragraph (c) of this section is not prohibited by or otherwise subject to regulation under this part.

(a) If any discharge of dredged or fill material resulting from the activities listed in paragraph (c) of this section contains any toxic pollutant listed under section 307 of the Act, such discharge shall be subject to any

applicable toxic effluent standard or prohibition and shall require a Section 404 permit.

(b) Any discharge of dredged or fill material into waters of the United States incidental to any of the activities identified in paragraph (c) of this section must have a permit if it is part of an activity whose purpose is to convert an area of the waters of the United States into a use to which it was not previously subject, where the flow or circulation of waters of the United States may be impaired or the reach of such waters reduced. Where the proposed discharge will result in significant discernable alterations to flow or circulation, the presumption is that flow or circulation may be impaired by such alteration.

Note: For example, a permit will be required for the conversion of a cypress swamp to some other use or the conversion of a wetland from silvicultural to agricultural use when there is a discharge of dredged or fill material into waters of the United States in conjunction with construction of dikes, drainage ditches or other works or structures used to affect such conversion. A conversion of Section 404 wetland to a non-wetland is a change in use of an area of waters of the U.S. A discharge which elevates the bottom of waters of the United States without converting it to dry land does not thereby reduce the reach of, but may alter the flow or circulation of, waters of the United States.

(c) The following activities are exempt from Section 404 permit requirements, except as specified in paragraphs (a) and (b) of this section:

(1)(i) Normal farming, silviculture and ranching activities such as plowing, seeding, cultivating, minor drainage, and harvesting for the production of food, fiber, and forest products, or upland soil and water conservation practices, as defined in paragraph (d) of this section.

(ii) (A) To fall under this exemption, the activities specified in paragraph (c)(1) of this section must be part of an established (i.e., ongoing) farming, silviculture, or ranching operation, and must be in accordance with definitions in paragraph (d) of this section. Activities on areas lying fallow as part of a conventional rotational cycle are part of an established operation.

(B) Activities which bring an area into farming, silviculture or ranching use are not part of an established operation. An operation ceases to be established when the area in which it was conducted has been converted to another use or has lain idle so long that modifications to the hydrological regime are necessary to resume operation. If an activity takes place outside the waters of the United States, or if it does not involve a discharge, it does not need a Section 404 permit whether or not it was part of an established farming, silviculture or ranching operation.

(2) Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs in order to qualify for this exemption.

(3) Construction or maintenance of farm or stock ponds or irrigation ditches or the maintenance (but not construction) of drainage ditches. Discharge associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption.

(4) Construction of temporary sedimentation basins on a construction site which does not include placement of fill material into waters of the United States. The term "construction site" refers to any site involving the erection of buildings, roads, and other discrete structures and the installation of support facilities necessary for construction and utilization of such structures. The term also includes any other land areas which involve land-disturbing excavation activities, including quarrying or other mining activities, where an increase in the runoff of sediment is controlled through the use of temporary sedimentation basins.

(5) Any activity with respect to which a State has an approved program under section 208(b)(4) of the Act which meets the requirements of section 208(b)(4)(B) and (C).

(6) Construction or maintenance of farm roads, forest roads, or temporary roads for moving mining equipment, where such roads are constructed and maintained in accordance with best management practices (BMPs) to assure that flow and circulation patterns and chemical and biological characteristics of waters of the United States are not impaired, that the reach of the waters of the United States is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized. The BMPs which must be applied to satisfy this provision include the following baseline provisions:

(i) Permanent roads (for farming or forestry activities), temporary access roads (for mining, forestry, or farm purposes) and skid trails (for logging) in waters of the United States shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming, silvicultural or mining operations, and local topographic and climatic conditions;
(ii) All roads, temporary or permanent, shall be located sufficiently far from streams or other water bodies (except for portions of such roads which must cross water bodies) to minimize discharges of dredged or fill material into waters of the United States;
(iii) The road fill shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows;
(iv) The fill shall be properly stabilized and maintained to prevent erosion during and following construction;
(v) Discharges of dredged or fill material into waters of the United States to construct a road fill shall be made in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within the waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself;
(vi) In designing, constructing, and maintaining roads, vegetative disturbance in the waters of the United States shall be kept to a minimum;
(vii) The design, construction and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body;
(viii) Borrow material shall be taken from upland sources whenever feasible;

(ix) The discharge shall not take, or jeopardize the continued existence of, a threatened or endangered species as defined under the Endangered Species Act, or adversely modify or destroy the critical habitat of such species;
(x) Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practical alternatives exist;
(xi) The discharge shall not be located in the proximity of a public water supply intake;
(xii) The discharge shall not occur in areas of concentrated shellfish production;
(xiii) The discharge shall not occur in a component of the National Wild and Scenic Rivers System;
(xiv) The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts; and
(xv) All temporary fills shall be removed in their entirety and the area restored to its original elevation.

(d) For purpose of paragraph (c)(1) of this section, cultivating, harvesting, minor drainage, plowing, and seeding are defined as follows:

(1) Cultivating means physical methods of soil treatment employed within established farming, ranching and silviculture lands on farm, ranch, or forest crops to aid and improve their growth, quality, or yield.
(2) Harvesting means physical measures employed directly upon farm, forest, or ranch crops within established agricultural and silvicultural lands to bring about their removal from farm, forest, or ranch land, but does not include the construction of farm, forest, or ranch roads.
(3)(i) Minor drainage means:
(A) The discharge of dredged or fill material incidental to connecting upland drainage facilities to waters of the United States, adequate to effect the removal of excess soil moisture from upland croplands. Construction and maintenance of upland (dryland) facilities, such as ditching and tiling, incidental to the planting, cultivating, protecting, or harvesting of crops, involve no discharge of dredged or fill material into waters of the United States, and as such never require a Section 404 permit;
(B) The discharge of dredged or fill material for the purpose of installing ditching or other water control facilities incidental to planting, cultivating, protecting, or harvesting of rice, cranberries or other wetland crop species, where these activities and the discharge occur in waters of the United States which are in established use for such agricultural and silvicultural wetland crop production;
(C) The discharge of dredged or fill material for the purpose of manipulating the water levels of, or regulating the flow or distribution of water within, existing impoundments which have been constructed in accordance with applicable requirements of the Act, and which are in established use for the production or rice, cranberries, or other wetland crop species.
Note: The provisions of paragraphs (d)(3)(i) (B) and (C) of this section apply to areas that are in established use exclusively for wetland crop production as well as areas in established use for conventional wetland/non-wetland crop rotation (e.g., the rotations of rice and soybeans) where such rotation results in the cyclical or intermittent temporary dewatering of such areas.
(D) The discharge of dredged or fill material incidental to the emergency removal of sandbars, gravel bars, or other similar blockages which are formed during flood flows or other events, where such blockages close or constrict previously existing drainageways and, if not promptly removed, would result in damage to or loss of existing crops or would impair or prevent the plowing, seeding, harvesting or cultivating of crops on land in established use for crop production. Such

removal does not include enlarging or extending the dimensions of, or changing the bottom elevations of, the affected drainageway as it existed prior to the formation of the blockage. Removal must be accomplished within one year after such blockages are discovered in order to be eligible for exemption.

(ii) Minor drainage in waters of the United States is limited to drainage within areas that are part of an established farming or silviculture operation. It does not include drainage associated with the immediate or gradual conversion of a wetland to a non-wetland (e.g., wetland species to upland species not typically adequate to life in saturated soil conditions), or conversion from one wetland use to another (for example, silviculture to farming).

In addition, minor drainage does not include the construction of any canal, ditch, dike or other waterway or structure which drains or otherwise significantly modifies a stream, lake, swamp, bog or any other wetland or aquatic area constituting waters of the United States. Any discharge of dredged or fill material into the waters of the United States incidental to the construction of any such structure or waterway requires a permit.

(4) Plowing means all forms of primary tillage, including moldboard, chisel, or wide-blade plowing, discing, harrowing, and similar physical means used on farm, forest or ranch land for the breaking up, cutting, turning over, or stirring of soil to prepare it for the planting of crops. Plowing does not include the redistribution of soil, rock, sand, or other surficial materials in a manner which changes any area of the waters of the United States to dryland. For example, the redistribution of surface materials by blading, grading, or other means to fill in wetland areas is not plowing. Rock crushing activities which result in the loss of natural drainage characteristics, the reduction of water storage and recharge capabilities, or the overburden of natural water filtration capacities do not constitute plowing. Plowing, as described above, will never involve a discharge of dredged or fill material.

(5) Seeding means the sowing of seed and placement of seedlings to produce farm, ranch, or forest crops and includes the placement of soil beds for seeds or seedlings on established farm and forest lands.

(e) Federal projects which qualify under the criteria contained in Section 404(r) of the Act are exempt from Section 404 permit requirements but may be subject to other State or Federal requirements.

## 2.3 Description of Action Area

The Action Area is defined as "all areas to be affected directly or indirectly by the Federal Action and not merely the immediate area involved in the Action" (50 CFR § 402.02; and Subsection 62-331.010(2), F.A.C.). For the review of this Action, the Action Area encompasses the geographic extent of the FDEP Assumption of Section 404 permitting within the entire State of Florida. The Action Area consists of, and is limited to, the State-assumed waters and areas affected directly or indirectly by the Federal Action.

Florida's request to assume the administration of the CWA Section 404 permitting only includes those Waters of the United States (WOTUS) not retained by the USACE; referred to as assumed waters or State-assumed waters. The USACE will retain permitting responsibility for the discharge of dredged or fill material in those waters defined as "Retained Waters". This definition can be found in the State 404 Handbook in Chapter 2.0 and the process to determine whether a project is located in retained, or assumed waters, is described in

Chapter 4.1 of the 404 Handbook. In addition, Appendix A of the 404 Handbook includes the Retained Waters List maintained by the USACE. The administrative boundary demarcating the adjacent wetlands over which jurisdiction is retained by the USACE is a 300-foot guide line established from the ordinary high water mark or mean high tide line of the retained water. In the case of a project that involves discharges of dredged or fill material both waterward and landward of the 300-foot guide line, the USACE will retain jurisdiction to the landward boundary of the project for the purposes of that project only.

The USACE also retains permitting authority for projects within "Indian country" as that term is defined at 18 USC §1151 (provided below):

> "Except as otherwise provided in Sections 1154 and 1156 of this title, the term "Indian country," as used in this chapter, means
>
> a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation,
>
> b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and
>
> c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.
>
> A list of "Indian country" can be found online in the USACE Jacksonville District Regulatory Division Sourcebook.
>
> The boundary of a mitigation bank, excluding the service area, shall be considered the project boundary, even if only a portion of the bank requires a dredge and fill permit under Section 404 of the CWA."

Federal and state-approved dredge and fill activities may occur in isolation or adjacent to one another. In the case of a project that involves discharges of dredged or fill material both waterward and landward of the 300-foot guide line, the USACE will retain jurisdiction to the landward boundary of the project for the purposes of that project only (Figure 2-1). Projects that fall entirely outside of the 300-foot buffer of the retained waters will be permitted by the State 404 program (Project 3 in Figure 2-2). Linear projects that have some portion of dredge and fill activities in retained waters will be entirely authorized and permitted by the USACE, even if dredge and fill activities occur in wetlands landward of the 300-foot buffer (Figure 2-3).



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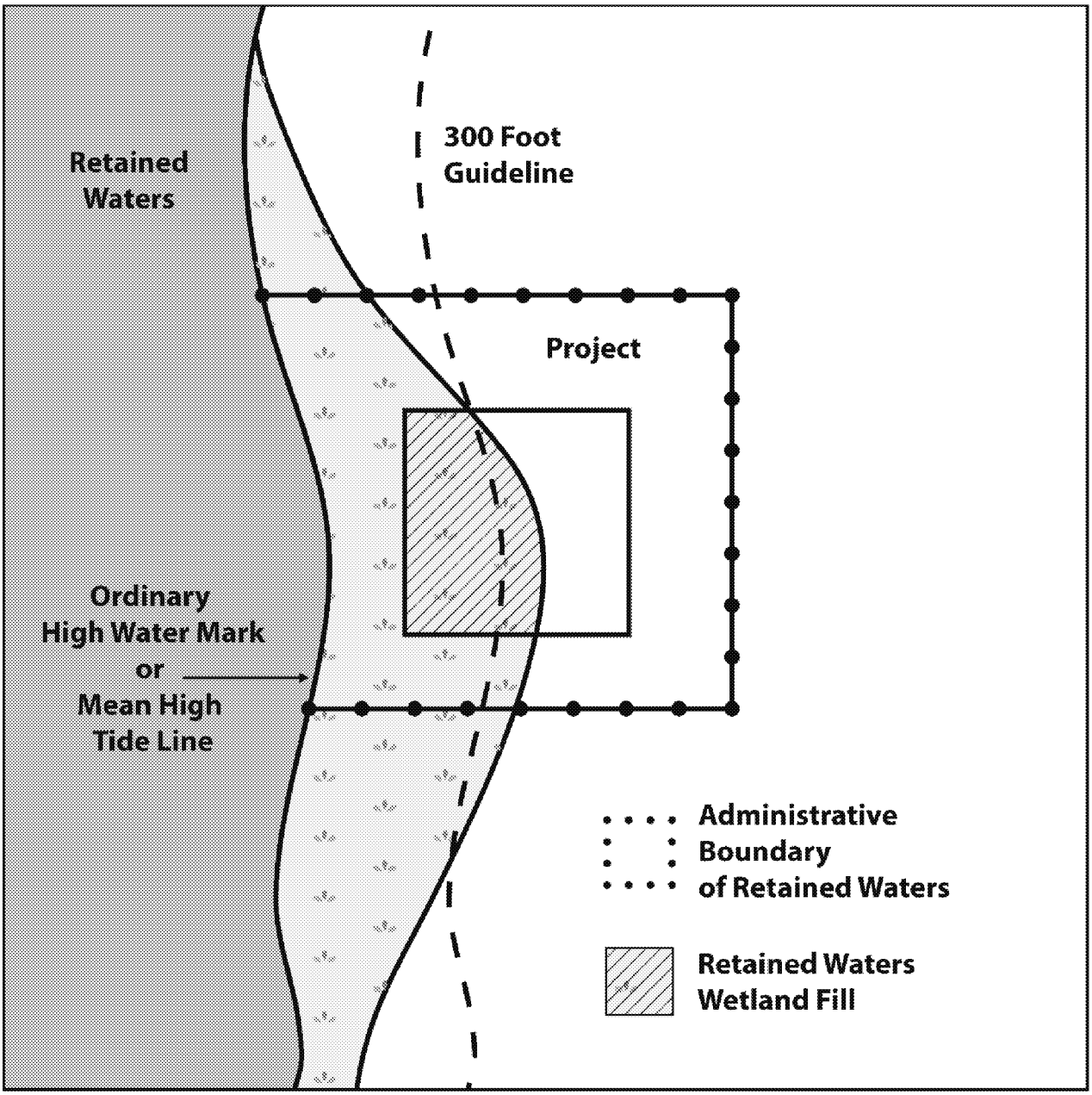


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Example of activities authorized by the USACE 404 program**



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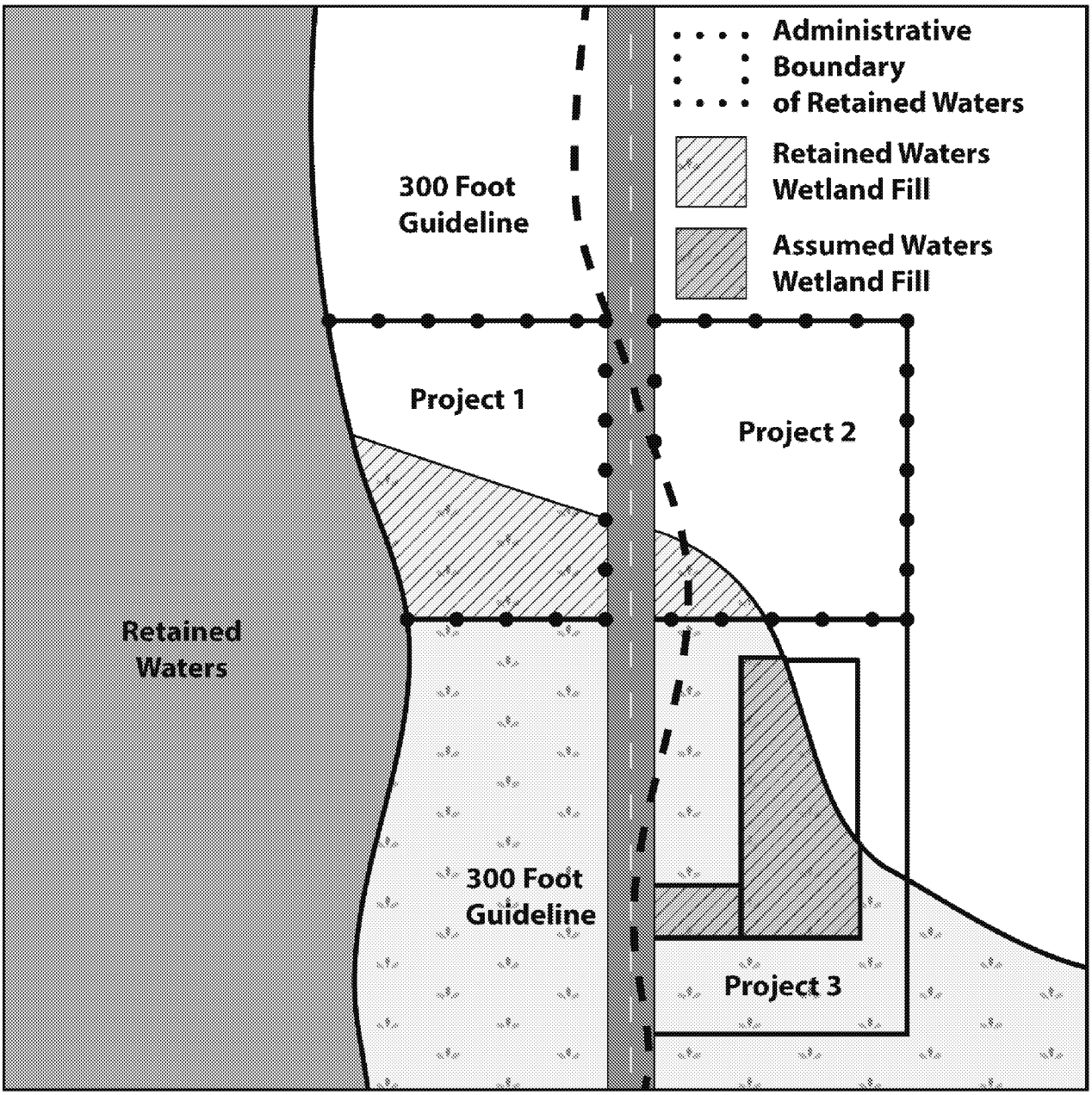


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Example of activities authorized by USACE and FDEP**

Projects 1, 2, and 3 show the difference between retained and assumed waters responsibilities. Project 3 would be authorized by FDEP.



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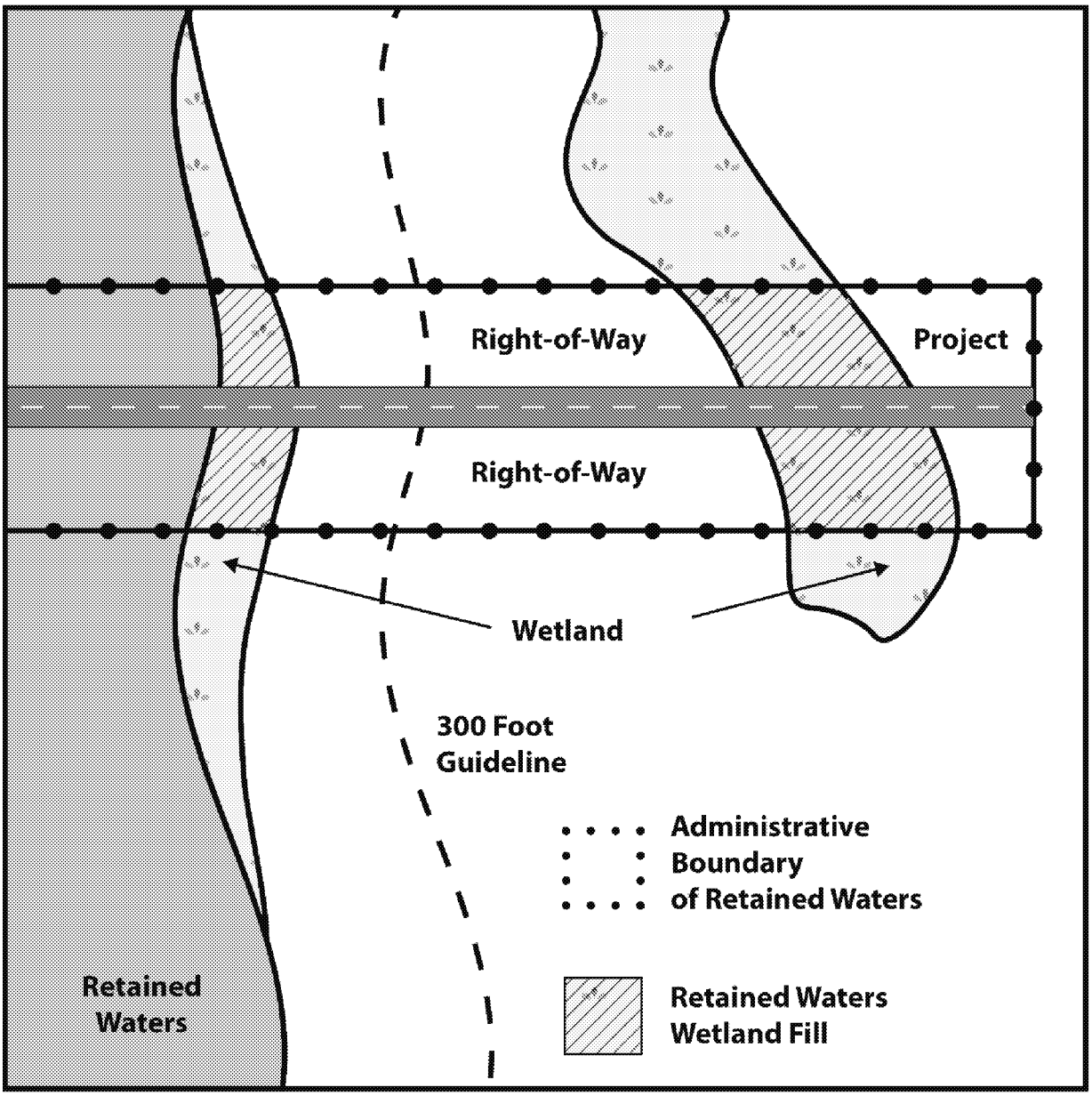


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ]** **Example of a linear project**

Linear projects may sometimes be miles long, but if there are dredge or fill activities waterward of the 300-foot guideline within the project boundary, the project is considered within retained waters and will be processed by the USACE.

## 2.4 Ecosystems/Habitats Located Within the Action Area

The State of Florida has several widely used land cover classification systems that define habitat/land use across the entire state. Each classification plays an integral role in the FWC's Florida's State Wildlife Action Plan (Wildlife Plan). The Wildlife Plan was the main resource for descriptions of ecosystems within the proposed Action Area. The key systems referenced for this BA are the Natural Communities Classification developed by the Florida Natural Areas Inventory (FNAI) and the Florida Land Cover Classification System (FLCCS) developed by FWC. FLCCS is a combination of several systems to include the FNAI Natural Communities Classification. The discussion below summarizes major wetland types within Florida, including freshwater non-forested wetlands, freshwater forested wetlands, lakes, rivers and streams, and estuarine wetlands. Each of the major types includes a variety of more specific sub-types (Tables 2-1 through 2-6).

### 2.4.1 Discussion of Aquatic Ecosystems and Habitats

Florida's freshwater ecosystem includes 7,800 freshwater lakes, 700 springs, 11 million acres of wetlands, more than 1,700 rivers and streams, and numerous underground aquifers (Fernald and Purdum 1998) (Appendix D, Figure 1). It is through these systems that freshwater eventually makes its way to the nearly 2,000 miles of Florida coastline and marine ecosystem.

*Freshwater Non-Forested Wetlands*

Florida's freshwater non-forested wetlands habitats include shrubby or herbaceous, non-tidal perennial communities in floodplains or depressions (Appendix D, Figure 2). In Florida, these habitats generally consist of sandy, clay, marl, and organic soils with a seven to 12-month hydroperiod. Fire in the summer months is often essential for these habitats to thrive. Freshwater non-forested wetlands can be divided into two major types: marshes and prairies/bogs (Table 2-1). Freshwater marshes are characterized by deeper, long inundation periods and tall emergent and floating-leaved species. Prairies and bogs are characterized by shallow, periodic inundation and are dominated by aquatic grasses, sedges, and/or titi (FWC 2019).

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Freshwater Non-Forested Wetlands**

| Major Type | Includes | Acres |
|---|---|---|
| Marshes | Depression Marsh, Basin Marsh, Coastal Interdunal Swale, Floodplain Marsh, and Glades Marsh | 2,743,064 |
| Prairies and Bogs | Wet Prairie, Shrub Bog, Marl Prairie, and Seepage Slope | 1,714,632 |

Source: FWC 2019

*Freshwater Forested Wetlands*

Freshwater forested wetlands occur in floodplains and depressional areas adjacent to large rivers, creeks, and lakes throughout Florida (Appendix D, Figure 3). The various types of freshwater forested wetlands are defined by their distinct fire frequency, hydroperiod, accumulated organic material, and water source. Areas with longer hydroperiods encourage the growth of cypress and tupelos, and areas with short hydroperiods support more hydrophytic hardwoods. Freshwater forested wetlands (Table 2-2) consist of a wide variety of soil types and diverse plant communities.



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Freshwater Forested Wetlands**

| Major Type | Includes | Acres |
|---|---|---|
| Coniferous Dominated Wetlands | Wet Flatwoods, Pond Pine, Atlantic White Cedar, and Slash Pine Swamp Forest | 782,518 |
| Cypress/Tupelo | Dome Swamp, Basin Swamp, Strand Swamp, and Floodplain Swamp | 1,534,202 |
| Hardwood Dominated Wetlands | Baygall, Hydric Hammock, Bottomland Forest, and Alluvial Forest | 1,531,214 |
| Other Wetland Forested Mixed | Cypress/Hardwood Swamps and Cypress/Pine/Cabbage Palm | 1,514,386 |

Source: FWC 2019

*Lakes*

Ponds and lakes are non-flowing water bodies in natural depressions but lacking persistent emergent vegetation except around their perimeters (Appendix D, Figure 4). Many of Florida's natural lakes are shallow and lack a natural surface outflow though some may be connected to aquatic caves. The majority of Florida's natural lakes are permanent, with some lakes thought to have held water for thousands of years (Table 2-3). Lakes provide essential habitat for a variety of terrestrial, semi-aquatic, and aquatic species.

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Lakes**

| Major Type | Includes | Acres |
|---|---|---|
| Limnetic Lake | Clastic Upland Lake, Coastal Dune Lake, Flatwoods/Prairie Lake, Marsh Lake, River Floodplain Lake, Swamp Lake, Sinkhole Lake, Coastal Rockland Lake, and Sandhill Lake | 24,786 |

Source: FWC 2019

*Rivers and Streams*

Florida's rivers and streams are characterized as natural, flowing waters from their source to the limits of tidal influence and bounded by channel banks (FNAI 2010) (Appendix D, Figure 5). Of the 1,700 rivers that flow through Florida, twenty-three are considered major rivers. Species such as the Okaloosa Darter and Shortnose Sturgeon rely on these waterways. Florida contains an abundance of springs that originate from the underground aquifer. These springs are noted for their high water clarity, low sedimentation, stable channels, and openings that are less than 40 feet wide. Table 2-4 below provides several habitat classes of rivers and streams in Florida.

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Rivers and Streams**

| Major Type | Includes |
|---|---|
| River | Alluvial River |
| Streams | Blackwater Stream, Calcareous Stream, Seepage Stream, Spring-run Stream, and Tidally-influenced Stream |
| Springs | Major Springs – 32 count |

Source: FWC 2019

*Estuarine*

The estuarine ecosystem is the tidally influenced zone landward to the point at which seawater becomes significantly diluted with freshwater inflow from the land (FNAI 2010) (Appendix D, Figure 6). This ecosystem occurs in the intertidal or supratidal zones, is dominated by herbaceous or woody halophytic vascular plants, and experiences salinity levels 0.5 parts per thousand and higher. Species diversity is low due to the extreme physiological stressors in these habitats.

Soils in mangrove swamps and salt marshes are typically muck/sand or limestone substrate and are inundated by daily tides with saltwater creating anoxic conditions. Both systems are found in relatively flat, low-wave energy areas. Salt marshes are dominated by vascular plants (saltmarsh cordgrass, needle rush, and saltwort). Mangrove swamps are usually stands of one of the three species present in Florida: red, white, and black mangroves (Table 2-5).

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Estuarine Areas**

| Major Type | Acres |
|---|---|
| Mangrove Swamp | 614,097 |
| Salt Marsh | 378,677 |

Source: FWC 2019

*Subterranean*

Natural chambers in the karstic limestone underlay much of northern and central Florida. These cavities are in the twilight, middle, and deep zones, and as such are characterized by animals that are in the trogloxenes, troglophiles, and troglobites groups. Many caves in Florida alternate between aquatic and terrestrial due to the rise and fall of water levels, though most cave systems are permanently inundated by groundwater (Table 2-6). Caves that are submerged are typically associated with spring systems. Due to the stability of conditions in caves, species that rely on these systems are very sensitive to any changes in environmental conditions. Caves provide supporting habitat for various salamanders, bats, crayfish, amphipods, and isopods.



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Aquatic Caves**

| Major Type | Caves |
|---|---|
| Aquatic | 105 |
| Terrestrial | 64 |

Source: FWC 2019

### 2.4.2 Discussion of Terrestrial Ecosystems and Habitats

Although terrestrial habitats are not regulated under the CWA, many ESA-listed species that occupy assumed waters also require or utilize adjacent uplands. Upland portions of permitted activities are also subject to ESA consultation as part of permit review. Thus, terrestrial habitat types are briefly summarized below.

Florida's terrestrial ecosystem includes approximately 3.7 million acres of natural habitats that are essential breeding, foraging, and refuge areas for many species. Florida has very little topographic relief, with the highest point at 328 feet above sea level. Slight changes in elevation result in habitat changes, with some upland communities at an only slightly greater elevation than adjacent wetlands. Diverse terrestrial ecosystems provide important habitat for a large variety of wildlife, including the Florida Panther, Gopher Tortoise, salamanders and frogs breeding in inclusions of ephemeral wetlands, and bats and crayfish living in caves (FWC 2019). Though uphill terrestrial habitats help to filter rainwater to lower elevations connected to freshwater habitats, only select ecosystems from the Wildlife Plan are discussed herein due to their relation to the Action Area.

*High Pine and Scrub*

High pine and scrub ecosystems are uplands with deep, sandy soils and mesic to xeric woodlands or shrublands. If present, open canopies consist of pine or a mixture of pine and deciduous hardwoods. Upland natural pine is often associated with and grades into upland mixed woodland, upland hardwoods, or sandhill.

Sandhill and scrub are mostly present in the panhandle and central Florida in upland areas with sand substrates. Sandhill is dominated by widely spaced longleaf pine, a midstory of oaks, and an herbaceous understory, all that rely on a frequent fire regime. Temporary wetlands in sandhills provide essential breeding habitat for a number of animal species. Scrub habitats are characterized by open to dense shrub cover with or without a pine canopy, with the midstory typically consisting of evergreen scrubby oaks and/or Florida rosemary. Temporary wetlands found in scrub provide foraging and breeding habitat for numerous species (Table 2-7).



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Sandhill and Scrub Areas**

| Major Type | Acres |
|---|---|
| Sandhill | 775,775 |
| Scrub | 400,308 |
| Upland Coniferous | 444,728 |
| Upland Mixed Woodland | 10,939 |

Source: FWC 2019

*Dry Prairie and Pine Rockland*

Dry prairie and pine rockland are characterized by low to non-existent canopy cover with mixed shrubs and herbs in the understory. Dry prairies occur on very flat terrain with wetlands scattered throughout. Pine rocklands are extremely rare habitats that occur on shallow soils over elevated areas of limestone bedrock and are bordered by wet prairies, rockland hammock, or mangroves (Table 2-8).

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Dry Prairie and Pine Rockland Areas**

| Major Type | Acres |
|---|---|
| Dry Prairie | 155,891 |
| Pine Rockland | 16,867 |

Source: FWC 2019

# 3. ESA-considered Species Potentially Affected by the Action

Table 3-1 includes 235 species: 139 listed and 96 considered by the ESA which occur or could occur within the Action Area and which may potentially be affected by the Action. Table 3-1 forms the basis of the analysis of the effects in Chapter 5. Species that have been petitioned for listing been included because some of these species may be added to the federal list in the future. The programmatic nature of this BA, and the proposed structure of the species coordination process address future listing status changes for listed species and any new species that may be listed that may not be included in this BA. At the time of a State 404 application review, any changes in listing status for affected species will be addressed during species coordination and technical assistance with the USFWS. Asterisks in this table indicate species that are also State-listed.



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| ***MAMMALS*** | | | | |
| Sherman's Short-tailed Shrew* | *Blarina brevicauda shermani* | Under review[1] | No | Yes |
| Gray Wolf | *Canis lupus* | Endangered | Yes | No |
| Red Wolf | *Canis rufus* | Endangered | No | Yes |
| Florida Bonneted Bat | *Eumops floridanus* | Endangered | No | Yes |
| Florida Salt Marsh Vole | *Microtus pennsylvanicus dukecampbelli* | Endangered | No | Yes |
| Gray Bat | *Myotis grisescens* | Endangered | No | Yes |
| Little Brown Bat | *Myotis lucifugus occultus* | Under review | No | Yes |
| Indiana Bat | *Myotis sodalis* | Endangered | Yes | No |
| Key Largo Woodrat | *Neotoma floridana smalli* | Threatened | No | Yes |
| Key Deer | *Odocoileus virginianus clavium* | Endangered | No | No |
| Rice Rat | *Oryzomys palustris natator* | Endangered | Yes | Yes |
| Pine Island Rice Rat | *Oryzomys palustris planirostris* | Under review[1] | No | Yes |
| Sanibel Island Rice Rat* | *Oryzomys palustris sanibeli* | Under review[1] | No | Yes |
| Tricolored Bat | *Perimyotis subflavus* | Under review[1] | No | Yes |
| Key Largo Cotton Mouse | *Peromyscus gossypinus allapaticola* | Endangered | No | Yes |
| Choctawhatchee Beach Mouse | *Peromyscus polionotus allophrys* | Endangered | No | No |
| Southeastern Beach Mouse | *Peromyscus polionotus niveiventris* | Threatened | No | No |
| St. Andrew Beach Mouse | *Peromyscus polionotus peninsularis* | Endangered | Yes | No |
| Anastasia Island Beach Mouse | *Peromyscus polionotus phasma* | Endangered | No | No |
| Perdido Key Beach Mouse | *Peromyscus polionotus trissyllepsis* | Endangered | No | No |
| Florida Panther | *Puma [=Felis] concolor coryi* | Endangered | No | Yes |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Insular Hispid Cotton Rat | *Sigmodon hispidus insulicola* | Under review[1] | No | No |
| Lower Keys Rabbit | *Sylvilagus palustris hefneri* | Endangered | No | Yes |
| West Indian Manatee | *Trichechus manatus* | Threatened | Yes | Yes |
| ***BIRDS*** | | | | |
| Cape Sable Seaside Sparrow | *Ammodramus maritimus mirabilis* | Endangered | Yes | Yes |
| Florida Grasshopper Sparrow | *Ammodramus savannarum floridanus* | Endangered | No | No |
| Saltmarsh Sparrow | *Ammospiza caudacutas* | Under review | No | Yes |
| Florida Scrub-Jay | *Aphelocoma coerulescens* | Threatened | No | No |
| Rufa Red Knot | *Calidris canutus rufa* | Threatened | No | Yes (tidal flats) |
| Ivory-billed Woodpecker | *Campephilus principalis* | Endangered | No | Yes |
| Piping Plover | *Charadrius melodus* | Threatened - Atlantic Coast DPS, which occurs in Florida | Yes | Yes (intertidal beaches) |
| Whooping Crane | *Grus americana* | Endangered | Yes | Yes |
| Eastern Black Rail | *Laterallus jamaicensis ssp. jamaicensis* | Under review[1] | No | Yes |
| Wood Stork | *Mycteria americana* | Threatened | No | Yes |
| Eskimo Curlew | *Numenius borealis* | Endangered | No | Yes |
| Red-cockaded Woodpecker | *Picoides borealis* | Endangered | No | No |
| Audubon's Crested Caracara | *Polyborus plancus audubonii* | Threatened | No | Yes |
| Black-capped Petrel | *Pterodroma hasitata* | Proposed for listing as Threatened | No | No |
| Everglade Snail Kite | *Rostrhamus sociabilis plumbeus* | Endangered | Yes | Yes |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Roseate Tern | *Sterna dougallii dougallii* | Threatened - Caribbean population, which occurs in Florida | No | No |
| Bachman's Wood Warbler | *Vermivora bachmanii* | Endangered | No | Yes |
| Golden-winged Warbler | *Vermivora chrysoptera* | Under review[1] | No | Yes |
| ***REPTILES*** | | | | |
| American Alligator | *Alligator mississippiensis* | Threatened - due to similarity of appearance | No | Yes |
| Spotted Turtle | *Clemmys guttata* | Under review[1] | No | Yes |
| American Crocodile | *Crocodylus acutus* | Threatened | Yes | Yes |
| Eastern Diamondback Snake | *Crotalus adamanteus* | Under review[1] | No | No |
| Key Ringneck Snake* | *Diadophis punctatus acricus* | Under review[1] | No | No |
| Eastern Indigo Snake | *Drymarchon corais couperi* | Threatened | No | Yes, especially in north Florida |
| Gopher Tortoise* | *Gopherus polyphemus* | Candidate - eastern population, which occurs in Florida (western population listed as Threatened) | No | No |
| Escambia Map Turtle | *Graptemys ernsti* | Under review[1] | No | Yes (streams) |
| Southern Hognose Snake | *Heterodon simus* | Not warranted 12-month finding | No | No |
| Apalachicola Common Kingsnake | *Lampropeltis getula meansi* | Under review[1] | No | Yes |
| Alligator Snapping Turtle | *Macrochelys termminckii* | Under review[1] | No | Yes (streams) |
| Atlantic Salt Marsh Snake | *Nerodia clarkii taeniata* | Threatened | No | Yes (streams) |



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Florida Pine Snake* | *Pituophis melanoleucus mugitus* | Under review[1] | No | No |
| Bluetail Mole Skink | *Plestiodon egregius lividus* | Threatened | No | No |
| Sand Skink | *Plestiodon reynoldsi* | Threatened | No | No |
| Florida Red-bellied (Florida Panhandle) Turtle | *Pseudemys nelsoni* | Under review[1] | No | Yes (streams) |
| Florida Scrub Lizard | *Sceloporus woodi* | Under review[1] | No | No |
| Short-tailed Snake* | *Stilosoma extenuatum* | Under review[1] | No | No |
| Rim Rock Crowned Snake* | *Tantilla oolitica* | Under review[1] | No | No |
| ***AMPHIBIANS*** | | | | |
| Reticulated Flatwoods Salamander | *Ambystoma bishopi* | Endangered | No | Yes |
| Frosted Flatwoods Salamander | *Ambystoma cingulatum* | Threatened | No | Yes |
| Georgia Blind Salamander* | *Eurycea wallacei* | Under review[1] | No | Yes (aquatic caves) |
| Gopher Frog | *Lithobates capito* | Under review[1] | No | Yes |
| Gulf Hammock Dwarf Siren | *Pseudobranchus striatus lustricolus* | Under review[1] | No | Yes |
| ***FISH*** | | | | |
| Shortnose Sturgeon | *Acipenser brevirostrum* | Endangered | No | Yes (streams) |
| Gulf Sturgeon | *Acipenser oxyrinchus [=oxyrhynchus] desotoi* | Threatened | Yes | Yes (streams) |
| Atlantic Sturgeon | *Acipenser oxyrinchus oxyrinchus* | Endangered - South Atlantic DPS, which occurs in Florida | Yes | Yes (streams) |
| Okaloosa Darter | *Etheostoma okalossae* | Threatened | No | Yes (streams) |
| Saltmarsh Topminnow* | *Fundulus jenkinsi* | Under review[1] | No | Yes (streams) |



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Smalltooth Sawfish | *Pristis pectinate* | Endangered - US DPS (Bahaman DPS also listed as Endangered) | Yes | Yes (streams) |
| ***MOLLUSKS*** | | | | |
| Southern Elktoe | *Alasmidonta triangulata* | Under review[1] | No | Yes (streams) |
| Fat Threeridge | *Amblema neislerii* | Endangered | Yes | Yes (streams) |
| Rayed Creekshell | *Anodontoides radiatus* | Under review[1] | No | Yes (streams) |
| Pygmy Siltsnail Snail | *Cincinnatia parva* | Under review[1] | No | Yes (streams) |
| Ponderous Siltsnail Snail | *Cincinnatia ponderosa* | Under review[1] | No | Yes (streams) |
| Delicate Spike | *Elliptio arctata* | Under review[1] | No | Yes (streams) |
| Chipola Slabshell | *Elliptio chiplolaensis* | Threatened | Yes | Yes (streams) |
| Purple Bankclimber | *Elliptoideus sloatianus* | Threatened | Yes | Yes (streams) |
| Tapered Pigtoe | *Fusconaia burki* | Threatened | Yes | Yes (streams) |
| Narrow Pigtoe | *Fusconaia escambia* | Threatened | Yes | Yes (streams) |
| Round Ebonyshell | *Fusconaia rotulata* | Endangered | Yes | Yes (streams) |
| Southern Sandshell | *Hamiota australis* | Threatened | Yes | Yes (streams) |
| Shinyrayed Pocketbook | *Lampsilis subangulata* | Endangered | Yes | Yes |
| Gulf Moccasinshell | *Medionidus penicillatus* | Endangered | Yes | Yes (streams) |
| Ochlockonee Moccasinshell | *Medionidus simpsonianus* | Endangered | Yes | Yes (streams) |
| Suwannee Moccasinshell | *Medionidus walker* | Threatened | Yes | Yes (streams) |
| Stock Island Tree Snail | *Orthalicus reses [not incl. nesodryas]* | Threatened | No | Yes |
| Oval Pigtoe | *Pleurobema pyriforme* | Endangered | Yes | Yes (streams) |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Fuzzy Pigtoe | *Pleurobema strodeanum* | Threatened | Yes | Yes (streams) |
| Southern Kidneyshell | *Ptychobranchus jonesi* | Endangered | Yes | Yes (streams) |
| Choctaw Bean | *Villosa choctawensis* | Endangered | Yes | Yes |
| ***CRUSTACEANS*** | | | | |
| Cypress Crayfish | *Cambarellus blacki* | Under review[1] | No | Yes |
| Florida Cave Amphipod | *Crangonyx grandimanus* | Under review[1] | No | Yes (aquatic caves) |
| Hobb's Cave Amphipod | *Crangonyx hobbsi* | Under review[1] | No | Yes (aquatic caves) |
| Squirrel Chimney Cave Shrimp | *Palaemonetes cummingi* | Threatened | No | Yes (aquatic caves) |
| Orange Cave Crayfish | *Procambarus acherontis* | Under review[1] | No | Yes |
| Coastal Flatwoods Crayfish | *Procambarus apalachicolae* | Under review[1] | No | Yes |
| Silver Glen Springs Crayfish | *Procambarus attiguus* | Under review[1] | No | Yes (aquatic caves) |
| Bigcheek Cave Crayfish | *Procambarus delicatus* | Under review[1] | No | Yes (aquatic caves) |
| Panama City Crayfish** | *Procambarus econfinae* | Proposed for listing as Threatened | No | Yes |
| Santa Fe Cave Crayfish* | *Procambarus erythrops* | Under review[1] | No | Yes (aquatic caves) |
| Orange Lake Cave Crayfish | *Procambarus franzi* | Under review[1] | No | Yes (aquatic caves) |
| Coastal Lowland Cave Crayfish | *Procambarus leitheuser* | Under review[1] | No | Yes (aquatic caves) |
| Florida Cave Crayfish | *Procambarus lucifugus* | Under review[1] | No | Yes (aquatic caves) |
| Miami Cave Crayfish | *Procambarus milleri* | Under review[1] | No | Yes (aquatic caves) |
| Putnam County Cave Crayfish | *Procambarus morrisi* | Under review[1] | No | Yes (aquatic caves) |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Pallid Cave Crayfish | *Procambarus pallidus* | Under review[1] | No | Yes (aquatic caves) |
| Black Creek Crayfish | *Procambarus pictus* | Under review[1] | No | Yes (streams) |
| Spider Cave Crayfish | *Troglocambarus maclanei* | Under review[1] | No | Yes (aquatic caves) |
| ***INSECTS*** | | | | |
| Logan's Agarodes Caddisfly | *Agarodes logani* | Under review[1] | No | Yes (streams) |
| Florida Leafwing | *Anaea troglodyta floridalis* | Endangered | Yes | No |
| Frosted Elfin Butterfly | *Callophrys irus* | Under review | No | No |
| Miami Tiger Beetle | *Cicindelidia floridana* | Endangered | No | No |
| Nickerbean Blue Butterfly | *Cyclargus ammon* | Threatened - due to similarity of appearance | No | No |
| Miami Blue Butterfly | *Cyclargus thomasi bethunebakeri* | Endangered | No | No |
| Monarch Butterfly | *Danaus plexippus plexippus* | Under review[1] | No | No |
| Duke's Skipper Butterfly | *Euphyes dukesi calhouni* | Under review[1] | No | Yes |
| Palatka Skipper Butterfly | *Euphyes pilatka klotsi* | Under review[1] | No | Yes |
| Westfall's Clubtail Dragonfly | *Gomphus westfalli* | Under review[1] | No | Yes (streams) |
| Ceraunus Blue Butterfly | *Hemiargus ceraunus antibubastus* | Threatened - due to similarity of appearance | No | No |
| Schaus Swallowtail Butterfly | *Heraclides aristodemus ponceanus* | Endangered | No | No |
| Gulf Coast Solitary Bee | *Hesperapis oraria* | Under review[1] | No | No |
| Sykora's Hydroptila Caddisfly | *Hydroptila sykorai* | Under review[1] | No | Yes (streams) |
| Morse's Little Plain Brown Sedge Caddisfly | *Lepidostoma morsei* | Under review[1] | No | Yes (streams) |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Cassius Blue Butterfly | *Leptotes cassius theonus* | Threatened - due to similarity of appearance | No | No |
| Purple Skimmer Dragonfly | *Libellula jesseana* | Under review[1] | No | Yes (lakes) |
| American Burying Beetle | *Nicrophorus americanus* | Endangered | No | No |
| Little Oecetis Longhorn Caddisfly | *Oecetis parva* | Under review[1] | No | Yes (lakes) |
| Southern Snaketail Dragonfly | *Ophiogomphus australis* | Under review[1] | No | Yes (streams) |
| Blue Calamintha Bee | *Osmia calaminthae* | Under review[1] | No | No |
| Calvert's Emerald Dragonfly | *Somatochlora calverti* | Under review[1] | No | Yes (streams) |
| Bartram's Scrub-hairstreak | *Strymon acis bartrami* | Endangered | Yes | No |
| Yellow-sided Clubtail Dragonfly | *Stylurus potulentus* | Under review[1] | No | Yes (streams) |
| Three-toothed Long-Horned Caddisfly | *Triaenodes tridontus* | Under review[1] | No | Yes (streams) |
| ***PLANTS*** | | | | |
| Meadow Joint-vetch | *Aeschynomene pratensis* | Under review[1] | No | Yes |
| Crenulate Lead-plant | *Amorpha crenulata* | Endangered | No | No |
| Blodgett's Silverbush | *Argythamnia blodgettii* | Threatened | No | No |
| Four-petal Pawpaw | *Asimina tetramera* | Endangered | No | No |
| Purpledisk Honeycombhead Sunflower | *Balduina atropurpurea* | Under review[1] | No | Yes |
| Apalachicola Wild Indigo | *Baptisia megacarpa* | Under review[1] | No | Yes |
| Florida Bonamia | *Bonamia grandiflora* | Threatened | No | No |
| Florida Brickell-bush | *Brickellia mosieri* | Endangered | Yes | No |
| Brooksville Bellflower | *Campanula robinsiae* | Endangered | No | Yes |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Fragrant Prickly-apple | *Cereus eriophorus var. fragrans* | Endangered | No | No |
| Deltoid Spurge | *Chamaesyce deltoidea ssp. deltoidea* | Endangered | No | No |
| Pineland Sandmat | *Chamaesyce deltoidea pinetorum* | Threatened | No | No |
| Wedge Spurge | *Chamaesyce deltoidea serpyllum* | Endangered | No | No |
| Garber's Spurge | *Chamaesyce garberi* | Threatened | No | No |
| Big Pine Partridge Pea | *Chamaecrista lineata keyensis* | Endangered | No | No |
| Pygmy Fringe-tree | *Chionanthus pygmaeus* | Endangered | No | No |
| Cape Sable Thoroughwort | *Chromolaena frustrata* | Endangered | Yes | No |
| Florida Golden Aster | *Chrysopsis floridana* | Endangered | No | No |
| Florida Perforate Cladonia | *Cladonia perforata* | Endangered | No | No |
| Pigeon Wings | *Clitoria fragrans* | Threatened | No | No |
| Short-Leaved Rosemary | *Conradina brevifolia* | Endangered | No | No |
| Etonia Rosemary | *Conradina etonia* | Endangered | No | No |
| Apalachicola Rosemary | *Conradina glabra* | Endangered | No | No |
| Florida Semaphore Cactus | *Consolea corallicola* | Endangered | Yes | No |
| Ciliate-Leaf Tickseed Sunflower | *Coreopsis integrifolia* | Endangered | Yes | Yes |
| Avon Park Harebells | *Crotalaria avonensis* | Endangered | No | No |
| Okeechobee Gourd | *Cucurbita okeechobeensis ssp. okeechobeensis* | Endangered | No | Yes |
| Florida Prairie-Clover | *Dalea carthagenensis floridana* | Endangered | No | No |
| Beautiful Pawpaw | *Deeringothamnus pulchellus* | Endangered | No | Yes |
| Rugel's Pawpaw | *Deeringothamnus rugelii* | Endangered | No | Yes |
| Garrett's Mint | *Dicerandra christmanii* | Endangered | No | No |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Longspurred Mint | *Dicerandra cornutissima* | Endangered | No | No |
| Scrub Mint | *Dicerandra frutescens* | Endangered | No | No |
| Lakela's Mint | *Dicerandra immaculata* | Endangered | No | No |
| Florida Pineland Crabgrass | *Digitaria pauciflora* | Threatened | No | Yes |
| Clam-shell Orchid | *Encyclia cochleata var. triandra* | Not warranted 12-month finding | No | No |
| Big Cypress Epidendrum Orchid | *Epidendrum strobiliferum* | Under review[1] | No | No |
| Blackbract Pipewort | *Eriocaulon nigrobracteatum* | Under review[1] | No | Yes |
| Scrub Buckwheat | *Eriogonum longifolium var. gnaphalifolium* | Threatened | No | No |
| Snakeroot (Wedgeleaf Eryngo) | *Eryngium cuneifolium* | Endangered | No | No |
| Telephus Spurge | *Euphorbia telephioides* | Threatened | No | No |
| Small's Milkpea | *Galactia smallii* | Endangered | No | No |
| Harper's Beauty | *Harperocallis flava* | Endangered | No | No |
| Aboriginal Prickly-apple | *Harrisia (=Cereus) aboriginum (=gracilis)* | Endangered | Yes | No |
| Florida Hartwrightia Sunflower | *Hartwrightia floridana* | Under review[1] | No | Yes |
| Henry's Spider-lily | *Hymenocallis henryae* | Under review[1] | No | No |
| Highlands Scrub Hypericum | *Hypericum cumulicola* | Endangered | No | No |
| Edison's Ascyrum St. Johns Wort | *Hypericum edisonianum* | Under review[1] | No | Yes |
| Smooth Barked St. Johns Wort | *Hypericum lissophloeus* | Under review[1] | No | Yes |
| Yellow Anisetree | *Illicium parviflorum* | Not warranted 12-month finding | No | Yes |
| Beach Jacquemontia | *Jacquemontia reclinata* | Endangered | No | No |



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Cooley's Water-willow | *Justicia cooleyi* | Endangered | No | Yes |
| Scrub Blazingstar | *Liatris ohlingerae* | Endangered | No | No |
| Panhandle Lily | *Lilium iridollae* | Under review[1] | No | Yes |
| Bog Spicebush | *Lindera subcoriacea* | Under review[1] | No | Yes |
| Sand Flax | *Linum arenicola* | Endangered | No | Yes |
| Carter's Small Flowered Flax | *Linum carteri carteri* | Endangered | Yes | Yes |
| West's Flax | *Linum westii* | Under review[1] | No | Yes |
| Boykin's Lobelia | *Lobelia boykinii* | Under review[1] | No | Yes |
| Raven's Seedbox | *Ludwigia ravenii* | Under review[1] | No | Yes |
| Scrub Lupine | *Lupinus aridorum* | Endangered | No | No |
| Curtis' Loosestrife | *Lythrum curtissii* | Under review[1] | No | Yes |
| Lowland Loosestrife | *Lythrum flagellare* | Under review[1] | No | Yes |
| White Birds-in-a-nest | *Macbridea alba* | Threatened | No | Yes |
| Godfrey's Stitchwort | *Minuartia godfreyi* | Under review[1] | No | Yes |
| Needleleaf or Narrowleaf Naiad Water-nymph | *Najas filifolia* | Under review[1] | No | Yes |
| Britton's Beargrass | *Nolina brittoniana* | Endangered | No | No |
| Cape Sable Orchid | *Oncidium undulatum* | Under review[1] | No | Yes |
| Papery Whitlow-wort | *Paronychia chartacea* | Threatened | No | No |
| Key Tree Cactus | *Pilosocereus robinii* | Endangered | No | No |
| Godfrey's Butterwort | *Pinguicula ionantha* | Threatened | No | Yes |



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Lewton's Polygala Milkwort | *Polygala lewtonii* | Endangered | No | No |
| Tiny Polygala Milkwort | *Polygala smallii* | Endangered | No | No |
| Horton Wireweed (Small) | *Polygonella basiramia* | Endangered | No | No |
| Sandlace (Woody Wireweed) | *Polygonella myriophylla* | Endangered | No | No |
| Florida Pondweed | *Potamogeton floridanus* | Under review[1] | No | Yes |
| Scrub Plum | *Prunus geniculata* | Endangered | No | No |
| White Meadowbeauty | *Rhexia parviflora* | Under review[1] | No | Yes |
| Panhandle Meadowbeauty | *Rhexia salicifolia* | Under review[1] | No | Yes |
| Chapman Rhododendron | *Rhododendron chapmanii* | Endangered | Yes | Yes |
| Hairy Peduncled Beakrush | *Rhynchospora crinipes* | Under review[1] | No | Yes |
| Miccosukee Gooseberry | *Ribes echinellum* | Threatened | No | Yes |
| Eared Coneflower | *Rudbeckia auriculata* | Under review[1] | No | Yes |
| Florida Willow | *Salix floridana* | Under review[1] | No | Yes |
| Gulf Sweet Pitcherplant | *Sarracenia rubra ssp. gulfensis* | Under review[1] | No | Yes |
| American Chaffseed | *Schwalbea americana* | Endangered | No | Yes |
| Florida Skullcap | *Scutellaria floridana* | Threatened | No | Yes |
| Everglades Bully | *Sideroxylon reclinatum ssp. austrofloridense* | Threatened | No | Yes |
| Georgia Bully | *Sideroxylon thorne* | Under review[1] | No | No |
| Fringed Campion | *Silene polypetala* | Endangered | No | No |
| Gentian Pinkroot | *Spigelia gentianoides* | Endangered | No | No |

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] ESA Species Potentially Affected by the Action**

| Common Name | Scientific Name | Federal Status | Critical Habitat Designated | Are wetlands, waters or adjacent uplands regularly utilized by the species? |
|---|---|---|---|---|
| Cooley's Meadow Rue | *Thalictrum cooleyi* | Endangered | No | Yes |
| Florida Torreya | *Torreya taxifolia* | Endangered | No | No |
| Florida Bristle Fern | *Trichomanes punctatum ssp. floridanum* | Endangered | No | No |
| Ocala Vetch | *Vicia ocalensis* | Not warranted 12-month finding | No | Yes |
| Wide-leaf Warea | *Warea amplexifolia* | Endangered | No | No |
| Carter's Mustard | *Warea carteri* | Endangered | No | No |
| Karst Pond Xyris | *Xyris longisepala* | Under review[1] | No | Yes |
| Florida Ziziphus (Jujube) | *Ziziphus celata* | Endangered | No | No |

[1]Substantial 90-day Finding
*Species/subspecies is also State-listed in Florida (i.e., State threatened)
**State Species of Special Concern (SSC)

## 3.1 ESA-considered Species and Critical Habitat in the Action Area

As noted, the Action is EPA's approval of Florida's Assumption of Section 404 permitting and the transfer of permitting responsibility from USACE to FDEP in State-assumed waters. If the State 404 program is approved, FDEP would assume regulatory responsibility over dredging and filling activities in WOTUS not retained by USACE pursuant to 33 USC § 1344(g).

All ESA-listed, proposed, candidate, and petitioned plant and animal species under USFWS jurisdiction and with ranges within Florida are discussed in this BA. The status of listed species can change from year to year, and species that have been petitioned for ESA-listing have also been included because some of these species may be listed in the future. Including a comprehensive analysis in this BA for the list of species in Table 3-1 helps evaluate the effects of the State 404 program on any species that are currently listed or that are currently under review and may become listed in the future. Table 3-1 includes all species analyzed in Chapter 5, although a few species were determined to be likely "no effect" findings because they are believed to be extirpated in Florida or any effects were considered to be insignificant or discountable.

Species dependent on aquatic systems are more likely to be affected by the Action; however, upland species may also be present in staging areas or along access routes or otherwise within or affected by individual



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project action areas. If adverse impacts/effects to upland species would not occur "but for" the Action, those adverse impacts must be addressed. Thus, upland species have been retained in the analysis.

Information for the species analyzed in this document was gathered from the USFWS Environmental Conservation Online System (ECOS) and various documents linked from ECOS, including 5-year reviews, Recovery Plans, and Species Status Assessments. Secondary references cited in ECOS documents were reviewed as necessary. For species under review for ESA-listing, petitions to list and 90-day and/or 12-month findings were reviewed. The amount of information available for under review species ranged from minimal to considerable, depending on the species. For some species, extensive additional literature was available; for others, relatively little is known.

As the precise locations of future permit applications are not known at this time, no attempt was made to generate detailed range maps or analyze species distributions relative to anticipated impacts. Without knowledge of future permit locations, it is impractical to determine the amount of overlap between project sites and species at this time. However, a relatively small number of species have repeatedly occurred in large numbers of past consultations, and these are identified in the Effects analysis chapter (Chapter 5) of this BA.

Similarly, critical habitat was not mapped because the locations of future permit applications are not precisely known at this time. Conservation tools are available online, including Geographic Information System (GIS) downloads for critical habitats and habitat ranges, including the ECOS system mentioned above. Additional tools are also available at [ HYPERLINK "https://www.fws.gov/southeast/conservation-tools/" ]. The USFWS's Information for Planning and Consultation (IPaC) website ([ HYPERLINK "https://ecos.fws.gov/ipac/" ]) can also be used to determine whether critical habitats or habitat ranges exist within a project area. Table 3-1 identifies whether or not critical habitat has been designated for each ESA-listed species. For species with designated critical habitat, future State 404 permit review will evaluate whether the project location is within a critical habitat unit.

Each State 404 permit application within assumed waters will identify the location and extent of proposed activities, allowing identification of ESA-listed species present or potentially present, and presence or absence of designated critical habitat (using IPaC, FNAI database, etc.). This data will be used to determine potential effects on ESA-listed species on a project-specific basis.

## 3.2 NMFS-Listed Species

FDEP requested input on a draft species list for Florida's application package for Assumption from the USFWS and the NMFS on November 22, 2019. On April 15, 2020, NMFS responded to FDEP with the conclusion that ESA-listed species under NMFS' jurisdiction do not occur in waters that are assumable by the State (See Appendix A). They stated that where there is shared jurisdiction for the Gulf sturgeon between NMFS and USFWS, the USFWS is responsible for consultations regarding sturgeon and critical habitat in riverine habitat units. NMFS further states that the riverine critical habitat units and river areas where Gulf Sturgeon are known to occur are all listed by the USACE as retained waters. While ESA-listed species under NMFS jurisdiction are anticipated to only occur in retained waters, they are included in this BA as part of the comprehensive review of all Florida's imperiled species. Based on the NMFS' letter, this BA will reflect the NMFS' recommendation of "no effect" for species under NMFS jurisdiction.

## 3.3 State-Listed Species

Although this BA focuses on federal ESA-listed, proposed, or under review species, there is considerable overlap with Florida's State-listed species (FWC 2018). The current listing status of all of Florida's federal and state listed species is found in Chapter 68A-27, F.A.C. It is noteworthy that Florida's definition of "take" is identical to the federal definition (Chapter 68A-27.003, F.A.C.). See Chapter 7.1 for additional information regarding State-listed species.

# 4. Baseline Conditions

This chapter identifies and describes all known natural and anthropogenic sources of impact on ESA-considered species and the condition of their habitats in the Action Area, except those caused by the Action. The purpose of the environmental baseline is to provide the context for the impacts of the Action with regard to the impacts of all the other human activities that are also affecting the ESA-considered species.

This environmental baseline describes wetlands status and trends within Florida, and implications for ESA-considered species. The baseline assessment focuses on factors influencing habitat and those which affect the distribution and abundance of ESA-considered species. The baseline also includes past and present impacts of federal, state, and private activities within the Action Area, and activities underway at present (i.e., coincident with the Assumption). The Action Area was previously defined and described in Chapter 2.

## 4.1 Regulatory Baseline

### 4.1.1 Federal Wetland Regulations

Section 404 of the CWA (33 USC § 1344) establishes a program to regulate the discharge of dredged or fill material into WOTUS, inclusive of wetlands. The Administrator of the EPA, in conjunction with the Secretary of the Army, acting through the Chief of Engineers, established guidelines for regulating such discharges under Section 404(b)(1) of the CWA (40 CFR § 230). The EPA and the USACE jointly implement the regulation and permitting of such proposed activities. In Florida, the USACE Jacksonville District acts as the regulatory agency that issues Section 404 dredge and fill permits.

*Individual Permits*

To receive a dredge and fill permit authorization from the USACE, an applicant must demonstrate the following under 40 CFR § 230.10:

- No practicable alternative to the proposed activity exists that would have less adverse impact on the aquatic ecosystem;
- The proposed activity will not:
  - violate State water quality standards,
  - violate any applicable toxic effluent standard or prohibition,
  - jeopardize the continued existence of Endangered and Threatened species, or result in the likelihood of destruction or adverse modification of critical habitat
  - violate any requirement imposed to protect a marine sanctuary;



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- The proposed activity will not cause or contribute to significant degradation of WOTUS; and
- The applicant has taken appropriate and practicable steps that will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

The USACE will request any additional information required to deem an application complete, typically within 15 days of receipt of the application. Once the agency deems the application to be complete, the USACE publishes a public notice within 15 days to receive comments from interested and/or affected parties on the proposed action.

Following receipt of an application and evaluation as to the completeness of the application, the USACE is charged with evaluating the effects of the proposed action on ESA-listed species or designated critical habitat. Where a proposed action may affect a listed species or critical habitat, USACE coordinates and/or consults with the Services prior to issuing any permit. If the USACE determines the proposed activity may affect any endangered or threatened species or their critical habitat, beneficially or adversely, the USACE District Engineer will initiate consultation with the Services. If the USACE District Engineer makes a determination from the submitted application that the proposed activity would not affect ESA-listed species or their critical habitat, the public notice will contain a statement attesting to such and consultation with the Services is not required.

The comment period is typically 30 days; upon receipt of comments, the USACE evaluates the comments received, provides them to the applicant, and determines whether a public hearing is required. Following the comment period (and a public hearing if conducted), the USACE makes a determination as to whether the Section 404 permit should be issued. This determination is based on applicable regulations governing the activity as well as comments received as part of the record. The USACE District Engineer will either prepare a Statement of Findings or – where an Environmental Impact Statement (EIS) has been prepared – a Record of Decision on all permit decisions. The final action of the USACE is either the signature of the issuing official on the authorizing document (a USACE Permit) or a signature on a letter notifying the application of the denial of the permit. An issued permit will contain conditions to follow in execution of the work; a denial will contain written documentation of the reason(s) for the denial.

#### *General Permits*

A general permit is issued for structures, work, or discharges that will result in only minimal adverse effects. General permits are issued on a nationwide, regional, or state basis for particular categories of activities. There are three types of general permits – Nationwide Permits, Regional General Permits, and Programmatic General Permits. General permits (which are reviewed by the Services) are usually valid for five years and may be re-authorized by the USACE (the Services will review the proposed reauthorizations).

#### *Nationwide Permits*

On a five-year basis, the USACE issues Nationwide Permits (NWPs) pursuant to Section 404(e) of the CWA (33 USC § 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 401 et seq.). As of January 6, 2017, there were a total of 52 NWPs. The NWPs streamline the requirements of the CWA and are informed by extensive feedback from the public and other key stakeholders. NWPs provide expedited review of projects that have minimal impact on the aquatic environment. Categories of activities that may be covered under the NWPs include linear transportation projects, bank stabilization activities, aquatic habitat restoration, residential development, commercial and industrial developments, aids to navigation, and certain maintenance activities.

In 2017, the USACE added two new NWPs in addition to the 50 that were in place in 2012. One addition provides a mechanism for an efficient authorization process for the removal of low-head dams to restore streams and enhance public safety; the second addition covers the construction and maintenance of living shorelines to control erosion in coastal areas (adapted from USACE news release dated January 6, 2017) (https://www.usace.army.mil/Media/News-Releases/News-Release-Article-View/Article/1043614/army-corps-of-engineers-revises-and-renews-nationwide-permits/; accessed January 30, 2020).

*Regional General Permits*

As of February 2020, the USACE Jacksonville District has issued 18 general permits. Each regional general permit has specific terms and conditions, all of which must be met for project-specific actions to be verified as compliant with and covered by the respective general permit.

*Programmatic General Permits*

Programmatic General Permits are based on an existing state, local, or other federal programs and designed to avoid duplication of that program. The USACE Jacksonville District lists 12 programmatic general permits - one of which is only applicable to Puerto Rico (https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit/; accessed January 30, 2020).

### 4.1.2 Florida Wetlands Regulations

Part IV of § 373, F.S. regulates dredging and filling in wetlands and other surface waters, such as: the construction, alteration, operation, maintenance, abandonment, and removal of stormwater management systems, dams, impoundments, reservoirs, works (including, but not limited to, ditches, canals, conduits, channels, culverts, pipes, and other artificial structures), and appurtenant works (artificial improvements to a dam).

This statute authorizes FDEP and the five water management districts (WMDs) in the state to jointly implement Florida's ERP program. The responsibilities of the agencies are divided according to Operating Agreements between FDEP and the particular WMD. Provisions in the statute allow for FDEP to approve local government programs to implement the ERP program on behalf of the FDEP and the WMDs. As of January 2020, full delegation has been given to Broward County and minor works delegated to the Environmental Protection Commission for Hillsborough County.

The ERP program operates in addition to the USACE Section 404 program that regulates activities in WOTUS. All state, local, and regional governments in Florida delineate wetlands in accordance with state methodology (Chapter 62-340, F.A.C.) instead of the federal wetland delineation method (Section 404 of the CWA and the Federal Manual for Identifying and Delineating Jurisdictional Wetlands). While the ERP application is issued, withdrawn, or denied in accordance with state statutory and rule criteria (briefly summarized below), agency action on the ERP application also constitutes any needed water quality certification (waiver thereto) under Section 401 of the CWA, and coastal zone consistency concurrence statements with Florida's federally-approved Coastal Zone Management program under section 307 (Coastal Zone Management Act). These State ERP reviews and approvals by FDEP, WMD, or delegated local governments are not connected to, dependent upon, nor do they influence the USACE permit review processes under Section 404 of the CWA. Therefore, the USACE must take separate action to issue or deny any needed federal permit under Section 404 of the CWA and/or section 10 of the Rivers and Harbors Act of 1899, and the USACE decision to issue a permit may or may not be consistent with the State's decision to issue an ERP permit.

To receive an ERP, an applicant must demonstrate that the proposed activity will not be harmful to the water resources of the state and will not be inconsistent with the overall objectives of Florida rules and statutes. The applicant must provide reasonable assurance that the activity will not violate the applicable state water quality standards and that the activity is not contrary to the public interest for all waters that are not designated as Aquatic Preservers or Outstanding Florida Waters. For activities in those designated waters, the applicant must provide reasonable assurance that the proposed activity will be clearly in the public interest. Surface water quality standards are published in Chapter 62-302, F.A.C. In addition, FDEP provides policy guidance on anti-degradation in Rule 62-4.242, F.A.C., and in Rule 62-302.300, F.A.C, which allows for the protection of water quality above the minimum required for classification. Further, FDEP administers the Impaired Waters Rule (Chapter 62-303, F.A.C.), and has established Total Maximum Daily Load criteria (Chapter 62-304, F.A.C.) (FDEP 2020b). It is the intent of FDEP and the WMDs that these criteria are implemented in a manner that achieves a programmatic goal and a project-permitting goal of no net loss in wetlands or other surface water functions.

To determine whether an activity is not contrary to the public interest or is clearly in the public interest, the FDEP must consider and balance the following criteria:

- Whether the activity will adversely affect the public health, safety, or welfare or the property of others;
- Whether the activity will adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats;
- Whether the activity will adversely affect navigation or the flow of water or cause harmful erosion or shoaling;
- Whether the activity will adversely affect the fishing or recreational values or marine productivity in the vicinity of the activity;
- Whether the activity will be of a temporary or permanent nature;
- Whether the activity will adversely affect or will enhance significant historical and archaeological resources; and
- The current condition and relative value of functions being performed by areas affected by the proposed activity.

FDEP provides a copy of all notices of ERP applications for individual permits that propose regulated activities in, on, or over wetlands or other surface waters to the FWC for review and comment. The FDEP and FWC frequently work together on non-regulatory issues as well as regulatory. Examples of the many collaboration efforts include habitat restoration projects, management of State Parks and management of species on other State-owned easements and property.

In accordance with the provisions of § 373.4141, F.S., the FDEP shall review the ERP application to determine if it is complete. If the application is incomplete, FDEP must request additional information (RAI) within 30 days. The applicant must respond to such requests within 90 days. Within 30 days after receipt of such additional information, FDEP must review the submitted material for completeness. The WMD processing procedures for ERP vary somewhat to accommodate the requirements of their specific Governing Boards.

In accordance with § 120, F.S., FDEP must decide whether it should issue or deny an ERP within 60 days after receipt of the original application, the last item of timely requested additional material, or the applicant's

written request to begin processing the permit application. Application completeness is determined by whether the applicant has submitted all materials required for review as specified by rule and statute. The WMDs also are subject to this requirement, but their ERP processing procedures vary by each district to accommodate the requirements of their different Governing Boards. Pursuant to § 120.60(1), F.S., any application that FDEP or the WMD does not approve or deny within 60 days is considered approved by default.

Once issued, ERP permits are valid for the life of the system (which includes all structures and works authorized for construction or land alteration). The ERP permit does not automatically expire after the construction phase (typically five years) of a project but continues to cover operation (use) of the system in perpetuity.

Under current regulations for permit issuance, an applicant proposing any activity that is expected to result in impacts to both federal and state jurisdictional wetlands or other surface waters must obtain both a Section 404 permit from the USACE and an ERP permit from FDEP or the WMDs. There is the potential for duplication of effort to obtain what, in some cases, results in nearly identical permits for anticipated impacts to the same extent of wetlands and other surface waters. The timelines for review and issuance of a federal Section 404 Permit and a State ERP permit can vary substantially. The State of Florida has an interest in assuming the federal permitting responsibility for Section 404 and will preserve the environmental protections afforded by federal law; the result should increase efficiency and consistency in the application review and issuance process while ensuring a framework that will maintain protections for listed species and their critical habitats.

## 4.2 Environmental Baseline

*Wetlands*

In 1845, the State of Florida contained an estimated 20.3 million acres of wetlands (Dahl 2005). By 1996, only about half of the original wetlands remained (USFWS 1996). From the mid-1950s through the mid-1970s, prior to the CWA, the rate of wetland loss has been estimated at 72,000 acres per year (Hefner 1986). In the following decade, wetland loss decreased to an estimated 23,700 acres per year (Hefner et al. 1994).

As of 1996, an estimated 11.4 million acres of wetlands covered about 29 percent of the surface area of Florida, more than any other state in America at that time. Of these wetlands, 90 percent or about 10.2 million acres were freshwater wetlands. The average annual net loss of wetlands from 1985 through 1996 was 4,740 acres, and freshwater forested wetlands exhibited a net gain. During the 1985-1996 interval, 72 percent of wetland loss was attributed to development and 28 percent to agriculture (Dahl 2005).

*Central and Southern Florida Project*

The Central and Southern Florida (CS&F) Project for flood control and other purposes was authorized by the Flood Control Act of 1948 as an improvement plan for flood control, drainage, and other purposes over an 18,000-square-mile area of central and south Florida. This project authorized the diversion of water to the Atlantic Ocean and the Gulf of Mexico through canals and the diversion of water southwest through the Everglades. The project provided benefits for human populations that were able to build, grow, and develop these new lands. The Everglades Agricultural Area was developed for the production of food, and areas further east became densely populated cities, including Miami, Ft. Lauderdale, and West Palm Beach. Unfortunately, the project also resulted in the modification and loss of 2,400 square miles of freshwater wetlands, including the Everglades (USACE 2019a). See Figure 4-1 for a comparison of historic freshwater



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flows compared to water flows today.

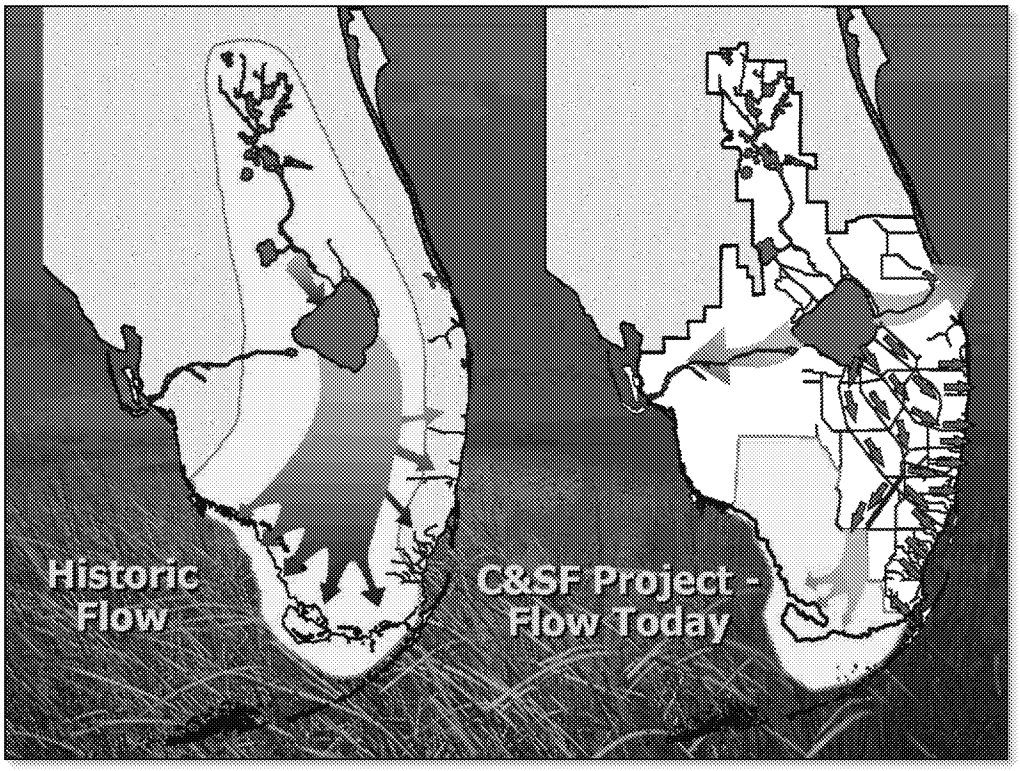


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Historic freshwater flows compared to freshwater flows after C&SF Project**

Source: USACE and SFWMD 2007

*Everglades Restoration*

Florida's everglades are twice the size of New Jersey, comprised of a mixture of dense forests and open prairies, sunny croplands and shady swamps, rural areas and cities. The South Florida Ecosystem Restoration Program, a partnership between the federal government and the State of Florida, consists of a suite of projects that focus on the C&SF system. In 2000, congressional authorization created the Comprehensive Everglades Restoration Plan (CERP), which is the single largest of the program's efforts. CERP is a 50/50 partnership between the federal government and the State of Florida. It is a program to restore, protect, and preserve water resources in central and southern Florida, including the Everglades. The USACE is the lead federal agency, and the South Florida Water Management District (SFWMD) is the lead State agency in this effort.

For 20 years, the CERP program has been designing, planning, and constructing multiple components of the South Florida Ecosystem Restoration Program. The goal of these efforts is to eventually improve 2.4 million acres of south Florida's wetlands ecosystems (including Everglades National Park), by reducing high volume discharges from Lake Okeechobee to the estuaries and improve water delivery to the Florida and Biscayne



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Bays, as well as enhance the freshwater supply (USACE 2019b). See Figure 4-2 for a depiction of the Everglades restoration project and the associated improvements to future ecosystem conditions.

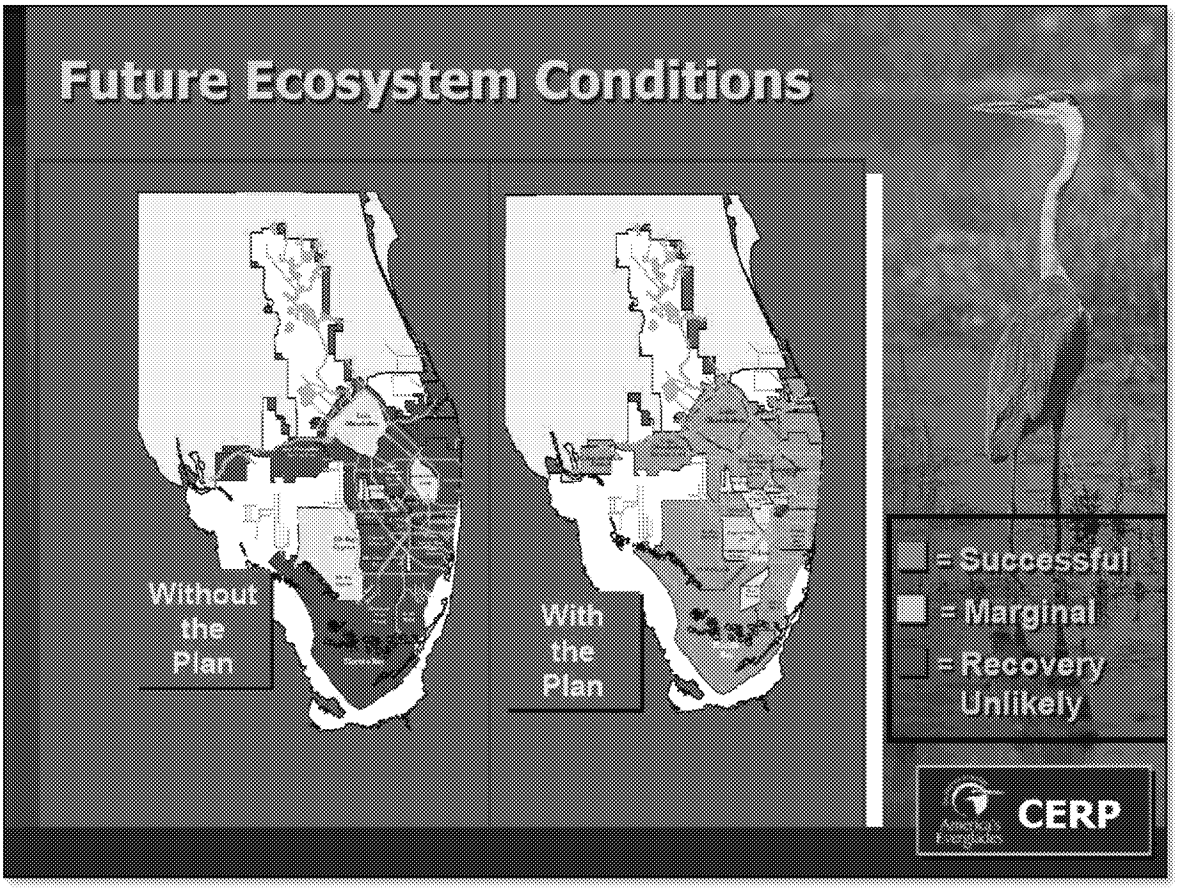


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Future Ecosystem Conditions based on CERP**

Source: USACE and SFWMD 2007

### 4.2.1 Historical Federal Permitting: Habitat

WOTUS, as defined under currently applicable regulations and guidance, are regulated by the USACE under Section 404 of the CWA, and by FDEP and the WMDs. The following discussion is based on data provided by the USACE and characterizes Section 404 permits issued from 2014 through 2018. The habitat types are from Wildlife Plan and Guide to the Natural Communities of Florida (FNAI 2010), and each includes multiple subtypes. These are cross walked with Cowardin types used for USACE reporting; while similar, definitions may not match entirely.

Table 4-1 summarizes wetland permits issued in Florida by the USACE over the most recently available five-year period, from FY 2014 through FY 2018. Permitted wetland fill is presented by type of wetland and acreage; the dataset is limited to wetlands mostly within the Action Area covered by the current document and does not include all wetlands in the state. For the first four years of the period, permitted wetland fill ranged from 1,587 to 2,417 acres per year, then more than doubled to 4,363 acres in FY 2018 reportedly because of a confluence of multiple larger one-time projects being permitted in that year. The mean annual permitted

acreage for the period was 2,423 acres per year. This suggests that annual wetland loss has remained at or below levels identified in previous decades. The numbers in Table 4-1 do not include offsets from wetland mitigation, wetland dredge, or grant-funded restoration. Based on national data, mitigation and restoration likely result in lower net loss of wetlands and even net gains for some habitat types in some years (1998-2004), although in 2004-2009 there was a continued national net loss (Dahl 2011).

As indicated in Table 4-1, wetland fill impacts within the Action Area were primarily to palustrine wetlands. Impacts on other wetland types were considerably less in comparison. Palustrine wetlands provide habitat for numerous ESA-listed species.

**NOTES regarding interpretation of USACE data:**

A single 404 permit may authorize activities that affect multiple wetlands or surface waters areas within the project area. So, the total number of areas will be larger than the total number of permits issued.

The USACE data assigns an ID number for each WOTUS that is delineated on a site, and that number is in the Table 4-1 under the column "Number of Areas". The acreages for these areas under the column "Total Acres" represent the entire footprint of the fill authorized for each area, not just the amount of WOTUS that was adversely impacted. (R. Barron, USACE, personal communication, April 16, 2020).

The USACE has been developing a GIS shapefile to depict the retained waters. At the time of this BA, the draft shapefile (February 2019) does not include all of the retained and tidal waters noted in the USACE list of retained water (particularly canal systems in southwest and south Florida). Because it was the best available information at the time, FDEP queried the USACE project data by overlaying it with the draft retained water shapefile. This was performed in order to estimate the number and types of projects in State-assumed waters, outside of boundaries of the draft USACE retained waters file. Due to the limitations of the geographically referenced shapefile, the USACE permit-related data in this BA does not accurately represent projects/permits in only assumed waters. Please note that this data was used to analyze and depict general data trends for this BA, and not serve as a source for definitive quantitative data. Tables and Figures in this BA that use this data likely overestimate the number of projects that will be in assumed waters but is presented here as best available information. The data provided in Table 4-1 and Figure 4-3 likely inadvertently include some retained waters and may include values for some section 10 projects.

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Authorized Areas and Acreages by Wetland Type, 2014 - 2018**

| Cowardin Type | FY 14 | | FY 15 | | FY 16 | | FY 17 | | FY 18 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number[1] of Areas | Total Acres | Number of Areas | Total Acres | Number of Areas | Total Acres | Number of Areas | Total Acres | Number of Areas | Total Acres |
| Estuarine | 29 | 2.71 | 39 | 6.85 | 22 | 5.55 | 55 | 17.3 | 112 | 10.82 |
| Lacustrine | 29 | 10.39 | 26 | 48.86 | 35 | 9.29 | 24 | 17.45 | 32 | 12.46 |
| Marine | 6 | 0.46 | 2 | 0.03 | 4 | 3.08 | 11 | 59.91 | 15 | 10.58 |
| Palustrine | 740 | 1,491.65 | 788 | 1,452.29 | 786 | 2,162.99 | 990 | 1,851.78 | 1,234 | 4,141.19 |
| Riverine | 130 | 432.94 | 124 | 78.95 | 169 | 235.75 | 141 | 44.34 | 238 | 188.06 |
| **Total** | **934** | **1,938.15** | **979** | **1,586.98** | **1,016** | **2,416.66** | **1,221** | **1,990.78** | **1,631** | **4,363.11** |

[1]The Number of Areas represents the number of WOTUS areas authorized. A single 404 permit may authorize multiple WOTUS areas, so the number of areas will exceed the number of permits issued. Also see Notes subsection under 4.2.1 regarding areas and acreages. FY = Federal Fiscal Year (October through September)

Source: USACE Jacksonville District

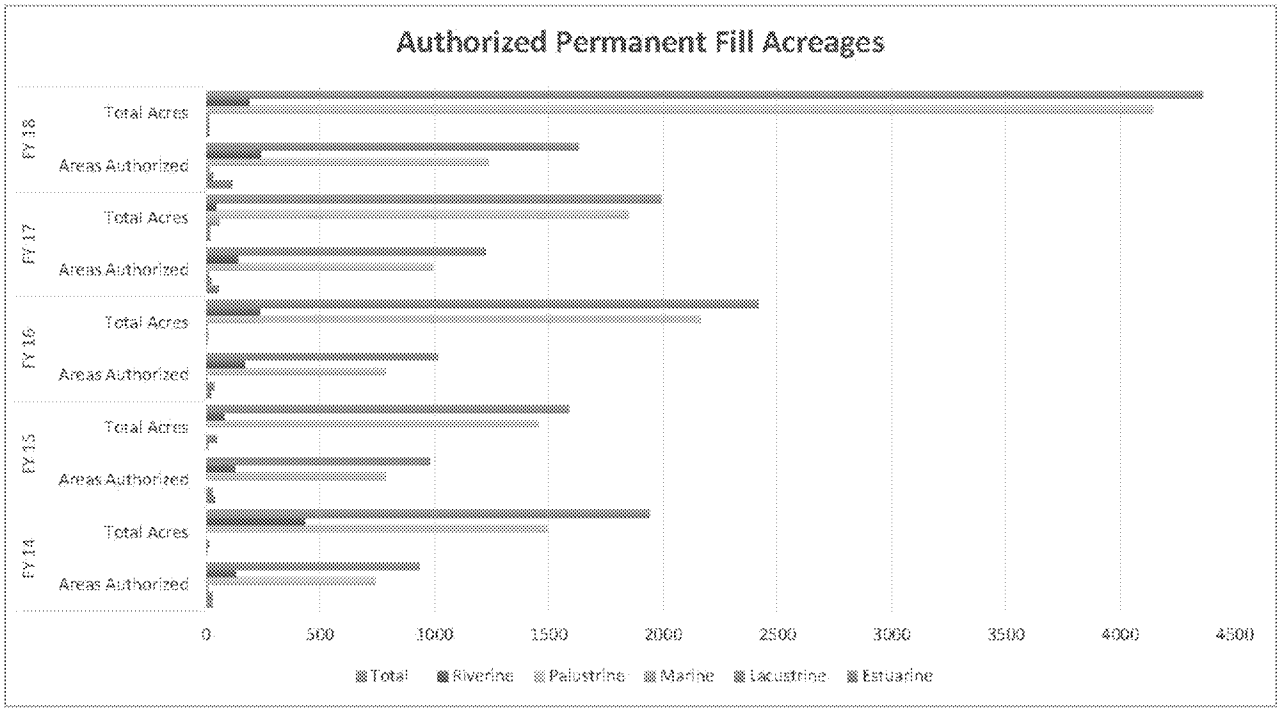


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Acreage of Authorized Fill, by Wetland Type**

A single 404 permit may authorize multiple WOTUS areas, so the number of areas will exceed the number of permits issued. Also see Notes subsection under 4.2.1 regarding areas and acreages. FY = Federal Fiscal Year (October through September). Source: USACE Jacksonville District

### *Freshwater Non-forested Wetlands – Palustrine Wetlands including Palustrine Emergent (PEM) and Palustrine Shrub Scrub (PSS)*

As shown in Table 4-1, freshwater non-forested wetlands (assumed to be roughly equivalent to combined PEM and PSS Cowardin Types) are associated with a considerable number of the permitted activities in Florida from FY 2014 through 2018; the number of WOTUS areas authorized ranged from 263 to 542, and the acreage ranged from 320 to 2,069 annually. Although freshwater non-forested wetlands are among the most extensive in Florida (about 5.4 million acres) (FWC 2019), Table 4-1 suggests that Section 404 permitted fill activities disproportionately affected this habitat type.

### *Freshwater Forested Wetlands*

Freshwater forested wetlands (assumed to be roughly equivalent to Palustrine Forested (PFO) Cowardin Types) accounted for an even greater number of permitted fill activities from FY 2014 through 2018; the number of WOTUS areas authorized ranged from 354 to 622, and the acreage ranged from 727 to 1,980.

Freshwater forested wetlands include about 4.2 million acres or about 10 percent of Florida's land area. Table 4-1 suggests that Section 404 permitted fill activities disproportionately affected this habitat type.

*Lakes*

Lakes (assumed to be roughly equivalent to lacustrine Cowardin Types) accounted for a relatively small proportion of permitted activities: 24 to 32 WOTUS areas authorized from FY 2014 through 2018, and nine to 48 acres. Lakes cover almost 1.3 million acres in Florida, with much of the surface area in public ownership.

*Rivers and Streams*

Rivers and streams (assumed to be roughly equivalent to riverine Cowardin Types) accounted for 124 to 238 WOTUS areas authorized from FY 2014 through 2018, and 79 to 432 acres with considerable year to year variation. Estuarine Cowardin Type wetlands may also fall in this category, with a small area included in assumed waters; 22 to 112 WOTUS areas associated with permits were issued for estuarine wetlands, including three to 17 acres of impacts.

*Marine*

Relatively small areas of marine habitat (assumed to be equivalent to marine Cowardin Types) are within assumed waters; WOTUS areas authorized ranged from two to 15 per year, including less than one to about 10 acres of impacts per year.

*Uplands*

While uplands are not regulated under state wetland regulations, under the CWA and ESA, if uplands include listed species which can be adversely affected as a result of the Action, those impacts/effects must be addressed. ESA-listed species could be affected by Actions on uplands that are associated with wetlands permits such as construction of access roads or staging areas, and many species utilize both wetland and upland habitat. Thus, such features are often included as part of the species coordination process for a State 404 permit application review.

*Inventories and Surveys for Habitat Types and Quantities*

The most current information on Florida habitat types is summarized in the Wildlife Plan and is also available as GIS layers from the FNAI. While this information is in some cases based on site-specific inventories or surveys, it is presented at the statewide level. A statewide approach is believed to be appropriate for this statewide Programmatic BA. Available GIS layers can be used to map specific wetlands, at a scale that can be presented in a statewide view or mapped on a finer scale when needed.

### 4.2.2 Historical Federal Permitting: ESA Consultations

Baseline conditions were derived from the USACE permit database provided by the Regulatory Division of the USACE Jacksonville District, which encompasses federal fiscal years 2014 through 2018. This database includes all temporary and permanent permitted wetland impacts by Cowardin code, permit authorization type, dredge or fill acreage approved, and a project site coordinate. The database also includes all ESA consultations by type, agency, closure method, ESA-listed species potentially affected, and a corresponding object identification number that links the ESA consultations with the permitted wetland impacts.

Please see the Notes subsection in 4.2.1 for details regarding interpretation of the data in this BA. Tables 4-2a and 4-2b show the types of consultations for ESA-listed species for the USACE consultation data involving permanent and temporary dredge and fill actions in Florida from 2014 through 2018. We estimate that out of those past Section 404 permit applications reviewed, 7.08 percent of reviews were reasonably certain to



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result in take (n=~368 permit reviews out of 5,195). This percentage was calculated using the USACE Jacksonville District permitting database's "Formal" choice in the "Consultation Type" field, since most of the formal consultations can be assumed to be associated with activities that may cause incidental take. The percentages of all types of consultations are shown for the five-year period is shown in Table 4.2a. In Table 2b, this data is shown annually for years 2014-2018. Approximately 14 percent resulted in "Informal" type consultations. As shown in Table 4.2, over ~79 percent of findings over the period 2014-2018 were covered by existing programmatic consultations or decision tools. For the USACE permit data collected during the years 2014-2018, a small proportion of the total number of ESA-listed species accounted for the majority of consultations. During this time, many of the species subject to frequent consultation had existing decisions tools such as consultation keys or programmatic biological opinions. For those species, such decision tools can help guide future consultations and assist FDEP when assessing potential effects of proposed actions.

Of the 139 listed and two (2) proposed species in the Action Area, 84 have been the subject of ESA consultations in the past five years. Two species (Eastern Indigo Snake and Wood Stork) accounted for 56.6 percent of species-level consultations, and just 15 species accounted for 93.3 percent of all species-level consultations (see Table 4-3a and Table 4-3b; note that most consultations include more than one species, therefore these numbers may represent a smaller number of consultations). Recent consultations are not distributed evenly within the Action Area and can be especially dense in areas of rapid growth and development (see Figures 8 and 9).

Discrepancies in the numbers between Tables 4-2 and Table 4-3 are explained as follows. Each permit may have several habitat types and species associated with it that may require input from either the USFWS or NMFS, sometimes both. Due to the availability of tools such as programmatic consultations and consultation keys, some species for a given permit may be covered under a programmatic consultation while others may require a formal or informal consultation. This results in the possibility of multiple species in the USACE database being associated with one USACE-assigned ESA Action Identification number based on their closure method and consultation type while other species associated with the permit fall into a different ESA Action Identification number.



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**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ]a Consultation Types for Federal Actions Totals, FY 2014 – 2018**

| ESA Determination | Total # (2014-2018) | % of Total |
|---|---|---|
| Formal | 368 | 7.08 |
| Informal | 710 | 13.67 |
| Programmatic | 4117 | 79.25 |
| **Total** | **5195** | **100** |

Source: USACE Jacksonville District

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ]b Consultation Types for Federal Actions by Year, FY 2014 – 2018**

| ESA Determination | Total # 2014 | Total # 2015 | Total # 2016 | Total # 2017 | Total # 2018 | % of Total |
|---|---|---|---|---|---|---|
| Formal | 41 | 61 | 63 | 80 | 123 | 7.08 |
| Informal | 137 | 131 | 127 | 131 | 184 | 13.67 |
| Programmatic | 811 | 738 | 740 | 883 | 945 | 79.25 |
| **Total** | **994** | **942** | **933** | **1096** | **1252** | **100** |

Source: USACE Jacksonville District

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ]a ESA Consultations Without Programmatic, By Species, 2014-2018**

| Species | # of Consultations | Species | # of Consultations |
|---|---|---|---|
| ***Mammals*** | | | |
| Florida Bonneted Bat, (*Eumops floridanus*) | 383 | Choctawhatchee Beach Mouse, (*Peromyscus polionotus allophrys*) | 1 |
| Key Largo Woodrat, (*Neotoma floridana smalli*) | 1 | Southeastern Beach Mouse, (*Peromyscus polionotus niveiventris*) | 2 |
| Key Deer, (*Odocoileus virginianus clavium*) | 2 | St. Andrew Beach Mouse, (*Peromyscus polionotus peninsularis*) | 3 |
| Rice Rat, (*Oryzomys palustris natator*) | 2 | Florida Panther, (*Puma (=felis*) | 108 |
| Key Largo Cotton Mouse, (*Peromyscus gossypinus allapaticola*) | 1 | Lower Keys Marsh Rabbit, (*Sylvilagus palustris hefneri*) | 2 |
| ***Birds*** | | | |
| Cape Sable Sparrow, Seaside (*Ammodramus maritimus mirabilis*) | 9 | Wood Stork, (*Mycteria americana*) | 216 |

| Species | # of Consultations | Species | # of Consultations |
|---|---|---|---|
| Florida Grasshopper Sparrow, (*Ammodramus savannarum floridanus*) | 45 | Red-Cockaded Woodpecker, (*Picoides borealis*) | 230 |
| Florida Scrub-Jay, (*Aphelocoma coerulescens*) | 143 | Audubon's Crested Caracara, (*Polyborus plancus audubonii*) | 142 |
| Red Knot, (*Calidris canutus rufa*) | 8 | Everglade Snail Kite, (*Rostrhamus sociabilis plumbeus*) | 121 |
| Piping Plover, (*Charadrius melodus*) | 19 | - | - |
| ***Reptiles*** | | | |
| American Alligator, (*Alligator mississippiensis*) | 2 | Gopher Tortoise, (*Gopherus polyphemus*) | 1 |
| American Crocodile, (*Crocodylus acutus*) | 12 | Atlantic Salt Marsh Snake, (*Nerodia clarkii taeniata*) | 6 |
| Eastern Indigo Snake, (*Drymarchon couperi*) | 207 | Bluetail Mole Skink, (*Plestiodon egregius lividus*) | 31 |
| Sand Skink, (*Plestiodon reynoldsi*) | 59 | - | - |
| ***Amphibians*** | | | |
| Reticulated Flatwoods Salamander, (*Ambystoma bishopi*) | 4 | - | - |
| ***Fish*** | | | |
| Shortnose Sturgeon, (*Acipenser brevirostrum*) | 5 | Atlantic Sturgeon, (*Acipenser oxyrinchus oxyrinchus*) | 6 |
| Smalltooth Sawfish, (*Pristis pectinata*) | 188 | Okaloosa Darter, (*Etheostoma okaloosae*) | 1 |
| ***Mollusks*** | | | |
| Fat threeridge, (*Amblema neislerii*) | 3 | Gulf Moccasinshell, (*Medionidus penicillatus*) | 4 |
| Chipola Slabshell, (*Elliptio chipolaensis*) | 3 | Ochlockonee Moccasinshell, (*Medionidus simpsonianus*) | 3 |
| Purple Bankclimber, (*Elliptoideus sloatianus*) | 5 | Choctaw Bean, (*Villosa chocctawensis*) | 6 |
| Tapered Pigtoe, (*Fusconaia burkei*) | 5 | Stock Island Tree Snail, (*Orthalicus reses* (not incl. *nesodryas*) | 1 |
| Narrow Pigtoe, (*Fusconaia escambia*) | 3 | Oval Pigtoe, (*Pleurobema pyriforme*) | 6 |
| Round Ebonyshell, (*Fusconaia rotulata*) | 2 | Fuzzy Pigtoe, (*Pleurobema strodeanum*) | 6 |



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| Species | # of Consultations | Species | # of Consultations |
|---|---|---|---|
| Southern Sandshell, (*Hamiota australis*) | 6 | Southern Kidneyshell, (*Ptychobranchus jonesi*) | 6 |
| Shinyrayed Pocketbook, (*Lampsilis subangulata*) | 4 | - | - |
| ***Crustaceans*** | | | |
| N/A | - | N/A | - |
| ***Insects*** | | | |
| Schaus Swallowtail Butterfly, (*Heraclides aristodemus ponceanus*) | 1 | - | - |
| ***Plants*** | | | |
| Telephus Spurge, (*Euphorbia telephioides*) | 12 | Miccosukee Gooseberry, (*Ribes echinellum*) | 2 |
| Florida Torreya, (*Torreya taxifolia*) | 1 | American Chaffseed, (*Schwalbea americana*) | 1 |
| Key Tree Cactus, (*Pilosocereus robinii*) | 2 | Fringed Campion, (*Silene polypetala*) | 1 |
| Chapman Rhododendron, (*Rhododendron chapmanii*) | 1 | - | - |

Source: USACE Jacksonville District

**Table 4-[ SEQ Table * ARABIC \s 1 ]b ESA Consultations with Programmatic, 2014-2018**

| Species | # of Consultations | Species | # of Consultations |
|---|---|---|---|
| ***Mammals*** | | | |
| West Indian Manatee, (*Trichechus manatus*) | 493 | Choctawhatchee Beach Mouse, (*Peromyscus polionotus allophrys*) | 1 |
| Florida Bonneted Bat, (*Eumops floridanus*) | 411 | Southeastern Beach Mouse, (*Peromyscus polionotus niveiventris*) | 3 |
| Key Largo Woodrat, (*Neotoma floridana smalli*) | 1 | St. Andrew Beach Mouse, (*Peromyscus polionotus peninsularis*) | 4 |
| Key Deer, (*Odocoileus virginianus clavium*) | 5 | Florida Panther, (*Puma (=felis*) | 197 |
| Rice Rat, (*Oryzomys palustris natator*) | 5 | Lower Keys Marsh Rabbit, (*Sylvilagus palustris hefneri*) | 6 |
| Key Largo Cotton Mouse, (*Peromyscus gossypinus allapaticola*) | 1 | - | - |
| ***Birds*** | | | |

**Table 4-[ SEQ Table * ARABIC \s 1 ]b ESA Consultations with Programmatic, 2014-2018**

| Species | # of Consultations | Species | # of Consultations |
|---|---|---|---|
| Cape Sable Sparrow, Seaside (*Ammodramus maritimus mirabilis*) | 9 | Wood Stork, (*Mycteria americana*) | 2681 |
| Florida Grasshopper Sparrow, (*Ammodramus savannarum floridanus*) | 57 | Red-Cockaded Woodpecker, (*Picoides borealis*) | 298 |
| Florida Scrub-Jay, (*Aphelocoma coerulescens*) | 199 | Audubon's Crested Caracara, (*Polyborus plancus audubonii*) | 175 |
| Red Knot, (*Calidris canutus rufa*) | 9 | Everglade Snail Kite, (*Rostrhamus sociabilis plumbeus*) | 159 |
| Ivory-Billed Woodpecker, (*Campephilus principalis*) | 1 | Kirtland's Warbler, (*Setophaga kirtlandii* (= *dendroica kirtlandii*) | 2 |
| Piping Plover, (*Charadrius melodus*) | 29 | Roseate Tern, (*Sterna dougallii dougallii*) | 1 |
| ***Reptiles*** | | | |
| American Alligator, (*Alligator mississippiensis*) | 2 | Gopher Tortoise, (*Gopherus polyphemus*) | 1 |
| American Crocodile, (*Crocodylus acutus*) | 33 | Atlantic Salt Marsh Snake, (*Nerodia clarkii taeniata*) | 6 |
| Eastern Indigo Snake, (*Drymarchon couperi*) | 2697 | Bluetail Mole Skink, (*Plestiodon egregius lividus*) | 31 |
| Sand Skink, (*Plestiodon reynoldsi*) | 66 | - | - |
| ***Amphibians*** | | | |
| Reticulated Flatwoods Salamander, (*Ambystoma bishopi*) | 6 | - | - |
| ***Fish*** | | | |
| Shortnose Sturgeon, (*Acipenser brevirostrum*) | 15 | Atlantic Sturgeon, (*Acipenser oxyrinchus oxyrinchus*) | 16 |
| Smalltooth Sawfish, (*Pristis pectinata*) | 305 | Okaloosa Darter, (*Etheostoma okaloosae*) | 1 |
| ***Mollusks*** | | | |
| Fat threeridge (*Amblema neislerii*) | 6 | Gulf Moccasinshell, (*Medionidus penicillatus*) | 6 |
| Chipola Slabshell, (*Elliptio chipolaensis*) | 6 | Ochlockonee Moccasinshell, | 6 |
| Purple Bankclimber, (*Elliptoideus sloatianus*) | 8 | Choctaw Bean, (*Villosa choctawensis*) | 9 |



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**Table 4-[ SEQ Table * ARABIC \s 1 ]b ESA Consultations with Programmatic, 2014-2018**

| Species | # of Consultations | Species | # of Consultations |
|---|---|---|---|
| Tapered Pigtoe, (*Fusconaia burkei*) | 8 | Stock Island Tree Snail, (*Orthalicus reses* (not incl. n*esodryas*) | 2 |
| Narrow Pigtoe, (*Fusconaia escambia*) | 3 | Oval Pigtoe, (*Pleurobema pyriforme*) | 11 |
| Round Ebonyshell, (*Fusconaia rotulata*) | 2 | Fuzzy Pigtoe, (*Pleurobema strodeanum*) | 7 |
| Southern Sandshell, (*Hamiota australis*) | 7 | Southern Kidneyshell, (*Ptychobranchus jonesi*) | 7 |
| Shinyrayed Pocketbook, (*Lampsilis subangulata*) | 6 | - | - |
| ***Crustaceans*** | | | |
| N/A | - | N/A | - |
| ***Insects*** | | | |
| Miami Blue Butterfly, (*Cyclargus* (=*hemiargus*) | 1 | Schaus Swallowtail Butterfly, (*Heraclides aristodemus ponceanus*) | 1 |
| ***Plants*** | | | |
| Beautiful Pawpaw, (*Deeringothamnus pulchellus*) | 1 | Chapman Rhododendron, (*Rhododendron chapmanii*) | 1 |
| Telephus Spurge, (*Euphorbia telephioides*) | 12 | Miccosukee Gooseberry, (*Ribes echinellum*) | 2 |
| Florida Torreya, (*Torreya taxifolia*) | 1 | American Chaffseed, (*Schwalbea americana*) | 1 |
| Aboriginal Prickly-Apple, (*Harrisia* (=*cereus*) | 0 | Fringed Campion, (*Silene polypetala*) | 1 |
| Key Tree Cactus, (*Pilosocereus robinii*) | 3 | - | - |

Source: USACE Jacksonville District



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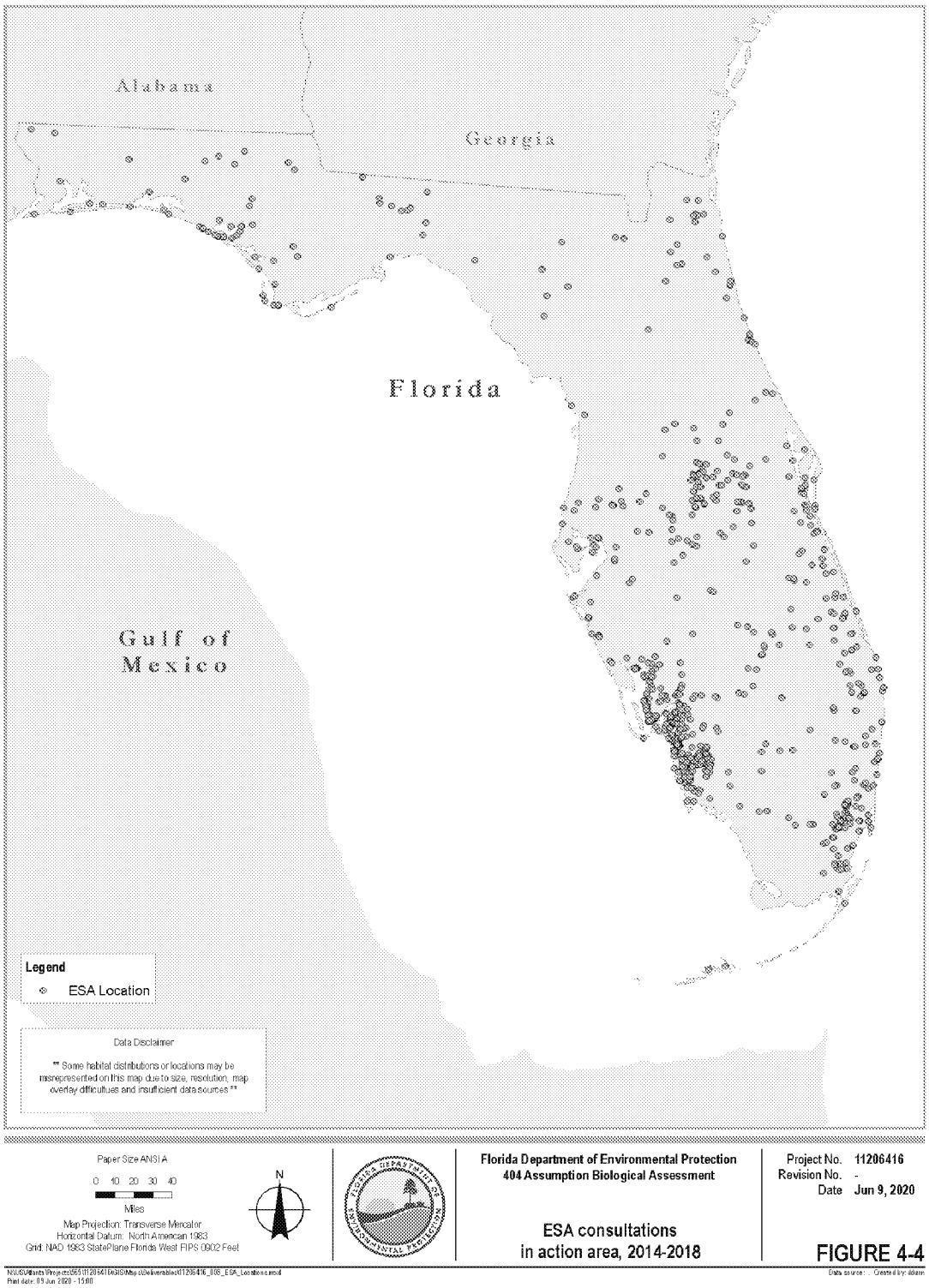
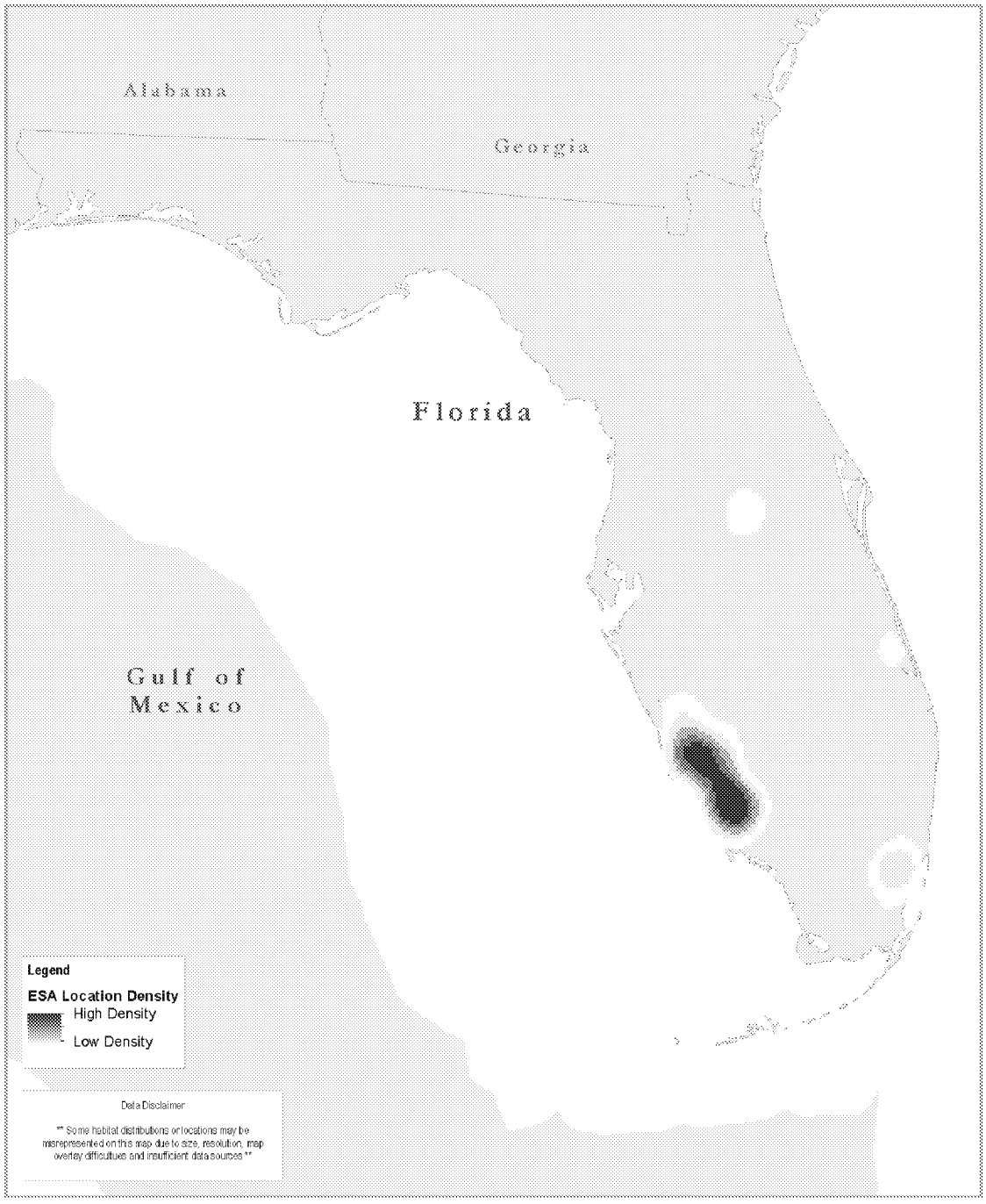
**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ]  Locations of ESA**




**Consultations in Action Area, 2014 - 2018**

**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Concentrations of ESA consultations in the Action Area, 2014 - 2018**




Paper Size ANSI A
0 10 20 30 40
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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

N

Florida Department of Environmental Protection
404 Assumption Biological Assessment

Concentrations of ESA consultations in the action area, 2014-2018

Project No. 11206416
Revision No. -
Date Jun 9, 2020

FIGURE 4-5

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# 5. Potential Effects on ESA-considered Species

Effects of an action are all consequences to listed species or critical habitat that are caused by the action, including the consequences of other activities that are caused by the action. A consequence is caused by the action if it would not occur but for the action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR §402.02). The Action studied in this BA is EPA's approval of the State's Assumption of the dredge and fill permitting program under Section 404 of the CWA for waters assumable by the State. A direct consequence of the Action is that an applicant must go through the State 404 permitting process for a permit in waters assumed by the State and may not go directly to the USACE to get a 404 permit to place fill in State-assumed waters. Therefore, the effects of the EPA approving the Program Assumption are 1) the USACE would no longer be allowed to issue a wetland fill permit in assumable waters, 2) FDEP would be the only entity allowed to issue 404 permits in assumable waters, and 3) the consequence of FDEP issuing 404 permits would be the placement of dredge material in wetlands, which in turn would alter the environment where ESA-considered species may exist or designated critical habitat may exist.

The Action is not expected to substantially increase or decrease the number of Section 404-type authorized activities post-assumption as compared to before Assumption, since the only expected change will be the entity processing the permits. The State 404 program's processes and structure will be consistent with CWA requirements and Section 404 analysis of species and aquatic resources and potential effects of proposed fill or dredge activities. It is reasonable to expect that permitting history available by the USACE for the interval 2014-2018 approximates the number and types of permitting activities that might be anticipated for the next five-year interval. See Chapter 4.2.1 regarding the limitations of the data used in the analyses of this BA, regarding the interpretations of the USACE database and shapefile.

The precise number and locations of future Section 404 permit applications are unknown. Some can be predicted well in advance, such as large public works projects with long lead times and planning horizons. However, most applications, especially from individuals or private entities, are less predictable. While precise locations are mostly unknown, as shown in Figures 8 and Figure 9 consultations related to Section 404 applications tend to cluster in rapidly developing regions of the state.

Using the best available data on recent (past five years) permitting activities as a baseline (see Chapter 4), as well as ecological theory, professional judgment, and the information included in the species accounts in Appendix B, we conducted a qualitative assessment of the potential effects of the Action on species and designated critical habitat. We did not distinguish direct and indirect effects based on 2019 updates to the section 7 implementing regulations of the ESA (50 CFR § 402); however, both immediate impacts and those delayed in time were considered.

Table C.1 in Appendix C summarizes the potential impacts of dredge and fill activities on ESA-listed and proposed to be listed species. This stressor table is intended to identify potential effects and facilitate analysis of which effects are reasonably likely to occur as a result of activities authorized, if Assumption of Section 404 is approved. A detailed analysis of potential effects in the future is not possible, because, as stated above, the exact locations, amounts, and types of impacts are not yet known. We briefly summarize major categories of impacts below, followed by a discussion of potential effects on major taxa.



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## 5.1 Types of Effects

The following discussion is not exhaustive but includes some of the more common influencing factors and consequences to species that may result from dredge and fill activities. There is a spectrum of effects to consider, including beneficial effects, but for the purposes of this BA the focus will be on potential adverse effects. For example, there is a level of disturbance without a detectable sign of effect (e.g. a wood stork flushed off a nest but returns before the eggs are harmed). There is also disturbance with a detectable sign of effect (e.g. a wood stork is flushed off a nest and the eggs overheat and die). Heightened levels of effect include injury that is observable or detectable, such as a failure to reproduce because of physiological or ecological effects of the action, or the death of one or more individuals.

There is also a spectrum of likelihoods that an effect may occur from a theoretical or conceptual standpoint. The likelihood that an effect may occur can be described by how confident a reviewer may be that something is actually going to occur. These levels of likelihood that something will occur include potential, unlikely, possible, likely, more than likely, and reasonably certain. Potential stressors or effects to the species and to the essential physical and biological features of any critical habitat are discussed below and summarized in Appendix C, but also must be assessed during the review of State 404 permit applications.

### 5.1.1 Biotic Stressors

Biotic stress is stress that occurs as a result of damage done to an organism by other living organisms, such as bacteria, viruses, fungi, parasites, beneficial and harmful insects, weeds, and cultivated or native plants. Dredge and fill activities can alter competitive balances, change predator/prey relationships, or encourage the establishment of invasive plants or animals, which can alter habitat structure. Loss or decrease, or colonization or increase, of a species can cascade through multiple trophic levels and, in some cases, even contribute to habitat alteration (monotypic stands of invasive plants).

### 5.1.2 Physical Stressors

Physical stressors should be assessed individually and cumulatively, when assessing potential biological impacts. An example of a physical stressor could be the physical diversion of a stream to another location, which may adversely impact the habitat for the flora and fauna using the original location of the stream. Other examples include the construction of new, improvements to, and even the removal of dams, weirs, and culverts, the removal of wetlands and surface waters by filling with materials, and the creation of surface waters by dredging and excavation. Physical stressors include direct mortality (burying or trapping of individual animals by fill or equipment placing fill), especially for smaller, less mobile species; it can also result in loss of habitat and displacement of more mobile species able to escape the immediate effect. Fill of part of a wetland can contribute to loss of function even if most of the wetland remains intact.

Dredging can result in temporary to permanent loss of aquatic bottom communities, and sedimentation can reduce visibility, clog gills of aquatic species, and bury immobile organisms. Recovery from dredge effects may require hours to years, depending on the habitat, substrate type, and the extent of the disturbance.

Fragmentation can affect species that migrate seasonally between habitat types (pond breeding salamanders which spend the summer in uplands up to hundreds of feet away) or which have large home ranges and frequently move among resource types (Eastern Indigo Snake or Florida Panther). It can also disrupt metapopulations, especially for short-lived invertebrates dependent on stochastic environments, reducing the frequency of recolonization of otherwise suitable habitat.



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Changes to hydrologic regime may include lowering of groundwater levels, increased runoff, or altered hydroperiod. Changes that result in early drying of ponds or wetlands may result in mortality to pond breeding amphibian larvae or small fish, while conversion of a seasonal wetland to a permanent pond may allow colonization by large predators, including stocking of game fish.

Some construction activities (e.g., pile driving or dredging) can result in air or underwater noise and vibration effects. Analysis of and attempting to reduce these effects has become more common in recent years. Construction activities such as noise, vibration, as well as visual disturbance, may alter the behavior of ESA-listed species.

Even measures intended to reduce effects can sometimes have unintended consequences. Some projects have relocated ESA-listed species, but little follow-up monitoring has been done to document success or failure of the translocations.

### 5.1.3 Physicochemical Water Quality Stressors

Physicochemical stress results from environmental factors such as food/nutrition, toxins, metabolic disorders, infections, and inflammation. Water Quality changes are commonly associated with dredge and fill activities, although these are not always easy to describe. Effects can include changes in water temperature, gas or oil dripping from construction equipment or generators to fill of a wetland, eliminating or reducing natural filtration of sediment and pollutants and resulting in degradation of downstream habitat. Dredging may also re-suspend environmental contaminants in sediment (common in industrial areas). Changes to nutrient cycling or exchange are even less obvious and may result from new activities occurring on or adjacent to the filled areas.

## 5.2 Potential Effects

The following discussion is grouped by major taxa and discusses potential effects of the Action by future activities that may be authorized, should the State 404 program be approved, within guilds of species with similar habitat needs or life-history traits. These effects are similar to the effects of the current USACE Section 404 process for granting or denying permits, only will be performed by the State 404 program process as a consequence of the Action, if approved. It is assumed that overall, the future number and/or any rate of increase for State 404 applications and the general types of activities and overall dredge or fill quantities will be similar to those permitted in similar jurisdictional waters as past requests for permits by the USACE, and would not change due to an approval of the State's request for Assumption.

### 5.2.1 Mammals

Twenty-four mammalian species/subspecies are included in Appendix C, Table C.1. Two of these mammals are extirpated from the state and are therefore excluded from further consideration in this BA. General habitat preferences in Florida can group the remaining twenty mammals into the following broad categories: wetland/marsh (six mammals), forests/grasslands/swamps (two mammals), tropical hardwood hammock/mangrove (three mammals), caves (four mammals), pine rockland (one mammal), beach/scrub dune (five mammals), and aquatic (one mammal). These groups are intentionally broad for this macro analysis. Impact analysis on the species level (that takes into consideration species'/subspecies' microhabitat preferences) is presented in Table C.1.



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In general, all mammalian species under consideration in this BA that occupy or frequent WOTUS or adjacent habitats during any stage of their life histories and behaviors may be disturbed by activities during periods when authorized activity-related noise and vibration exceed baseline levels. Such activities may also disturb the natural behavior of ESA-considered species due to visual disturbance during construction activities.

ESA-considered mammals that occupy wetlands and marshes in Florida include voles, rabbits, and rats. These species/subspecies may occupy or use wetland/marsh habitat during all or a portion of their life history (e.g., for breeding, foraging, or shelter). Marsh and wetland species are likely to be directly affected by impacts to their habitat from future authorized dredge and fill activities, which may also result in habitat fragmentation. Changes in existing hydrological regimes and water quality associated with future authorized activities could also degrade the quality of wetland/marsh habitat and vegetation (e.g., allow for invasion of non-native vegetation). Dredge and fill activities are also frequently associated with coastal development. Development of marshes/wetlands may create suitable conditions for non-native predators (e.g., cats and dogs) and competitors (e.g., *Rattus rattus*), which would also impact these ESA-considered species via increased ecological pressures.

Carnivores with large home ranges (e.g., Florida Panther and Red Wolf) occupy a diverse range of habitats, such as forests, grasslands, and swamps in Florida (as well as pine rocklands). Due to the restricted range of the Red Wolf on protected land in Florida (limited to St. Vincent Island, a USFWS National Wildlife Refuge), future activities authorized by the State 404 program are not likely to adversely affect the species. However, future permitted activities may impact the Florida Panther through direct impacts to habitat (dredge and fill), habitat fragmentation, and changes to existing hydrological regimes/water quality. Habitat fragmentation is one of the primary threats to this subspecies and a limit to its recovery.

Tropical hardwood hammock/mangrove ESA-considered mammal species (bats, rats, and mice) are likely to be impacted by future permitted activities via habitat fragmentation from fill or impacts to hydrology/water quality. Several species require fresh sources of drinking water, and their prey items are also dependent on these landscape features. In addition, impacts to habitat, including fragmentation, may create opportunities for non-native predators (e.g., cats) to colonize/thrive. The extent of tropical hardwood hammock and mangrove, particularly in south Florida, has declined significantly over the last several decades as a result of development, and further fragmentation could have significant impacts on ESA-considered species (USFWS 1999).

Several ESA-considered bat species/subspecies occur in limestone karst cave regions of the Florida Panhandle. Most of these bats are rare/unlikely to occur in the state, and future permitted activities are unlikely to adversely affect them. However, the Tricolored Bat is a permanent resident throughout Florida and occupies caves as well as woodland habitat and urban landscapes. Water features are also important to the species as foraging habitat. Direct impacts on the species' habitat (fill) as well as an increase in habitat fragmentation or impacts to hydrological regimes/water quality, may adversely affect the species.

The Key Deer (as well as the Florida Panther) inhabits pine rocklands. Pine rockland (as well as hammock) contains a substantial portion of the deer's forage plants, freshwater, and cover, which is especially important for fawning. Ongoing threats to the species include urbanization. Through direct impacts to habitat via fill, as well as habitat fragmentation and impacts to water quality, future permitted activities could have an impact on the subspecies.

Several ESA-considered beach mice occupy dune systems vegetated by sea oats and adjacent scrub (dominated by oaks and sand pine or palmetto) in coastal Florida. The predominant factors of decline for

these mice are habitat loss due to alteration or conversion of dunes (from human development and use) as well as predation by non-native predators. Direct impacts to habitat via fill, dredging, and habitat fragmentation (which may make habitat for hospitable for non-native predators) could affect these species.

The West Indian Manatee is the only ESA-listed aquatic marine mammal considered in this BA. Florida manatees occur in freshwater, brackish, and marine environments, including coastal river estuaries, sloughs, canals, creeks, and lagoons. The species requires a source of freshwater for drinking. Threats to the species include human-caused mortality (watercraft collisions), interactions with commercial fishing gear, pollution, exposure to cold/loss of warm-water refugia, red tides, and impacts to habitat. Future activities authorized by the State 404 program could affect this species from dredge and fill activities, increases in vessel storage and operation, and impacts on habitat, including changes in hydrologic regimes, water quality, water control structures, and habitat fragmentation.

### 5.2.2 Birds

Nineteen avian species/subspecies are included in Appendix C, Table C.1. Five of these birds are extirpated from the state and are therefore excluded from further impact analysis in this BA. The remaining 14 birds can be grouped by general habitat preferences in Florida into the following broad categories: marsh/wetland birds (five birds), upland scrub birds (one bird), coastal tidal/marine birds (four birds), grassland birds (two birds), pine savanna birds (one bird), and forest/forested wetlands birds (one bird). These groups are intentionally broad for this macro analysis. Impact analysis on the species level (that takes into consideration species'/subspecies' microhabitat preferences) is also presented in Appendix C, Table C.1.

In general, all avian species under consideration in this BA that occupy or frequent WOTUS or adjacent habitats during any stage of their life histories may be disturbed by future permitted activities during periods project noise and vibration exceed baseline levels. In addition, these activities may also alter the natural behavior of ESA-considered via visual disturbance during construction activities.

Marsh/wetland avian species may be affected by any direct impacts to their habitat (nesting, foraging, roosting, overwintering, or stop-over site habitat). Physical impacts to their habitat associated with future State 404 permits may include fill, dredging, and habitat fragmentation. In addition, fill of marsh/wetland habitat may result in a change to existing hydrologic regimes that could impact prey availability, via providing better conditions for invasive/competing prey species or reducing habitat for prey). Changes in hydrology also have the potential to flood habitat and nesting areas (resulting in nest failure), allow aquatic or terrestrial predators easier access to nests (during flooding vs. receding water conditions), and change the existing nutrient cycle. Changes in hydrology may result in high nitrogen levels in marshes/wetlands. The habitat then may become choked by an overabundance of emergent vegetation. Future permitted activities may also result in changes to water quality that could impact existing marsh/wetland vegetation and prey items (reducing habitat suitability for the species).

The only upland scrub avian species under evaluation is the Florida Scrub-jay. Florida Scrub-jays occupy early successional xeric scrub and scrub flatwood habitat in relict sand dunes in north and central Florida. This xeric habitat is well-drained but may be interspersed with swale marshes. Direct impacts associated with permitted activities that could affect the species include placement of fill, alteration of hydrologic regimes, and habitat fragmentation (a major issue that hampers the recovery of this species).

Direct impacts of future permitted activities on coastal tidal/marine avian species may include fill, dredging, and habitat fragmentation of nesting and foraging habitat (beaches, mudflats, intertidal areas, and inlets).



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Shoreline stabilization efforts, in particular, threaten several coastal avian species (i.e., fortification by riprap and other hardscape reduces available habitat). Permitted activities may also result in changes to hydrologic regimes and water quality in coastal areas.

Grassland (or dry prairie) avian species may be impacted if authorized dredge or fill activities result in diminished habitat quality via habitat fragmentation or changes to existing hydrologic regimes. Throughout Florida, grassland habitat is declining and highly fragmented. This habitat may also be mismanaged by suppression of natural fire regimes (USFWS 1999). Additional habitat loss and fragmentation may impact grassland species. Many grassland species also nest on or close to the ground and are highly susceptible to nest flooding (could occur with altered hydrological conditions in the grassland).

The only pine savanna avian species under evaluation is the Red-cockaded Woodpecker. Pine savanna ecosystems (or "high pine") are characterized by widely spaced pine trees and extensive ground cover. Wetlands may be interspersed in low-lying areas. This habitat is almost extinct and highly fragmented in Florida. Also, the quality of existing high pine forests may be hampered by fire suppression (USFWS 1999). Pine savanna avian species may be impacted if authorized dredge or fill activities result in diminished habitat quality via habitat fragmentation or changes to existing hydrologic regimes.

Forest/forested wetlands avian species may be impacted if future authorized dredge or fill activities result in diminished habitat quality via habitat fragmentation or changes to existing hydrologic regimes and water quality. Many of the forest/forested wetland obligate species under evaluation are extirpated from the State of Florida. Habitat fragmentation may expose the remaining forest/forested wetland avian species to increased predation risk and nest failure (Stephens et al. 2004). Altered hydrology and water quality may impact prey availability as well.

### 5.2.3 Reptiles

Nineteen reptiles are included in Appendix C, Table C.1. These reptiles can be grouped by general habitat preferences in Florida into the following broad categories: wetland/marsh/freshwater (seven reptiles), swamp/saltwater (one reptile), pine flatwoods (two reptiles), pine rocklands (two reptiles), and sandhill/scrub flatwood (seven reptiles). These groups are intentionally broad for this macro analysis. Impact analysis on the species level (that takes into consideration species'/subspecies' microhabitat preferences) is presented in Appendix C, Table C.1.

Wetland/marsh/freshwater reptile species in Florida may be affected by any direct impacts to their habitat (foraging, breeding, loafing, etc.). Dredge and fill activities in wetlands, marshes, and freshwater (ponds, rivers, streams), including ditching, diking, and impoundments, may result in habitat fragmentation and potentially impact both prey and predator populations (both native and invasive species). In addition, species that spend a large portion of their lives in water are likely to be impacted by changes in hydrological regimes, water quality, and vegetation composition (e.g., increased levels of sedimentation, impacts to burrowing mud substrate, and changes in emergent/submergent vegetation). Impacts are anticipated to be similar for species that inhabit swamps/forested wetlands and saltwater mangroves.

Pine flatwoods serve as a mesic successional stage between hardwood hammock and wet flatwoods (USFWS 1999). This habitat is threatened by conversion or loss and degradation from fire suppression. Species restricted to pine flatwoods are unlikely to be adversely affected by future State 404 permits. However, species that range between pine flatwoods and other habitat types such as wet flatwoods may be affected by direct impacts to habitat and habitat fragmentation.



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In Florida, large areas of pine rockland habitats are protected on federal lands. However, particularly around Miami and the Keys, this habitat is on private land and under threat from development, conversion to agriculture, fire suppression, and invasive species (USFWS 1999). Pine rocklands are interspersed with areas of freshwater wetlands. Species associated with these wetland features may be affected by direct impacts to habitat as well as habitat fragmentation.

Sandhill/scrub flatwoods are xeric, well-drained areas of prairie, hammock, and scrub. These habitats are threatened by conversion, degradation, and fragmentation. The species that are found in sandhill/scrub flatwoods are not typically associated with wetlands/WOTUS during their life histories. The future permits under the State 404 program are not likely to adversely affect species that occupy these habitats.

### 5.2.4 Amphibians

Five amphibians are included in Appendix C, Table C.1. These include species that utilize seasonal wetlands to breed and then disperse into surrounding upland habitat (three amphibians); species restricted to aquatic caves (one amphibian); and subspecies that primarily utilize perennial wetlands but which always had a restricted distribution and may now be extirpated (one amphibian).

Pond breeding species are easily affected by direct fill of wetlands and by hydrology alteration, especially shortening of pond hydroperiod, which may strand aquatic larvae prior to metamorphosis. As these species move between upland and wetland habitat, fragmentation is a concern. In other parts of the United States, the USFWS sometimes explicitly considers fragmentation in making effects determinations and making conservation recommendations for pond-breeding ESA-listed amphibians (R. Henry pers. comm.). Fire suppression is believed to be a concern for some species in some habitat types. Pond breeding amphibians are also at risk because they utilize seasonal isolated wetlands, which often are not subject to CWA jurisdiction. For cave-dwelling amphibians, water quality degradation, both chemical and from sedimentation, could have adverse effects. Hydrology alteration is also a concern.

Most ESA-considered amphibians in Florida have relatively small distributions. Fully implemented safeguards, such as careful review to identify occurrences associated with future permitting and with adequate avoidance and minimization measures including minimization of fragmentation near utilized wetlands, would ensure that effects would remain at or below baseline conditions.

### 5.2.5 Fish

Six species/subspecies of fish are included in Appendix C, Table C.1 including three types of sturgeon associated with larger rivers and estuaries, two other coastal species, and one species associated with smaller streams. The stream species (Okaloosa Darter) is especially at risk of fragmentation or direct habitat loss because of a restricted range and very limited mobility; however, most populations are currently managed, and the species is considered to be stable at present. The estuarine and coastal species are less likely to be affected by small amounts of dredge or fill because they tend to occur in larger and more contiguous habitats, although sedimentation, water quality degradation, and to a lesser extent direct habitat loss are potential effects. As fish are, by definition, fully aquatic, they are frequently affected by CWA activities. Should these species be found in State-assumed waters, coordination with the Services and important safeguards may need to be identified during permit review, such as implementation of Best Management Practices (BMPs), and avoidance and minimization measures.



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### 5.2.6 Insects

Twenty-five species/subspecies of insects are included in Appendix C, Table C.1 including 11 butterflies, five caddisflies, five dragonflies, two bees, and two beetles. Two of these insects, the American Burying Beetle and the Three-toothed Long-horned Caddisfly, are extirpated from the state and therefore excluded from further consideration in this BA. The majority of these ESA-considered insects are threatened by the use of pesticides for agricultural purposes (e.g., Monarch Butterfly's loss of milkweed host plant) and biocides/insecticides for mosquito control.

All of the caddisfly and dragonfly species face similar threats associated with spring, stream, river, and lake modifications. They may be directly affected by impacts to their habitat from future authorized dredge and fill activities, which may also result in habitat fragmentation. Given that both groups spend the larval stage of their life cycles in an aquatic habitat, they are especially vulnerable to changes in water quality conditions (e.g., siltation, pollution, and eutrophication) and changes to existing hydrological regimes. Thus, changes in existing hydrological regimes and water quality could also degrade the quality of aquatic habitat and vegetation (e.g., allow for invasion of non-native vegetation).

ESA-considered insects that occupy wetlands, marshes, and swamps in Florida include the Palatka Skipper and Duke's Skipper butterflies and the Calvert's Emerald Dragonfly. These species are likely to be directly affected by impacts to their habitat from future authorized dredge and fill activities, which may also result in habitat fragmentation. Changes in existing hydrological regimes and water quality could also degrade the quality of wetland/marsh habitat and vegetation (e.g., allow for invasion of non-native vegetation). Dredge and fill activities are also frequently associated with coastal development and, in turn, habitat fragmentation.

Species that occupy forests, woodlands, pine barrens, pine rocklands, and/or grasslands in Florida (e.g., Monarch Butterfly, Florida Leafwing, Frosted Elfin Butterfly, Ceraunus Blue Butterfly, Cassius Blue Butterfly, Bartram's Scrub-hairstreak, and Miami Tiger Beetle) do not use wetlands or WOTUS during any stage of their life history. Future permits under the State 404 program are not likely to adversely affect species that occupy these habitats.

Coastal or tropical hardwood hammocks, dunes, sand pine, and/or scrub obligate insect species (e.g., Gulf Coast Solitary Bee, Nickerbean Blue Butterfly, Miami Blue Butterfly, and Blue Calamintha Bee) may be impacted by habitat fragmentation from fill. These impacts may occur where waters/wetland habitat is interspersed with or border these habitat types. As insects are declining on a global scale, impacts to habitat and other resources that factor into species' life history could affect ESA-considered species recovery.

### 5.2.7 Crustaceans

Nineteen crustacean species/subspecies are included in Appendix C, Table C.1. These species can be grouped by general habitat preferences in Florida into the following broad categories: pond/river/stream species (four crustaceans) and cave/well/sinkhole species (15 crustaceans). These groups are intentionally broad for this macro analysis. Impact analysis on the species level (that takes into consideration species'/subspecies' microhabitat preferences) is presented in Appendix C, Table C.1.

Future authorizations under the State 404 program may impact pond/river/stream crustaceans (crayfish) via direct mortality or physical alteration of habitat through dredge and fill activities. Dredge and fill activities may also fragment habitat, change existing hydrological regimes, and affect water quality. All of the crayfish species under consideration in the Action Area are highly sensitive to and already threatened by impacts to both surface and groundwater quality (e.g., changes in temperature, flow, siltation levels, etc.). Changes in



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water quality (e.g., an increase in nitrogen levels) may also create favorable conditions for invasive aquatic vegetation or change existing levels and/or species composition of native vegetation. This could decrease the quality of the existing crayfish habitat.

Crustaceans (crayfish and amphipods) that inhabit caves, wells, sinkholes, and other subterranean water features may also experience indirect mortality and/or impacts to habitat as a result of dredge and fill activities in or adjacent to occupied areas. Many cave/well obligates are extremely restricted in range (some species are only known from one or two localities). Any changes in habitat conditions could potentially result in species extirpation. Cave/subterranean crustaceans are also highly threatened by changes in hydrology. Any future activities that would deplete groundwater/aquifers results in changes in flow and, in turn, impacts availability of detrital food items or burrowing habitat. Water quality impacts (increase in nitrogen or sediment levels) may also affect the species. In addition, many cave-dwelling species are dependent on cave-roosting bats, specifically their guano, as a food source. Impacts on cave-roosting bat populations may also affect these crustaceans by reducing food availability.

### 5.2.8 Mollusks

As freshwater mussels are, by definition, fully aquatic, they are likely to be impacted by dredge and fill activities. Twenty-one species of mollusks are included in Appendix C, Table C.1, including 18 types of freshwater mussels that are associated with varying sizes of springs, creeks, and rivers, two freshwater snails, and one tree snail. The freshwater mussel species all face similar threats associated with habitat modification. These include direct habitat modifications such as impoundments, dredging/channelization, stream bed destabilization, and streamflow depletion (e.g., water extraction). They are especially vulnerable to changes in water quality conditions (e.g., excessive sedimentation, environmental contaminants, and eutrophication) and changes to existing hydrological regimes. Similarly, as filter feeders, they are vulnerable to changes in nutrient cycling. Given the reliance all freshwater mussels have on host fish during the larval period of their life cycle, impoundments or other effects influencing host fish species may affect these species. Additionally, mollusk species may be threatened by the invasive species (e.g., Asiatic Clam (*Corbicula fluminea*)), which could be spread by dredge and fill activities. Tree Snails are less likely to be affected as they occur in terrestrial, arboreal environments; nonetheless, direct habitat fragmentation is possible.

### 5.2.9 Plants

Ninety-nine plants are included in Appendix C, Table C.1. These species/subspecies/varieties can be grouped by guild into the following categories: lichens, graminoids, annual forbs, perennial forbs, sub-shrubs, shrubs, cacti, and trees. These groups are intentionally broad for this macro analysis. Impact analysis on the species/subspecies/varietal level (that takes into consideration microhabitat preferences) is presented in Appendix C, Table C.1.

Nine annual forbs are included in this analysis. Five of these forbs occur primarily in wetland habitats, including non-forested wetlands such as prairies, as well as ponds and lakes, ditches, and road shoulders. Fifty-five perennial forbs are included, and roughly half of these occur in wetland habitats. They occur in a variety of specific habitats within freshwater non-forested and freshwater forested wetlands, including wet prairies, cypress swamps, bogs, fens, and seeps. Some occur in pond or lake habitats, and others occur in floodplains or along the banks of rivers or streams. Two epiphytic orchids in this category grow on trees in forested wetlands. One grass and one sedge species included in this analysis may be affected as well.



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Four sub-shrubs, six shrubs, and two tree species considered in the analysis occur in wetland habitats, or in habitats which may border wetlands, and which may be affected by future activities that may be permitted under the State 404 program. These species occur in both freshwater non-forested and freshwater-forested wetlands. The sole lichen species and the four cacti species occur in upland habitats that are not likely to be affected.

Many of the species analyzed in this document have experienced substantial habitat loss and range restrictions due to a number of factors, including development and land conversion, alteration of fire regimes and fire suppression, threats from invasive species, and changes to hydrologic regimes. Some have been impacted by forestry practices or horticultural collection. Direct impacts to several of the plants may occur from future authorized fill or dredging activities (which could result in direct mortality or direct impact on wetland habitats). Indirect impacts from wetland dredge or fill activities may affect not only hydrophytes but also some upland species occurring in habitats that border wetlands, from the building of access roads or staging areas. Other indirect impacts include changes in hydrology, water quality, nutrient alteration, and competitive pressure that may arise from shifts in species composition.

# 6. Cumulative Effects

Cumulative effects are defined as the effects of future non-federal activities, including Tribal, state, local, and private actions on ESA-considered species or their critical habitat that are reasonably certain to occur in the Action Area for this BA. While these effects will likely occur regardless of the agency responsible for administering the requirements in Section 404 of the CWA, they are considered during the analysis of this Action. Any future State 404 program permits would also consider cumulative effects.

## 6.1 Effects of Non-Federal Activities

ESA regulations (50 CFR § 402.02; § 402.14) require the action agency to evaluate all effects of a proposed non-federal activity. Effects of an activity may occur later in time and may include consequences occurring outside the immediate area involved. Cumulative effects are those effects of future State or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area of the federal Action subject to consultation 50 CFR § 402.02.

There are existing anthropogenic stressors currently impacting ESA-listed species. In addition, there are national-scale, non-federal activities that are reasonably certain to occur. These include watershed development, increased water use, and climate change (USEPA 2013). The "What is Your Vision for Florida's Future? Florida 2070 and Water 2070 Joint Project," prepared by 1000 Friends of Florida, University of Florida Geoplan Center, and Florida Department of Agriculture and Consumer Services (2017), addresses the current anthropogenic stressors that will impact development and water use in Florida in the future.

### 6.1.1 Watershed Development

Florida's population continues to grow rapidly, and it is expected that 33.7 million people will reside in Florida by 2070 - nearly 15 million more than were in residence in 2010 (1000 Friends of Florida et al. 2017). The greatest projected population growth is observed in the Central region of Florida (Figure 6-1). If growth continues as projected, nearly one-third of Florida's land will be developed, and development-related water demand will more than double. Due to the significant increase of projected development, especially in the



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Central region of Florida, agricultural lands will be consumed by residential, commercial, or industrial activity; therefore, agricultural irrigation development is expected to decrease except for the Southern region of Florida.

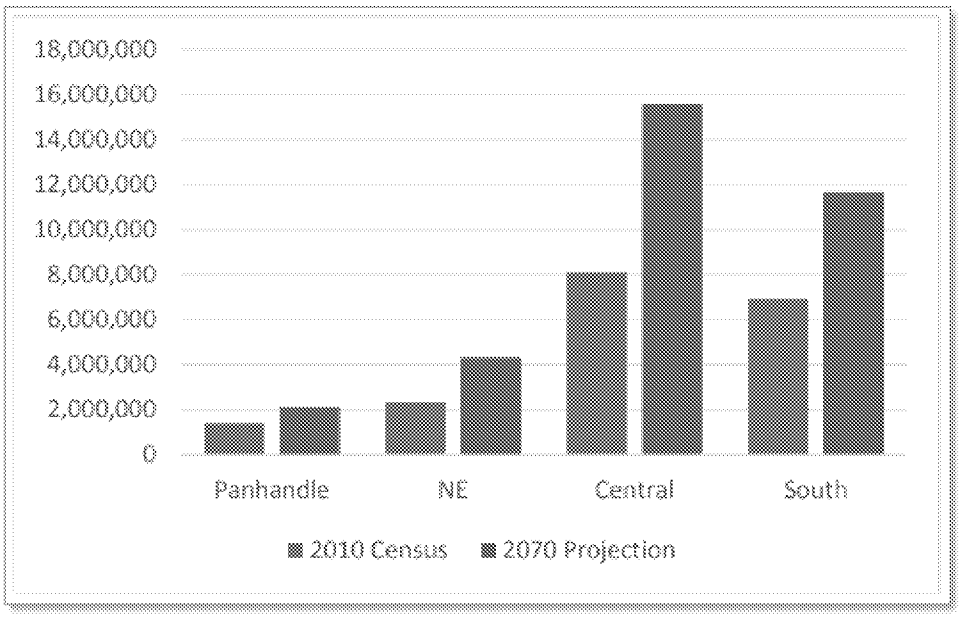


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Comparison of projected 2010-2070 population change in four Florida Regions**

Source: 1000 Friends of Florida et al. 2017

Projected development scenarios for the State of Florida depict a significant increase in land use between 2010 and 2070 (Figure 6-2). It is expected that by 2070, developed land in Florida will increase from 6,275,000 acres to 11,648,000 acres, growing by 15.55 percent (1000 Friends of Florida, et al. 2016). As a result of increased civil and industrial development, land usage for agricultural purposes in the State of Florida is expected to decrease from 7,586,000 acres to 5,422,000 acres by 2070. However, increased development has the potential for various adverse effects in terms of water quality.

Developmental activity associated with new construction, as well as the overall growth of urban areas, directly affect the stormwater quality and can result in detrimental effects for aquatic communities. Not only does the increased flow from additional stormwater drainage systems affect receiving water bodies, but the stormwater runoff quality that is impacted by developmental activities such as litter, chemicals, metals, nutrients, pesticides, bacteria, sediment loads, and organic matter can harm biological health. These various pollutants and how they can impact water quality are discussed below.



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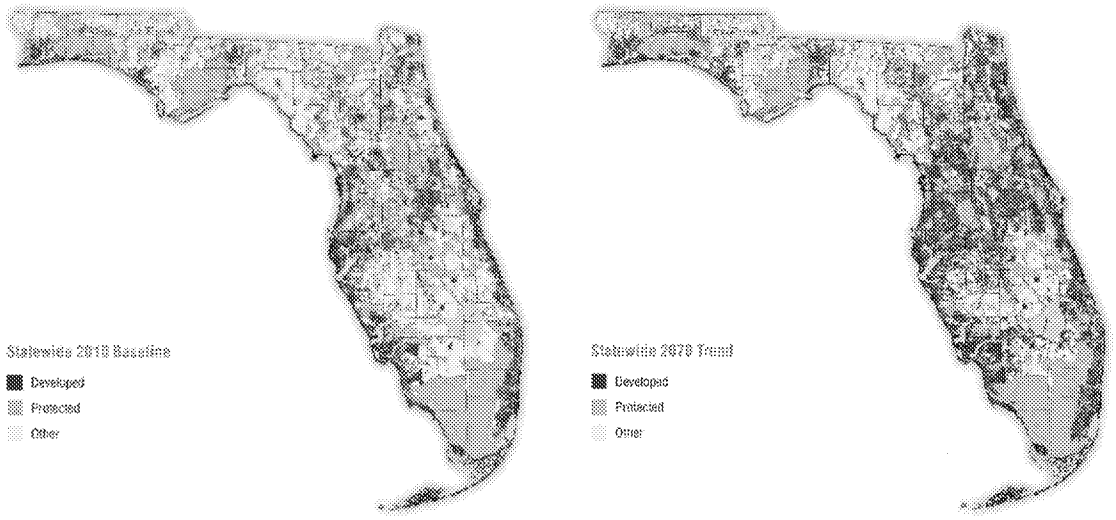


**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] A comparison of the State development scenarios**

Source: 1000 Friends of Florida et al. 2016

Increased sedimentation loads in water systems can result from construction and agricultural activities. There are significant differences in suspended solid concentrations between urban and non-urban stream systems. For example, a study comparison in South Carolina documented a higher total suspended solid concentration value of 2.7 kilograms per square meter per year in an urbanized coastal stream compared to a nearby forested stream that reported a value of 1.6 kilograms per square meter per year (Nagy et al. 2011). Both suspended and accumulated sediment can have adverse impacts. Sedimentation can infill porous areas in a stream/riverbed, eliminating niche areas that multiple aquatic organisms use for egg protection and/or attachment surfaces. Suspended sedimentation can lead to increased turbidity, which not only decreases dissolved oxygen levels (one of the most critical components of water quality) but also can interfere with benthic organisms and their feeding abilities. Makepeace et al. (1995) found that turbid water can be detrimental to aquatic biota. The authors found that total suspended solids concentration between 25 and 100 milligrams per liter "could reduce a river's primary biological productivity by 13 percent to 50 percent" (Makepeace et al. 1995).

Pollutants, including chemicals, bacteria, metals, oils, and pesticides are commonly found in stormwater runoff. These substances and increased concentration levels in urban stormwater can be correlated with construction, developmental, and agricultural activities. Dependent on various factors, these chemicals and substances can result in either acute or chronic detrimental effects to biological life. Stream hydrologic, microbial, and physiochemical data collected in watershed areas in Florida with impervious surfaces ranging from 0-15 percent displayed higher pH, specific conductivity, elevated temperature, higher loads of nutrients (Cl-, NO3-, SO2-4_, Na+, K+, Mg2+, Ca2+, and total phosphorus), higher bacterial concentrations (fecal coliform and *Escherichia coli*,) and increased hydrologic flashiness in areas with greater impervious surfaces (Nagy et al. 2011). The expected trend of exponential developmental growth of approximately 15.55 percent by 2070 for the State of Florida will increase impervious surface areas; conversely, stormwater quality will

decrease while flow rates will demonstrate hydrologic flashiness. The combined hydrologic flashes and influx of toxic substances in stormwater will negatively influence biological communities.

Heavy nutrient pollution is deemed one of America's most challenging environmental problems and is mainly influenced by nitrogen and phosphorus loading. Sources of heavy nutrient loading include but are not limited to agriculture, urban stormwater runoff, wastewater, power generation, and private fertilizer usage. Heavy concentrations of dissolved nitrogen and phosphorus in freshwater systems stimulate plant growth, especially algal growth, which ultimately can harm biological life due to the lack of available dissolved oxygen. A two-year monitoring study on reefs in Florida found that harmful algal blooms alter entire fish assemblages and can reduce both abundance and species richness (Baumberger 2008). With development in Florida increasing in the future, increased construction and higher rates of urban stormwater will consequently increase heavy nutrient loading in aquatic systems and reduce biotic diversity.

Another issue specific to Florida, related to watershed developmental concerns, is the potential for saltwater intrusion into confined aquifer systems. Historical evidence since the 1930s documents the concerns and issues related to saltwater intrusion in Florida as a result of encroaching development. In many areas around Florida, draining efforts were initiated to provide dry land for both developmental and agricultural purposes. There are severe and current concerns for the drinking water of nearly 2.5 million residents of Miami-Dade County, due to saltwater intrusion of the Biscayne aquifer stem (a consequence of the draining of the Everglades to allow for development) (Prinos 2014). As of 2011, Prinos determined that 463 square miles ($mi^2$) of the Biscayne aquifer had been intruded with saltwater. Further pump-out of wetland or lake areas in Florida to create additional areas for development could impact groundwater quality by saltwater intrusion mechanisms.

### 6.1.2 Increased Water Use

An increase in population size will place higher demands on the supply of water. Table 6-1 provides the historical water use data in Florida from 1975-2000. A large source of freshwater for the state of Florida is from underground aquifer systems. With growing pressures of climate change, influxes of anthropogenic demands, and unstable weather patterns, aquifer systems will be unable to meet recharge rates to suffice these conditions. Projected data report that by 2070, development-related freshwater demands will increase as much as 100 percent compared to 2010 (Figure 6-3). The Florida statewide demand for water in 2010 was 5,269,311,481 gallons per day; however, by 2070, the demand is expected to increase to 8,094,862,839 gallons per day. (1000 Friends of Florida et al. 2017). It is estimated that approximately 90 percent of the consumed water in the State of Florida is sourced from groundwater, and only 10 percent is from surface water (Holt 2005).



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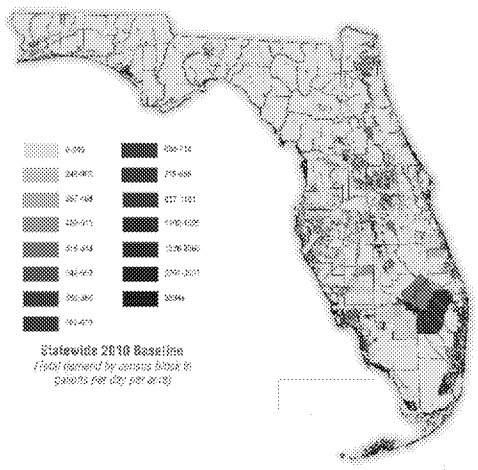
**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Historic Water Use in Florida (millions of gallons per day)**

| Category | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|---|---|
| Public Supply | 1124 | 1406 | 1685 | 1925 | 2079 | 2437 |
| Domestic self-supplied | 228 | 243 | 259 | 299 | 297 | 199 |
| Commercial – industrial mining | 883 | 700 | 709 | 770 | 692 | 563 |
| Agricultural irrigation[a] | 2930 | 3026 | 2798 | 3495 | 3244 | 3923 |
| Recreational irrigation[b] | n/a | n/a | 182 | 310 | 281 | 411 |
| Power generation | 1608 | 1326 | 680 | 784 | 637 | 659 |
| **Total** | **6773** | **6701** | **6313** | **7583** | **7230** | **8192** |

n/a – Not available; b – Withdrawals for turfgrass and landscaping; – Withdrawals for crops, livestock, and fish farming

Source: Holt 2005, reprinted from Bureau of Economic and Business Research, University of Florida, Table 8:40, Florida Statistical Abstracts 2003

The higher demands for groundwater result in the extensive pumping of aquifer systems, which can result in saltwater intrusion. Depleting existing aquifer storage potential and further, harming future aquifer water quality by saltwater intrusion is expected as a consequence of increased water demands for the State of Florida. Receiving an average of 4.6 feet of rainfall annually, Florida has the second-highest precipitation rate behind Louisiana. With climatic changes and differing seasonal patterns, precipitation is likely to be influenced in the future. Approximately 70 percent of annual rainfall in Florida is lost due to evaporation and the remaining 30 percent flows through pervious surfaces to aquifers, surface water bodies, or to impervious surfaces (Holt 2005). Rising temperatures associated with climate change will increase the evaporation rates of Florida precipitation, therefore reducing overall recharge rates of surface and groundwater systems.



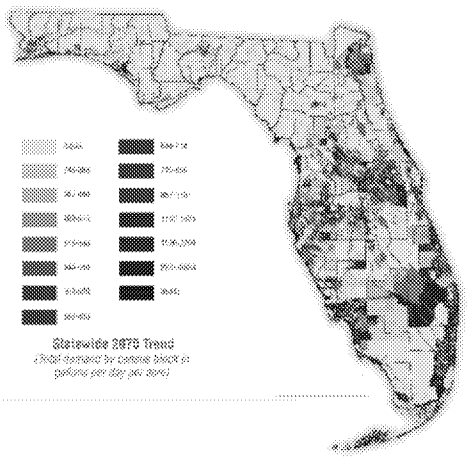



**Figure [][ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] State Water Scenarios (gallons/day/acre)**

Source: 1000 Friends of Florida et al. 2016

Impacts of increased water demand may include reduced depth, areal coverage, and habitat quality for many aquatic communities and aquatic threatened and endangered species. Anthropogenic water demands are also likely to be exacerbated by climate change (see below), leading to greater hydrological variability with an increased probability of drought in many regions.

### 6.1.3 Climate Change

Florida is among the states in the United States most vulnerable to climate change. The extent of coastline in Florida, along with its low elevation and heavy development of coastal and inland areas, will result in large-scale impacts both to human development and biological habitat as climate changes and sea levels continue to rise. According to the Fourth National Climate Assessment (4th NCA), "The Southeast's diverse natural systems, which provide many benefits to society, will be transformed by climate change. Changing winter temperature extremes, wildfire patterns, sea levels, hurricanes, floods, droughts, and warming ocean temperatures are expected to redistribute species and greatly modify ecosystems. As a result, the ecological resources that people depend on for livelihood, protection, and well-being are increasingly at risk, and future generations can expect to experience and interact with natural systems that are much different than those that we see today."

Annual average temperatures throughout the Southeast United States have been increasing since the 1970s. The decade of the 2010s through 2017 was warmer than any previous decade, with much of this warming being experienced as higher nighttime temperatures and longer freeze-free season lengths. (4th NCA) Statistically significant warming is projected for all parts of the United States through the next century, although, in the Southeast, that trend will be somewhat mitigated by latent heat release from increases in evapotranspiration. Average annual temperatures are projected to increase by 3.4°F to 4.3°F by the middle of the 2000s, and between 4.4°F and 7.7°F by 2100 (Vose et al. 2017).

Warmer winter temperatures in Florida will drive some ecosystem changes, especially when combined with sea level rise. Mangroves are being documented in more northerly locations than previously, thanks to more



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winters without freeze events, and are beginning to replace *Spartina* marshes. As sea level rises, mangroves and other tidal marsh species may be blocked from migrating up-gradient by sea walls, roads, ditches, or other natural or manmade landscape features, and may drown in place.

Landfall of tropical storms and hurricanes has occurred more frequently in Florida than any other state and increasing sea surface temperatures are expected to increase the frequency of high-intensity tropical cyclones (Mendelsohn et al. 2012). Additionally, increasing sea surface temperature has already negatively impacted Florida's coral reefs. As the ocean becomes more acidic due to the uptake of atmospheric carbon, it will become increasingly difficult for a variety of marine invertebrates to produce calcium carbonate shells and skeletons. This will impact biodiversity and the ecosystem services these species provide. These include shellfisheries production, wave and storm surge attenuation, water filtration, tourism, and transfer of energy via trophic processes to recreationally and commercially important finfish species.

Localized changes in precipitation regimes are also expected to occur due to climate change and will likely have a negative impact on a variety of habitats and species. Periods of unstable precipitation patterns of severe storms followed by longer drought periods pose not only risks for threatened and endangered species but also humans. Abiotic factors such as hydroperiod, water table height, salinity gradient, and surface water depth are likely to be disrupted as precipitation patterns change. Southeast Florida has already experienced hydroclimate variability, which has increased drought conditions causing decreased surface water levels, decreased groundwater recharge rates, lower groundwater tables, and ultimately leads to higher risks of saltwater intrusion (Abiy 2019).

Climate change impacts associated with rising sea levels pose immediate and long-term risks for land management practices of Florida. Coastal degradation and land loss due to sea-level rise will result in land fragmentation and habitat loss for biological organisms. Changes in abiotic factors from a number of climate change-related drivers are likely to cause habitats and species to shift their ranges in response. In addition to biological habitat loss, rising sea levels will also reduce available land in Florida for development. A study of ESA-listed subspecies in Florida showed both high vulnerability and low adaptive capacity in response to rising sea levels and habitat fragmentation (Benscoter et al. 2013). This will be especially problematic for habitats that are unable to migrate because of natural or anthropogenic barriers, and for species that are rare, occur in isolated populations, and/or have poor dispersal capabilities. Sustainable and climate change specific planning should be at the forefront of developmental planning, conservation efforts, and land usage for the State of Florida. The FWC has an adaptation guide, *A Guide to Climate Change Adaptation for Conservation* that can be found on their website at [ HYPERLINK "https://myfwc.com/media/5864/adaptation-guide.pdf" ]. For more information about what the FWC is doing to address the impacts of climate change on fish and wildlife in Florida, see their website at: [ HYPERLINK "https://myfwc.com/conservation/special-initiatives/climate-change/" ].

### 6.1.4 Summary of Cumulative Effects of Non-Federal Activities

As compared to the regulatory baseline, the Action does not authorize any new activities or increased discharge of pollutants that would significantly increase the magnitude of adverse cumulative environmental impacts to ESA-listed species, and the implementation of the State 404 program by FDEP will ensure effects on ESA-listed species will be evaluated and addressed at project-level.



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# 7. State 404 Program Species Coordination

*This Chapter is written as if the State has assumed the CWA 404 program*

The following chapter describes the ESA-listed species coordination process that will occur if the EPA were to approve FDEP's request to assume the dredge and fill permitting program under Section 404 of the CWA for waters assumable by the State. The intention of presenting this section as if the State has assumed the CWA 404 program is to describe the effects of the Action by articulating the changes to the process that would occur as the result of EPA's approval. It is also to establish a clear difference between the pre-assumption coordination between federal agencies (section 7 consultation between USFWS and EPA), from the potential post-assumption coordination between federal and state agencies (technical assistance between USFWS and FDEP as part of the State 404 program species coordination process).

The State 404 program rule [Rules 62-331.053(3)(a)4, 62-331.201(3)(k), and 62-331-248(3)(k) F.A.C] and EPA regulations (40 CFR 233.20, 40 CFR 230) prohibits issuance of a permit that will likely jeopardize the continued existence of endangered or threatened species, or result in the likely destruction or adverse modification of habitat designated as critical for these species as determined by USFWS and confirms that USFWS conclusions about the effects of 404 permits on listed species are determinative.

The USFWS will review State 404 permit applications and provide, through technical assistance, recommendations to FDEP on a project-by-project basis to ensure adverse effects to ESA-listed species are avoided and minimized, and to ensure that no State 404 permits will be issued that will jeopardize the continued existence of a listed or proposed to be listed species, or result in adverse modification of critical habitat. This process will also assist USFWS in monitoring any incidental take that is reasonably certain to occur. Under this process, the USFWS will not be issuing any project-by-project incidental take statements (ITS). The anticipated Program assumption BiOp will have a programmatic ITS that will exempt all incidental take associated with State 404 permits from being considered prohibited take under section 9 of the ESA. However, the section 9 exemption provided in the programmatic ITS is contingent on the EPA, FDEP, and the State 404 permit applicant complying with processes and conditions described in the BA, state rules, and any reasonable and prudent measures and terms and conditions provided in the USFWS Program assumption BiOp and it's ITS.

The State 404 program rule includes stipulations (Rules 62-331.053(3)(a)4, 62-331.201(3)(k), and 62-331-248(3)(k) F.A.C. that prohibit issuance of a permit that will likely jeopardize the continued existence of endangered or threatened species, or result in the likely destruction or adverse modification of habitat designated as critical for these species as determined by USFWS. This is ensured by the technical assistance process between the FDEP and USFWS.

The scope of Chapter 62-331, F.A.C. is statewide, covering a wide range of construction activities that are reasonably certain to affect a wide variety of listed species and their habitats. The word "impact" used in Chapters 62-330 and 62-331, F.A.C. describes effects similar to "may affect" and "adverse effects" under the ESA. The terms "effect" and "impact" are used interchangeably throughout this document. The review will be in accordance with the requirements and processes specified in the BA, the MOAs, the MOU, Chapter 62-331, F.A.C., and the anticipated Program assumption BiOp. Figure 7-1 at the end of this chapter depicts an overview of the species coordination process.



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## 7.1 Federally and State-listed Species Coordination Review

While this BA and this chapter focuses on the species review coordination for federally listed species, it is important to note that both the State 404 permit and the State ERP permit require protections for both federally listed and State-listed species. If a project requires both a State 404 permit and a State ERP permit, protection measures for federally listed species will be incorporated as permit conditions to both permits. In addition, protection measures for State-listed species will be incorporated as permit conditions to both permits. The species review processes for the the State 404 permit and the species review processes for the ERP permit will be similar, with the FDEP permit processor and the FWC permit reviewer working together as a team to resolve issues related to both ESA-listed species and species listed in Chapter 68A-27, F.A.C. The species coordination process outlined in this BA as well as the Memorandum of Understanding between FDEP, FWC and the USFWS will ensure that measures for ESA-listed species that may conflict with measures for a State-listed species that use the same habitat types will be addressed.

The Florida Fish and Wildlife Conservation Commission (FWC) is already involved in the review of many ERP applications and provides FDEP recommended wildlife-related permit conditions, including those that are federally proposed to be listed. In many cases, FWC is the lead conservation agency for federally proposed or candidate species in Florida. A number of species analyzed in this BA are State-listed and under federal review. FWC provides useful resources for State-listed species, including species summary pages with conservation goals, identification of threats, current protections, and links to species action plans and biological status review reports (FWC 2016). These resources include valuable information for future permit application reviews and can help to identify effective measures to reduce the adverse impacts resulting from project activities.

Florida's Imperiled Species Management Plan (FWC 2016) includes integrated conservation strategies as well as other useful material intended to benefit multiple species. Effective conservation strategies can provide protections that improve the status of an imperiled species and contribute to a decision not to federally list the species.

## 7.2 State 404 Program and Prior-existing USFWS HCPs and BiOps

In some cases, a landowner or project proponent have a project that had undergone previous section 7 consultation with the USFWS and is covered by a valid BiOp or is covered by a valid Habitat Conservation Plan (HCP) and Incidental Take Permit (ITP). Briefly, Congress recognized the need for a process to reduce conflicts between listed species and economic development, in addition to the permits to authorize take from scientific research or certain other conservation actions. As such, the ESA was amended to add an exemption for incidental take of listed species that would result from non-Federal activities (section 10(a)(1)[B] of the ESA). To obtain a permit from USFWS for such take, an applicant must develop a habitat conservation plan (HCP) that meets specific requirements identified in section 10(a)(2)(A) of the ESA and its implementing regulations at 50 CFR § 17.22 and § 17.32 and 50 CFR § 222.25, § 222.27, and § 222.31. HCPs are planning documents that describe the anticipated effects of the proposed taking; how those impacts will be minimized or mitigated; and how the HCP is to be funded. Additional information about Habitat Protection Planning can be found at: [ HYPERLINK "https://www.fws.gov/endangered/what-we-do/hcp-overview.html" ].

The Habitat Conservation Planning Handbook (December 2016) and a USFWS Memorandum dated April 22, 2020 provide guidance regarding how approved HCPs or new HCPs being developed are integrated with the ESA section 7(a)(2) consultations with other federal agencies. This guidance specifically addresses potential



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federal agency permit actions within an HCP area for activities where take has been authorized in an ESA section 10 permit.

In summary, the guidance provides the USACE the ability to recognize the pre-existing HCP/ITP and use it to comply with section 7 of the ESA. Whether the USACE has been involved in the development of the HCP or not, there is still a streamlined section 7 process that can occur if the USACE 404 permit application's activities are also covered by the HCP within the HCP plan area, and the effects of to all ESA-listed species and/or critical habitat were analyzed in the USFWS's biological opinion. The streamlined process involves the USACE requesting consultation with the USFWS, describing the proposed activities and asking if those activities are consistent with those covered in the HCP and analyzed in the biological opinion. If so, the USFWS would issue a brief letter to the USACE agreeing that the proposed permit is consistent with the HCP and biological opinion, and that extends the exemption of the prohibition against take to the USACE. However, the streamlined process may not be available if a proposed USACE permit project's actions involve activities, species, or areas that were not covered in the biological opinion associated with the HCP, or the USACE intends to authorize the action in a manner that is inconsistent with biological opinion.

It is FDEP's intent to adopt this guidance for its species coordination process to insure consistent and adequate protections for species and regulatory certainty to the regulated community, satisfying the requirements in Chapters 62-331, and 62-330, F.A.C. After technical assistance with the USFWS to confirm that the activities in the proposed State 404 permit are consistent with the HCP and biological opinion, FDEP will incorporate by reference in the State 404 permit, the terms and conditions contained in the approved HCP or biological opinion. Compliance with the HCP requires project applicants to implement the applicable and appropriate avoidance and minimization measures, and any other applicable terms and conditions as contained in the HCP. In addition, FDEP and/or FWC may participate in the development of HCPs when staff are available, to help ensure that all State requirements are covered appropriately under the HCP.

## 7.3 State 404 Program Species Coordination Process

The State 404 program, based on Chapter 62-331, F.A.C., requires the analysis for whether effects to listed species and their critical habitats have reasonable potential to occur, and if so, further determines whether those effects are "likely to be an adverse effect", or "not likely to be an adverse effect". If adverse effects/impacts may occur, conditions or measures to avoid and minimize the impacts would be included as permit conditions and implemented by the Permittee. This State 404 program species assessment is modeled after the federal processes for determining, avoiding, and minimizing effects to listed species and ensures compliance with the ESA and the CWA during State 404 permit application review and permit issuance.

The resulting species coordination processes are intended to fulfill the following criteria when reviewing future State 404 permit applications: (1) the scope of the action is adequately described; (2) the physical, chemical, or biotic stressors to species that are likely to be produced as a result of the action is estimated; (3) the adverse effects of such activities on ESA-listed species and designated critical habitat is minimized; (4) applicants participating in permitted activities are informed, encouraged, and screened for potential incidental take exemption eligibility as required by permit issuance; (5) likely adverse effects on listed species and critical habitat are monitored and evaluated; (6) permit compliance is monitored and enforced; and (7) if new information becomes available (including inadequate protection for species or low levels of compliance), the action is re-evaluated and modified if warranted.

The FWC has partnered with FDEP to assist with the coordination of federally listed species reviews, which would take place concurrently with their review of impacts to State-listed species (per Chapters 62-330, F.A.C. and 68A-27, F.A.C.) for the State 404 and ERP programs. The FWC may assist FDEP as the State's species coordination lead to be the point of contact for coordination with the USFWS. FWC may provide information and other preliminary assessment assistance to USFWS as USFWS reviews State 404 permit applications and develops recommendations for FDEP/FWC to avoid and minimize adverse impacts to listed species and their habitats.

*Key commitments for the species coordination process*

The species coordination process includes a USFWS review of all State 404 permit applications for consistency with the ESA and an EPA review of applications with a reasonable potential to affect ESA-listed species. Key commitments between FDEP, FWC, and the USFWS to ensure a successful species coordination review process include:

- FDEP's processes and procedures to review State 404 applications will be similar to and will utilize the USFWS-approved permitting guidance that is currently used by the USACE, to ensure consistency with CWA and ESA requirements.
- FDEP, FWC, and USFWS will participate in a State 404 program species coordination technical team. This technical team will oversee the species coordination process, including but not limited to: assisting in the transition of 404 permitting by participating in training efforts; providing a process to elevate questions and decision-making to a group with technical expertise, as needed; assist in refining coordination processes, procedures, and future improvements, as needed, related to State of Florida permitting under Chapter 62-331, F.A.C.
- Prior to assuming 404 permitting, FDEP and FWC permit review staff will be trained in the new State 404 program species coordination procedures and processes. The FDEP, FWC and the USFWS will collaborate on developing the training materials, and the FWC and the USFWS be invited to participate in the in-person and/or virtual training meetings for FDEP permit review staff.
- All State 404 applications will be forwarded to USFWS for review, the majority of which will include FDEP or FWC preliminary determinations for effects to ESA-listed species or species proposed to be listed within a few days of the application provided to the USFWS. These preliminary determinations may include possible effects for species found onsite, potential impacts to critical habitat, and potential protective measures that may address the effects and impacts.
- Technical assistance in individual project-by-project reviews from the USFWS may be accomplished by individual USFWS staff or by USFWS-approved effect determination tools, as described below.
- FDEP will incorporate as permit conditions all recommended impact avoidance and minimization measures (protection measures) provided by the USFWS to avoid jeopardizing listed species and/or adversely modifying designated or proposed critical habitat. In addition, if:

  1) the applicant for a State 404 permit is the holder of a valid and active biological opinion, or Habitat Conservation Plan Incidental Take Permit (HCP/ITP), or a similar binding agreement that is issued by the USFWS and

  2) the species and activities described in the State 404 permit application are covered in the Program assumption BiOp, HCP/ITP (or similar agreement), then no additional avoidance and

minimization measures would be required. FDEP would provide the documentation in order for USFWS review the project. If the USFWS concludes that a permit application is likely to jeopardize or adversely modify designated critical habitat and no protection measures are available to reduce the risk to an acceptable level, FDEP will issue a Notice of Intent to Deny the permit.

## 7.4 Application Review

*State 404 Program Application Review Process*

FDEP will review all submitted applications or additional information provided by the applicant in response to FDEP's request for additional information, for administrative and technical completeness. Upon receipt, submitted applications will be forwarded to all appropriate State and Federal agencies for comment, including FWC and USFWS.FDEP will request any additional information required to publish public notice pursuant to Rule 62-331.060, F.A.C. (administrative completeness), and to determine if the proposed activity meets the conditions for issuance in Rules 62-330.301, 62-330.302, and 62-331.053, F.A.C. (technical completeness).

The provisions described in the Applicant's Handbook (Volume I, sections 5.5.3.5 through 5.5.3.7, which govern an applicant's timeframes to respond to requests for additional information) apply to applications for State 404 permits. Once FDEP has determined that an application is administratively complete, FDEP will provide public notice as described in Subsection 62-331.060(2), F.A.C.

Permit applications will not be considered technically complete until the ERP review, if required, is complete. This is to satisfy the requirement for reasonable assurance that State water quality standards and coastal zone consistency requirements will be met. (See Rule 62-331.070, F.A.C., and section 5 of the State 404 Handbook). FDEP may request additional information as necessary during its review of any information it receives during the public comment period, at a public meeting, or during federal review.

*Application Timelines*

Pursuant to Rule 62-331.052, F.A.C., FDEP will review the application within 30 days of receipt of an application for a permit, or receipt of any additional information provided by the applicant in response to FDEP's request for additional information, for: 1) administrative and technical completeness; 2) request any additional information required to publish the public notice; and 3) determine if the proposed activity meets the conditions for issuance. The applicant may voluntarily submit a written waiver of the above 30-day timeclock requirement to allow more time for FDEP to determine if additional information is required. However, FDEP is not obligated to accept the waiver or to delay sending the request for additional information. FDEP may request additional information as necessary during its review of any information that FDEP receives during the public comment period, at a public meeting, or during federal review.

Within 10 days of FDEP determining that an application is administratively complete pursuant to subsection 62-331.060(1), F.A.C., FDEP will provide public notice as described in subsection 62-331.060(2), F.A.C. In addition, FDEP will send a copy of the public notice to EPA for those projects that EPA reviews, in accordance with section 5.2.5 of the 404 Handbook. EPA review timelines and potential public meetings are discussed in section 7.4.2.

FDEP will provide public notice within 10 days of the following: 1) FDEP determination that an application for an individual permit or major modification is administratively complete; 2) FDEP notification to a permittee of



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revocation or suspension of a permit; and 3) issuance of an emergency field authorization. The FDEP shall provide public notice 30 days prior to any scheduled public meeting for such projects.

From date of publication, interested parties may express their views concerning the permit application, modification, revocation, or suspension for a period of 30 days, or 15 days for the projects listed in 62-331.060(b)(3)(b). The public notice comment period shall automatically be extended to the close of any public meeting, if one is held. The presiding officer may also extend the comment period at the public meeting.

### 7.4.1 Technical Assistance with the USFWS

Similar to the USACE Section 404 permit review process, applicants submitting a State 404 permit application will be required to submit information that allows FDEP (and USFWS) to sufficiently assess potential adverse impacts of the proposed project on listed species and their designated critical habitats. To that end, the following information will be required as part of the State 404 application:

- Description of the proposed activity
- Description of the specific areas affected by the activity
- Description of listed species/critical habitat that are present in the area affected by the activity
- Description on the manner in which species may be affected by the activity
- Analysis of any cumulative effects, which are the effects of future State or private activities that are reasonably certain to occur within the project area
- Relevant information (e.g., species surveys, etc.)
- When needed, proposed project designs and proposed conservation measures that would avoid and minimize the expected impacts to listed species and their habitats.

If incomplete, additional information will be requested during the information gathering and review processes and forwarded by FDEP to the FWC and USFWS.

As part of the species coordination process, FDEP will provide copies of all State 404 permit applications to the USFWS and FWC. At the time each application is submitted to USFWS (or within a short period after submittal), FDEP or FWC will include a preliminary determination to the USFWS as to whether listed or proposed to be listed species are expected to be present, and whether the species will be affected. If this preliminary review finds that ESA-listed or proposed to be listed species may be affect, this effect determination from the State to the USFWS will also include a request for USFWS to review the forwarded information and submit questions or recommendations regarding the permit application in order to adequately review the project. In some cases, after all needed information about the application has been received, FDEP or FWC may provide the USFWS with a preliminary protective measures for the USFWS to review or develop the protective measures in coordination with the USFWS.

The State's lead for species coordination may be FWC staff, or the permit processor with FDEP, depending on the complexity of the request and the workload. Regardless of the designated staff to be the point person for coordinating with the USFWS, both State agencies will work together as a team for all projects with listed species issues. For each State 404 permit application review, staff with FWC and FDEP will determine who will take the lead to coordinate with the USFWS and will copy the other reviewer on all correspondence. The State species lead will provide, and/or validate the applicant's submittal of a preliminary list of species anticipated to be affected, identification of project areas, preliminary impact/effect determinations, and



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preliminary proposed impact avoidance and minimization measures (protection measures) for federally listed and State-listed endangered or threatened species (and species proposed to be listed) and their habitats. Upon coordination with the USFWS on appropriate protection measures for federally listed species, FDEP will incorporate the USFWS-recommended measures as permit conditions, or will issue a Notice of Intent to Deny the permit.

*Estimated Species Review Timelines*

Times frames are identified in State regulations (see *Application Timelines* under 7.4 above), however, there are transitional timelines between these timeframes, and they are estimated and described in the steps below.

1) FDEP receives a permit application.
2) Within 3-5 days, FDEP sends a copy to USFWS and FWC. Within a day or two, FWC sends preliminary affected species list and type of effects determination to USFWS.
3) Within 10-15 days of receipt, USFWS may send to FDEP [no longer than 20 days from the date received by FDEP]:
    a) For incomplete or General Permit applications: Provide comment or any questions it has about missing information; or
    b) For complete applications: Provide comment or notify FDEP of intent to comment with request for notification of deadline.
4) Within 30 days from receipt, FDEP must request additional information (RAI) from applicant or deem the application complete.
5) After FDEP receives additional info, FDEP has 30 days to review the response and:
    a) Request clarification of answers to the questions; or
    b) Notify applicant their application is complete.
6) During the RAI process, FWC and USFWS determine affected species, affected critical habitats, types of effects, and potential protective measures. These determinations are forwarded to FDEP, preferably before the application is deemed complete.
7) After application is deemed complete, FDEP has 10 days to issue a public notice for applications for individual permits.
8) The public notice is provided to EPA and USFWS.
9) The public notice comment period is 15 days for minor projects and 30 days for more complicated ones.
10) If EPA has waived review, then after the public comment period closes, FDEP has either 60 or 90 days to issue or deny the permit.
11) If EPA reviews the public notice, then the 40 CFR 233.50 regulations and timeframes govern the timeframes and process of permit review.
    a) EPA has 10 days to send a copy of the public notice to USFWS.

b) USFWS has 15 days to notify EPA it intends to comment

c) USFWS has 50 days from receipt of public notice from EPA to send comments to EPA

d) EPA has 90 days to send comments or objection to FDEP. The final decision to comment, object, or to require permit conditions will be made by EPA.

12) Because applications that are deemed as "no effects" by FDEP will not be subject to EPA review, the USFWS will have a shorter amount of time to review and provide FDEP with additional information to consider.

a) The total time that USFWS will have a permit application that is not subject to EPA review is 15 days to send questions about missing information to FDEP, plus another 15 for FDEP to send that request to the applicant, plus the 20 days FDEP has to let the applicant know the permit is complete, plus 10 days for FDEP to issue the public notice, plus 15-30 days for the public comment period. Therefore, the potential maximum amount of time USFWS would have to review and comment on a permit application that is not subject to EPA review would be approximately 75-90 days, depending on whether the public comment period was 15 days or 30 days. If the application had all the necessary information at the start then the time for USFWS review and comment would be 55-70 days, depending on whether the public comment period was 15 days or 30 days.

b) Therefore, it will be important for FWC and USFWS to work with FDEP to develop an efficient system to promptly check applications for completeness and their potential to affect listed species to ensure "no effects" are accurate determinations.

*Identifying applications that may pose adverse impacts*

The FDEP/FWC species coordination and technical assistance with the USFWS may begin before the application's public notice is posted. The USFWS will receive applications prior to FDEP posting a public notice and USFWS may submit information and questions to FDEP prior to FDEP posting a public notice. The public notice will also go to the USFWS, and details regarding the type of effects/impacts to species and their critical habitat as well as proposed protection measures that may have been suggested by USFWS will be included in the public notice. The technical assistance process between the USFWS, FDEP, and FWC will not be considered complete until any modifications are incorporated as a result of the public notice. If needed, technical assistance with the USFWS may continue during and after the public notice period.

Upon receiving an application, FDEP and FWC will review the submittal by the applicant and preliminarily identify the affected species, affected project area, and critical habitats. The species lead is responsible for making a preliminary determination for affected species, affected project area and critical habitats, and assess whether, and what type of, adverse impacts to endangered or threatened species and their critical habitats is expected. The FDEP will forward the application to FWC and the USFWS within three-five days of receipt. The species lead will contact the USFWS and send their preliminary assessments to the USFWS as soon as possible. Response from USFWS are due to FDEP within 20 days of FDEP's receipt of information.

For example, if FDEP received an application on June 1st and forwarded it to USFWS on June 5th, any questions USFWS need to be answered must be relayed through the species coordinator by June 20th. If USFWS has no questions, technical assistance continues. All comment deadlines for USFWS's response will be included in FDEP/FWC request to USFWS.

- If FDEP/FWC does not get a response from the USFWS by the deadline for questions or comments, the lack of a response will be considered a "no comment" and no further information from the USFWS is needed. If the State species coordinator believes that effects may be significant and the lack of response may be in error, they will contact the USFWS asap to confirm. In addition, the USFWS will receive a copy of all public notices and may provide comments to EPA and/or FDEP at that time.
- For the determination of potential affected species, project area or impact/effect on the species, if FDEP/FWC receives a response from USFWS with additional information to consider, the information will be re-evaluated and resubmitted to USFWS, if needed.
- Once it has been determined by FDEP/FWC that an application will have no adverse impacts or adverse effects to federally listed endangered or threatened species (or species proposed to be listed) and the USFWS has not submitted information or questions that would lead the State to reconsider its determination, the species review concludes for that application. If the applicant modifies the project activities or increases the project area as the application is continued to be reviewed, FDEP/FWC/USFWS may re-evaluate the application with this information, if warranted.
- Once it has been determined by FDEP/FWC that an application may cause an adverse impact or adverse effect to federally listed endangered or threatened species (or species proposed to be listed), technical assistance with USFWS continues in order to determine if, and how, the impacts and effects can be addressed with protection measures.

*Coordination of protective measures with the USFWS*

- For applications determined to have an adverse impact to federally listed or species proposed to be listed, the species coordination lead will forward all available information to the USFWS with a request for additional technical assistance.
- The FDEP/FWC species coordination lead will compile additional information or questions needed to complete the review, including information or questions from the USFWS, to forward to FDEP. These questions and requested information will be incorporated into the FDEP's RAI to the applicant.
- The species coordination lead will coordinate with the USFWS regarding potential protection measures that may offset the anticipated adverse impacts. In some cases, depending upon the project, the USFWS may submit recommendations to FDEP/FWC. In other cases, the species coordination lead will compile a package that presents the proposed protection measures and transmit the package to USFWS for their review and comment.
- After USFWS provides/agrees with recommended protection measures appropriate to offset the expected adverse impacts associated with the proposed project, the protection measures are incorporated into the public notice as proposed permit conditions.
    - If modifications are made during the public comment period that may change the original conclusion, FDEP reviewers will forward this information to FWC and USFWS for further review and comment.
    - If no modifications are made, or if the modifications during the public notice process can be addressed by FDEP/FWC/USFWS, protective measures are incorporated into the permit as special conditions and the species review concludes for that application.

- If the review by FDEP, FWC, and USFWS concludes that adverse impacts are likely to jeopardize the continued existence of a species, or will destroy, or adversely modify critical habitat, either of the following alternatives may occur, depending upon the project:
    - Additional protection measures that will satisfy the requirements of the ESA and avoid jeopardy or adverse modification are developed in coordination with or as recommended by USFWS, FDEP incorporates those measures as permit conditions and processes the permit; or
    - The FDEP issues an "Intent to Deny" the application for a permit.

### 7.4.2 EPA Oversight and Review

In accordance with the FDEP-EPA MOA and governing federal regulations (40 CFR § 233), EPA will retain federal oversight authority on the issuance of State 404 permits, with the ability to review applications, review proposed protection measures/conditions and, if necessary, recommend additional protection measures if deemed prudent and practicable. EPA's federal authority also allows EPA to intervene in the application review process, if needed, where there may be disagreements or issues that need to be resolved. FDEP can also request EPA's assistance in the application review process for the same reasons, if needed.

Pursuant to 40 CFR § 233.51(b)(2), there are specific categories of discharge EPA can waive Federal review of State 404 permit applications. Discharges with reasonable potential for affecting endangered or threatened species, however, are not waived and must be reviewed. For those projects subject to EPA review, FDEP will send a copy of the public notice to EPA, in accordance with section 5.2.5 of the State 404 Handbook (also 40 CFR § 233.50(a)(1)). Under the State 404 program, projects with reasonable potential for affecting listed or proposed to be listed species are the projects that have been determined by FDEP and FWC, in coordination with USFWS, to affect listed species. Details regarding the level of effects to species and their critical habitat as well as proposed protection measures will be included in the public notice.

Within 30 days of receipt of notice, EPA will notify FDEP of the intent to comment upon, object to, or make recommendations with respect to a permit application, draft general permit or FDEP's failure to accept the recommendations of an affected state pursuant to § 233.31(a). Within this time period, EPA may also request information from FDEP if the information provided is inadequate to determine whether the permit application or draft permit meets the requires of the CWA, 40 CFR § 233.50, and the 404(b)(1) Guidelines. EPA may notify FDEP that there is no comment but reserves the right to object within 90 days of receipt, based on any new information brought out by the public during the comment period or at a hearing.

Pursuant to 40 CFR § 233.50(b), EPA will provide a copy of each public notice, each draft general permit, and other information needed for review of the application to the USACE, USFWS, and NMFS, within 10 days of receipt. These agencies will notify the EPA within 15 days of their receipt if they wish to comment on the public notice or draft general permit. Such agencies should submit their evaluation and comments to EPA within 50 days of such receipt. The final decision to comment, object, or to require permit conditions will be made by EPA.

If EPA has given notice to FDEP of the intent to comment, those comments shall be submitted within 90 days of the receipt of the public notice, draft general permit, or FDEP's failure to accept the recommendations of an affected State. An FDEP permit shall not be issued until after the receipt of such comments or 90 days of the



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EPA's receipt of the public notice, draft general permit, or FDEP's response (§ 233.31(a), whichever comes first. Within 90 days, the EPA will provide a written statement with comments, objections, or recommendations; and the actions that must be taken by FDEP in order to eliminate any objections (see 40 CFR § 233.50(e) for more details). FDEP shall not issue a permit until steps required by EPA to eliminate an objection or incorporate a requirement for a permit condition to a permit application or draft general permit. Within 90 days of FDEP receipt of EPA's comments, EPA may hold a public hearing on the objection or requirement (see 40 CFR § 233.50(g) and (h) for more details).

If no public hearing is held, within 90 days of receipt of EPA's comments, FDEP shall either issue the permit revised to satisfy EPA's objections or notify EPA of its intent to deny the permit. In the event FDEP neither satisfies EPA's objections, requirement for a permit condition, nor denies the permit, EPA shall transfer the permit application to the USACE for processing.



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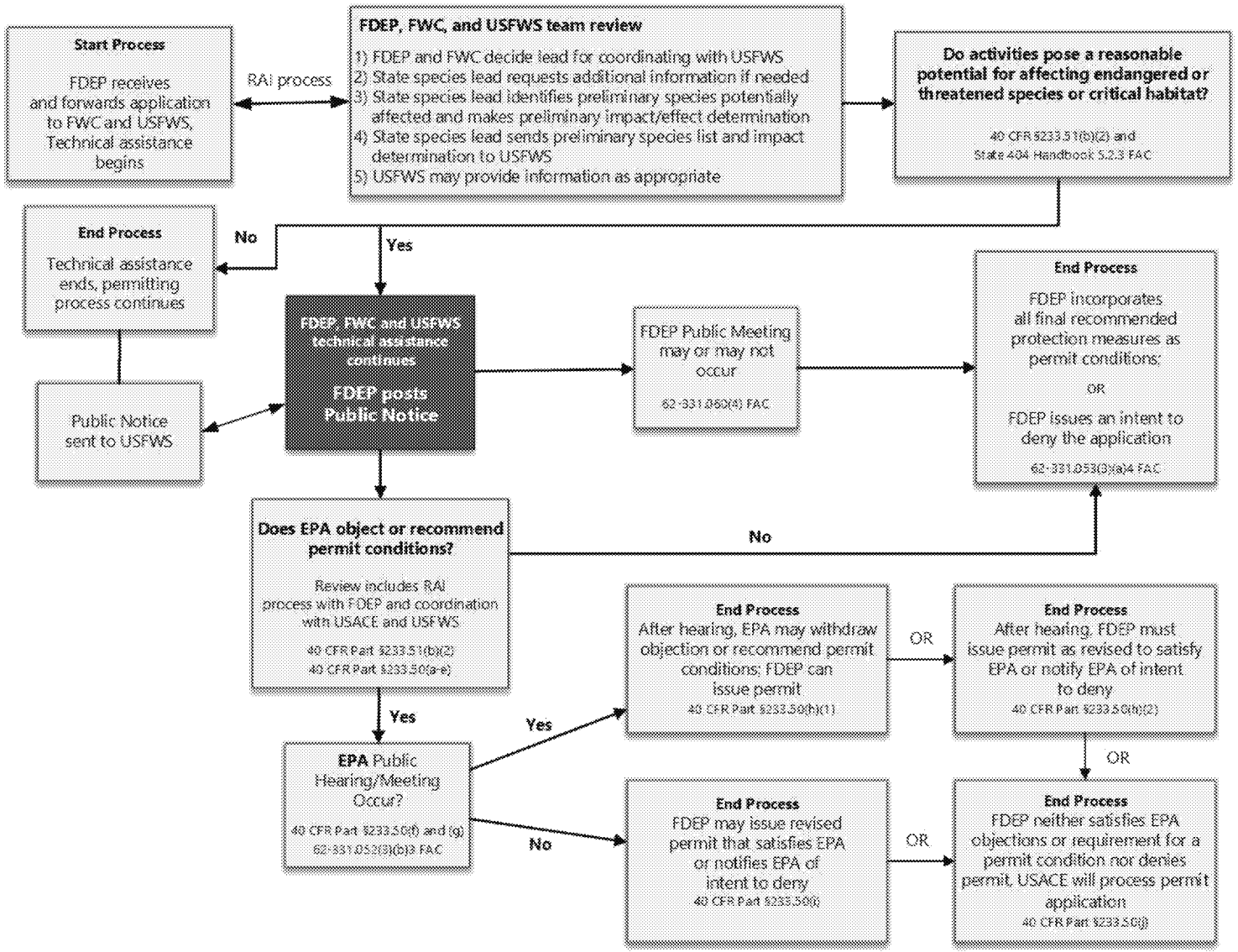
**Figure [ STYLEREF 1 \s ]-[ SEQ Figure * ARABIC \s 1 ] Species Coordination Overview**



## 7.5 Species Assessments

The structure of the species coordination process discussed in the previous section allows for the determination of effects regulated activities may have on a listed species and/or critical habitat that is consistent with past processes regulated by the CWA and the ESA. It also will identify, through coordination with USFWS, practicable, implementable process for developing protective measures that may avoid or minimize potential adverse impacts of the regulated activity consistent with past consultations under the USACE 404 program.

### 7.5.1 Identifying Project Area and Affected Species

The first step in assessing potential adverse impacts to listed species or those proposed to be listed as endangered or threatened, as well as their habitats, is to define the project area (similar to the "action area" during a federal section 7 consultation). The project area can be larger than the immediate area of activity, since it is an identification of all areas that may affect listed species and their habitats directly or indirectly by the project's activities.

For species within the USFWS's jurisdiction, the USFWS's Information for Planning and Consultation (IPaC) website ([ HYPERLINK "https://ecos.fws.gov/ipac/" ]) allows for the user to draw a polygon to represent the project area. The project area must include the proposed project's potential impacts to the affected species and their habitats, even those traditionally considered as offsite, if the impacts would occur as a result of approval of the project. By creating a polygon that is geographically referenced, the system will produce a preliminary list of resources for the area chosen. This list of species and habitats will be considered preliminary, because all potential adverse effects need to be determined (and some species may need to be confirmed by on-site surveys) and verified during the State and Federal species reviews. The result of this online search will also include critical habitats that overlap with the project area. While critical habitat is a special designation under the ESA, during project reviews all occupied habitat within the species range that may be adversely affected will be considered if the project's activity may affect listed species, even that which is not designated as critical habitat under the ESA.

### 7.5.2 Assessments Using Available Federal Decision Tools

Once there is a proposed affected species list, the State's species coordination lead determines (preliminarily or concurrently with the USFWS) whether adverse effects/impacts are likely to occur. The types of impacts that may occur could be beneficial to species and their critical habitat or could adversely impact or adversely affect them. Adverse impacts to species include the potential for harm to members of the species, such as injury, death, or those that occur by loss of feeding, breeding, or sheltering resources due to a project's activities affecting habitat where members of the species exist. Adverse impacts also include the potential for jeopardizing the continued existence of a species, or adversely modifying critical habitat. Adverse effects/impacts, or types of harm to one or more individuals, can result directly from dredging and filling activities involved with construction or demolition proposed by the project, as well as secondary impacts caused by the ongoing operations of the project once constructed. Assessment of adverse cumulative impacts must be considered during the review of State 404 permit applications; the assessment of expected impacts to species that may be caused from a particular project must be considered along with the impacts that may have been caused from past authorized projects, as well as those future projects that are reasonably certain to occur. Adverse impacts to habitats, particularly critical habitats, include alteration or destruction of

the physical and biological characteristics of that habitat. These characteristics are important to the listed species using the area, and harm to species may occur temporarily during construction or permanently during operation or by alteration of the habitat.

For some species, the IPaC system provides Federal species guidelines. These guidelines include General Project Design Guidelines, Habitat Assessment Guidelines, Species Survey Guidelines, Effects Determination (consultation and/or dichotomous) Keys, conservation measures, guidance for determining whether a species 'may be present', proactive management suggestions, Species Assessment Guides (SAGs) or Standard Local Operating Procedures for Endangered Species (SLOPES).

Programmatic consultations, when available, help identify where impacts/effects will occur and whether technical assistance with the USFWS is needed. Some programmatic consultations do not exempt take; rather, they attempt to avoid take through setting project-specific criteria that either determines a project is "not likely to adversely affect" a listed species or critical habitat, or sets avoidance and minimization measures that allow a "not likely to adversely affect" determination to be made. Because these consultation keys and programmatic biological opinions cover many of the species which are most often the subject of ESA section 7 consultations in Florida, they include many useful measures to identify, avoid, or minimize adverse effects to ESA-listed species.

These tools, particularly SLOPES, benefit the species, the USFWS, and the regulated community by:

- Increasing the effect determinations' accuracy and consistency;
- Improving completeness and efficiency in the documentation of the administrative record;
- Decreasing the amount of staff and time needed to complete coordination; and
- Improving ESA-listed species conservation and compliance with the ESA.

These tools also provide a major benefit to the regulated community because they are available to the public and may be used by the applicant during the pre-application and application phases. An applicant is often able to identify any potential effects of the proposed project and be able to consider whether effects could be avoided or minimized before a significant amount of planning resources have been expended.

Lists or links to other biological opinions, including a few additional examples of programmatic biological opinions, can be found on the USFWS Vero Beach Field Office website at [ HYPERLINK "https://www.fws.gov/verobeach/Programmatic%20Consultations.html" ]. Additional information and tools can also be found at [ HYPERLINK "https://www.fws.gov/northflorida/Tools2Use/consult-landowner-refs.htm" ]. A few examples of these are included in Table 7-1 below.

**Table [ STYLEREF 1 \s ]-[ SEQ Table * ARABIC \s 1 ] Programmatic Consultations and Consultation Keys in Florida, 2010 - 2019**

| Name of Consultation | Year Published | Species | Exempts Incidental Take |
|---|---|---|---|
| FEMA National Flood Insurance Program Projects (Florida Keys) | 2014 | American Crocodile | No |
| Eastern Indigo Snake Consultation Key | 2017 | Eastern Indigo Snake | No |
| Florida Bonneted Bat Consultation Key | 2019 | Florida Bonneted Bat | No |

| Name of Consultation | Year Published | Species | Exempts Incidental Take |
|---|---|---|---|
| Florida Panther Effect Determination Key | 2007 | Florida Panther | No |
| Natural Resources Conservation Services Working Lands for Wildlife Program | 2012 | Gopher Tortoise | No |
| Piping Plover Programmatic Biological Opinion | 2013 | Piping Plover | Yes |
| Sand Placement Programmatic Biological Opinion | 2015 | Sea Turtles and Beach Mice | Yes |
| Department of Housing and Urban Development Loan Projects | 2010 | Various | No |
| FEMA Conditional Letters of Map Revision | 2014 | Various | No |
| Clearance to Proceed with Federally Insured Loan and Grant Projects | 2016 | Various | No |
| West Indian Manatee Programmatic Biological Opinion | 2011 | West Indian Manatee | No |
| Guidance to Proceed with Events Authorized by the US Coast Guard | 2016 | West Indian Manatee and Sea Turtles | No |
| Wood Stork Programmatic Key (North and South Florida) | 2010 | Wood Stork | No |

Source: USFWS 2019a

Some types of guidelines are considered decision tools (i.e., SLOPES, dichotomous keys, etc.), and can assist in determining not only whether an impact/effect will likely occur and may also recommend protection measures appropriate for specific species and specific activities. For example, effect determinations for wide-ranging species such as the Eastern Indigo Snake rely on whether an individual was detected on site and the size of the habitat loss. The Wood Stork determination key is also used extensively and has had some success. As stated in chapter 4.2.2., the Eastern Indigo Snake and Wood Stork accounted for 56.6 percent of all species-level consultations in Florida between 2014 and 2018. Species guidelines, or decision guidance tools, are also available independently from the IPaC system on the USFWS website.

These types of tools provide consistent criteria to reach impact/effect determinations and will be used by the State's species coordination lead to facilitate the USFWS's review. The review process for species with these types of decision tools will likely be slightly different and simplified compared to those species that do not have these tools. In the beginning of the review of a State 404 permit application, the State's species lead will use these decision tools to arrive at impact/effect determinations and potential protection measures. This preliminary review will be submitted to the USFWS with a request for technical assistance, allowing the USFWS to concur with the conclusions, or provide additional information that may change the conclusions. Once the species review outcome is finalized, technical assistance from the USFWS ends for those species and the protection measures are incorporated as conditions to any State 404 permit that is issued.



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### 7.5.3 Case by Case Assessments When Tools Are Not Available

For those species or activities that do not have federal species guidelines or decision tools, a case by case assessment must be performed. A preliminary assessment will be performed by the applicant and verified or expanded upon by the FDEP/FWC species coordination lead. Applicants will need to provide all of the information necessary to perform an assessment of potential impacts to listed species and their habitats, as well as submitting proposed protection measures to avoid and minimize the anticipated impacts.

The following factors should be considered when evaluating the impacts/effects of the activity:

- Proximity of the activity to the species and/or designated critical habitat;
- Location and extent of the area of disturbance;
- Timing (with regards to sensitive periods of a species lifecycle);
- Duration of the activity or impact;
- Disturbance frequency, and
- Nature of the effect (elements of a lifecycle, population size, variability, or distribution, physical and biological features of habitat, etc.).

Federal species guidelines, information on [ HYPERLINK "https://ecos.fws.gov/ipac/" ], [ HYPERLINK "https://www.fws.gov/southeast/florida/" ], the results of species surveys, (see Table 7.2 below for guidance), relevant scientific literature, species accounts in Appendix B of this document, stressors and effects in Appendix C with discussion in Chapter 5 of this document, and other available sources of information are reviewed to develop preliminary conclusions of impact/effect as well as develop any potential protection measures.

Physical or Biological Features essential to the conservation of the species as identified in the final rules designating critical habitat for specific listed species should be considered to determine whether there may be adverse modification of critical habitat.



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**Table 7.2 Interpreting the results of species surveys**

| Suitable habitat present in the project area? | Species Survey Result | Conclusion | Next Step | Comments |
|---|---|---|---|---|
| No | N/A | Species unlikely to be present | No technical assistance needed. Document conclusion in project record | Consider the potential for the species habitat to become established in the project area before the activity is complete |
| Yes | Species not detected[1] | Species unlikely to be present | – | Review species-specific survey protocols; make sure survey methods and results are sufficient to support conclusion |
| Yes | No survey data or surveys inconclusive | Species unlikely to be present until new information shows it exists | Review potential impacts/effects to critical habitats | |
| Yes | Positive survey data | Species is present | | |

[1] Within species range and preferred habitat type

The species coordination lead will use the information from the applicant and assess all the data available to them to determine if there will be impacts to any listed species and the severity of adverse impacts to each species and habitats present in the project area. For projects with large amounts of acreage or that are intensive in the amount of activities proposed, or with multiple species and critical habitats, a written assessment determining preliminary anticipated adverse impacts and protection measures to avoid and minimize those impacts would be developed. This preliminary review will be submitted to the USFWS with a request for technical assistance or would be developed in coordination with the USFWS. The USFWS would agree with the conclusions and recommended protection measures or provide additional information that may change the conclusions and protective measures. Once the species coordination review and technical assistance with the USFWS is completed, the species coordination process with the USFWS ends for those species and the protection measures are incorporated as conditions to any State 404 permit that is issued. At any time during the review of State 404 permit applications, if modifications to the project are proposed after the species coordination process, the species review will be revisited with the USFWS. If modification occurs after the application is granted, and the modification causes effects not previously considered by USFWS, the applicant may be liable for any take under section 9 of the ESA.

## 7.6 Impact/Affect Determinations and Protective Measures

The word "impact" used in Chapters 62-330 and 62-331, F.A.C. describes effects similar to "may affect" and "adverse effects" under ESA. Throughout this document, these terms are used interchangeably. The State 404 program has two standards of review regarding the protection of listed species: the species protections required under CWA and ESA, and the species protections required under State Chapters 62-330, and 62-331, F.A.C. Under State rules, the requirements of CWA and ESA are incorporated into the species review process for adverse impacts to listed species and their habitats. The State rules are broad; the ERP rule and State 404 program rule protect not only federally listed and State-listed species, but all fish and wildlife in Florida.

While the State 404 program has been developed to meet the requirements of CWA and ESA, it also relies on the requirements of the existing State ERP program. The ERP program requires the applicant to provide reasonable assurances that the proposed activities will not damage or harm the water resources of the State nor reduce the value of wetland functions including functions provided to fish, wildlife and listed species. A state or federally listed species' ability to nest or den cannot be interrupted by negative impacts to the uplands or wetlands a listed species uses. Subsection 62-330.301(1)(d), F.A.C. requires an applicant provide reasonable assurance that the construction, alteration, operation, maintenance, removal, or abandonment "will <u>not adversely impact</u> the value of functions provided to fish and wildlife and listed species by wetlands and other surface waters" to obtain approval for a permit. This review also includes consideration for secondary and cumulative impacts.

There is case law that has defined the terms "adversely impact" regarding listed species that should be considered while reviewing State 404 program and ERP program applications (*Metro. Dade County v. Coscan Florida*, 609 *So. 2d 644, 649-50 (Fla. Dist. Ct. App. 1992)*. The Florida District Court of Appeals overruled the recommended order from the administrative hearing, finding that the hearing officer ruled under the federal standard rather than the Florida standard. The federal standard is stated as "whether the project would jeopardize the continued existence of an endangered species", whereas the Florida standard is stated as "whether the project would adversely impact" an endangered species. According to the District Court, any impacts that adversely affect a species should be considered (and addressed if warranted), regardless of whether those impacts result in jeopardizing the continued existence of the entire species. Therefore, under Florida law, the standards for addressing adverse impacts/effects to listed species includes not only a prohibition of issuing permits that may jeopardize the continued existence of the species, but it also includes a requirement to identify and address adverse impacts to ESA-listed species.

Protection measures are defined as those avoidance and minimization measures to address adverse impacts to listed species and critical habitat. Protection measures, in the form of avoidance and minimization measures recommended by the USFWS, are incorporated as conditions to the State 404 permit. Examples of protection measures include but are not limited to project design changes and operational restrictions for the protection of species (i.e., seasonal restrictions for construction work).

For the purposes of the affected species list for this BA, anticipated stressors are outlined in Table C.1.a and anticipated effect determinations are noted in Table C.1.b in Appendix C. During future reviews of State 404 permit applications, however, all potential impacts and effects to species and their habitat will be assessed and addressed during project by project permit application reviews.



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### 7.6.1 Impact and Affect Determinations

When decision tools are not available, the determination of whether a project's activities will affect endangered or threatened species is preliminarily made by FDEP and FWC, and confirmed with USFWS during the technical assistance process. Information about a species should be cross-referenced with knowledge of the project's activities and the project area to help predict whether and how the species at any life stage will respond when exposed to the effects of the activities. Based on best available data, if any of the following occurs it will be determined that the project will adversely impact/effect the species and technical assistance with the USFWS to determine possible protective measures is required. The following statements can be used as guidance for the determination of "may adversely impact":

- Data indicate the species may be exposed to the elements of the activity and respond deleteriously upon exposure to elements of the activity or to stressors produced by the activity; or
- Data indicate the proposed activity will cause changes to the physical and biological features of critical habitat and produces exposure or stressor to species.

As the species coordination process progresses during the review of a State 404 permit application, proposed activities will be assessed for potential effects to species. The USFWS will confirm whether adverse impacts are anticipated to occur, and how significant the impacts are expected to affect the species or critical habitats. These determinations can be categorized as follows:

- No Effect/No Impact
- Not Likely to Adversely Affect/Impact
- Likely to Adversely Affect/Impact
- Jeopardizes the Continued Existence of the Species, and/or Destroys or Adversely Modifies Critical Habitat

*No Effect/No Impact*

If physical or biological features essential to the conservation of the species are not present or are present but will not be affected in the project area, then no further review of effects/impacts to critical habitats is required. In addition, a determination of "No Effect/No Impact" would be made if listed species do not occur and do not have the potential to occur on a site. If neither the species nor the critical habitat will respond in any manner, no further review of adverse impacts to species is required and technical assistance with the USFWS is concluded.

*Not Likely to Adversely Affect/Impact*

This determination is reached when there is reasonable certainty that a proposed activity may affect a species or designated critical habitat, but the effect is not anticipated to cause harm to a member of the species, nor cause adverse impacts to critical habitat that would result in harm to a listed species dependent on that habitat. The impact expected may not require protective measures (if discountable, or insignificant) or it may be deemed as not likely to adversely affect via required protective measures to avoid and minimize the effects.



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*Likely to Adversely Affect/Impact*

This determination is reached when there is reasonable certainty that a proposed activity may adversely affect a species or designated critical habitat, and the effect is anticipated to cause harm to a member of the species and/or cause adverse impacts to critical habitat that would result in harm to a listed species dependent on that habitat. Harm to an individual(s) means injury or death. The level of harm, however, may not result in jeopardizing the continued existence of the species or destroying or adversely modifying critical habitat. The adverse impact expected is likely to require protective measures to avoid and minimize the effects.

*Jeopardizes the Continued Existing of the Species and/or Destroys or Adversely Modifies Critical Habitat*

The State 404 program rule includes stipulations (Rules 62-331.053(3)(a)4, 62-331.201(3)(k), and 62-331-248(3)(k) F.A.C. that prohibit issuance of a permit that will likely jeopardize the continued existence of endangered or threatened species, or result in the likely destruction or adverse modification of habitat designated as critical for these species as determined by USFWS. Through technical assistance with the USFWS, the FDEP and FWC will be informed of when a proposed project and its activities is anticipated to jeopardize the continued existence of the species, or if critical habitat is destroyed, or adversely modified. Under these circumstances, the FDEP, FWC, USFWS and the applicant will discuss to determine what, if any, protective measures may be appropriate.

It should be noted that the continued existence of a species could still be in question even without anticipated harm to individuals, but if there were harm to the resources the species depend on. An example would be a project site that includes pines trees that are 70-90 years old, and a listed species has been verified as being onsite with habitat requirements for that age of pine tree. The applicant proposes to cut all the trees before they reach the age of 70 or just after they reach the age of 90. The applicant's proposed protection measures only includes making sure no species are present in each tree before they are cut down. This project area would leave only pine trees younger than 70 years old. If this activity was taken across the entire range of the listed species onsite, it could jeopardize the existence of the species without directly or indirectly taking (as defined by ESA section 9) individual members of the species.

### 7.6.2 Developing and Ensuring Protective Measures

After the determination of "may adversely effect/impact" and the level of adverse impact, the species coordination process continues between the State species coordination lead and the USFWS during the review of a State 404 permit application. In order to move towards authorization of an activity, the project's adverse effects/impacts to species and habitat that have been identified must be avoided and minimized by implementing protective measures. Those protective measures may likely either modify the project design, modify the project operation, or follow species-specific protective measures. Early in the review process, the species lead will draft and compile the applicant's information as well as their own assessment and forward to the USFWS for review. The assessment may also be done in coordination with the USFWS, depending upon the project. The USFWS may agree with the proposed preliminary impact review and proposed protection measures, and the finalized assessment and recommendations will be provided to the applicant in the form of comments and draft permit conditions. The USFWS may also recommend additional avoidance and minimization measures, provide recommendations for appropriate permit conditions if none were proposed in the informational package sent to them, or state that the proposed measures are not adequate.

Some of the federal species guidelines discussed in the previous subsection of this chapter provide minimization measures that are considered standard conditions for adverse effects associated with common, minor activities. For other species, there are typical minimization measures for common activities that are frequently incorporated into permits as standard conditions that may not be associated with programmatic guidance but can be found in biological opinions. Some projects, particularly those with a greater level of adverse impacts or multiple activities and/or multiple species that may be affected, have a need for a more comprehensive assessment and intensive coordination with USFWS.

In addition to species-specific protective measures, thorough assessments of adverse impacts to habitat must be performed in order to ensure alterations to habitat do not adversely affect listed species. There are various methods for avoiding and minimizing effects of dredge and fill activities within wetlands. Some impacts can be avoided or minimized through BMPs (e.g., silt fences, turbidity curtains, containing dredge materials during dewatering, transfer and storage), while others require administrative restrictions or permit conditions (e.g., contractor education, not refueling equipment within 100 feet of wetlands) to protect wetlands, waters, or "at-risk" species. A major administrative control that compensates for wetland destruction is wetland mitigation. Wetland mitigation includes the enhancement, restoration, establishment, and/or preservation of wetlands that serve to offset unavoidable impacts on wetlands (FDEP 2019b). Governments and agencies have used this policy across North America with notable levels of success (NAWCCC 2000). The species coordination process will avoid and minimize adverse impacts to habitat when practicable.

In addition, FDEP intends to incorporate adaptive management into the State 404 process as needed, particularly as it pertains to wetland compensatory mitigation projects. Per the FDEP's State 404 handbook, wetland compensatory mitigation projects that cannot be constructed in accordance with the approved mitigation plans will require FDEP approval prior to any significant modifications. Wetland compensatory mitigation projects not progressing toward meeting their performance standards will be evaluated for measures to address deficiencies and a determination as to whether these modifications will result in the project meeting its original ecological objectives. These modifications/measures may include but are not limited to site modifications, design changes, revisions to maintenance requirements, and revised monitoring requirements. The measures shall be designed to ensure that the modified compensatory mitigation project provides aquatic resource functions comparable to those described in the mitigation plan objectives. Performance standards will be revised to address deficiencies in wetland compensatory mitigation projects and to reflect changes in management strategies and objectives if the new standards provide for ecological benefits that are comparable or superior to the approved compensatory mitigation project. No other revisions to performance standards shall be allowed except in the case of natural disasters.

*Best Management Practices for Wetland Protection*

BMPs, including schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of WOTUS from discharges of dredged or fill material, will be implemented for all projects under the State 404 program. BMPs include methods, measures, practices, or design and performance standards which facilitate compliance with the Section 404(b)(1) Guidelines (40 CFR § 230), effluent limitations or prohibitions under Section 307(a), and applicable water quality standards.

Wetland mitigation measures included in a Section 404 application may also offset effects or result in longer-term beneficial effects to ESA-listed species; however, they are part of the wetland protection process of the State 404 and ERP processes and not a requirement of the ESA coordination.

*Protective Measures for Plants and Animals*

In Florida, fifty-four (54) plant species are on the federal list of endangered species and 14 are on the federal list of threatened species. The ESA (16 USC § 1531) provides protection to both endangered and threatened plants and animals. The ESA, however, does not prohibit the destruction, damage or transplantation of protected plants unless such activities involve an endangered species on federal land or if the activities occur in violation of state laws. If a person wishes to develop private land, with no federal jurisdiction involved, and if the proposal is in accordance with state law, then the potential destruction, damage, or movement of endangered or threatened plants does not violate ESA. Further, a section 10 ESA incidental take permit is only needed in situations where a non-federal project is likely to result in "take" of a listed species of fish or wildlife; there is no such process for plants.

But while incidental take does not apply to plants, an assessment of jeopardy and adverse modification to critical habitat under section 7(a)(2) applies to plants. For the State 404 program, 40 CFR § 233.51(2), and 40 CFR § 233.20(a) would prohibit issuance of a State 404 permit that will jeopardize a plant species or adversely modify its critical habitat. FDEP will incorporate any reasonable and prudent measures and terms and conditions provided by the USFWS into permit conditions for a State 404 permit for such a project.

Endangered, threatened and commercially exploited plant species in Florida are regulated by the Florida Department of Agriculture and Consumer Services, by their Division of Plant Industry. Florida's State ERP program under Chapter 62-330, F.A.C. and the State 404 program under Chapter 62-331, F.A.C. include plants in the definition of endangered and threatened species, which requires consideration of adverse impacts resulting from activities authorized under these programs. During the permit review process for each type of permit, FDEP will evaluate potential impacts and effects to listed plant species. This evaluation may include a request to the USFWS for recommendations to avoid and reduce anticipated impacts. For those types of projects where jeopardy is not expected to occur and no adverse modification to critical habitat is expected, some projects may still need protective measures incorporated as permit conditions in order to adequately conserve endangered and threatened plant species.

The State 404 program, the State ERP program, and the ESA provide protection to both endangered and threatened plants and animals. As with animals, there could be a situation in which a federally listed plant is located in the upland portion of the project area that is adjacent to assumable waters and would be affected by the permit. As discussed in subsection 3.1., the State 404 program is required to consider adverse impacts in uplands that would not occur except for the authorization of the proposed activity. In addition, while the State 404 program does not have jurisdiction in isolated wetlands, the ERP program does have jurisdiction and can address adverse impacts to animal and plant species dependent on these wetlands.

*Ensuring Protection for Endangered and Threatened Species in Florida*

The State of Florida is required to incorporate all USFWS recommendations for protection measures as State 404 program permit conditions (Subsection 62-331.054(1), F.A.C.). The existing working relationship and coordination during the review of projects would continue between the FDEP and the USACE. The FDEP will add fields in their permitting tracking database that will continue the collection of data done by the USACE for past Section 404 permits. This data will continue the monitoring of adverse effects on listed species and critical habitat, facilitating the State's ability to do compliance.

In the current ERP program, FWC provides recommendations to FDEP and the WMDs for State-listed species and some federally listed species, such as manatees and sea turtles. FWC has offered to assist FDEP in the State 404 program review for impacts to federally listed species, and the current collaboration between FDEP and FWC will be enhanced by the Assumption. FWC and the USFWS have a long-standing partnership and a current ESA section 6 Cooperative Agreement for conserving Florida's federally endangered and threatened wildlife. This relationship between FWC and USFWS will bring an existing level of cooperation, knowledge, and expertise to the State 404 program. In addition, FDEP, FWC and USFWS have entered into a Memorandum of Understanding to identify commitments, roles and responsibilities regarding species coordination for the State 404 program as well as the ERP program.

The State 404 program species coordination process involves the applicant, FDEP, FWC and USFWS, and encourages compliance by the applicant to avoid and minimize adverse effects, reducing the expected impacts to listed species and their habitats. The interactions between agencies and the applicant will inform applicants of the importance of this process in order to be eligible for authorization of their proposed activities and in order to ensure compliance with the ESA.

### 7.6.3 Statements of Adverse Impact in Public Notices

While many adverse effects can be avoided and minimized during the species coordination review process, impacts that are likely to adversely affect a species (e.g. likely to cause incidental take or jeopardy) or critical habitat (e.g. destroy or adversely modify critical habitat) must be recorded, monitored, provided to the USFWS for tracking and species conservation purposes. These types of projects will receive the most stringent review and be documented in the Public Notice as well as the FDEP database and project file.

The public notice, required by Rule 62-331.060, F.A.C., will include an effect determination statement and include the proposed protection measures, if known at the time of publication. The effect determinations statements for species may include one of the following: "No Effect/Impact", "Not Likely to Adversely Affect/Impact", "Likely to Adversely Affect/Impact", or "Jeopardizes the Continued Existence of the Species" for endangered or threatened species or species proposed to be listed. The effect determination statements for critical habitat may include one of the following: "Destroys Critical Habitat" or "Adversely Modifies Critical Habitat" for designated critical habitat or habitat proposed to be designated as critical.

The USFWS will receive copies of all applications when submitted, including those FDEP/FWC has preliminarily determined as "No Effect/No Impact". If the USFWS elected to not respond to these types of applications upon first submittal, they will still receive public notices for these applications and may elect to comment at that time. Receiving public notices for all applications also provides an opportunity for the USFWS to re-review all of the effect determinations made by the State and provide oversight of the species coordination process. Along with the public notice, the USFWS will receive copies of all applications and



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supplemental information submitted for applications required to be publicly noticed, with all stated effect or no effect determinations.

With the public notice, EPA will receive copies of all applications with a determination other than "No Effect/Impact". This provides an opportunity for the EPA to monitor the effectiveness of the species coordination process and to provide oversight for CWA and ESA compliance.

### 7.6.4 Dispute Resolution between FDEP and USFWS and USFWS-EPA Coordination

To be clear, as stated elsewhere in this BA, State 404 permits (as with USACE 404 permits) must comply with Section 404(b)(1) guidelines which include a stipulation that "Where consultation with the Secretary of the Interior occurs under section 7 of the Endangered Species Act, the conclusions of the Secretary concerning the impact(s) of the discharge on threatened and endangered species and their habitat shall be considered final" (per 40 CFR § 230.30(c). Furthermore, per the State 404 Chapter 62-331, F.A.C. and CWA 404(g) and 404(b)(1) guidelines: 404 permits may not be issued if doing so jeopardizes the continued existence of species of plants and animals listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification of a designated critical habitat.

For permits that would result in injury or harm to individuals of a listed species but whose impacts would not jeopardize the continued existence of the species or cause adverse modifications to critical habitat, FDEP shall incorporate USFWS-recommended protection measures as permit conditions to fulfill compliance with the anticipated Program assumption BiOp and for any subsequent anticipated incidental take to be exempted from the prohibitions of section 9.

In the event FDEP questions or disagrees with a local USFWS office about the necessity of project-specific, species-specific USFWS-recommended protection measures being added as permit conditions for the purpose of either 1) avoiding jeopardy to a ESA-listed species or adverse modification of critical habitat; or 2) for the purpose of mimiizing incidental take to fish and wildlife, the following steps would guide the resolution process.

1. If there is a dispute that occurs between FDEP and USFWS prior to FDEP issuing a public notice for a permit application, the dispute resolution process will only involve the State (FDEP and FWC) and the State-level USFWS Ecological Services (ES) office. The processes detailed in the 2020 FDEP, FWC, USFWS Endangered Species Coordination Memorandum of Understanding will be followed and the Florida 404 Endangered Species technical team composed of FDEP, FWC, and USFWS staff and decision-makers will assist in resolving any local disputes. The EPA will not be involved at this stage but may later be involved should it receive a copy of the public notice from FDEP. EPA would then coordinate with FDEP, the USFWS, NMFS, and USACE per the EPA's federal oversight regulations pertaining to state 404 permits (40 CFR 233.50). In the highly unlikely event the dispute is not resolved between FDEP and USFWS prior to the state's deadline for issuing a public notice and the USFWS has not settled on a final conclusion (e.g., USFWS local office's recommendations are being reviewed by higher levels within USFWS),, FDEP will prepare a public notice that reflects FDEP's position and submit that public notice to EPA (per EPA's regulations governing federal oversight of State 404 permits - 40 CFR § 233.50) along with a transmittal letter to EPA that succinctly presents the relevant facts, FDEP's position, and conveys that the USFWS is formulating its final comments/position.



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2. Per 40 CFR § 233.50, EPA will then transmit FDEP's public notice to USFWS within 10 days of receipt. USFWS will notify EPA within 15 days of receipt on whether it will submit comments. USFWS will have 50 days from receipt to provide comments to EPA. EPA shall make final decisions to comment, object or to require permit conditions (per 40 CFR 233.50) and shall consider USFWS conclusions concerning impacts to ESA-listed species to be final (per CFR 230.30(c). FDEP or any interested person can ask EPA to hold a public hearing on EPA's objection or required permit conditions. At any point and whether or not EPA has a public hearing, FDEP may accept EPA's conditions and issue the permit, deny the permit, or notify EPA that it is neither issuing or denying the permit. In the latter case, EPA would transfer the permit application to the Corps for processing (per 40 CFR § 233.50).

# 8. Conclusions

This BA evaluates the effects of the potential approval by EPA for the State of Florida assuming Section 404 of the CWA on listed species in present time, and estimates effects into the future. All species that are currently listed, proposed to be listed or might be listed in the future are discussed, with evaluations of effects on respective guilds. This review helps evaluate the effects of the State 404 program on any species that are currently listed or may become listed in the future.

This BA analyzes a total of 235 plant and animal species in the State of Florida that are federally listed as endangered (95), threatened (44), or is ESA-considered. Species that must be addressed pursuant to Section 7 of the ESA, Section 404 of the CWA and Chapter 62-331, F.A.C. for the State 404 program, are federally listed species or species proposed to be listed under the ESA (a total of 141 species). If these listed species have designated critical habitats, or critical habitats proposed to be listed, the adverse effects and impacts to those habitats must also be analyzed and addressed under the State 404 program.

If approved, the State's Assumption of the dredge and fill permitting program under Section 404 of the CWA for waters assumable by the State would be implemented by processes and procedures described in state regulations (Chapters 62-330, and 62-331, F.A.C.), MOAs with EPA and USACE, and an MOU with the FWC and the USFWS. Should EPA request formal consultation with USFWS at the time of EPA's review of whether to approve Assumption of the State 404 program, USFWS may issue a Program assumption BiOp. The opinion may include conditions that guide implementation of the State 404 program. If the USFWS determines that the Action is not likely to jeopardize the continued existence of ESA-listed species and is not likely to destroy or adversely modify designated critical habitat, the Program assumption BiOp may also include an ITS with reasonable and prudent measures and terms and conditions that must be complied with during the implementation of the State 404 program.

In implementing the State 404 program, FDEP will request technical assistance from the USFWS in order to address federally listed species and critical habitat issues. This coordination is to ensure that any permit issued by FDEP is not likely to jeopardize the continued existence of any listed species or adversely modify or destroy designated critical habitat (pursuant to 40 CFR § 233.20(a)). As such, FDEP will consider all information provided by USFWS and will include all species protection measures recommended by USFWS as conditions to the State 404 permit.

If Section 404 of the CWA is assumed by the State of Florida, it will allow the State to assess and regulate all activities that will occur in assumed waters, integrating protections that were previously regulated by two

different programs. Chapter 62-331, F.A.C., by referencing much of the existing State ERP Chapter 62-330, F.A.C., will facilitate the State's implementation of the CWA requirements and provide a more comprehensive approach to the protection of WOTUS and Florida's habitats and species.

The State 404 program is designed to provide equivalent conservation of ESA-listed species as the currently operating USACE Section 404 program. The ability of the State of Florida to process applications with permitting authority equivalent to Section 404 of the CWA in conjunction with the State ERP program allows for addressing potential adverse effects to both federally listed or State-listed species more comprehensively, consistently and efficiently. Conservation strategies for some species will benefit multiple species that share the same habitat. Some State-listed species are also proposed to be federally listed and assessing the expected adverse impacts from proposed projects for all listed species at the same time is likely to improve conservation efforts. It is also possible that the Action could improve efficiencies in processing applications as well as enhance the consistency of decision making, resulting in greater predictability to both the regulated and the conservation communities.

Florida's State ERP program is jointly implemented by FDEP, the WMDs and certain local governments delegated by FDEP. At this time, the administration and implementation of the State 404 program is limited to the FDEP. It is anticipated, however, that the State 404 program may be delegated to the WMDs by FDEP in the future. If this is considered, approval from the EPA will be required prior to implementation. Upon approval, these agencies' will be provided training and will be required to follow the same procedures outlined for the State 404 program.

*Effect of the Action on Tribal Resources or Interests*

Consultations on permit actions taking place on waters in Indian Country would continue to be conducted by the USACE, as they are at present. The Section 404 Assumption rules include a procedure to offer an opportunity for tribal comment by the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida on any applications within a buffer zone around these lands.

A public notice will be sent to the Seminole Tribe of Florida Environmental Resource Management Department for any activity that is within six miles of the Seminole Tribe of Florida's Big Cypress or Brighton Reservations; within two miles of the Seminole Tribe of Florida's Immokalee, Lakeland, or Fort Pierce Reservations; within one mile of the Seminole Tribe of Florida's Tampa, Coconut Creek, or Hollywood Reservations; within the Seminole Tribe's reserved rights areas, including but not limited to: within Big Cypress National Preserve; within Big Cypress National Preserve addition lands; within Everglades National Park; within Rotenberger Wildlife Management Area; or within Water Conservation Area 3-A.

A public notice will be sent to the Miccosukee Tribe of Indians of Florida for any activity that is within two miles of the Miccosukee Federal Reservation; Miccosukee Reserve Area; Krome Avenue, Dade Corners, Cherry Ranch, or Sherrod Ranch Reservations; and Coral Way, Lambick, or Sema Trust Properties. Also, for any activity within the Miccosukee Tribe's reserved rights areas, including but not limited to: within Big Cypress National Preserve; within Big Cypress National Preserve addition lands; within Everglades National Park; within Rotenberger Wildlife Management Area; or within Water Conservation Area 3-A. With these provisions, no substantial difference in effects on tribal resources would be expected under the Action.

*Uncertainty Associated with the Effects Determination*

The precise locations and types of activities included in future permit applications are unknown at this time. It is assumed that overall, the future number and/or any rate of increase for State 404 applications and the

general types of activities and overall dredge or fill quantities will be similar to those permitted in similar jurisdictional waters as past requests for permits by the USACE, and would not change due to an approval of the State's request for Assumption. The number of applications and the total quantities may vary over time and with economic fluctuations and would be greatest in areas of rapid growth where the number of proposed projects tends to be high. However, over shorter timeframes, one or a few large projects (for example, a major infrastructure initiative) can result in a concentration of proposed impacts in a given area or a given set of habitat types, with effects on one or a few species. Not all individual project proposals are known or can be anticipated in advance.

Other uncertainties can include the introduction of new invasive species, the spread of new pathogens, or other biotic or abiotic factors that can affect ESA-listed species or populations. For example, chytrid fungus and white-nose syndrome have contributed to the loss of populations of amphibians and bats, respectively, in recent years. Unexpected changes in the status of an ESA-listed species can lead to the increased importance of future project-level decisions, which under baseline conditions would have little effect on the species. Similarly, recovery of species can lead to increased resilience and, ultimately, in some cases, to delisting. If there are uncertainties, FDEP will work closely with the USFWS on a project by project basis to address those uncertainties and any impacts to ESA-listed species or their critical habitat to ensure effects are avoided and minimized.

*Conclusions*

Historical Section 404 permitting by the USACE resulted in issuance of permits for one or more projects that adversely affected one or more listed species and their critical habitats. The USACE Section 404 process, in accordance with section 7 of the ESA, employed various conservation measures to avoid and minimize adverse effects. And similar to the USACE 404 program, the State 404 program may result in permitting the discharge of dredged or fill material that may adversely affect one or more ESA-listed species and designated critical habitats. While State 404 permits can potentially have significant adverse effects on the aquatic environment and ESA-listed species, many effects can be avoided and minimized during the technical assistance process between FDEP and the USFWS, as demonstrated in the past through the USACE Section 404 review and permitting processes.

It is anticipated that with technical assistance to be set in place by a USFWS Program assumption biological opinion, Chapter 62-331 F.A.C., and Memorandums of Agreement provided in FDEP's Assumption application package, the Action will result in procedural and substantive protections that are at least as protective as the protections afforded by the USACE Section 404 program and through section 7 consultation with the USACE under the ESA. The State 404 program is prohibited from issuing a permit that would jeopardize the continued existence of a species or adversely modify designated critical habitats because of the prohibition in the 404(b) Guidelines. The State's Assumption of CWA Section 404 permit program is not expected to result in significant changes from the number, type, or location of permit applications and proposed projects typically issued by the USACE. This BA is provided to assist in the review of potential effects to ESA-listed endangered and threatened species anticipated with the State of Florida's request for the Assumption of Section 404 of the CWA.



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# Appendix A
## April 15, 2020 Letter from NMFS to FDEP Regarding NMFS Jurisdiction

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

April 15, 2020

Heather Mason, PWS
Environmental Administrator
Florida Department of Environmental Protection
Submerged Lands and Environmental Resources Coordination
2600 Blair Stone Road, MS 2500
Tallahassee, FL 32399-2400

RE: National Marine Fisheries Service in the Clean Water Act Section 404 Assumption by the State of Florida

Dear Ms. Mason:

On November 22, 2019, the National Marine Fisheries Service (NMFS) received your request for input on a draft species list for Florida's assumption of Clean Water Act Section 404 permitting from the U.S. Army Corps of Engineers (USACE). Through subsequent communications with you and your staff, a review of state mapping products, NMFS'own mapping analysis, and a review of state-provided documents about the assumption, we conclude that Endangered Species Act (ESA)-listed species under NMFS' jurisdiction do not occur in waters that are assumable by the state.

We specifically analyzed the possible spatial overlap of the assumption with waters used by shortnose sturgeon, Atlantic sturgeon, smalltooth sawfish, and Gulf sturgeon. Based on that analysis, shortnose sturgeon and Atlantic sturgeon occur in the St. Marys and St. Johns Rivers, which are included on the USACE retained waters list. Smalltooth sawfish occur in waters "subject to the ebb and flow of the tide" which will also remain under the USACE's jurisdiction, per the draft State 404 Program Applicant's Handbook definition of "Retained Waters." Therefore, the USACE will retain ESA Section 7 responsibility for proposed Section 404 actions in the waterways where NMFS's trust resources are most likely to occur.

For Gulf sturgeon, which has shared jurisdiction between NMFS and the U.S. Fish and Wildlife Service, the U.S. Fish and Wildlife Service is responsible for all consultations regarding Gulf sturgeon and critical habitat in riverine habitat units (final rule designating critical habitat for the Gulf sturgeon – 68 FR 13370). Rivers in Florida that include riverine critical habitat units (i.e., Escambia, Yellow, Choctawhatchee, Apalachicola, and Suwannee rivers) and river areas where Gulf sturgeon are known to occur (e.g., lower Ochlockonee River) are all listed by the USACE as retained waters.

Based on this determination we also assume that the Environmental Protection Agency will make a "no effect" determination for NMFS' ESA-listed species that were originally identified as part of this proposed assumption.

We appreciate all the information and assistance you provided in making this determination. If you have any questions, please contact Dr. Pat Shaw-Allen at (301) 427-8473, or by e-mail at pat.shaw-allen@noaa.gov or me at (301) 427-8495 or by e-mail at cathy.tortorici@noaa.gov.

Sincerely,

TORTORICI.CATHRYN.E.1365826850 Digitally signed by TORTORICI.CATHRYN.E.1365826850 Date: 2020.04.15 13:25:25 -04'00'

Cathryn E. Tortorici
Chief, ESA Interagency Cooperation Division
Office of Protected Resources

cc: Karen Myers, US Fish and Wildlife Service
Robert Tawes, US Fish and Wildlife Service
David Bernhart, NMFS, Southeast Regional Office

# Appendix B
## Species Accounts



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## Vertebrates

## MAMMALS

### Sherman's Short-tailed Shrew

Sherman's Short-tailed Shrew (*Blarina brevicauda shermani = Blarina carolinensis shermani*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

The small range of the subspecies in southwestern Florida extends from Fort Myers to near Royal Palm in Lee County (Benedict et al. 2006), although it has not been located since 1955. Current status is unknown, and it is possible the species has been extirpated. Habitat is described as edges of marshes or shallow depressions, mesic flatwoods, with abundant grasses (FNAI 2001a); also drainage ditches with abundant grass cover (Layne 1978). Threats include habitat loss and predation by cats (Layne 1992).

### Gray Wolf

The Gray Wolf (*Canis lupus*), was first listed as endangered effective March, 11, 1967 (32 FR 4001). Various populations throughout the west were listed after this date (43 FR 9607, 76 FR 25590, 43 FR 9607). Critical habitat has been designated in Michigan and Minnesota (43 FR 9607). There have been multiple proposals to delist the Gray Wolf (USFWS 2020a). On May 14, 2019, the US Fish and Wildlife Service (USFWS, the Service) announced a proposal to delist the Gray Wolf, except for the Mexican Wolf (*Canis lupus baileyi*) subspecies (84 FR 21312). This decision is controversial and some organizations believe delisting is premature (CBD 2020a).

Gray Wolves are a keystone terrestrial predator. They feed primarily on ungulates, and utilize a wide range of habitats (USFWS 2020a). In North America, their historic range spanned much of Canada, the US, and Mexico (International Wolf Center 2020, NatureServe 2020). There is disagreement in the scientific community regarding Gray Wolf taxonomy and how many subspecies there are within the United States (International Wolf Center 2020). 'American' Gray Wolves were nearly driven extinct as a result of federal extermination programs. Protection of Gray Wolves has resulted in substantial increases to population numbers, in part due to reintroduction programs. However, Gray Wolves have only returned to an approximate 10 percent of their historic range in the US. Gray Wolves remain extirpated from Florida. Ongoing threats include direct persecution, often as a result of conflicts with livestock, and habitat fragmentation (limiting population growth and genetic diversity) (CBD 2020a).

### Red Wolf

The Red Wolf (*Canis rufus*) is listed as endangered effective March, 11, 1967 (32 FR 4001), except for experimental populations in areas of North Carolina and Tennessee (51 FR 26564). Critical habitat has not been designated (USFWS 2020a).

Red Wolves were nearly driven to extinction as a result of predator control programs and habitat loss (CBD 2019a). The historical range for Red Wolves included North Carolina, Tennessee, and Texas (USFWS 2020a), and may have been much larger spanning the Southeast, the lower Midwest, and into southern Pennsylvania and New York (Weller 2018). A captive breeding program began in 1973 and was largely successful until the mid-2000s (FWC 2020a, CBD 2019a). These captive-bred wolves were reintroduced as experimental populations on several National Wildlife Refuges in North Carolina. In addition, one breeding pair was introduced to St. Vincent Island, Florida (FWC 2020a, USFWS 2020c). A multi-generational pack was present on the island as of 2019 (USFWS 2020c). The species occupies coastal prairies, forests, and swamps within these areas. A major threat to Red Wolf populations is loss of genetic diversity from interbreeding with coyotes (*Canis latrans*) (FWC 2020a). Additionally, incidental take of Red Wolves (mistaken for coyotes) in North Carolina has caused substantial



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declines in the reintroduced population (CBD 2019a).

### Florida Bonneted Bat

The Florida Bonneted Bat (*Eumops floridanus*) was listed as endangered effective November 1, 2013 (78 FR 61003). Critical habitat has not been designated for this species, although designation was expected to occur in 2014 (FWC 2013).

The Florida Bonneted Bat (previously the Florida Mastiff Bat) is the largest bat species in Florida. The species has an extremely restricted range and only occupies pineland, tropical hardwood, and mangrove habitat in Charlotte, Collier, Lee, Monroe, and Miami-Dade counties. It is known from a total of nine locations. Areas of freshwater wetlands are also important to the species (78 FR 61003). Very limited information is available on the species' natural history. The Florida Bonneted Bat does not undergo periods of hibernation and the species is active year-round, although they may engage in torpor during cold weather. The bats roost singly or in small colonies in tree cavities (including Red-cockaded Woodpecker cavities), buildings, foliage, and rock crevices, as well as artificial roosts (FWC 2011a, 2013). Peak breeding season is in April (USFWS 2018a). Florida Bonneted Bats give birth from June through September (a second breeding season may also occur in January or February) (78 FR 61003, FWS 2013). They feed on insects primarily from the orders Coleoptera, Diptera, and Hemiptera (FWC 2013).

The species' range contracted due to habitat loss (urbanization) in the mid-1900s (FWC 2011a, 2013). Current threats to the species include a restricted range and small population size, loss of forested habitat via urbanization, limited roost sites, environmental stochasticity, and pesticides (FWC 2013, USFWS 2018a). The current population size is estimated to be a few hundred individuals and the species is considered to be critically endangered (FWC 2011a, 2013).

### Florida Salt Marsh Vole

The Florida Salt Marsh Vole (*Microtus pennsylvanicus dukecampbelli*) was listed as endangered effective February 13, 1991 (56 FR 1457). Critical habitat has not been designated (USFWS 2020a).

The Florida Salt Marsh Vole is a subspecies of the Meadow Vole. This subspecies is endemic to the central Gulf coast of Florida and is only known from 32 kilometers of salt marsh habitat. The species occurs between the Lower Suwannee River and the Withlacoochee River, Levy County, Florida, predominantly located on state or federal conservation lands. This distribution appears to be a relic from a formerly large range along the Gulf coast (when sea levels were lower and suitable habitat extended west of the current coastline of Florida) (USFWS 2019a).

Habitat for this species has been documented to include the following vegetation: saltgrass (*Distichlis spicata*), smooth cordgrass (*Spartina alterniflora*) and black needle rush (*Juncus roemerianus*) (USFWS 1997, 2019). Because of its rarity, the life history and reproductive behavior of the Florida Salt Marsh Vole have not been well studied. Life history of the Meadow Vole has been well studied and some aspects are expected to be similar to that of the Florida Salt Marsh Vole. Typically, Meadow Voles are active both day and night and feed on a variety of plant matter, including bark, grass, roots, and seeds. Voles have a high reproductive rate and breed throughout most the year with a peak of breeding activity occurring in the spring. The life span of voles is short; typically, few individuals live longer than six months (USFWS 2019a).

The decline of the species appears to be due to climatic changes and associated rise in sea level (USFWS 1997, 2019). Encroachment of mangroves into Florida Salt Marsh Vole habitat may be a new threat. Given a very limited range and only a few known locations within 32 kilometers of each other, an environmental or human-caused stochastic event could cause a catastrophic decline or possibly extinction of this subspecies (USFWS 2019a).

### Gray Bat

The Gray Bat (*Myotis grisescens*) was listed as endangered effective May 3, 1976 (41 FR 17736). Critical habitat



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has not been designated (USFWS 2020a).

The Gray Bat occurs in limestone karst regions of Alabama, Arkansas, Kentucky, Missouri, Tennessee, and Indiana (USFWS 1982). The species roosts colonially in caves year-round, occupying deep, vertical, colder caves and mines in the winter (hibernacula at 1 °C to -4 °C) and warmer caves with restricted rooms or domed ceilings during the summer. Environmental conditions aid in thermoregulation (USFWS 1982, USFWS 2009a). Summer caves are typically located near bodies of open fresh water (foraging habitat) (USFWS 1982). In Florida, the species occurs in a single county (Jackson) in the northwest Panhandle. Roosting (including some maternity roosts) has been documented in nine caves in this county (USACE 2007). The bats breed in early fall and then hibernate from October or November to March.

Females enter hibernation a few weeks before males (USFWS 1982). Pups are born in May or June. The species feeds on aquatic insects including mayflies, caddisflies, and stoneflies (USFWS 2009a).

The majority of high priority maternity sites for this species have been protected. Approximately 95 percent of the total population size is confined to nine caves. The species was increasing in the early 2000s (USFWS 2009a); however, nationwide population data is not available post the discovery of white- nose syndrome in Gray Bats. Although large declines have not yet been documented, they are possible (USFWS 2012a, Powers et al. 2016). Threats to the species include roost disturbance (environmental or human-caused) and white-nose syndrome (USFWS 1982, USFWS 2012a).

### Little Brown Bat

The Little Brown Bat (*Myotis lucifugus lucifugus,* formerly *M. l. occultus*) is under review for listing by the USFWS (NatureServe 2020). On January 21, 2010, the Center for Biological Diversity petitioned the USFWS to close caves to protect bat species from becoming exposed to white-nose syndrome (caused by the fungus *Pseudogymnoascus destructans*) and petitioned for the listing of several other bat species. On June 29, 2011, the USFWS determined that the petition may be warranted, and a status review was initiated (however, not for the Little Brown Bat) (76 FR 38095).

The Little Brown Bat is widely distributed across North America with the exception of the southern Great Plains, southeastern California, and the coastal southeast, in regions with suitable hibernacula (caves and mines). There are currently five recognized subspecies of *Myotis lucifugus* although there is now evidence that these may be five distinct species (Morales and Carstens 2018, Kunz and Reichard 2010). The subspecies that occurs in Florida is *Myotis lucifugus lucifugus*. The northeastern US is considered to be the core range of the species. The Little Brown Bat has been occasionally detected in northern Florida, although it is not common in the state (Kunz and Reichard 2010). General habitat requirements include forested or herbaceous wetlands, hardwood and mixed forest, grassland, and scrub (NatureServe 2020).

The species migrates between winter hibernacula and summer roost sites. Mating occurs during fall swarming, from August through October. Females store sperm over the winter. Characteristics of winter hibernacula include caves or mines with high humidity and stable temperatures above freezing (typically between 2 °C to 12°C). Winter hibernacula may be located up to 300 kilometers from summer roosts. Summer maternity colonies are located in tree cavities and man-made structures such as barns and attics (Kunz and Reichard 2010). Females give birth in late spring or early summer (NatureServe 2020). The species feeds on a variety of insects from the orders Diptera, Lepidoptera, Coleoptera, Thrichoptera, Ephemeroptera, and Neuroptera (Kunz and Reichard).

Prior to the introduction of white-nose syndrome to the US, the species population was estimated to be greater than 6.5 million. This species appears to have experienced one of the highest mortality rates from white-nose syndrome in North America, and the population is in rapid decline. Current estimates put the northeast population at a 99 percent chance of extinction by 2026 (CBD 2010b, Kunz and Reichard 2010). Threats to the species



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include white-nose syndrome, climate change, pesticides, mortality from wind turbines, and habitat modification or destruction (CBD 2010b, Kunz and Reichard 2010, NatureServe 2020).

### Indiana Bat

The Indiana Bat (*Myotis sodalis*) was listed as endangered effective March 11, 1967 under the Endangered Species Preservation Act of 1966 (32 FR 4001). Critical habitat was designated for the species on September 24, 1976 (41 FR 41914).

The Indiana Bat is found in karst regions of the east-central US. There are no current records of the species in Florida (USFWS 2009b). However, there has been one historical winter record of the species in Old Indian Cave in Jackson County (pre 1995). During the winter, the species hibernates colonially in caves and mines (exhibits site fidelity). Winter hibernacula temperatures are above freezing but below 10 °C. The species hibernates from October through April. In the summer, the species roosts behind the bark of large trees (live trees or dead snags) in wooded wetlands, riparian forest, bottomland, floodplains, and uplands. Mating occurs shortly before hibernation in the fall (fall "swarming"). Breeding females may migrate up to 575 kilometers between winter and summer habitat. In contrast, non-breeding females and males remain close to their winter hibernacula and may roost singly in trees. Breeding females form maternity roosts. Maternity roost trees are typically next to an opening in the forest such as a forest edge, gap in the canopy, or along a fence line. Females give birth to one pup in June or July. Foraging habitat consists of open habitats or areas with an open understory in forests, along forest edges, and in riparian areas. The species feeds on prey items primarily from the orders Coleoptera, Diptera, Lepidoptera, and Trichoptera (USFWS 2007a).

The population size is currently estimated as 537,297 bats, with 71 percent of the population located in Indiana and Missouri. From the 1960s to the early 2000s, the species declined as a result of habitat destruction, habitat modification, and roost disturbance (USFWS 2007a). The total population size increased in the early 2000s, thanks to recovery efforts (USFWS 2009b); however, since 2007, the population declined again by 19 percent, primarily due to the spread of white-nose syndrome. Current threats to the species include roost disturbance, white-nose syndrome, climate change, environmental contaminants, collisions with man-made objects, mining operations, forest fragmentation, invasive species, and loss/degradation of habitat (including swarming and migration habitat; USFWS 2019b).

### Key Largo Woodrat

The Key Largo Woodrat (*Neotoma floridana smalli*) was originally listed as threatened under the Endangered Species Conservation Act of 1969 (USFWS 1999a). It was listed as endangered under an emergency rule effective September 21, 1983 (48 FR 43040) and protection continued through a final rule in 1984 (49 FR 34504). The USFWS announced the initiation of the latest five-year review of the species in 2016 (81 FR 59650). Critical habitat has not been designated (USFWS 2020a). The subspecies was protected in conjunction with the Key Largo Cotton Mouse (*Peromyscus gossypinus allapaticola*) because of their similar habitat requirements.

The Key Largo Woodrat is a subspecies of the Eastern Woodrat (*Neotoma floridana*). The subspecies inhabits tropical hardwood hammock forests (48 FR 43040). The historic range of the Key Largo Woodrat spanned all of Key Largo. Unfortunately, as a result of development, much of the hammock forest habitats have been destroyed. Currently the subspecies is limited to North Key Largo, which is approximately half of its historical range (USFWS 1999a). Woodrats are well-known for their large stick nests (USFWS 1999a). The subspecies is omnivorous, with a diet primarily composed of buds, leaves, and fruit from a variety of plants (USFWS 1999a, 2020b).

Key Largo Woodrats were introduced to Lignumvitae Key in 1970 (48 FR 43040). Although the subspecies is not historically native there, it hosts similar hammock forest habitats as those found on Key Largo. Key Largo Woodrats appear to have been extirpated on Lignumvitae Key by 1990 (USFWS 1999a). A captive propagation program began in 2002 because the causes of continued decline were undetermined. The Key Largo Woodrat's

small and isolated populations are especially vulnerable to extinction because of a wide range of threats including demographic factors and natural catastrophes (USFWS 2018b). Predation poses another significant risk, as they are depredated by a wide range of raptorial, reptilian, and mammalian (including free-roaming cats) predators (USFWS 1999a).

Reintroduction efforts have been largely unsuccessful because of high predation (USFWS 2018b).

### Key Deer

The Key Deer (*Odocoileus virginianus clavium*) was listed as endangered effective March 11, 1967 (32 FR 4001). Critical habitat has not been designated (USFWS 2020a).

The Key Deer is found in the Florida Keys within 11 island complexes from Johnson Keys to Sugarloaf Key. Each of these complexes are considered a subpopulation which collectively form a metapopulation. Key Deer are concentrated on Big Pine Key and No Name Key, which are home to approximately three- quarters of the metapopulation. The historical range of the subspecies extended into Marathon and Key West; however, these areas are now too urbanized to support Key Deer populations. The subspecies selectively uses hammock and pine rockland upland habitats. These habitats contain a substantial portion of their forage plants, fresh water, and cover, which is especially important for fawning. The diet of Key Deer is primarily composed of red mangrove (*Rhizophora mangle*) as well as a wide variety of other plants (USFWS 2010a).

Roads and fences fragment deer habitat as well as cause direct mortality. Despite high annual mortality rates, the population growth rate appears stable (USFWS 2010a). Ongoing threats include urbanization (documented to increase deer habituation and result in conflicts between dogs and deer) and vehicular collisions. The Service has translocated animals from the core areas to periphery islands in an attempt to bolster the metapopulation (USFWS 2010a).

### Rice Rat

The Lower Keys population of the Rice Rat, also known as the Silver Rice Rat, (*Oryzomys palustris natator* = *O. argentatus*) was listed as endangered effective May 30, 1991 (56 FR 19809) due to its low population numbers (restricted to wetlands on eight of the Lower Keys, Florida). Rice Rats in mainland Florida are not listed. Critical habitat was designated in 1993 (58 FR 45030) and includes nine keys or groups of keys inhabited by the species.

Rice Rat habitat includes contiguous mangrove swamps, saltmarsh flats, buttonwood transition vegetation (Goodyear 1987), and fresh water cattail marshes (56 FR 19809). Generally, the rats use mangrove habitats for foraging and higher elevation saltmarsh flats for nesting and foraging (Forys et al. 1996). They are primarily nocturnal and have large home ranges, with some individuals traveling up to 325 meters at a time (Spitzer 1983, Forys et al. 1996). Although Rice rats may breed throughout the year, few juveniles have been observed during population studies (Forys et al. 1996, NatureServe 2020). A reproduction rate may be due to limited resources. Rice Rats are impacted by the continued development of the Lower Keys, increased populations of predators (such as raccoons, cats, and dogs), and through competition with introduced Black Rats (*Rattus rattus*) (Goodyear 1992).

### Pine Island Rice Rat

The Pine Island Rice Rat (*Oryzomys palustris planirostris*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

The subspecies is known from only two occurrences, on Pine Island and the adjacent mainland. The Pine Island Rice Rat has been found in a garbage dump, in an adjacent herbaceous wetland, and in runways with Cotton Rats (*Sigmodon*) (Layne 1978). Little is known about the species ecology, though they have been noted to feed on stems of cord-grass (*Spartina* spp.), smut grass (*Sporoborus* spp.), and shoreline purslane (*Sesuvium* spp.)

(Hamilton 1955). To complete the species review, habitat requirements should be studied in more detail and additional taxonomic study has been recommended. The Pine Island Rice Rat's habitat is threatened with habitat destruction by filling and draining of wetlands and invasion of woody plants (NatureServe 2020).

### Sanibel Island Rice Rat

The Sanibel Island Rice Rat (*Oryzomys palustris sanibeli*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

The subspecies is known only from one Florida island that is currently being extensively developed (Sanibel Island). The Sanibel Island Rice Rat's preferred habitat is along the edge of freshwater swamps of artesian origin, including swales and cattail stands. While the subspecies is protected in part on Ding Darling National Wildlife Refuge, it is threatened by habitat destruction through drainage, filling of marshes, lowering of the water table for human use, and woody plant invasion. Due to the limited information available on this subspecies, ecological studies are required to establish comprehensive management plans and the effects of major hurricanes (NatureServe 2020).

### Tricolored Bat

The Tricolored Bat, formally known as the Eastern Pipistrelle, (*Perimyotis subflavus*) was petitioned for listing on June 14, 2016 (CBD and DOW 2016), and the 90-day finding found that listing may be warranted (82 FR 60362). The species remains under review at this time (USFWS 2020a).

The Tricolored Bat is found throughout eastern North and Central America and the US Midwest (CBD and DOW 2016). The species is a permanent resident throughout the Florida peninsula. However, the majority of records are from the Panhandle (CBD and DOW 2016, NatureServe 2020). Habitat preferences include open landscapes bordered by woodland (e.g., hardwood woodlands, grasslands, abandoned fields, and urban landscapes) (CBD and DOW 2016). The species migrates between summer roosting areas and winter hibernacula. Summer and winter sites are typically less than 100 kilometers apart. Winter hibernacula are located in the deepest part of caves and mines with high thermal stability and temperatures typically in the range of -6 °C to 14 °C (CBD and DOW 2016). Summer roosting sites, including maternity colonies, are located in barns and other man-made structures as well as tree foliage. Males and non-breeding females may also use the winter hibernacula as a roost during the summer (CBD and DOW 2016, NatureServe 2020). The species mates during fall "swarming" outside of winter hibernacula. Females store sperm, overwinter, and give birth to two pups in the later summer. Tricolored Bats forage near water and in early successional forests and feed on a variety of insects, primarily from the orders Homoptera, Coleopteran, and Diptera (CBD and DOW 2016, USFWS 2019c).

This species has experienced precipitous population declines resulting from white-nose syndrome mortality (CBD and DOW 2016). Threats to the species include white-nose syndrome, human disturbance of hibernacula, habitat loss and modification, pesticides, climate change, and mortality from wind energy (CBD and DOW 2016, USFWS 2019c).

### Key Largo Cotton Mouse

The Key Largo Cotton Mouse (*Peromyscus gossypinus allapaticola*) was listed as endangered under an emergency rule effective September 21, 1983 (48 FR 43040), and protection continued through a final rule in 1984 (49 FR 34504). The USFWS announced the initiation of the latest five-year review of the species in 2016 (81 FR 59650). Critical habitat has not been designated (USFWS 2020a). The species was protected simultaneously with the Key Largo Woodrat (*Neotoma floridana smalli*) because of similar habitat requirements and the fact that the Cotton Mouse constructs its leaf-lined lairs in close proximity to or within Key Largo Woodrat nests (48 FR 43040, USFWS 2015a).



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The Key Largo Cotton Mouse is a subspecies of the widespread southeastern species, *P. gossypinus.* The subspecies inhabits tropical hardwood hammock forests, one of the most limited and threatened ecosystem types in the state of Florida (48 FR 43040), as well as nearby Salicornia coastal strands. The historical range of the Key Largo Cotton Mouse spanned all of Key Largo to Tavernier on Plantation Key. Unfortunately, as a result of development, much of the hammock forest habitats have been destroyed and currently the species is limited to North Key Largo, an area delineated as north of the US Highway 1 and County Road 905 intersection (USFWS 2015a). Key Largo Cotton Mice were introduced to Lignumvitae Key in 1970 (48 FR 43040). Although the subspecies was not historically native there, it hosts similar hammock forest habitats as those found on Key Largo (USFWS 1999a).The Cotton Mouse is herbivorous, with a diet composed of fruits, seeds, and leaves (USFWS 2015a).

The last sighting of a Cotton Mouse on Lignumvitae Key was in 1977 (USFWS 2019d). Fortunately, much of their remaining habitat on Key Largo has been acquired and protected. However, free-roaming cats and loss of hammock forest habitat through sea level rise (e.g., salt intolerant forest) are ongoing threats to their populations (USFWS 2015a).

### Choctawhatchee Beach Mouse

The USFWS listed the Choctawhatchee Beach Mouse (*Peromyscus polionotus allophrys*) as Endangered effective June 6, 1985 (50 FR 23872). Critical habitat has not been designated (USFWS 2020a).

The historical distribution of the Choctawhatchee Beach Mouse included Florida's western Gulf Coast, as well as the barrier between Choctawhatchee Bay and St. Andrew Bay (USFW 1987). Remaining populations of this subspecies exist in the sand dunes on Shell Island, Grayton Beach, and Topsail Hill (FWC 2020b). This species occurs in beach dune systems vegetated by sea oats (*Uniola paniculata*) and beach grasses, and adjacent interior scrub areas populated by oaks including yaupon (*Ilex vomitoria)*, marsh-elder (*Iva spp.*), scrub oak (*Quercus myrtifolia),* sand-live oak (*Quercus virginiana var. maritima)* and sand pine (*Pinus clausa*), saw palmetto (*Sereona repens*), and slash pine (*Pinus elliotti).* Optimal habitat for the Choctawhatchee Beach Mouse should include: high maximum elevation of coastal sand dunes; relatively great difference between maximum dune height and minimum interdunal elevation; close proximity of forest; sparse ground cover; and relatively low cover of sea oats. The fruits of beach grass are readily available to the mice, but those of sea oats are usually obtainable only after they have been blown down by heavy winds. The Choctawhatchee Beach Mouse also likely eats invertebrates in the late winter or early spring when seeds are scarce (USFWS 1987). The breeding season for the subspecies starts in November and ends in early January. Females reach reproductive maturity at six weeks of age and produce two to seven mice per litter (70 FR 94426). The predominant factor of decline for this subspecies is habitat loss due to alteration or conversion of dunes for human development and use (USFWS 1987).

More than two-thirds of this species' habitat has been lost as a result of real estate development (USFWS 1987).

### Southeastern Beach Mouse

The Southeastern Beach Mouse (*Peromyscus polionotus niveiventris*) was listed as threatened effective June 12, 1989 (54 FR 20598). Critical habitat has not been designated (USFWS 2020a).

This Southeastern Beach Mouse is a coastal subspecies of the Oldfield Mouse (*Peromyscus polionotus*), (USFWS 2005a). The original distribution of the Southeastern Beach Mouse included approximately 280 kilometers of the central eastern coast of Florida from Ponce Inlet, Volusia County, southward to Hollywood, Broward County, and possibly as far south as Miami Beach in Dade County. Remaining populations of this species exist in Volusia County (Canaveral National Seashore to 11 kilometers north of the Volusia-Brevard County line); Brevard County (Canaveral National Seashore, Merritt Island National Wildlife Refuge, and Cape Canaveral Air Force Station); scattered localities in Indian River County (Sebastian Inlet State Recreation Area, Seavie Subdivision, Treasure Shores Park, and Turtle Trail Public Beach access area); and St. Lucie County (Pepper Park and Fort Pierce Inlet State Recreation Area). As of 1993, this species occupies approximately 80 kilometers of beach (USFWS 1993).

This species occurs in beach dune systems vegetated by sea oats (*Uniola paniculata*) and dune panic grass (*Panicum* spp.), and adjacent interior scrub areas populated by oaks and sand pine (*Pinus clausa*) or palmetto (*Sabal* spp.; USFWS 2005a). The best habitat for Southeastern Beach Mouse is characterized by patches of bare, loose, sandy soil. Sea oats must be blown to the ground for the mice to eat, and during the spring and early summer; when seeds are scarce, beach mice may eat invertebrates. The breeding season for the Southeastern Beach Mouse starts in November and ends in early January.

Females reach reproductive maturity at six weeks of age, and produce two to seven mice per litter (USFWS 2005a). The predominant factors of decline for this species are habitat loss due to alteration or conversion of dunes due for human development and use, and destruction of habitat due to hurricanes and storms (USFWS 1993).

### St. Andrew Beach Mouse

The St. Andrew Beach Mouse (*Peromyscus polionotus peninsularis*) was listed as endangered effective January 19, 1999 (63 FR 70053). Critical habitat has been designated and includes dunes in Bay and Gulf counties, Florida (71 FR 60238).The USFWS announced the initiation of the latest five-year review of the subspecies in 2018 (83 FR 38320).

The St. Andrew Beach Mouse is one of the eight beach mice subspecies. Its historical range spanned from East Pass of St. Andrew Bay, along the coastline of St. Joseph Bay to St. Joseph Peninsula, and east to Money Bayou. The two existing populations of St. Andrew Beach Mouse inhabit East Crooked Island in Bay County and St. Joseph Peninsula in Gulf County. Habitat requirements include primary and secondary scrub dune ecosystems. The subspecies constructs burrows within the dunes, especially in steep, well-vegetated areas. The Beach Mouse feeds primarily on the seeds and fruits of dune plants as well as insects (USFWS 2010b).

The St. Andrew Beach Mouse population on East Crooked Island was presumed extinct in 1994. However, reintroduction efforts have led to a reestablished population there. St. Andrew Beach Mice face a suite of threats primarily related to habitat loss or degradation via urbanization and stochastic environmental events. Predation by feral cats is also a significant threat (USFWS 2010b).

### Anastasia Island Beach Mouse

The Anastasia Island Beach Mouse (*Peromyscus polionotus phasma*) was listed as endangered effective June 12, 1989 (54 FR 20598). Critical habitat has not been designated (USFWS 2020a).

This species historically occurred from the Duval-St. Johns County line southward to Matanzas Inlet, St. Johns County along Florida's northern east coast (USFWS 1993). Currently, two populations of this species exist on Anastasia Island: at Anastasia Island State Park and Fort Matanzas National Monument (USFWS 1993, USFWS 2005a). This species occurs in beach dune systems vegetated by sea oats (*Uniola paniculata*) and dune panic grass (*Panicum* spp.), and adjacent interior scrub areas populated by oaks and sand pine or palmetto (USFWS 2005a). Prime habitat for Anastasia Island Beach Mouse is characterized by patches of bare, loose, sandy soil. (USFWS 1993). Sea oats must be blown to the ground for the mice to eat. During the spring and early summer, when seeds are scarce, beach mice may eat invertebrates. The breeding season for beach mice starts in November and ends in early January.

Females reach reproductive maturity at six weeks of age, and produce two to seven mice per litter (USFWS 2005a).

The predominant factors of decline for this species are habitat loss through alteration or conversion of dunes due to human development and use and destruction of habitat due to hurricanes and storms (USFWS 1993). In 1992, mice from Anastasia Island were reintroduced into suitable historical habitat between Ponte Vedra Beach and South Ponte Vedra Beach in north St. Johns County at the Guana- Tolomato-Matanzas National Estuarine



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Research Reserve (formerly Guana River State Park). The reintroduced population is surviving, although in low numbers (USFWS 2005a).

### Perdido Key Beach Mouse

The Perdido Key Beach Mouse (*Peromyscus polionotus trissyllepsis*) was listed as endangered effective June 6, 1985 (50 FR 23872). Critical habitat was designated on June 6, 1985 (50 CFR § 17) and revised most recently in 2006 (71 FR 60238).

The species' current range is restricted to Perdido Key in Florida, with critical habitats identified in Gulf State Park, West Perdido Key, Perdido Key State Park, Gulf Beach, and Gulf Islands National Seashore. The Perdido Key Beach Mouse is a nocturnal herbivore that feeds primarily on dune plant seeds such as sea oats (*Uniola paniculata*) and beach grass (*Panicum amarum*); it is also known to prey on insects, likely as a result of seasonal fluctuations in seed availability. They require a mosaic of frontal and scrub dunes for food, burrow sites, and refuge habitat. The frontal dunes have a cover of sea oats, blue stem (*Schizachyrium scoparium*), beach grass, and beach goldenrod (*Chrysoma pauciflosculosa*) while the scrub dunes are dominated by scrub live oak (*Quercus geminata*) with gopher apple (*Licania michauxii*) and green briar (*Smilax* spp.) ground covers. The importance of scrub dunes for this species was recognized through the revision to its critical habitat in 2006 (71 FR 60238). Threats to the species include loss/fragmentation of habitat for land development, tropical storm damage and mortality, and predation by non-native species (71 FR 60238). In addition, predicted future sea level rise and associated flooding is expected to produce increased habitat fragmentation and isolation (USFWS 2019e).

### Florida Panther

Florida Panther (*Puma* (= *Felis*) *concolor coryi*) was listed as endangered effective March 10, 1967 (32 FR 4001). The Service announced the initiation of the latest five-year review of the species in 2017 (82 FR 29916). Critical habitat has not been designated (USFWS 2020a).

The historic range of the Florida Panther included Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Tennessee (USFWS 2020a). The subspecies is now limited to a single population in southern Florida (inhabits less than five percent of its historic range). Panther habitat preferences are closely associated with prey abundance (USFWS 2008a). Habitats with dense understory vegetation are also important as they provide cover for panthers to hunt, rest, and den (USFWS 2020a). Panthers have vast home ranges, occur at low densities, and require large swaths of contiguous habitat (USFWS 2008a). Although their population numbers have increased substantially from 12 to 20 individuals in the 1970s to 100 to 120 in 2007, Florida Panther incompatibility with urbanization continues to limit the recovery of this subspecies. Habitat fragmentation and loss also serve as significant threats to Florida Panthers. Additionally, vehicular collisions continue to limit the subspecies' population growth (USFWS 2020a).

### Insular Hispid Cotton Rat

The Insular Hispid Cotton Rat *(Sigmodon hispidus insulicola)* was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

The Insular Hispid Cotton Rat currently has a range of <100-250 square kilometers within peninsular Florida and the Keys. The preferred habitat is herbaceous wetlands, grasslands, shrubland, and mixed woodlands (NatureServe 2020). Populations apparently undergo large annual fluctuations. Pregnant and lactating females have been recorded in May and August with a litter size of 2-4 young (Layne 1978).

Further research is required to determine subspecies life history, ecology, habitat requirements, and population sizes. The rat is threatened by habitat destruction from urbanization (NatureServe 2020).



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### Lower Keys Rabbit

The Lower Keys Rabbit, also known as the Lower Keys Marsh Rabbit, *(Sylvilagus palustris hefneri*) was listed as endangered effective June 23, 1990 (55 FR 25588). Critical habitat has not been designated (USFWS 2020a).

The subspecies is endemic to a very small area (<100-250 square kilometers) in the Florida Keys (NatureServe 2020). The Lower Keys Rabbit likely breeds year-round, with a peak from December through to June. Gestation lasts approximately 30-37 days. The rabbit's habitat is at risk due to development, dredging and filling of wetlands, human exploitation of very limited fresh water, and impacts from predators such as cats, dogs, and human poachers (Wolfe 1992). The population has been categorized as "declining" (USFWS 1990). Recommended conservation efforts focus on protecting the rabbit's preferred marshland habitat and areas used in dispersal, including the lower-mangrove and upland-forest (Forys and Humphrey 1996).

### West Indian Manatee

The West Indian Manatee *(Trichechus manatus)* was listed as endangered effective March 11, 1967 under the Endangered Species Preservation Act of 1966 (32 FR 4001). Listing was revised in 1970 to include the Caribbean subspecies and South American subspecies *(T. m. manatus)* (35 FR 18319). The species was down-listed to Threatened on April 5, 2017 (82 FR 16668). Critical habitat was designated in 1976 (50 CFR § 17.95(a)).

There are two subspecies of West Indian Manatee, *T. m. manatus* and *T. m. latirostris*. The latter of these subspecies occurs in Florida and the Gulf of Mexico (USFWS 1999b, 2007). There are four unique Florida sub-populations/management units (there is genetic exchange amongst populations) that exhibit varying degrees of site fidelity: the Upper St. Johns River subpopulation, the Northwest subpopulation, the southwest subpopulation, and the Atlantic Coast subpopulation (USFWS 2007b). Florida manatees occur in freshwater, brackish and marine environments including coastal river estuaries, sloughs, canals, creeks, and lagoons (USFWS 1999b). The species requires a source of freshwater for drinking (USFWS 2001). They are not cold-tolerant, prefer waters with temperatures above 68°F, and remain in warm-water sites around the state during the winter (e.g. warm water springs and power plant outfall sites) (USFWS 2001, USFWS 2007b). Breeding may occur year-round, although peak breeding is suspected to occur from March through November. Manatees form "mating herds" (one female and multiple males) to breed. Manatees reach sexual maturity at around four years. Gestation is roughly 11 to 14 months, and females may give birth to one or two calves per litter. The species feeds on submerged and emergent floating vegetation such as seagrass, hydrilla (*Hydrilla verticillata*), and smooth cordgrass *(Spartina alterniflora)* (USFWS 2001).

The most recent population estimate (2015), put the Florida population at 6,350 manatees (82 FR 16668). Recent analysis indicates this population is stable or increasing throughout much of the state (USFWS 2014a). Threats to the species include human-caused mortality (watercraft collisions), interactions with commercial fishing gear, pollution, exposure to cold/loss of warm-water refugia, and red tides (*Gymnodinium breve*) (USFWS 2007b, USFWS 2014a).



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## BIRDS

### Cape Sable Seaside Sparrow

The Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*) was listed as endangered effective March 11, 1967 under the Endangered Species Preservation Act of 1966 (32 FR 4001). Critical habitat was designated in Collier, Dade, and Monroe counties in Florida in 1977 (42 FR 47840). This designation was revised in 2007 (72 FR 62736).

The Cape Sable Seaside Sparrow is non-migratory and inhabits freshwater marl prairies with muhly grass (*Muhlenbergia filipes*) in the Everglades National Park. These marl prairies are defined by short hydroperiods, densely clumped grasses, and periodic fires (USFWS 1999b). Within the park, populations are located at Shark River Slough, Big Cypress Preserve, and at Taylor Slough in the Southern Glades Wildlife and Environmental Area (the subspecies occurs entirely on public conservation lands) (USFWS 2019f). Nesting occurs from late February through early August and a pair may raise multiple broods per season (USFWS 1999b). The subspecies builds their nests in clumps of grass a few centimeters above the ground; nests are highly susceptible to floods during the breeding season (USFWS 2019f). The Cape Sable Seaside Sparrow will feed on a variety of invertebrate prey items including spiders, caterpillars, worms, beetles, and shrimp (USFWS 1999b). Subspecies recovery has been hampered by altered hydrology in the region which has impacted their prairie habitat (Central and Southern Florida Project) (USFWS 1999b, 2010). Threats to the subspecies include habitat loss and conversion, nest predation, climate change, fires, and sea level rise (USFWS 2019f, USFWS 2010c). This subspecies is considered to be in decline (USFWS 2010c).

### Florida Grasshopper Sparrow

The Florida Grasshopper Sparrow (*Ammodramus savannarum floridanus*) was listed as endangered effective September 2, 1986 (51 FR 27492). Critical habitat has not been designated (USFWS 2020a).

The Florida Grasshopper is a non-migratory subspecies of grasshopper sparrow that inhabits dry, treeless, flat prairies in central and southern Florida. These prairies are dominated by saw palmetto (*Serenoa repens*), dwarf oaks (*Quercus minima*), bluestems (*Andropogon* spp.), St. John's wort (*Hypericum* spp.), and wiregrass (*Aristida stricta*). They avoid areas of dense vegetation and accumulated litter (breeding grasslands defined by a history of frequent fires) (51 FR 27492). The range of the Florida Grasshopper Sparrow is currently restricted to Avon Park Air Force Range, Kissimmee Prairie Preserve State Park, Three Lakes Wildlife Management Area, and three private ranches (USFWS 2019g). The Florida Grasshopper Sparrow was historically more widespread, but a 95 percent decrease in habitat since pre-settlement times has severely restricted the subspecies' distribution.

The Florida Grasshopper Sparrow breeds from early April through late June, although at some locations they breed through September. They are ground nesters. Nest structure includes a shallow scrape in sand substrate with a dome-shaped cup of woven grasses. Grasshopper Sparrows prey on insects (e.g., beetles, crickets, and moths) and will also feed on seeds (USFWS 1999b). Threats to the subspecies include habitat loss, degradation, fragmentation (conversion of native prairie to agriculture), unfavorable hydrology (though management or natural phenomena), and predation (particularly by the red imported fire ant, *Solenopsis invicta*). The subspecies also has a high risk of extinction due to factors such as environmental stochasticity and loss of genetic diversity (USFWS 2019g). The subspecies is in decline and there are only an estimated 23 breeding pairs remaining in the wild (USFWS 2008b, USFWS 2019g). The USFWS is currently engaged in a captive propagation program (USFWS 2019g).



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### Saltmarsh Sparrow

The Saltmarsh Sparrow, also known as the Saltmarsh Sharp-tailed Sparrow, (*Ammospiza caudacuta*) is proactively being assessed for listing by USFWS. The Service is currently conducting a Species Status Assessment (USFWS 2018c). The species remains under review at this time (USFWS 2020a).

As their name implies, this species has a strong habitat association with tidal saltmarshes. Their breeding range extends along the Atlantic Coast from Maine to Virginia. Their wintering range covers similar coastal habitats from Maryland to Florida, with concentrated numbers from South Carolina to northern Florida.

Their populations have experienced substantial declines since the 1990s or earlier, with an estimated 75 percent decline from 1998 to 2012. This decline was caused primarily by habitat degradation of coastal marshes. Other factors such as sea level rise are threats to their breeding populations (Greenlaw et al. 2018). Having been listed as Vulnerable (international status) for quite some time, the species was up- listed to Endangered during the latest assessment in 2018 (BirdLife International 2018).

### Florida Scrub-jay

The Florida Scrub-jay (*Aphelocoma coerulescens*) was listed as threatened effective June 6, 1987 (52 FR 20715). Critical habitat has not been designated (USFWS 2020a).

The Florida Scrub-jay is a non-migratory corvid that serves as the state's only endemic bird species (USFWS 2019h). The species is restricted to early successional xeric scrub and scrub flatwood habitat in relict dunes located on Florida's central ridges and coasts, in areas defined by historic fires (USFWS 1999b, USFWS 2007c, USFWS 2019h). Habitat requirements include low densities of pine trees, a minimum of 50 percent scrub oak cover, and open areas of sand or minimal herbaceous vegetation (USFWS 2019h). Florida Scrub-jay's may live in pairs or family groups and the species engages in cooperative breeding with helpers at the nest (USFWS 2019h). Territory size is a minimum of 5 hectares. The species defends their territory year-round (USFWS 2015b). Nesting occurs from March through the end of July. Florida Scrub-jays typically construct their nests in sand live oak (*Quercus geminate*), scrub oak (*Q. inopina*), or myrtle oaks (*Q. myrtifolia*). Nests consist of a cup constructed out of oak twigs and woven with palmetto or cabbage palm (*Sabal palmetto*). The species feeds on insects such as grasshoppers, beetles, and butterfly or moth larvae (USFWS 2015b).

Historically, the Florida Scrub-jay occupied 39 counties in Florida. They have been functionally extirpated from nine of these counties and the species is in decline (USFWS 1999b, USFWS 2007c, USFWS 2019h). Currently, about 25 percent of the state's population is located in areas that have urbanized, and research indicates that these urban populations are not sustainable (USFWS 2014b). Threats to the species include habitat loss, fragmentation, degradation (through urbanization and fire suppression), predation, and epidemic diseases (USFWS 1999b, USFWS 2015b, USFWS 2019h).

### Rufa Red Knot

The Rufa Red Knot (*Calidris canutus rufa*) was listed as threatened effective January 12, 2015 (79 FR 73705 73748). Critical habitat has not been designated (USFWS 2020a).

The Rufa Red Knot is one of the six subspecies of Red Knot (Baker et al. 2013). They follow one of the longest known migrations, traveling roughly 15,000 kilometers from their breeding grounds in the central Canadian arctic to their overwintering grounds as far south as Tierra del Fuego at the tip of South America (USFWS 2019i). Nests are constructed as scrapes on bare tundra habitat. Usually four eggs are laid which the male is left to care for after hatching (Baker et al. 2013). There are four concentrated overwintering areas, including the Southeast US, the Northwest Gulf of Mexico, the northern coast of South America, and Tierra del Fuego (USFWS 2019i). Delaware Bay is an important stopover site on their spring migration path (79 FR 73705).

Overharvested by market hunting in the 19th Century, their populations seemed to have largely recovered after the passage of the Migratory Bird Treaty Act (USFWS 2019i). However, a crash in Horseshoe Crab population (*Limulus polyphemus*) during the 2000s (a primary prey item), caused Rufa Red Knot populations to plummet (79 FR 73705). Other prey items include marine invertebrates, such as bivalves and amphipods (Baker et al. 2013). Red Knots face a suite of ongoing environmental and anthropogenic threats across their range (79 FR 73705), specifically the threat of sea level rise inundating their coastal habitats (Kieffer 2014).

### Ivory-billed Woodpecker

The Ivory-billed Woodpecker (*Campephilus principalis*) was listed as endangered effective March 11, 1967 (32 FR 4001). Critical habitat has not been designated (USFWS 2020a). The Service announced the initiation of the latest five-year review of the species in 2018 (83 FR 20092).

The Ivory-billed Woodpecker was the largest woodpecker species in North America. (Jackson 2002, USFWS 2020a). The historical range of the Ivory-billed Woodpecker included the southeast US (Arkansas, Florida, Georgia, Illinois, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas) and the main island of Cuba. It inhabited old-growth forests with abundant beetle larvae – its primary food source. Dense swamps were selected for nesting. Parents excavated nest cavities in dead portions of both live trees and snags, usually below a dead branch (Jackson 2002).

Ivory-billed Woodpeckers were historically harvested by humans for food and regalia (by Native Americans), souvenirs and trade, and as scientific specimens for personal natural history collections (Jackson 2002). This overexploitation along with habitat destruction led to the species' demise (USFWS 2010d). The last accepted sightings were in 1938 in the US and in 1948 in Cuba. There is a great deal of contention whether Ivory-billed Woodpeckers are still extant, given recent reported sightings; however, none of these sightings have been confirmed (Jackson 2002). Nonetheless, reports over the last several decades have prompted surveys across multiple states and some suggestive evidence has been found (USFWS 2010d).

### Piping Plover

The Piping Plover (*Charadrius melodus*) Great Lakes Distinct Population Segment (DPS; *C. m. circumcinctus*) was listed as endangered effective January 10, 1986 (50 FR 50726). The Atlantic Coast and Northern Great Plains populations (*C. m. melodus* and *C. m. circumcinctus*, respectively) were listed as threatened at the same time (50 FR 50726). Critical habitat was designated for this species on May 7, 2001 and September 11, 2002 (for separate breeding populations; 66 FR 22938, 67 FR 57637). Critical habitat for wintering populations was designated on July 10, 2001 (66 FR 36038). Critical habitat was revised several times via court rulings and final critical habitat was published on May 19, 2009 (74 FR 23476).

The Piping Plover is a migratory shorebird that breeds along the Atlantic Coast from Canada to North Carolina and along inland rivers and lakes in the Great Plains and Great Lakes regions (three independent populations with two subspecies). Piping Plovers winter along the Gulf Coast, Southern Atlantic Coast (including Florida), Bahamas, and the West Indies (USFWS 1999b). Fall migration occurs from June through August while peak spring migration occurs in April (Elliott-Smith and Haig 2004). The largest number of wintering birds are routinely found in Texas; however, a significant proportion of the species also winters in states along the Gulf Coast, including Florida (USFWS 2015c). The species exhibits site fidelity to migration and wintering sites (USFWS 2009c). On their breeding grounds, the species favor open, sparsely vegetated sand or gravel beaches for nesting. Nesting microhabitat within these larger landscape features includes open ground adjacent to bunches of grass, logs, or other conspicuous items in an otherwise barren landscape. Nest scrapes are also constructed in areas relatively free of vegetative cover. These scrapes are lined with debris such as shell fragments or pebbles. Both adults will share in incubating and parental care duties. The species typically forages within five meters of the water's edge and feeds on a variety of freshwater, saltwater, terrestrial, and benthic invertebrates (Elliot-Smith and Haig 2004). Wintering habitat preferences in Florida include bay beaches (vs. ocean facing beaches) and inlets with exposed



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intertidal areas and tide cast wrack (USFWS 2009c).

Threats to the species include habitat loss and degradation from urbanization and some shoreline stabilization efforts, sea level rise, predation, and anthropogenic disturbance (USFWS 2009c, USFWS 2015c). A recent population viability analysis revealed that the species is highly sensitive to extinction risk (USFWS 2015c). Modeling of the Great Plains and Great Lakes populations have indicated that the species has a low probability of persisting for more than 100 years (Elliott-Smith and Haig 2004).

### Whooping Crane

The Whooping Crane (*Grus americana*) was listed as endangered effective March 11, 1967 under the Endangered Species Preservation Act of 1966 (32 FR 4001). Critical habitat was designated for the species on May 15, 1978 (43 FR 20938). Critical habitat was revised on July 21, 1997 (62 FR 38932).

Brought back from the brink of extinction by intensive recovery efforts, the Whooping Crane is an environmental success story. Population declines (the population sank to only 15 individuals in 1941) were primarily the result of shooting and destruction of prairie habitat (CWS and USFWS 2007, USFWS 2012b). Historically, the documented breeding range of the Whooping Crane included tall and mixed-grass prairie marshes throughout the central US and Canada. Wintering locations included tall grass prairie, wetlands, deltas, and interior tablelands along the southeast and Gulf Coast, including Florida. Currently, four populations of Whooping Cranes exist in North America, only one of which is self- sustaining. This naturally occurring population, the Aransas/Wood Buffalo population, nests in in the Northwest Territories and Alberta within Wood Buffalo National Park and winters along the Texas Gulf Coast at the Aransas National Wildlife Refuge (Urbanek and Lewis 2015). Two reintroduction efforts (out of an initial four) are ongoing, the Eastern Migratory Population and the Louisiana non-migratory population (USFWS 2012b, Urbanek and Lewis 2015). Reintroduced Whooping Cranes in Florida, located in the Kissimmee Prairie area, are designated as an experimental, non-essential population (population size of five as of March 2019; 58 FR 5647, International Crane Foundation 2019). Reintroduction efforts in Florida were hampered by drought conditions and ceased in 2005 (USFWS 2012b). As of the winter of 2018/2019, the national wild population comprised of over 505 individuals (Butler and Harrell 2019).

Whooping Cranes breed in April and May (CWS and USFWS 2007). The preferred nesting habitat for the species is shallow, silty-bottom wetlands with trees such as willow, spruce, and birch. The species is well known for their elaborate courtship displays. Nests are constructed on shallow water islands out of surrounding vegetation (e.g., bulrush, cattail, etc.). The species is omnivorous and feeds on crustaceans, fish, amphibians, small reptiles, tubers, insects, berries, and grains (Urbanek and Lewis 2015). During fall migration, the Aransas/Wood Buffalo population leaves their breeding grounds in Canada between September and October. The birds take roughly 50 days to reach their wintering grounds at the Aransas National Wildlife Refuge on the Gulf Coast. Spring migration is initiated between late March and mid-April and may take as little as 10 days (CWS and USFWS 2007, Urbanek and Lewis 2015). The species remains at risk due to numerous factors such as environmental degradation, genetic bottlenecks, climate change, and natural disasters (USFWS 2012b). In addition, the slow reproductive rate of the species hampers breeding efforts (CWS and USFWS 2007).

### Eastern Black Rail

The Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The subspecies remains under review at this time (USFWS 2020a).

The Eastern Black Rail is a subspecies of the Black Rail that inhabits brackish, freshwater, and saltwater wetlands with dense vegetation cover in eastern North and Central American and the Caribbean. While some populations are migratory, in Florida the subspecies is present year-round. On the Florida Gulf Coast, breeding habitat is dominated by black needlerush (*Juncus roemerianus*) and cordgrass (*Spartina* spp.), coastal saltgrass (*Distichlis spicata*), Jamaican swamp sawgrass (*Cladium jamaicense*), and wax myrtle (*Myrica cerifera*). The breeding

season spans from March through August. Nest cups are built out of emergent, herbaceous plants in a clump of vegetation over mud or shallow water usually at higher elevations in the marsh; these are required refugia to survive high water events as these rails do not typically fly. Nest failure is common with flooding and heavy rain. Average clutch size is seven eggs (USFWS 2018d). Eastern Black Rails feed on seeds and a variety of invertebrate prey including aquatic beetles, weevils, and snails (Eddleman et al. 19994, USFWS 2018d).

The subspecies has undergone a significant range contraction in the last century. Historic and current threats to the subspecies include marsh habitat loss, degradation, fragmentation (conversion to urban or agricultural lands and sea level rise), stochastic events, and incompatible land management. Historically, mosquito abatement measures in the region may have also reduced habitat for the subspecies. Currently, there are an estimated 200 to 500 breeding pairs in Florida. The subspecies is considered to have a low level of resiliency in the southeast and further extirpations are anticipated (USFWS 2018d).

### Wood Stork

The Wood Stork (*Mycteria americana*) was listed as endangered effective March 29, 1984 (49 FR 7332). The species was downlisted to Threatened effective June 30, 2014 (79 FR 37077). Critical habitat has not been designated (USFWS 2020a).

The Wood Stork is a wading bird that occurs in the southeastern US, Cuba, Hispaniola, as well as Central and South America. The populations currently listed under the ESA are located in Florida, Georgia, the Carolinas, Alabama, and Mississippi (USFWS 2007d). The Wood Stork was originally listed due to population declines in the early and mid-1900s, stemming from inhibited/reduced natural wetland function in south Florida ecosystems tied to water management practices including the Central and Southern Florida project (USFWS 1999b, USFWS 2007d).

The species inhabits freshwater, estuarine wetlands, cypress and mangrove swamps, stock ponds, and seasonally flooded agricultural areas (USFWS 1996a, USFWS 1999b, USFWS 2007d). Wood Storks breed in colonies. In Florida, major colonies are located in the following counties: Broward, Charlotte, Collier, Miami-Dade, Hardee, Indian River, Lee, Monroe, Osceola, Palm Beach, Polk, St. Lucie, and Sarasota (USFWS 1999b). Nesting site features include tall trees either in water (swamps) or located on islands surrounded by water. In Florida, the nesting season runs from October to June (USFWS 1996a, USFWS 1999b). Nests are platforms constructed out of sticks, Spanish moss, and leaves and may be placed in a variety of tree species including bald cypress (*Taxodium distichum*), swamp black gum (*Nyssa biflora*), southern willow (*Salix carolina*), and red mangroves (*Rhizophora mangle*) (USFWS 1999b, USFWS 1996a). Wood Storks feed on fish, and the species is heavily dependent on hydrology (dropping water levels) to concentrate fish in foraging areas (USFWS 1996a). Although not a traditional migrant, the species tends to disperse following the breeding season and in response to local environmental conditions (Coulter et al. 1999). Since its initial listing, the species' status has improved, with an increase in breading pairs and nesting colonies across the southeast. In addition, the species has undergone a range extension. Based on the most recent USFWS five-year review, 50 to 75 percent of recovery objectives have been achieved. Current threats to the species include wetland habitat loss, fragmentation, and modification (USFWS 2007d).

### Eskimo Curlew

The Eskimo Curlew (*Numenius borealis*) is listed as endangered effective March 11, 1967 (32 FR 4001). Critical habitat has not been designated (USFWS 2020a).

The historical range for the Eskimo Curlew covered all 48 contiguous states (including Florida), as well as Alaska. Currently, the Eskimo Curlew may still occur in Alaska, Nebraska, and Texas (USFWS 2020a).

Eskimo Curlews were not well studied before their decline and little is known about their biology (USFWS 2016a). Only two confirmed breeding sites for Eskimo Curlews exist from tundra areas in the Northwest Territories of Canada (Gill et al. 1998, USFWS 2016a). Their breeding range likely included tundra habitats in the Northwest

Territories, Nunavut, and possibly Alaska and eastern Russia. Nests were constructed as simple scrapes on bare ground with typically four eggs (USFWS 2016a). As long-distant migrants, they traveled from their breeding grounds to overwinter in the Pampas regions of Argentina, Brazil, Uruguay, Chile, and Patagonia (Gill et al. 1998, USFWS 2016a). Their diet was based on an annual cycle with dependence on insect eggs, larvae, and adults during their northward migration and on ericaceous berries and marine invertebrates during their southward migration. They utilized prairie habitats in the Midwestern United States on their spring migration and a variety of terrestrial and coastal habitats on their fall migration (Gill et al. 1998).

Eskimo Curlew population numbers were once thought to range in the hundreds of thousands (USFWS 2016a). However, by the end of the 19th century, their populations had declined precipitously as a result of market hunting (USFWS 2016a, Lewis 2018). Other contributing factors were habitat loss with the conversion of grasslands for agricultural use and the extinction of one of their primary food sources, the Rocky Mountain Grasshopper (*Melanoplus spretus*) (Lewis 2018). The last confirmed sighting dates from 1963 from a specimen collected in Barbados.

Based on multiple analyses, the USFWS concluded the likelihood that Eskimo Curlews are extant is extremely low (USFWS 2016a). However, the Service has not declared the species extinct because of recent potential sightings in the last two decades (USFWS 2016a). At this time there is no expectation of presence in Florida.

### Red-cockaded Woodpecker

The Red-cockaded Woodpecker (*Picoides borealis*) was listed as endangered effective October 8, 1970 (35 FR 16047). Critical habitat has not been designated (USFWS 2020a).

The Red-cockaded Woodpecker is a keystone species endemic to old growth, pine savanna ecosystems in the southeastern US (USFWS 2003a). These pine ecosystems are defined by longleaf pine (*Pinus palustris*), shortleaf pine (*P. echinata*), loblolly (*P. taeda*), or slash pine (*P. elliottiil*) and abundant herbaceous groundcover. Red-cockaded Woodpeckers underwent precipitous population declines in the 1800s and 1900s due to habitat loss (logging and agriculture), incompatible forest management practices, and fire suppression (USFWS 2003a). There are currently 10 core populations of the species remaining, and the total population was estimated as 14,068 in 2003 (USFWS 2003a, USFWS 2006). In Florida, the largest populations occur in the Panhandle. Estimated population size for the state is roughly 1,500 pairs (USFWS 1999b). Red-cockaded Woodpeckers are non-migratory and territorial year-round. The species feeds on arthropods, beetles, moths, and a variety of other insects as well as fruits and seeds. They breed cooperatively in family groups (have helpers at the nest) (USFWS 2003a). The species is limited by the availability of old growth pines; the species excavates their own cavities, a process which may take several years. Nest trees are frequently infected with a heartwood fungus (*Phellinus pini*). These trees are in open stands with little to no hardwood midstory or overstory (Jackson 1994, USFWS 2003a). The nesting season in Florida runs from April through June (USFWS 1999b).

Threats to the species include suppression of natural fire regimes (which allows encroachment of hardwoods in habitat), genetic stochasticity, and habitat loss (USFWS 2003a). The species status is considered to be improving, bolstered by intensive management efforts including creation of artificial nest cavities, translocation, and prescribed burning (USFWS 2006).

### Audubon's Crested Caracara

Audubon's Crested Caracara (*Polyborus plancus audubonii*) was listed as threatened effective August 5, 1987 (52 FR 25229). Recent taxonomic data indicates that Florida caracaras should be recognized as a discrete population of the Northern Crested Caracara (*Caracara cheriway*) (Dove and Banks 1999, USFWS 2008c). Critical habitat has not been designated (USFWS 2020a).

The Northern Crested Caracara is a distinctive, medium-sized raptor that inhabits open, upland prairies, interspersed with ponds, marshes, and cabbage palm hammocks in south-central Florida. The species' current

range is limited to the following counties: Brevard, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Indian River, Manatee, Martin, Okeechobee, Osceola, Palm Beach, Polk, and St. Lucie (Morrison and Dwyer 2012).

Northern Crested Caracaras in Florida are non-migratory (USFWS 2008c). The majority of occupied habitat and nesting occurs on private rather than public lands. Nests are built in tall trees (e.g., cabbage palms) bordering open habitat and nest fidelity is common (Morrison and Dwyer 2012). Crested Caracaras may breed year-round in Florida although the majority of nesting occurs from October through March (Dwyer 2010). The species feeds on road-kill carrion as well as invertebrates and a variety of vertebrate prey (fish, reptiles, birds, eggs, etc.) (USFWS 2008c, Morrison and Dwyer 2012). The species has declined throughout its range from the 1900s to the 1980s (USFWS 1999b). Threats to the species include habitat loss, degradation, and fragmentation, specifically from urbanization in south-central Florida (particularly loss or conversion of cattle ranches). Loss of natural fire regimes also have resulted in habitat homogeneity that threatens the species. In addition, this population is isolated from other breeding populations (closest is Cuba) and may be subjected to factors such as reduced gene flow and loss of genetic diversity (USFWS 2008c).

### Black-capped Petrel

The Black-capped Petrel (*Pterodroma hasitata*) was proposed for listing as Threatened under the Endangered Species Act on October 9, 2018 (83 FR 50560). The species remains under review at this time (USFWS 2020a).

The Black-capped Petrel, or regionally "diablotín" ("little devil"), is a pelagic seabird that nests on the island of Hispaniola and forages offshore of the southeastern US. The species exhibits nest site fidelity (83 FR 50560). The majority of nest sites are located in the Parc National La Visite. Nesting habitat includes high elevation montane forests. Nest burrows are located in rocky substrate on steep slopes, rock crevices, and caves and lined with twigs and pine needles. Black-capped Petrels lay one egg per breeding attempt; therefore, productivity and fecundity are inherently low. The species commonly forages in flocks at night or in the early morning in the Gulf Stream in areas with upwellings (USFWS 2018e). Prey items include crustaceans, squid, and fish (83 FR 50560). Historically, the species was harvested on Hispaniola for consumption. Current threats to the species include breeding habitat loss from deforestation and forest fires, climate change, invasive predators, and human population growth (USFWS 2018, NatureServe 2020). Currently, the estimated number of breeding birds on Hispaniola is 500 to 1,000 and population resiliency is considered to be low. Off the coast of Florida, Black-capped Petrels may be found year-round in relatively shallow waters near shore (USFWS 2018e, NatureServe 2020).

### Everglade Snail Kite

The Everglade Snail Kite, also known as the Snail Kite, (*Rostrhamus sociabilis plumbeus* = *Rostrhamus sociabilis*) was listed as endangered effective March 11, 1967 under the Endangered Species Preservation Act of 1966 (32 FR 4001). Critical habitat was designated for the subspecies on August 11, 1977 (42 FR 40685). The designation was revised on September 22, 1977 (42 FR 47840).

The Everglade Snail Kite is a non-migratory raptor that resides in central and South Florida, Cuba, and Honduras (AOU 1983, USFWS 1999b). In Florida, the historic distribution of the species was considerably larger than the current range and included most of the peninsula. The distribution of Everglade Snail Kite is currently limited to the following freshwater ecosystems: Upper St. Johns marshes, Kissimmee River Basin, Lake Okeechobee, Loxahatchee Slough, the Everglades, and Big Cypress basin. Species habitat preferences include freshwater marshes with shallow water, patchy emergent vegetation, and large expanses of open water for foraging. Emergent vegetation is important for nesting habitat. Other important habitat features include communal roosts, typically in riparian tree species within or bordering the marsh/lake, which are used throughout the year (USFWS 1999b). Snail Kites nest in patches of emergent marsh vegetation such as sawgrass (*Cladium jamaicense*) and cattails (*Typha* spp.) over water. The species may also nest in small trees such as willows (*Salix spp*), pond cypress (*Taxodium ascendens*), and paperbarks (*Melaleuca*). Nests are a loose platform of woven sticks and



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herbaceous vegetation. The Snail Kite is a specialist that preys on the native Florida Apple Snail (*Pomacea paludosa*), but is also adapting to prey on the Exotic Apple Snail (*Pomacea insularum*; USFWS 2019j). Shallow, open, calm and clear water is required for foraging habitat (USFWS 1999b).

Threats to the species include habitat loss and fragmentation, hydrology management practices in the state (that may directly or indirectly impact both the kite and its prey), predation, invasive species (predators as well as the Exotic Apple Snail), and anthropogenic sources of disturbance. Another threat to the species is that designated critical habitat does not closely match habitat currently being used by the species (USFWS 2019j). The subspecies is considered to be in decline, and juvenile survival has been trending downward in the last decade (USFWS 2008d, USFWS 2019j).

### Roseate Tern

The Roseate Tern (*Sterna dougallii dougallii*) is managed as two separate populations. The Northeast population is listed as endangered and the Caribbean population as Threatened effective November 2, 1987 (52 FR 42064). The Service announced the initiation of a five-year species review in 2018 (83 FR 39113). Critical habitat has not been designated (USFWS 2020a).

The range of the Roseate Tern includes the two listed populations as well as populations in Britain, France, the Azores, Canary Islands, and southeastern Africa (USFWS 2010e). They almost solely breed in large colonies on islands (Nisbet et al. 2014). A metapopulation of the Caribbean Roseate Tern is known to breed in 12 areas of the Florida Keys (USFWS 2010e, Nisbet et al. 2014). High colony site fidelity has been documented in the Northeast population. Nests are simple scrapes on the ground comprised of sand, rock, or vegetation. The species feeds on small marine fish (Nisbet et al. 2014).

Historically, Roseate Terns suffered declines as a result of overharvesting for the millinery trade (52 FR 42064). The species continues to be particularly vulnerable because of its small and localized nesting populations. These habitats face a variety of threats such as erosion, invasive plant species, sea level rise, and intensification of storms. For instance, severe winter storms in 2005 substantially eroded colony sites within Florida, resulting in the species relocating to other areas for breeding. Additionally, breeding colonies often experience substantial pressure from mammalian predators. In Canada, displacement from colony sites by competing gulls is a significant threat (USFWS 2010e).

### Bachman's Wood Warbler

Bachman's Wood Warbler, hereafter Bachman's Warbler per recent naming standards, (*Vermivora bachmanii*) was listed as endangered effective March 11, 1967 (32 FR 4001). Critical habitat has not been designated (USFWS 2020a). This species is considered to be extinct by most authorities (Hamel 2011).

Historically, this species bred in the southeastern US and wintered in Cuba and the Isle of Youth. However, habitat loss on both the breeding and wintering grounds and other population pressures beginning in the 1800s resulted in considerable species declines. The Bachman's Warbler is now considered to be one of the rarest passerines in North America. It has not been documented in the states since 1962 and the last sighting in Cuba is from 1981 (USFWS 2015d, Hamel 2018).

Habitat preferences and behavior of the species are not well understood. Breeding habitat likely consisted of bottomland hardwood forested wetlands with an understory of cane/bamboo (*Arundanaria gigantea*) or palmetto (*Sabal minor*). Longleaf pine forest and brackish marsh habitat may also have served as breeding habitat. All documented nests (cups of grass and leaves) have been located in dense understory close to the ground. Wintering habitat potentially included the Cuban lowlands, but this is not well documented (Hamel 2018). Historical threats to the species included habitat loss from palustrine forested wetland habitat conversion to agriculture (sugar cane production) as well as logging. Diet included invertebrates. Bachman's Warblers were previously documented in Florida while passing through on migration (breeding has not been documented in the state)

(Hamel 2011, USFWS 2015d). The species is not currently known to occur in Florida (USFWS 1999b).

### Golden-winged Warbler

The Golden-winged Warbler (*Vermivora chrysoptera*) was petitioned for listing on February 10, 2010 by a private citizen (Sewell 2010), and the 90-day finding determined that the listing may be warranted (76 FR 31920). The species remains under review at this time (USFWS 2020a).

The Golden-winged Warbler is a neotropical migrant that breeds in upland and wetland forest landscapes in the Great Lakes and Appalachian regions of North America and winters in Central and South America. The species occurs in Florida strictly during migration (Confer et al. 2011, Roth 2012). Migration records from the state are primarily clustered in the Panhandle with few records from the coast. Habitat on migration is not well documented, but may include forest edge and second-growth forest (Confer et al. 2011). On their breeding grounds, the species is associated with early successional, disturbed habitats with dense shrubs, often near forest edges, with low to moderate canopy cover (76 FR 31920, Confer et al. 2011). Golden-winged Warblers construct their nests on the ground or in a grassy tussock. Nests are constructed out of woven plant material including leaves and bark (Confer et al. 2012). The species feeds on moths, larvae, and spiders (76 FR 31920, Confer et al. 2011)

This species is declining throughout its range as a result of habitat loss (on both the breeding and wintering grounds), degradation (through fire suppression and development), fragmentation, cowbird nest parasitism, and competition and hybridization with the co-occurring Blue-winged Warbler (*Vermivora cyanoptera*) (76 FR 31920, Confer 2011, Roth et al. 2012). This species also is known to have high levels of mortality during migration from building strikes (Roth et al. 2012). Extensive management of breeding habitat in the northeast and Great Lakes regions has successfully bolstered regional populations (McNeil et al. 2017).

## REPTILES

### American Alligator

The American Alligator (*Alligator mississippiensis*) was listed as endangered effective March 11, 1967 (32 FR 4001). This was prompted by decimation of their populations as a result of unregulated harvesting.

Federal protections and wide scale recovery efforts led to a swift recovery and the species is no longer considered to be "biologically endangered or threatened" (52 FR 21059). Based on similarity of appearance to the American Crocodile, which is currently listed under the Endangered Species Act, the American Alligator was reclassified to Threatened in 1975 (40 FR 44412). Critical habitat has not been designated (USFWS 2020a).

The American Alligator is one of the two native crocodilian species to North American, the other being the American Crocodile (70 FR 15052). The range of the American Alligator includes Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Florida, and Texas. The majority (83 percent) of Alligator habitat available within this range is concentrated in Florida, Louisiana, and Texas (52 FR 21059). They utilize a variety of wetland habitats including but not limited to marshes, ponds, lakes, rivers, swamps, bayous, and canals. Females construct nest mounds from debris (e.g., vegetation, rocks, mud, etc.), often in marshes or near lakes and rivers. As opportunistic predators, they feed on a wide array of prey from invertebrates as juveniles to deer as large adults (NatureServe 2020).

### Spotted Turtle

The Spotted Turtle (*Clemmys guttata*) was petitioned for listing on July 11, 2012 (CBD 2012) and the 90- day finding in 2015 determined that listing may be warranted (80 FR 37568). The species remains under review at this time (USFWS 2020a).

Although the range of the Spotted Turtle is extensive and extends from the Great Lakes along the Atlantic Coast

and into northern Florida (Ernst and Lovich 2009), the species has apparently been extirpated from many regions resulting in disjunct populations (CBD 2012). Habitat includes a variety of shallow, isolated wetlands with clean water, soft substrate, and emergent or submerged vegetation (Ernst and Lovich 2009). The species may engage in terrestrial movements, especially in spring. In cold weather, hibernation occurs in water depths of 56 to 94 centimeters with muddy bottoms and dense vegetation (CBD 2012). Spotted Turtle populations tend to be small and isolated, and dispersal ability is limited (van Dijk 2010, Anthonysamy et al. 2014). Threats to the species include habitat destruction and loss of wetlands, collection for the pet trade, road mortality, and invasive species (Ernst and Lovich 2009, van Dijk 2010).

### American Crocodile

The American Crocodile (*Crocodylus acutus*) is managed as two separate populations, those in Florida and those that occur in the rest of the United States. The US population of American Crocodile was listed as endangered effective October 25, 1975 (40 FR 44149). The Florida population was classified as a distinct population segment and listed as threatened effective May 1, 2006 (71 FR 13027). In 1978, the Saltwater (estuarine) Crocodile (*Crocodylus porosus*) was listed as endangered because of the similarity in appearance (44 FR 75074, 70 FR 15052). Critical habitat has been designated (41 FR 41914, 42 FR 47840), and includes "portions of Biscayne Bay south of Turkey Point, northeast Florida Bay, including the Keys, and the mainland extending as far west as Flamingo" as well as Everglades National Park (70 FR 15052).

The American Crocodile is one of the two crocodilian species native to North America. The broader range of the American crocodile includes the Caribbean Islands and the Atlantic and Pacific coastal regions along southern Mexico, Central America, and northern South America. In Florida, at the northern extent of its range, it is limited to the southern tip of Florida and the Florida Keys, with the historic core concentrated in Miami-Dade, Broward, and Monroe Counties. Crocodile habitat includes mangrove-lined bays, swamps, and marshes (70 FR 15052). Adult crocodiles are powerful predators and feed primarily on fish (NatureServe 2020), as well as a wide array of prey including birds, mammals, crabs, and turtles. Young specialize in fish and aquatic invertebrates (USFWS 2020a). They are primarily nocturnal, aiding in prey ambush. Earthen nests are constructed on well-drained soils in close proximity to water, often along ditches and beaches. Females lay an average of 38 eggs, and often will not nest every year. The nest must be excavated by the female after the young have hatched (70 FR 15052).

The American Crocodile was historically common across southern Florida, with breeding records as far north as Lake Worth. Their populations were decimated because of habitat loss from development and excessive human persecution. At the time of listing in 1975, only an estimated 10 to 20 breeding females remained in Florida (40 FR 44149). Through the protections afforded by listing, their populations grew from 200 to 300 individuals in 1975 to 500 to 1,000 individuals in 2005 (70 FR 15052). As of 2005, the mainland shore of Florida Bay between Cape Sable and Key Largo makes up the majority of the current breeding range (70 FR 15052). They may be expanding their range back into the Florida Keys, but nesting is only known from Key Largo (70 FR 15052).

### Eastern Diamondback Rattlesnake

The Eastern Diamondback Rattlesnake (*Crotalus adamanteus*) was petitioned for listing on August 22, 2011 (CBD 2011a), and the 90-day finding determined that listing may be warranted (77 FR 27403). The species remains under review at this time (USFWS 2020a).

Although the species was historically distributed through much of the southeast from Louisiana to North Carolina, there have reportedly been considerable declines over much of the range (Means 1986, Waldron et al. 2008, CBD 2011a). In Florida, large sub-populations remain in the northern peninsula and the eastern and southern Panhandle (Timmerman and Martin 2003); however, populations in other parts of the state have been considerably reduced or in some cases extirpated (Means 2010). About half of the currently occupied range is in Florida (Timmerman and Martin 2003). The primary pre-settlement habitat was longleaf pine savanna (Means 2006), although other open-canopy habitats with a dense herbaceous understory are also utilized today. In addition to

habitat conversion or loss, rattlesnakes are actively targeted for malicious killing by humans (Means 2010).

### Key Ringneck Snake

The Key Ringneck Snake (*Diadophis punctatus acricus*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding determined that listing may be warranted (76 FR 59835). The subspecies remains under review at this time (USFWS 2020a).

Distribution is restricted to five Lower Keys: Key West, Big Pine, Little Torch, Middle Torch, and No Name keys. Presence on a few additional keys which have suitable habitat is possible but unverified (Weaver et al. 1992). Habitat includes pine rocklands and rockland hammocks, usually near permanent fresh water (Lazell 1989, FNAI 2001a). Up to 98 percent of pine rockland habitat has reportedly been lost (Bentzien 1987) and what remains has been fragmented. There have been few recent surveys for Key Ringneck Snakes (and relatively few individuals found) (CBD 2012). Storm surge and sea level rise could be a future risk given the low elevation of much of the remaining habitat (FWC 2011b).

### Eastern Indigo Snake

The Eastern Indigo Snake (Drymarchon couperi = Drymarchon corais couperi) was listed as threatened effective March 3, 1978 (43 FR 4026). Critical habitat has not been designated (USFWS 2020a).

Indigo Snakes are currently considered to be extirpated or very rare in the Florida Panhandle (Enge et al. 2013). The majority of recent records are in Peninsular Florida south of Gainesville. Indigo Snakes require large patches greater than 4000 hectares of contiguous, good quality habitat with few roads and sufficient shelter sites, such as Gopher Tortoise burrows (USFWS 2019k). Individual home ranges are large, from tens to several hundred hectares. A variety of upland and lowland habitat types are utilized, generally with a preference for upland habitat (Bauder et al. 2018). Winter shelter is a key structural component, and may include Gopher Tortoise burrows, hollowed root channels, hollow logs, stump holes, rodent or armadillo burrows, or other similar shelter (Hyslop et al. 2014, Bauder et al. 2017, USFWS 2019k).

There have been considerable Indigo Snake population declines reported, including a 97 percent loss in the Florida Panhandle and 56 percent loss in Peninsular Florida. Out of 83 total historic populations, 53 remain extant, although only four are considered to have high resiliency. Major threats to the species include habitat fragmentation, fire suppression leading to eventual habitat degradation, and road mortality (USFWS 2019k).

### Gopher Tortoise

The Gopher Tortoise (*Gopherus polyphemus*) is managed as two separate populations, western and eastern. The western Gopher Tortoise population was listed as threatened effective August 6, 1987 (52 FR 25376). The Gopher Tortoise eastern population was petitioned for listing on January 18, 2006 (USFWS 2018f). The listing was determined to be warranted; however, the species has been precluded from listing because of delays from higher priority listings (USFWS 2018f). Thus, the eastern population remains a Candidate for listing (USFWS 2020a). Critical habitat has not been designated (USFWS 2020a).

The western Gopher Tortoise population occurs west of the Mobile and Tombigbee Rivers in Alabama, Louisiana, and Mississippi (USFWS 2020a). The eastern Gopher Tortoise population occurs east of the Mobile and Tombigbee Rivers in Alabama, Georgia, Florida, and South Carolina (USFWS 2020a). The majority of the eastern population occurs in Florida (CBD 2020b). The species is associated with habitats characterized by dry sandy soils, open canopy cover, and abundant herbaceous vegetation (USFWS 2018f). Gopher Tortoises are considered a keystone species because the burrows they dig are utilized by 360 other species (CBD 2020b). The primary threats to Gopher Tortoise populations include habitat loss, degradation, and fragmentation (84 FR 54732).

### Escambia Map Turtle

The Escambia Map Turtle (*Graptemys ernsti*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

This species is endemic to very few relatively small river systems in western Florida and adjacent southern Alabama where it is locally abundant, with populations appearing to be relatively stable (NatureServe 2020). The species usually favors areas with good flow, avoids backwaters and salt water, and nests along sandbars and river berms. Basking individuals are conspicuous from late spring to fall, despite being present year-round. Florida currently has a state possession limit of two turtles, however it is illegal to buy or sell the species or its parts. Future management recommends the acquisition of remaining private floodplain and bordering uplands in both Escambia and Yellow river systems, and to identify and control sources of pollution within those river systems (FNAI 2001a).

### Southern Hognose Snake

The Southern Hognose Snake (*Heterodon simus*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding in 2015 determined that listing may be warranted (80 FR 37568). Following further review in 2019, the USFWS announced that the listing was not warranted based on likely population persistence (84 FR 53336).

The Southern Hognose Snake is endemic to the Coastal Plain of the southeastern United States. The species range extent includes 200,000 to 2,500,000 square kilometers with a presumed population of at least several thousand. The main threats to the species are loss of habitat through fire and urban development, fragmentation, and invasive species such as red imported fire ants and feral hogs (USFWS 2019l). The Southern Hognose Snake inhabits open, xeric habitats with well-drained, sandy soils, dominated by pine or pine-oak woodland with an open canopy and grassy understory (Enge et al. 2016). They spend a considerable amount of time burrowed in the soil and may use their snout to excavate buried toads (NatureServe 2020). Further studies are required to determine the factor or combination of factors that have caused the population to decline. Once established, management strategies can be implemented.

### Apalachicola Kingsnake

The Apalachicola Kingsnake (*Lampropeltis getula meansi*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding determined that listing may be warranted (80 FR 37568). The subspecies remains under review at this time (USFWS 2020a). The petition requested listing of the subspecies if recognized, or as a distinct population segment (DPS) level if not recognized. Krysko et al. (2017) presented further genetic evidence that the Apalachicola Kingsnake may be a distinct species.

Endemic to the Florida panhandle, the range of the Apalachicola Kingsnake is limited to Franklin and Liberty Counties between the Apalachicola and Ochlockonee Rivers and south of Telogia Creek. Some intergradation with the nominate subspecies has been reported in surrounding counties (Krysko and Judd 2006). Habitat has been described as wetland margins within longleaf pine flatwoods. The Apalachicola Kingsnake has been found in freshwater marshes in the Apalachicola River estuary and behind the Franklin County beachfront (Moler 1992). The subspecies has declined considerably since the 1970s in part due to extensive development in the southern Apalachicola region, where only two to three percent of the original longleaf pine savanna is estimated to remain intact (Noss et al. 1995, Krysko and Smith 2005).

### Alligator Snapping Turtle

The Alligator Snapping Turtle (*Macrochelys temminckii*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding determined that listing may be warranted (80 FR 37568). Despite a lawsuit filed by the Center for Biological Diversity in 2016 pressing for more timely protection, the species remains under review at this time (CBD 2016, USFWS 2020a). A recent genetic study proposed two new species (*Macrochelys apalachicolae* and *Macrochelys suwanniensis*) that had previously been considered Alligator Snapping Turtle (Thomas et al.

2014, CBD 2016).

Alligator Snapping Turtles are fully aquatic (except while nesting), foraging on the bottom of permanent water bodies. Their diet consists primarily of aquatic animals, supplemented with carrion and plants (NatureServe 2020). They are secretive and occupy large home ranges (NatureServe 2020).

Alligator Snapping Turtle populations are experiencing drastic declines and the species has been extirpated from much of their historic range, including Iowa, Illinois, Kentucky, Missouri and Tennessee. Extant populations remain in Alabama, Arkansas, Florida, Georgia, Indiana, Kansas, Louisiana, Mississippi, Oklahoma, and Texas. Primary threats to their populations are overharvest in the exotic trade market and habitat loss (CBD 2012).

### Atlantic Salt Marsh Snake

The Atlantic Salt Marsh Snake (*Nerodia clarkii taeniata*) was listed as threatened effective December 29, 1977 (42 FR 60743). Critical habitat has not been designated (USFWS 2020a). The 2008 and 2019 five- year reviews prioritized taxonomic and genetic analysis because status at both the specific and subspecific levels is unknown and in question. Analysis reportedly was scheduled for completion late in 2019 (USFWS 2019m) but is not yet available. Earlier work suggests that the subspecies may not be genetically, morphologically, or ecologically distinct (Territo 2013, Parkinson et al. 2016).

As currently defined, the range of the Atlantic Salt Marsh Snake is believed to be restricted to coastal marshes in Volusia County, Florida (Territo 2013). Habitat is described as brackish coastal marshes dominated by pickleweed (*Salicornia* spp.) and saltgrass (*Distichlis spicata*); black mangrove (*Avicennia* spp.) may also be present. Habitat loss due to development and habitat degradation resulting from ditching, diking, and impoundments has had a negative impact on the species, but these impacts have slowed in recent years (USFWS 2019m). Florida Natural Areas Inventory mapped 3,696 hectares of suitable habitat for the subspecies, of which 95 hectares are protected within public lands (FNAI 2007). Nearly 400 hectares of salt marsh have recently been restored in Volusia County. Northward encroachment of mangrove swamp replacing brackish marsh is reportedly a threat to subspecies habitat (USFWS 2019m).

### Florida Pine Snake

The Florida Pine Snake (*Pituophis melanoleucas mugita*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding in 2015 determined that listing may be warranted (80 FR 37568).

This southeastern Coastal Plain species occurs from South Carolina to Alabama, including Florida north of the Everglades (Ernst and Ernst 2003). Preferred habitat is characterized by well-drained sandy soils and relatively open canopy, including sandhills, xeric hammock, scrubby flatwoods, and dry prairie (Enge 1997, Franz 2005). In northern Florida, most observational reports are from sandhill or high pine habitat. The number of reports has decreased over time, suggesting an ongoing population decline (Franz 2005). Major threats are thought to include collecting, road mortality, and habitat loss (Franz 1992, Golden et al. 2009).

### Bluetail Mole Skink

The Bluetail Mole Skink (*Plestiodon egregious lividus* = *Eumeces egregious lividus*) was listed as threatened effective December 7, 1987 (52 FR 42658). Critical habitat has not been designated (USFWS 2020a).

The subspecies has been reported from 23 localities, almost all of them on the Lake Wales Ridge in Highlands, Polk, and Osceola Counties; about half the localities are on public lands (Turner et al. 2006, USFWS 2007e). Because the subspecies is fossorial, spending much of its time underground, little abundance information is available. Populations are associated with scrub and sandhill habitat, and are believed to require loose soils, moderate soil temperatures, and presence of vegetation (although much of this information is inferred from studies of related species) (Mushinsky and McCoy 1999, Gianopulos et al. 2001). Threats to the subspecies include habitat fragmentation and a lack of site management resulting in dense overgrown vegetation.

## Sand Skink

The Sand Skink (*Plestiodon reynoldsi* = *Neoseps reynoldsi*) was listed as threatened effective December 7, 1987 (52 FR 42658). Critical habitat has not been designated (USFWS 2020a).

The species has been reported from 73 localities, 70 of them on the Lake Wales Ridge in central Florida (Turner et al. 2006, USFWS 2007e). The species is fossorial, spending much of its time underground; presence of loose, uncompacted, coarse-grained soil is thought to be an important habitat component. Populations are associated with scrub and sandhill habitat (Mushinsky and McCoy 1999, Gianopulos et al. 2001). Occasional fire is important to keep sites open, although Sand Skink densities tend to be somewhat higher on sites which have not burned in several years (Schrey et al. 2011), suggesting that there is a range of optimal fire frequency. Threats to the species include habitat fragmentation and a lack of site management resulting in dense overgrown vegetation. About 85 percent of pre-settlement sand scrub habitat has been lost to development, and only about six percent is currently protected (Turner et al. 2007). There is some evidence that populations may persist in lower densities in altered habitat as long as loose, dry soil is present (USFWS 2007e).

## Florida Red-Bellied (Florida Panhandle) Turtle

The Florida Red-bellied (Florida Panhandle) Turtle (*Pseudemys nelsoni* pop. 1) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (77 FR 27403). The species remains under review at this time (USFWS 2020a). There is no evidence of taxonomic distinctness between the Panhandle and peninsular populations in Florida; however, the populations are separated by a considerable physical distance (NatureServe 2020).

The Florida Panhandle population is restricted to the lower Apalachicola/Chipola River drainage, associated delta, and off-shore islands in the Florida Panhandle (NatureServe 2020). The remainder of the population is found from Suwannee River area south, primarily in Florida with extensions into Georgia. The species inhabits water rich with aquatic plant life, such as streams, ponds, lakes, ditches, sloughs, marshes, and mangrove-bordered creeks (Gleaton 2020). It is threatened by drought, predators, and (though now illegal) harvesting for food by turtle trappers. The Florida Red-bellied (Florida Panhandle) Turtle requires extensive survey work to verify its occurrence, population size, habitat use, and ecological and biological processes to establish appropriate management plans (NatureServe 2020).

## Florida Scrub Lizard

The Florida Scrub Lizard (*Sceloporus woodi*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding in 2016 determined that listing may be warranted (81 FR 63160). The species remains under review at this time (USFWS 2020a).

Endemic to Florida, the range consists of four disjunct areas: Ocala National Forest and vicinity in the northern Peninsula; portions of Polk and Highlands Counties in central inland Florida; Atlantic Coast scrub from Brevard to Broward Counties; and Gulf Coast scrub in Lee and Collier Counties (DeMarco 1992).

Habitat is limited to evergreen oak scrub and young sand pine scrub; and to a lesser extent sandhills adjacent to scrub or scrubby flatwoods. Both open areas and mature trees are required, and habitat is exclusively xeric (Hammerson 2007a). Density tends to be higher in recently burned areas (Tiebout and Anderson 2001, Schrey et al 2011). Declines are attributed to loss and fragmentation of sand scrub habitats and fire suppression (Whelan 1995).

### Short-tailed Snake

The Short-tailed Snake (*Stilosoma extenuatum* = *Lampropeltis extenuata*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding in 2015 determined that listing may be warranted as of early 2020 (80 FR 56423). The species remains under review at this time (USFWS 2020a).

Found only in northern and central Florida, Short-tailed Snake preferred habitat includes dry upland habitats of sandhill, xeric hammock, and sand pine scrub (FNAI 2001a). They are rarely seen above ground and are known to burrow or use soil, fallen logs, or debris for shelter. Little is known about the ecology of this snake; as such, further studies on ecology, behavior, life history, movement patterns, and other natural history would be valuable to understand and effectively manage this species (NatureServe 2020).

### Rim Rock Crowned Snake

The Rim Rock Crowned Snake (*Tantilla oolitica*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90-day finding in 2015 determined that listing may be warranted (80 FR 37568). The species remains under review at this time (USFWS 2020a).

The range of the Rim Rock Crowned Snake is small, restricted to eastern Dade County around Miami and to several of the Keys. Most of the Dade County range is extirpated and what remains is fragmented, Very few specimens have been collected from this area (Hammerson 2007b). Habitat includes pine rockland and rockland hammock as well as disturbed urban environments including vacant lots, roadsides, and pastures (Hines and Bradley 2009, CBD 2012). In natural habitat types, refugia include crevices in oolitic limestone, rock rubble, or accumulated organic matter in depressions within the rock (Enge et al. 2003).

Animals are sometimes found under surface cover including rocks, downed woody debris, or palmetto leaves (Rochford et al. 2010, Yirka et al. 2010). Habitat loss and fragmentation are the primary threats to the species (CBD 2012).

## AMPHIBIANS

### Reticulated Flatwoods Salamander

The Reticulated Flatwoods Salamander (*Ambystoma bishopi*) was listed as endangered effective March 12, 2009, and critical habitat was designated simultaneously (74 FR 6700).The listing recognized Flatwoods Salamanders west of the Apalachicola and Flint Rivers as a distinct species from the Frosted Flatwoods Salamander, as originally proposed by Pauly et al. (2007).

Breeding occurs in the fall in acidic seasonal wetlands; eggs are inundated and larvae hatch after subsequent rains. Breeding ponds range from relatively open-canopy to dense canopy cypress domes, and are located within longleaf pine-dominated flatwoods or savannas with a predominantly wiregrass understory (Palis 1997, USFWS 2015e). Fire suppression may have led to increased canopy closure Gorman et al. 2013). Adults, and juveniles after leaving the ponds, spend most of their time underground in crayfish burrows or root channels (USFWS 2015e). The Florida range is entirely west of the Apalachicola River. Of the 20 populations known at the time of listing (11 on private land, nine on public land), only six were known to be extant as of 2014 (USFWS 2015e). All of these populationsare on public land, and five of them are in Florida. Private lands have not been extensively surveyed and status there is unknown.

### Frosted Flatwoods Salamander

The Flatwoods Salamander (*Ambystoma cingulatum*) was listed as threatened effective May 3, 1999 (54 FR 15691). Following a taxonomic revision which recognized two species of Flatwoods Salamander (Pauly et al. 2007), the listing was revised with the Frosted Flatwoods Salamander retaining Threatened status and defined as including populations east of the Apalachicola River (74 FR 6700). Critical habitat was designated for the Frosted Flatwoods Salamander in 2009 (74 FR 6700).

The Frosted Flatwoods Salamander has a disjunct range in parts of Florida, Georgia, and South Carolina; the historic Florida distribution included a band from the Apalachicola River to east of Tallahassee, and a separate area west of Jacksonville. Of the 25 populations identified in the original listing, only nine are confirmed extant



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(USFWS 2019n). In Florida, five populations are within Apalachicola National Forest, and two are within St. Marks National Wildlife Refuge.

The Frosted Flatwoods Salamander breeds in the fall, depositing eggs in small depressions which are inundated by subsequent rains (Palis 1995, 1997). Aquatic larvae metamorphose from March to May and disperse from the ponds (Palis 1995). Terrestrial adult habitat is typically within mesic longleaf pine (Pinus palustris)/wiregrass flatwoods or savanna, or slash pine (Pinus elliottii)/sawgrass (USFWS 2019n).

Juveniles and adults spend considerable time underground in crayfish burrows or root channels (Petranka 1998). The species' population is in decline (USFWS 2019n). Habitat management recommendations include actions to increase herbaceous vegetation cover (Gorman et al 2014).

### Georgia Blind Salamander

The Georgia Blind Salamander (*Eurycea wallacei* = *Hadeotriton wallacei*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

Distribution is restricted to the karst region of the Marianna Lowlands-Dougherty Plain physiographic region of Florida and adjacent Georgia (NatureServe 2020). There are at least 22 localities in the Chipola River watershed of Jackson County, one in Calhoun County, and five in the Lower Choctawatchee River watershed of Washington County (Fenolio et al 2013, NatureServe 2020). Georgia Blind Salamanders are fully aquatic, neotenic, and restricted to streams and pools within caves. Presence may be associated with bat droppings (Means 2005). Although density may be high at some localities, there are no reliable population estimates because of the difficulty of sampling within caves (Fenolio et al 2013). Primary threats include habitat loss and water quality degradation (NatureServe 2020).

### Gopher Frog

The Gopher Frog (*Lithobates capito*) was petitioned for listing on July 11, 2012 (CBD 2012), and the 90- day finding determined that listing may be warranted (80 FR 37568). The species remains under review at this time (USFWS 2020a).

The Gopher Frog is a southeastern Coastal Plain species, extending from North Carolina to Florida with isolated populations in Alabama and Tennessee. Gopher Frogs historically occurred throughout Florida except in the Everglades (CBD 2012). Habitat is primarily fire-maintained xeric uplands (Greenberg and Tanner 2008), with breeding occurring in fishless semi-permanent emergent wetlands (Bailey 1991).

Gopher Frogs are commensal with Gopher Tortoises, relying on tortoise burrows for shelter (Kent et al 1997).

Although the historic range is extensive, Gopher Frog populations are thought to be in significant decline (Bailey 1991, CBD 2012). Threats include loss or degradation of longleaf pine (*Pinus palustris*) habitat as a result of logging and fire suppression, as well as wetland loss, introduction of fish into wetlands, ATV use, and reduced Gopher Tortoise populations (CBD 2012).

### Gulf Hammock Dwarf Siren

The Gulf Hammock Dwarf Siren (*Pseudobranchus striatus lustricolus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The subspecies remains under review at this time (USFWS 2020a).

The Gulf Hammock Dwarf Siren was described in 1951 from 11 specimens found in Levy and Citrus Counties, and has not been observed since. The survival and even the validity of the subspecies is uncertain because of the small number of available specimens and long interval since detection (NatureServe 2020). Habitat is believed to



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be restricted to hydric hardwood hammocks within a small geographic area, where they burrow in the soft mud at wetland margins. Threats within the historic range include commercial forestry, habitat conversion for agriculture or development, and hydrology alteration (FWC 2008).



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## FISH

### Shortnose Sturgeon

The Shortnose Sturgeon *(Acipenser brevirostrum)* was listed as endangered effective March 11, 1967 (32 FR 4001). Critical habitat has not been designated (USFWS 2020a).

The Shortnose Sturgeon's historical range spans riverine and estuarine waters along the Atlantic coast of North America from the Indian River in Florida to the St. John River in Canada. There are three metapopulations distributed across this area: northern, mid-Atlantic, and southern. The current range is disjunct, with a 402 kilometer gap between the northern and mid-Atlantic metapopulations and the southern metapopulation (NOAA 2020). The species is managed across 19 distinct population segments (DPSs) (NMFS 1998).

As primarily an amphidromous fish, Shortnose Sturgeon are born in freshwater rivers in which they live and spend most of their adult lives, making short trips to marine waters for foraging (NOAA 2020). Some populations in the southern range exhibit estuarine anadromous life histories, but adults remain in estuaries rather than foraging offshore and only engage in short-distance migrations (NMFS 1998). In the southern portion of their range, spawning occurs from January to April (NOAA 2020). Spawning habitat typically includes the uppermost reach of a river (NMFS 1998). Adult sturgeons are characterized as benthic feeders, primarily upon mollusks and crustaceans (NOAA 2020).

Extensive overfishing contributed to initial declines. Pollution and habitat impediments as a result of industrial development has prevented the recovery of this species (NMFS 1998). Ongoing major threats include habitat impediment (e.g., dams), habitat degradation (e.g., dredging and poor water quality), and fisheries bycatch (NOAA 2020).

### Gulf Sturgeon

The Gulf Sturgeon (*Acipenser oxyrinchus desotoi*, formerly known as *Acipenser oxyrhynchus desotoi*), was as Threatened effective October 30, 1991 (56 FR 49653). Critical habitat was designated for the Gulf Sturgeon on March 19, 2003 (68 FR 13370).

The Gulf Sturgeon is primarily confined to the eastern Gulf of Mexico and classified as a subspecies of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) (NatureServe 2020). This anadromous fish spends much of its adult life foraging in the Gulf during colder months of the year, returning to natal freshwater river systems to spawn from February to April (FNAI 2001a). The species may migrate as far as 225 kilometers upriver to spawn. Spawning typically occurs over substrates consisting of hard clay, rubble, and gravel (NatureServe 2020). Adults return to the Gulf of Mexico in late fall and young-of-the-years remain in their natal rivers for as long as 12 months before moving into the lower estuarine habitats (68 FR 13370). Adult sturgeons are characterized as bottom feeders, utilizing their barbels to scan the benthos primarily in search of invertebrates such as brachiopods, insect larvae, mollusks, worms and crustaceans (56 FR 49653).

Initially, population declines were the product of overfishing for caviar, smoked fish, and isinglass. Damming and disconnection of spawning grounds from the Gulf of Mexico is one of the current major factors contributing to the species decline. Other factors such as habitat modification due to dredging, navigation maintenance activities, and water pollution also pose potential threats (68 FR 13370). In Florida, the Gulf Sturgeon distribution extends from all major Panhandle river systems east to the Suwannee River (FNAI 2001a). The species seen as far southeast as Florida Bay, although these observations coincide with especially cold years and are rare (68 FR 13370).

### Atlantic Sturgeon

The Atlantic Sturgeon *(Acipenser oxyrinchus oxyrinchus)* is managed across five distinct population segments (DPSs) all of which were federally listed in 2012: the Carolina DPS, Chesapeake Bay DPS, New York Bight DPS, and South Atlantic DPS are listed as endangered; and the Gulf of Maine DPS is listed as threatened (77 FR 5913, 77 FR 5880). The South Atlantic DPS was listed as endangered effective April 6, 2012 (77 FR 5913). Critical habitat was designated for all DPSs in 2017 (82 FR 39160). Critical habitat for the South Atlantic DPS includes the Edisto, Combahee-Salkehatchie, Savannah, Ogeechee, Altamaha, Ocmulgee, Oconee, Satilla, and St. Marys Rivers in South Carolina, Georgia, and Florida (82 FR 39160).

The species' historical range spans riverine and coastal waters along the Atlantic coast of North America from Florida to Canada. As an anadromous fish, adults spend their lives foraging in the Atlantic Ocean, with records as far north as Iceland. Adults return to their natal freshwater rivers to spawn in springtime every one to five years. Adult sturgeons are characterized as bottom feeders, utilizing their barbels to scan the benthos primarily in search of invertebrates such as mollusks, worms, crustaceans, and fish (NOAA Fisheries 2020).

Extensive overfishing contributed to initial species declines (NOAA Fisheries 2020). Despite a moratorium on all Atlantic Sturgeon fisheries that began in 1998, some populations have continued to decline (77 FR 5913). Current threats include fisheries bycatch, habitat degradation (e.g., dredging and poor water quality), habitat impediment (e.g. dams), and vessel strikes (FWC 2020c, NOAA Fisheries 2020).

### Okaloosa Darter

The Okaloosa Darter (*Etheostoma okaloosae*) was originally listed as endangered efffective June 4, 1973 (38 FR 14678). The species was downlisted to Threatened effective May 2, 2011 (76 FR 18087). Critical habitat has not been designated (USFWS 2020a).

The species occurs only in Florida, with the range limited to six streams (Toms, Turkey, Mill, Swift, East Turkey, and Rocky Creeks) in two Florida Panhandle counties (Walton and Okaloosa). An estimated 98.7 percent of the occupied range is within and managed by Eglin Air Force Base (76 FR 18087). Habitat is typically dense vegetation, root mats, and detritus along clear, flowing stream margins (FNAI 2001a). Holt et al. (2013) reported that individual fish remained within relatively small areas, with 22 percent of individuals remaining in the same 20-meter reach for one year; fish infrequently crossed open, sandy, mid-channel areas to the other side. Most populations are believed to be stable or increasing at present and vulnerability is primarily due to the small range and limited number of occurrences (NatureServe 2020).

### Saltmarsh Topminnow

The Saltmarsh Topminnow (*Fundulus jenkinsi*) was petitioned for listing on September 3, 2010 (WildEarth Guardians and Felsen 2010), and the 90-day finding determined that listing may be warranted (76 FR 49412). The species remains under review at this time (USFWS 2020a).

Habitat includes small meandering channels of brackish marshes dominated by cordgrass (*Spartina alterniflora*) and needle grass rush (*Juncus roemerianus*). Channel and marsh salinities are in the range of 1-4 parts per thousand (ppt) (Lopez et al. 2011). Patchy populations occur along the Gulf Coast from Texas (Galveston Bay) to Florida. In Florida, the species is restricted to the estuary of the Escambia River (Gilbert and Relyea 1992).

### Smalltooth Sawfish

The US distinct population segment (DPS) of Smalltooth Sawfish (Pristis pectinate) was listed as endangered on April 1, 2003 (68 FR 15674). The Bahamian DPS was listed as endangered in 2014 (79 FR 73977). In 2009, two areas along the southwestern coast of Florida were designated as critical habitat for the US DPS (74 FR 45353).

This species has a circumtropical distribution, from Brazil through the Caribbean and Central America, the Gulf of

Mexico, and the Atlantic Coast of the United States (NMFS 2009). NMFS regulates the US DPS in four regions of the eastern US including Florida. Peninsular Florida has the largest number of capture records on the East Coast (NMFS 2018). The species occurs off the southwest coast of Florida from about Charlotte Harbor through the Everglades (NOAA Fisheries 2020). Currently, Smalltooth Sawfish can only be found regularity in south Florida between the Caloosahatchee River and the Florida Keys (NMFS 2009). Habitat includes shallow coastal waters of most warm seas. The species is found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 10 meters. They are often found in sheltered bays, on shallow banks, and in estuaries or river mouths (NMFS 2009). Juvenile Smalltooth Sawfish generally live in estuaries during their first two years (habitats fringed with vegetation, especially red mangroves (*Rhizophora mangle*)), and move into more coastal habitats upon reaching two meters in length. Female Smalltooth Sawfish may have 7 to 14 pups at a time, gestate for 12 months, and give birth every other year (NOAA Fisheries 2020). This species generally subsists on small schooling fish, crustaceans and other bottom-dwelling organisms (NMFS 2009), and utilize their rostra (or "saw") to slash through schools of fish and to find shrimp and crabs on the seafloor (NOAA Fisheries 2020).

The species has declined as a result of habitat loss (development of the Florida waterfront) and bycatch (NMFS 2009, NMFS 2018, NOAA Fisheries 2020). Historically, Smalltooth Sawfish were often accidentally caught in fishing nets, and often killed rather than released unharmed (NOAA Fisheries 2020). This threat has been reduced with the 1995 enactment of the Florida Net Ban Amendment and improved education reform (NMFS 2009, NOAA Fisheries 2020). It is likely that the population is currently at a level less than 5 percent of its size at the time of European settlement (NMFS 2009).

### Invertebrates

### MOLLUSKS

### Southern Elktoe

The Southern Elktoe (*Alasmidonta triangulata*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Southern Elktoe is listed by several other entities, including Critically Imperiled by NatureServe, Endangered by the IUCN, and Endangered by the American Fisheries Society (CBD 2010a, NatureServe 2010).

The Southern Elktoe is a rare freshwater mussel that lives in sandy substrates, such as sandbars, of rivers and larger creeks with moderate currents. Its range is limited to a single river system, the Apalachicola Basin, which includes the Chattachoochee River in Alabama and Georgia, the Flint River in Georgia, and the Apalachicola and lower Chipola rivers in Florida (CBD 2010a, NatureServe 2020).

Adults are detritivores and the glochidia (larvae) are parasitic, though specificity of fish hosts is not known (NatureServe 2020). The species has suffered severe declines (70 to 90 percent) and there are less than five populations remaining within its range. Major threats to the species include habitat degradation and fragmentation caused by dredging, impoundment, sedimentation, water extraction, and drought (CBD 2010a).

### Fat Threeridge

The Fat Threeridge (*Amblema neislerii*) was listed as endangered effective April 15,, 1998 (63 FR 12664). Critical habitat was designated on November 15, 2007 (72 FR 64286).

The Fat Threeridge is endemic to Georgia and Florida. In Florida, their distribution is limited to the Chipola and Apalachicola rivers (FNAI 2001a). Fat Threeridge Mussels typically inhabit the main channels of small to large rivers where the current is slow to moderate and the substrate varies from gravel to cobble to a mixture of sand and sandy mud (Williams and Butler 1994).

Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, likely siphoning water to collect detritus, algae, and zooplankton from the water column for food (Fuller 1974). This mussel is a short-term brooder with gravid females observed in late May and June, suggesting the mussel releases glochidia in summer. Glochidia are parasitic and released in a white web-like structure to wrap around fish hosts. Fish hosts include Speckled Madtom (*Noturus leptocanthus*), Weed Shiner (*Notropis texanus*), Bluegill (*Lepomis macrochirus*), Redear sunfish (*Lepomis microlophus*), Largemouth Bass (*Micropterus salmoides*), and Blackbanded Darter (*Percina nigrofasciata*) (O'Brien and Williams 2002). Adults are relatively nonmotile and significant dispersal only occurs via glochidia (NatureServe 2020). The primary factors contributing to population declines are anthropogenic habitat degradation caused by sedimentation, channelization, impoundment, and environmental contaminants that alter water quality (USFWS 2003b).

### Rayed Creekshell

The Rayed Creekshell (*Anodontoides radiates* = *A. radiatus*, formerly *Strophitus radiatus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Rayed Creekshell is listed by several other entities, including Imperiled by NatureServe, Near Threatened by the IUCN, and as a Special Concern species by the American Fisheries Society (CBD 2010a, NatureServe 2020).

The Rayed Creekshell has a sporadic distribution throughout Alabama, Florida, Georgia, Louisiana, and Mississippi. Specifically it is known from the Apalachicola, Chattahoochee and Flint to Tickfaw River system, the Yazoo River (a tributary of the Mississippi drainage), as well as the Mobile and Apalachicola drainages. Recent surveys have also discovered Rayed Creekshells in several new locations. In Florida, they are known from only Gadsden County (NatureServe 2020). Rayed Creekshells live in the mud, sand, or gravel of large rivers as well as medium to small sized creeks in areas of moderate currents (CBD 2010a).

Rayed Creekshells are detritivores and the glochidia (larvae) are parasitic and feed on the outer gill of fish (though specificity of fish hosts is not known). Gravid females have been observed in September and December (NatureServe 2020). Although distribution historically may have always been sporadic and rare, recent survey efforts have resulted in low numbers at formerly known sites, suggesting up to a 30 percent population decline. Major threats to their populations are associated with stream modifications and come from a variety of sources including pesticide use, deforestation, damming, and water extraction for human consumption (CBD 2010a).

### Pygmy Siltsnail

The Pygmy Siltsnail (*Cincinnatia parva* = *Floridobia parva*) was first petitioned for listing in 1984 (46 FR 21664), with multiple petitions since that point. The species was again petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The species is considered Critically Imperiled by NatureServe (NatureServe 2020).

This species is restricted to Blue Spring (St. John's River system) in Volusia County, Florida; specifically the spring run section (approximately 0.5 kilometers long) (NatureServe 2020). Blue Spring is a freshwater karst spring run, characterized by clear circular pools with abundant aquatic vegetation and silty- sand/gravel substrate over limestone (CBD 2010a). Little to no information is available on the species' list history (NatureServe 2020). Threats to the species include recreational activities (Blue Spring is a popular recreation site), increased sedimentation from erosion and logging practices, invasive species, and any impacts to water quality. The single population also places the species at high risk of extinction from stochastic events. The population is considered in decline (CBD 2010a).

### Ponderous Siltsnail

The Ponderous Siltsnail, formerly known as Ponderosa Spring Siltsnail, *(Cincinnatia ponderosa* = *Floridobia*

*ponderosa)* was first petitioned for listing in 1984 (49 FR 21664). The species has been under review on several occasions (54 FR 554, 56 FR 58804, 59 FR 58982). The species was again petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Ponderous Siltsnail is listed by several other entities including as Critically Imperiled by NatureServe and as Vulnerable by the IUCN (CBD 2010a).

The Ponderous Siltsnail is a rare freshwater snail only known to occur in Sanlando Springs and the following approximate 450 meters of Little Wekiva River below it in Seminole County, Florida (NatureServe 2020). The species is commonly found in vegetated areas as well as in sand and gravel. The Ponderous Siltsnail is vulnerable due to its extremely limited range. In addition, habitat degradation (including water quality impacts from recreation and nearby urban areas) are threats to the species (CBD 2010a). Sanlando Springs has been dammed to be used as a recreational swimming hole (NatureServe 2020). Like other freshwater springs in Florida, there are many other threats to Ponderous Siltsnail habitat including saltwater intrusion, groundwater extraction for human consumption, and pollution from development (CBD 2010a).

### Delicate Spike

The Delicate Spike (*Elliptio arctata*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Delicate Spike is listed by several other entities, including Imperiled Globally and in Florida by NatureServe, and as a Special Concern species by the American Fisheries Society (CBD 2010a, NatureServe 2020).

The Delicate Spike is a river mussel. Adults are detritivores and glochidia (larvae) are parasitic on fish, though specificity of fish hosts is not known (NatureServe 2020). Its historic range included much of the eastern Gulf Coast drainages in Alabama, Florida, Georgia, Mississippi, and Tennessee. Specifically, it is known from the Apalachicola Basin in Georgia and Florida (Panhandle) west to the Pearl River drainage in Mississippi. Delicate Spike live in areas of moderate currents among large rocks or in the sand and gravel underneath them. Historically they were also common in headwater streams and river bars (CBD 2010a).

The Delicate Spike has been extirpated from many of its historic drainages and populations may become genetically isolated. The species is declining across its range, especially within the Coosa-Tallapoosa and Choctawhatchee-Escambia drainages. Delicate Spike populations face a wide array of threats related to habitat degradation including damming, eutrophication and pollution, water extraction, deforestation, bank scouring, and sedimentation (CBD 2010a).

### Chipola Slabshell

The Chipola Slabshell (*Elliptio chipolaensis*) was listed as threatened effective April 15, 1998 (63 FR 12664). Critical habitat has been designated and encompasses several rivers and streams in Florida (as well as other states not described here) including: Econfina Creek, Chipola River, Apalachicola River, Upper Ochlockonee River, Ochlockonee River, and Santa Fe River and New River (72 FR 64286).

The Chipola Slabshell is one of seven rare and listed freshwater mussel species that are evaluated together because they are endemic to eastern Gulf Slope tributaries of the Apalachicolan Region in southeast Alabama, southwest Georgia, and north Florida. The Chipola Slabshell was named from the Chipola River in Florida where it was first described and thought to be endemic. Recent records have documented its presence in a tributary of the Chattahoochee River as well as in Alabama (63 FR 12664). It lives in muddy and silty-sand substrates in areas with slow to moderate currents (NatureServe 2020). It has been extirpated from approximately one-third of its historical range (USFWS 2007f). Bluegill (*Lepo mis macrochirus*) and centrarchids (sun fishes) are likely main host fish species for parasitic larvae (glochidia) (63 FR 12664, USFWS 2007f). Like other freshwater mussels, adults are detritivores (filter feeders) and are likely very long-lived (examples of up to 130 years of age in other species (63 FR 12664). Given its extremely limited distribution and ongoing severe declines (over 75 percent of the

population size), this species is particularly vulnerable to extinction. Ongoing threats include dams, stream channelization, pollution, and sedimentation (NatureServe 2020).

### Purple Bankclimber

The Purple Bankclimber (*Elliptoideus sloatianus*) was listed as threatened effective April 15, 1998 (63 FR 12664). Critical habitat was designated on November 15, 2007 (72 FR 64286).

The Purple Bankclimber is endemic to Alabama, Georgia, and Florida, where they are found in the Apalachicola-Chattahoochee-Flint and Ochlockonee river basins (63 FR 12664). The species is believed to be extirpated from the Chipola and Chattahoochee rivers, making it no longer extant in Alabama (63 FR 12664). However, one individual was observed from the Chattahoochee River in December 2000; the most recent record from that river since the 1800s (Brim Box and Williams 2000). Depending on the river system, the preferred habitat of the Purple Bankclimber seems to vary slightly. In general, they are typically observed in small to large rivers, often in the main channels, where there is moderate current (Clench and Turner 1956, NatureServe 2020). They seem to prefer sand substrate but have also been observed in fine gravel, muddy sand, and sand/limestone. They are frequently observed at depths greater than three meters (Brim Box and Williams 2000).

This species is thought to be a summer releasing mussel as gravid females have been observed in the Ochlockonee River from February through April (NatureServe 2020). They produce parasitic glochidia (NatureServe 2020). Glochidia transformation has occurred on Eastern Mosquitofish (*Gambusia holbrooki*), Guppy (*Poecilia reticulata*), and Blackbanded Darter (*Percina nigrofasciata*) (O'Brien and Williams 2002). Adult Bankclimbers are characterized as filter feeders, positioning themselves on or near the substrate surface, siphoning water to collect detritus, algae, and zooplankton from the water column (Fuller 1974). Adults are relatively nonmotile and only move to burrow deeper into the sediment or travel passively downstream during high flow events. Dispersal occurs through glochidia transportation through infected fish movement (NatureServe 2020). The primary factors contributing to species decline are habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining, and environmental contaminants (68 FR 42419).

### Tapered Pigtoe

The Tapered Pigtoe (*Fusconaia burkei*) was listed as threatened effective November 9, 2012 (77 FR 61663). Critical habitat was designated simultaneously (77 FR 61663).

The Tapered Pigtoe is an endemic species found in the Choctawhatchee River drainage in Alabama and Florida. Within this river drainage, its distribution also includes several oxbow lakes in Florida. Tapered Pigtoe are found in areas with slow to moderate currents in medium creeks to medium rivers, where the substrate is stable and consists of sand, small gravel, or sandy mud (77 FR 61663). They are also occasionally found in floodplain lakes (Williams and Butler 1994).

Little is known about the specific life history of this mussel, although, based on closely related species, they are thought to be short-term brooders (NatureServe 2020). Gravid females have been observed from mid-March through May, and possibly June (Pilarczyk et al. 2006).Their glochidia are parasitic. Blacktail Shiner (*Cyprinella venusta*) are confirmed to produce glochidia transformation (White et al. 2008). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, siphoning water to collect detritus, algae, and zooplankton from the water column (Fuller 1974). Adults are relatively nonmotile and only move to burrow deeper into the sediment (NatureServe 2020). Dispersal occurs via glochidia transportation on parasitized fish. The primary factors contributing to their population decline are habitat degradation caused by excessive sedimentation, streambed destabilization, and environmental contaminants (77 FR 61663).

### Narrow Pigtoe

The Narrow Pigtoe (*Fusconaia escambia*) was listed as threatened effective November 9, 2012 (77 FR 61663). Critical habitat was designated simultaneously (77 FR 61663).

The Narrow Pigtoe is an endemic species with its presence limited to two river systems that drain through northwestern Florida: the Escambia River and Yellow River (77 FR 61663). This mussel is typically found in substrate consisting of sand, gravel, sandy gravel, or silty sand and prefers slow to moderate currents within small to medium sized streams and rivers (CBD 2010a). Little is known about the specific life history of this mussel, although they are thought to be short-term brooders, with gravid females observed in June containing eggs and glochidia (CBD 2010a, Mirarchi et al. 2004). Their glochidia are believed to be parasitic larvae, a common reproductive strategy shared among most freshwater mussels (NatureServe 2020). The host fish species for larvae development is currently unknown (77 FR 61663, Mirarchi et al. 2004). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, likely siphoning water to collect detritus, algae, and zooplankton from the water column for food (Fuller 1974).

Threats to the species include habitat degradation caused by excessive sedimentation, stream bed destabilization, and environmental contaminants altering the water quality (77 FR 61663). The total species population size of the Narrow Pigtoe is estimated to be low, around 2,500 to 10,000 individuals. Surveys of sites currently supporting the species averaged three individuals per site; this likely contributes to low recruitment (NatureServe 2020).

### Round Ebonyshell

The Round Ebonyshell (*Fusconaia rotulata*) was listed as endangered effective November 9, 2012 (77 FR 61663). Critical habitat was designated simultaneously (77 FR 61663).

The Round Ebonyshell has one of the most restricted ranges of all North American unionids (NatureServe 2020). It is endemic to the Escambia River drainage in Alabama and Florida where it is only found in the main river channel (77 FR 61663). The habitat for this species consists of areas with moderate current on sand and gravel substrate (Williams and Butler 1994).

Little is known about the specific life history of this mussel, although based on closely related species, they are thought to be short-term brooders (NatureServe 2020). Gravid females have been observed in the spring and summer (77 FR 61663). Their glochidia are believed to be parasitic larvae, a common reproductive strategy shared among most freshwater mussels (NatureServe 2020). The host fish species for larvae development is currently unknown (77 FR 61663, NatureServe 2020). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, siphoning water to collect detritus, algae, and zooplankton from the water column (Fuller, 1974). Adults are relatively nonmotile but may passively move downstream during high flow events. Dispersal likely occurs via glochidia transportation on parasitized fish (NatureServe 2020). Primary factors contributing to the species decline are habitat degradation caused by excessive sedimentation, stream bed destabilization, and environmental contaminants. Due to the limited species distribution, the Round Ebonyshell is at a high risk of catastrophic events such as flood scour, contaminated spills, and activities associated with streambed destabilization (77 FR 61663).

### Southern Sandshell

The Southern Sandshell (*Hamiota australis*) was listed as threatened effective November 9, 2012 (77 FR 61663). Critical habitat was designated simultaneously (77 FR 61663).

The Southern Sandshell is an endemic species limited to the Escambia, Choctawhatchee, and Yellow River drainages that flow through Alabama and northwestern Florida. In Florida, the species has only been observed within the Choctawhatchee and Yellow River drainages. Southern Sandshell habitat includes areas with slow to moderate currents in small creeks and rivers, where the substrate is stable and consists of sand or a mix of sand and fine gravel (77 FR 61663). This mussel also relies on clear water to complete its life cycle, as it is one of the few mussels to produce a super conglutinate lure to attract a host fish (NatureServe 2020).

This Southern Sandshell is believed to be a long-term brooder with females remaining gravid from late summer/autumn to the following spring (77 FR 61663, Blalock-Herod et al. 2002). This species produces parasitic glochidia (NatureServe 2020). A host fish species has not been identified, although predatory centrarchids such as basses are believed to be a suitable host based on closely related mussel species (77 FR 61663). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, siphoning water to collect detritus, algae, and zooplankton from the water column (Fuller 1974).

Adults are relatively nonmotile but may passively move downstream during high flow events. Dispersal likely occurs via glochidia transportation on parasitized fish (NatureServe 2020). The primary factors contributing to the species' decline are habitat degradation caused by excessive sedimentation, stream bed destabilization, impoundment, and environmental contaminants (77 FR 61663, NatureServe 2020). In addition, habitat fragmentation is likely to limit the dispersal and reproductive capabilities of this species (Williams et al. 2008).

### Shinyrayed Pocketbook

The Shinyrayed Pocketbook (*Lampsilis subangulata*) was listed as endangered effective April 15, 1998 (63 FR 12664). Critical habitat was designated on November 15, 2007 (72 FR 64286).

The Shinyrayed Pocketbook is endemic to Alabama, Georgia, and Florida, where they are found in the Apalachicola-Chattahoochee-Flint and Ochlockonee river systems. In Florida, their distribution is limited to the Chipola and Ochlockonee rivers (FNAI 2001a). Shinyrayed Pocketbook habitat includes areas with slow to moderate currents in medium sized creeks to rivers, where the substrate consists of clean sand or silty sand (Williams and Butler 1994). Individuals are often found in areas where the current strength and sediment particle size are transitional, such as the interface of stream channel and sloping bank habitats (NatureServe 2020).

Gravid females have been observed from December through August and it is suggested that nearly an entire year of incubation is required for glochidia to reach full maturity. Glochidia are parasitic and released from late May to early July to attract a host. The primary host fish for this mussel are Spotted Bass (*Micropterus punctulatus*) and Largemouth Bass (*Micrjjopterus salmoides*) (O'Brien and Brim Box 1999). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, siphoning water to collect detritus, algae, and zooplankton from the water column (Fuller 1974). Adults are relatively non-motile and significant dispersal occurs via glochidia transportation on parasitized fish (NatureServe 2020). The primary factors contributing to their population decline are anthropogenic habitat degradation caused by sedimentation, channelization, impoundment, and environmental contaminants (USFWS 2003b).

### Gulf Moccasinshell

The Gulf Moccasinshell (*Medionidus penicillatus*) was listed as endangered effective April 15, 1998 (63 FR 12664). Critical habitat was designated on November 15, 2007 (72 FR 64286).

While the range of the Gulf Moccasinshell has been debated due to lack of strong populations and presence at sample sites, it is generally considered to be restricted to the Apalachicola-Chattahoochee- Flint river system and Ecofina Creek in Alabama, Georgia, and Florida (USFWS 2003b). In Florida, populations of this species are found in the Chipola River, Ecofina Creek, and potentially the Choctawhatchee, Yellow, and Apalachicola Rivers (may be extirpated; FNAI 2001a). Gulf Moccasinshell habitat includes areas with a slow to moderate current in medium-sized creeks to large rivers where the substrate consists of sand and gravel or silty sand (Williams and Butler 1994).

Gravid females have been observed in March, April, September, and November. Due to the timing of these gravid female observations, it is suggested that this species is an overwintering mussel and releases glochidia in the summer. Glochidia are parasitic and the primary fish host includes Brown Darter (*Etheostoma edwini*) and Blackbanded Darter (*Percina nigrofasciata*) (O'Brien and Williams 2002). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, likely siphoning water to collect detritus, algae, and



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zooplankton from the water column for food (Fuller 1974).

Adults are relatively nonmotile and typically only voluntarily move to burrow deeper into the sediment or travel passively downstream during high flow events. Dispersal occurs through glochidia transportation through infected fish movement (NatureServe 2020). The primary threats to the species include habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining, and environmental contaminants altering the water quality (USFWS 2003b).

### Ochlockonee Moccasinshell

The Ochlockonee Moccasinshell (*Medionidus simpsonianus*) was listed as endangered effective April 15, 1998 (63 FR 12664). Critical habitat was designated on November 15, 2007 (72 FR 64286).

The Ochlockonee Moccasinshell is an endemic species. Its range is restricted to one river system, Ochlockonee River, in Florida and Georgia (FNAI 2001a). Most observations of this rare mussel have been from large creeks where there is current. The species seems to prefer substrates that are primarily sand with some gravel (William and Butler 1994).

Due to the rarity of the species, specific life history is not well understood but is assumed to be similar to related species. It likely overwinters glochidia and releases in summer, using darters as host fish (USFWS 2003b). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, likely siphoning water to collect detritus, algae, and zooplankton for food (Fuller 1974). Adults are relatively non-motile and only move to burrow deeper into the sediment or travel passively downstream during high flow events. Dispersal occurs via glochidia transportation of parasitized fish (NatureServe 2020). The primary factors contributing to the species' decline is habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining and environmental contaminants altering water quality (USFWS 2003b).

### Suwannee Moccasinshell

The Suwannee Moccasinshell (*Medionidus walkeri*) was listed as threatened effective November 7, 2016 (81 FR 69417). Critical habitat was proposed on November 27, 2019 and is awaiting public comment and a final rule (84 FR 65325).

The Suwannee Moccasinshell is a rare freshwater mussel that lives in the mud, muddy sand, sand, and gravel of larger streams with moderate flows. The species generally occurs in proximity to large woody debris (80 FR 60335, CBD 2010a, NatureServe 2020). Its range is limited to a single river system in Florida and Georgia: the Suwannee River system. There are less than five populations within this range (CBD 2010a).

Adults are detritivores and the glochidia (larvae) are parasitic; main host species include the Blackbanded Darter (*Percina nigrofasciata*) and the Brown Darter (*Etheostoma edwini*) (84 FR 65325, NatureServe 2020). The following five criteria are required to support Suwannee Moccasinshell: stable stream, stable substrates, natural flow regimes, suitable water quality conditions, and presence of host fish species (84 FR 65325). The species has undergone extreme declines (70-90 percent), and it is now only known from the main channel of the Suwannee River and the lower Santa Fe River in Florida (CBD 2010a, 80 FR 60335). Population declines are the result of chemical pollution (e.g., industrial pulp mill in the Withlacoochee watershed), sedimentation from logging and agriculture, development, pollution from mining and agriculture, invasive species (Asiatic Clam (*Corbicula fluminea*)), stream channel instability, water extraction, and eutrophication (CBD 2010a, 81 FR 69417). Additionally, the species has been overharvested by shell collectors (CBD 2010a).

### Stock Island Tree Snail

The Stock Island Tree Snail (*Orthalicus reses = O. s. reses*, [not incl. *nesodryas*]) was listed as threatened effective August 2, 1978 (43 FR 28932). Critical habitat has not been designated (USFWS 2020a). The Service



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announced the initiation of the latest five-year review on the species in 2018 (83 FR 38320). The Stock Island Tree Snail is also listed by the Florida Fish and Wildlife Conservation Commission as Endangered (USFWS 2009d).

The Stock Island Tree Snail is an arboreal snail endemic to tropical hammock hardwood trees (USFWS 2009d, NatureServe 2019). Its historical range included many of the western Florida Key islands, including Key West, the lower Keys, and Key Vaca. Its range was limited to Stock Island at the time of listing (43 FR 28932). As of 2006, the current range encompasses 25 known sites within the Florida Keys and two sites on the Florida mainland in Monroe and Miami-Dade counties (USFWS 2009d). The species feeds on lichens, fungi, and algae in the trees they live on (NatureServe 2020).

The Stock Island Tree Snail underwent a significant range reduction as a result of urbanization (43 FR 28932). Relocation efforts by hobbyists have spread Stock Island Tree Snails to areas beyond their historical range, particularly to Key Largo (USFWS 2009d). Current threats to the species include habitat degradation and loss. Additionally, poaching, hurricanes, and droughts are significant threats (NatureServe 2020).

### Oval Pigtoe

The Oval Pigtoe (*Pleurobema pyriforme*) waslisted as endangered effective April 15, 1998 (63 FR 12664). Critical habitat was designated on November 15, 2007 (72 FR 64286).

The Oval Pigtoe is endemic to Georgia, Alabama, and Florida. Their center of distribution is generally limited to the Apalachicola-Chattahoochee-Flint and Ochlockonee river basins (63 FR 12664). In Florida, the species is found in the Apalachicola, Chipola, Suwanee, and Ochlockonee river systems, as well as Ecofina creek (63 FR 12664, NatureServe 2020). Oval Pigtoe habitat includes areas with slow to moderate current in medium-sized creeks to small rivers, where the substrate is silty sand to sand and gravel (Williams and Butler 1994).

Adults are relatively nonmotile and typically only move to burrow deeper into the sediment. Dispersal occurs via glochidia transportation on parasitized fish. Individuals observed in the Apalachicola- Chattahoochee-Flint basin were gravid between March through July, indicating that fertilization may take place in late winter to early spring and that the species is a summer releasing mussel (NatureServe 2020). Glochidia transformation has occurred on the gills of Sailfin Shiner (*Pteronotropis hypselopterus*), Eastern Mosquitofish (*Gambusia holbrooki*), and Guppy (*Poecilia reticulata*) (NatureServe 2020, O'Brien and Williams 2002). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, likely siphoning water to collect detritus, algae, and zooplankton from the water column for food (Fuller 1974). The primary factors contributing to species decline are habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining, and environmental contaminants (68 FR 42419).

### Fuzzy Pigtoe

The Fuzzy Pigtoe (*Pleurobema strodeanum*) was listed as threatened effective November 9, 2012 (77 FR 61663). Critical habitat was designated simultaneously (77 FR 61663).

The Fuzzy Pigtoe is an endemic species with its presence limited to three river systems that drain through northwestern Florida: the Escambia, Choctawhatchee, and Yellow River. The species is exceedingly rare within the Yellow River, with only a single documented observation in 2010 (77 FR 61663). Fuzzy Pigtoe habitat includes areas with moderate flow in medium-sized creek and rivers where the substrate is sand to silty sand (Williams and Butler 1994, Williams et al. 2000).

The mussel is a short-term brooder, with gravid females observed from mid-March to May. Their glochidia are parasitic, a common reproductive strategy shared among most freshwater mussels. Host species include the Blacktail Shiner (*Cyprinella venusta*) (White et al. 2008). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, likely siphoning water to collect detritus, algae, and zooplankton from the water column for food (Fuller 1974). Adults are relatively nonmotile and typically only move to burrow deeper

into the sediment. Dispersal occurs via glochidia transportation through infected fish movement (NatureServe 2020). The primary factors contributing to population declines are habitat degradation caused by excessive sedimentation, stream bed destabilization, and environmental contaminants altering the water quality (77 FR 61663).

### Southern Kidneyshell

The Southern Kidneyshell (*Ptychobranchus jonesi*) was listed as endangered effective November 9, 2012 (77 FR 61663). Critical habitat was designated simultaneously (77 FR 61663).

The distribution of the Southern Kidneyshell is limited to the Escambia, Choctawhatchee, and Yellow River drainages that flow through Alabama and northwestern Florida. In Florida, recent occurrences of the Southern Kidneyshell have only been observed within the Choctawhatchee River drainage. Their habitat requirements are not fully understood; however, individuals are typically observed in areas with slow to moderate currents in medium creeks to small rivers, where the substrate consists of firm sand (77 FR 61663). Additionally, recent surveys conducted in the Choctawhatchee basin found their preferred habitat to be stable substrates near bedrock outcroppings (Gangloff and Hartfield 2009).

Little is known about the specific life history of this mussel although, based on closely related species, they are thought to be long-term brooders (Mirarchi et al. 2004, NatureServe 2020). Females are gravid from autumn through spring/summer of the following year. Their glochidia are believed to be parasitic. A host fish species has not been identified, although darters are believed to be a suitable host based on closely related mussel species (77 FR 61663). Adults are characterized as filter feeders, positioning themselves on or near the substrate surface, siphoning water to collect detritus, algae, and zooplankton from the water column (Fuller, 1974). Adults are relatively nonmotile, but may passively move downstream during high flow events. Dispersal likely occurs via glochidia transportation on parasitized fish (NatureServe 2020). Primary factors contributing to their population decline are habitat degradation caused by excessive sedimentation, stream bed destabilization, impoundment, and environmental contaminants (77 FR 61663, NatureServe 2020). In addition, habitat fragmentation and host fish disappearance will likely limit the dispersal and reproductive capabilities of this species (NatureServe 2020). Due to the limited species distribution, the Southern Kidneyshell is vulnerable to stochastic environmental and human-caused events (CBD 2010a).

### Choctaw Bean

The Choctaw Bean (*Villosa choctawensis*, formerly *Obovaria choctawensis*) was listed as endangered effective November 9, 2012 (77 FR 61663). Critical habitat has been designated and encompasses habitat in the following Florida counties: Bay, Escambia, Holmes, Jackson, Okaloosa, Santa Rosa, Walton, and Washington (as well as other rivers in Alabama not described here) (76 FR 61482). In 2019, the USFWS announced the initiation of the latest five-year review of the species (84 FR 14669).

The Choctaw Bean is one of eight listed freshwater mussel species that are endemic to the East Gulf Coastal Plain Physiographic Region. Its range includes the Escambia, Yellow, and Choctawhatchee rivers systems in Florida and Alabama. It lives in silty sand and sandy clay substrates in medium-sized creeks and rivers with moderate currents. Adults are detritivores and the glochidia (larvae) are parasitic, though specificity of fish hosts is not known (76 FR 61482). Despite still occurring across much of its historical range, population numbers are low and declining, and the Choctaw bean can no longer be found from many historical sites. Its populations within the Escambia River drainage have become fragmented (76 FR 61482). The primary threat to this species is habitat loss and degradation (NatureServe 2020).

## CRUSTACEANS

### Cypress Crayfish

The Cypress Crayfish (*Cambarellus blacki*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Cypress Crayfish is listed by several other entities, including Endangered by the IUCN, Endangered by the American Fisheries Society, and as Critically Imperiled by NatureServe (CBD 2010a).

The Cypress Crayfish is a rare freshwater crayfish that inhabits cypress ponds. It is usually found within submergent and emergent vegetation (CBD 2010a, NatureServe 2019). The species range is limited to one locality in Escambia County, Florida (CBD 2010a). Further surveys are needed to locate potential nearby populations (NatureServe 2019). Its limited range and number of populations make the species vulnerable. The major threat facing Cypress Crayfish is expansion of a nearby oil production facility (CBD 2010a).

### Florida Cave Amphipod

The Florida Cave Amphipod (*Crangonyx grandimanus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). Despite the Service announcing the species review of Florida Cave Amphipod in 1984 (49 FR 21664), 1989 (54 FR 554), 1991 (56 FR 58804), and 1994 (59 FR 58982), it has yet to be listed and remains under review at this time (USFWS 2020a). The Florida Cave Amphipod is listed by several other entities, including Imperiled by NatureServe, as Vulnerable by the IUCN, and as a Species of Greatest Conservation Need in Florida (CBD 2010a, NatureServe 2020).

The Florida Cave Amphipod is a stygobitic amphipod which inhabits caves, wells, and karst springs. Its range spans 12 counties (Alachua, Citrus, Dade, Gilchrist, Hernando, Leon, Levy, Madison, Marion, Pasco, Suwanne, and Wakulla) in Florida, with the Ochlockonee River serving as its western boundary. Despite this seemingly large range, the species is uncommon and population numbers are low. The species is likely threatened by changes in detrital flows and depletion of aquifers (CBD 2010a).

### Hobb's Cave Amphipod

The Hobb's Cave Amphipod (*Crangonyx hobbsi*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835 59862). Listing was first deemed warranted but precluded in 1984 (49 FR 2485). Despite the Service announcing the species review of Florida Cave Amphipod in 1984 (49 FR 21664), 1989 (54 FR 554), 1991 (56 FR 58804), and 1994 (59 FR 58982), the species remains under review at this time (USFWS 2020a). The Hobb's Cave Amphipod is listed by several other entities, including Critically Imperiled by NatureServe and as Vulnerable by the IUCN (CBD 2010a).

The Hobb's Cave Amphipod is a troglobitic freshwater amphipod that inhabits subterranean caves and wells (NatureServe 2020). It is often associated with limestone and detritus, and found near cave entrances. Its range spans 13 counties (Alachua, Citrus, Columbia, Dade, Gilchrist, Hernando, Leon, Levy, Madison, Marion, Pasco, Suwannee, and Wakulla) in Florida, primarily in the northern portion of the peninsula as well as the Panhandle. It is likely threatened by changes in detrital flows and depletion of aquifers (CBD 2010a).

#### Squirrel Chimney Cave Shrimp

The Squirrel Chimney Cave Shrimp (*Palaemonetes cummingi*) was listed as threatened effective June 23, 1990 (55 FR 25588). Critical habitat has not been designated (USFWS 2020). A petition to delist the species was put forth by the Florida Game and Freshwater Fish Commission in 1997. However, the USFWS found that the petition did not present substantial scientific or commercial information indicating that delisting this species due to extinction may be warranted (63 FR 67618).

The Squirrel Chimney Cave Shrimp was discovered in 1953 and is only known from the Squirrel Chimney, a small sinkhole that connects to a flooded cave system near Gainesville, Alachua County, Florida. Due to a lack of evidence of cave shrimp from other surveyed caves, it is believed that the Squirrel Chimney Cave Shrimp is the



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only cave shrimp in Florida (USFWS 2016b, 2018g). Habitat for this species includes groundwater within a flooded limestone cave (FNAI 2001a). The water temperature in Squirrel Chimney is approximately 20°C throughout the year. Other than an apparent drop in water levels between the 1970 surveys and 1990 surveys, there were no indications of any significant change in the physical environment at Squirrel Chimney; both water level and water quality have remained the same since 1992 (USFWS 2016b).Threats to the species include expanded development associated with the growth of Gainesville, Florida, which may alter land uses and groundwater in the vicinity of Squirrel Chimney (USFWS 2016b, 2018g). Stormwater runoff, septic tank drainage fields, aquifer recharge, herbicide/fertilizer use, and erosion/sediment deposition are some of the primary factors impacting groundwater quality. A small fish, the Redeye Chub (*Notropis harperi*), was detected in Squirrel Chimney during 1994 to 1996 surveys. This species is believed to prey on Squirrel Chimney Cave Shrimp; therefore, predation may also constitute a threat to the species (USFWS 2016b).

### Orlando Cave Crayfish

The Orlando Cave Crayfish (*Procambarus acherontis*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). Listing was first deemed warranted but precluded in 1984 by the USFWS (Service) (49 FR 2485). Despite the Service announcing review of the species in 1984 (49 FR 21664), 1989 (54 FR 554), 1991 (56 FR 58804), and 1994 (59 FR 58982), the species remains under review at this time (USFWS 2020a). The Orlando Cave Crayfish is listed by several other entities, including Endangered by the IUCN, Endangered by the American Fisheries Society, Critically Imperiled by NatureServe, as Rare by the Florida Committee on Rare and Endangered Plants and Animals, and as a Species of Greatest Conservation Need by the state of Florida (CBD 2010a, NatureServe 2020).

The Orlando Cave Crayfish is a troglobitic freshwater crayfish that inhabits aquifers. It is associated with karst and the entrances of springs, sinkholes, and underground water features. Its range is limited to the central Florida Peninsula (Seminole and Orange counties). All of the four remaining populations are within the vicinity of Orlando. The species type locality was destroyed when the well they lived in collapsed. The major threat facing Orlando Cave Crayfish is expanding human populations and development (CBD 2010a).

### Coastal Flatwoods Crayfish

The Coastal Flatwoods Crayfish (*Procambarus apalachicolae*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). In the state of Florida, the species is listed as Imperiled (NatureServe 2020). It is listed as endangered on the IUCN Red List (Crandall 2010).

The species occurs in the Apalachicola coastal flatwoods of northwest Florida in Bay and Gulf Counties. Coastal Flatwoods Crayfish inhabit still waters when water levels are high and burrow when waters recede (USFWS 2014c). The species is usually found in detritus accumulations on the bottom of pools caused by root mats and logs, interspersed between areas of turbulence (Franz and Franz 1979). Coastal Flatwoods Crayfish are susceptible to pollution, changes in water temperature, siltation, and other changes in water quality.

### Silver Glen Springs Crayfish

The Silver Glen Springs Crayfish (*Procambarus attiguus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). In the state of Florida, the species is listed as Critically Imperiled (NatureServe 2020). It is listed as Critically Endangered on the IUCN Red List (USFWS 2020a).

This species has been documented from only one cave system in Ocala Natural Forest, Silver Glen Springs, Marion County, Florida. The species is potentially threatened by water pollution and disturbance from tourists (snorkelers and scuba divers, as the cave is a popular recreation area). This species may have late reproductive maturity and a long life span, which make it particularly susceptible to loss of individuals. As a cave species, Silver



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Glen Springs Crayfish are likely sensitive to changes in habitat, especially water quality (NatureServe 2020).

### Bigcheek Cave Crayfish

The Bigcheek Cave Crayfish (*Procambarus delicates*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The Service may drop the species from further review because it could already be extinct (this is not confirmed as its population has likely always been very small and difficult to detect due its deep-cave habitat) (CBD 2018, NatureServe 2019). The Bigcheek Cave Crayfish is listed by several other entities, including Critically Endangered by the IUCN, Endangered by the American Fisheries Society, and Critically Imperiled by NatureServe (Crandall and Cordeiro 2010, CBD 2018, NatureServe 2020). The species has not been seen in decades, with the last sighting dating 1976 or 1985 (CBD 2018, NatureServe 2020).

The Bigcheek Cave Crayfish is a troglobitic freshwater crayfish that inhabits subterranean caves (BD 2018, NatureServe 2020). This species has extremely specific habitat requirements and they are limited to only one cave system at Alexander Springs within the Ocala National Forest, Lake County, Florida (Crandall and Cordeiro 2010, CBD 2018, NatureServe 2020). Their population is threatened by disturbance and habitat degradation from recreational use, as these cave systems are located within National Forest property readily accessible to the general public (CBD 2018, NatureServe 2020).

### Panama City Crayfish

The Panama City Crayfish (*Procambarus econfinae*) was proposed as Threatened on January 3, 2018 (83 FR 330). A formal listing decision has not been made as of January 2020 (USFWS 2020a).

This species occupies shallow, often ephemeral, vegetated, freshwater systems in pine flatwoods or wet prairie/marsh habitats of Bay County, Florida. After the majority of its habitat was converted to slash pine plantations or residential/commercial development, the species has been relegated to grassy ditches or swales of slash pine plantations, utility rights-of-way, and other relic wetland habitats protected on easements (83 FR 330, USFWS 2017a). These crayfish require specific types of substrate that allow them to burrow down to the water table, where they can remain hydrated to survive dry seasons or droughts. If soils are too sandy or do not hold water long enough, sustained colonization of this species is not supported. This species occupies the surface water primarily when it is present, and utilizes its burrows when surface water recedes (USFWS 2017a). Threats to this species include habitat loss, degradation, and fragmentation; development; hydrologic alterations; silviculture practices; and collection for fish bait (83 FR 330).

### Santa Fe Cave Crayfish

The Santa Fe Cave Crayfish (*Procambarus erythrops*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Santa Fe Cave Crayfish is listed by several other entities, including Endangered by the IUCN and the American Fisheries Society (CBD 2010a).

The Santa Fe Cave Crayfish is a troglobitic freshwater crayfish that inhabits subterranean pools (CBD 2010a, NatureServe 2020). Its range is limited to five locations within southern Suwannee County, Florida (CBD 2010a). These may make up five populations or only one as they may be interconnected through passageways in the aquifer (NatureServe 2020). It lives within detritus at the entrances of subterranean caves and sinkholes. The Santa Fe Cave Crayfish requires waters with low flows so that detritus is able to build up. It is particularly long-lived, with documented recaptures of crayfish at least 16 years old. The species is threatened by hydrological changes, particularly pollution (there is a garbage dump at one of their known localities) and saltwater intrusion (CBD 2010a).

### Orange Lake Cave Crayfish

The Orange Lake Cave Crayfish (*Procambarus franzi*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Orange Lake Cave Crayfish is listed by several other entities, including Critically Imperiled by NatureServe, Endangered by the IUCN, Endangered by the American Fisheries Society, and as a Species of Greatest Conservation Need in Florida (CBD 2010a).

The Orange Lake Cave Crayfish is a troglobitic freshwater crayfish that inhabits subterranean caves (CBD 2010a, NatureServe 2020). It is associated with bat colonies and the detrital input provided. Its range is limited to Marion County, Florida, where it is known from three cave locations near Orange Lake. These three locations may represent a single population, as sites are part of the same chamber and likely interconnected. The species is particularly vulnerable because of its limited range and small numbers. The species may be sensitive to impacts to water quality from nearby quarrying (CBD 2010a).

### Coastal Lowland Cave Crayfish

The Coastal Lowland Cave Crayfish (*Procambarus leitheuseri*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Coastal Lowland Cave Crayfish is listed by several other entities, including Vulnerable by the IUCN, Endangered by the American Fisheries Society, Critically Imperiled by NatureServe, as Rare by the Florida Committee on Rare and Endangered Plants, and as a Species of Greatest Conservation Need by the state of Florida (CBD 2010a).

The Coastal Lowland Cave Crayfish is a troglobitic freshwater crayfish that inhabits deep, subterranean, karst cave systems (CBD 2010a, NatureServe 2020). Most areas of occurrence are tidally influenced and associated with silt. Specimens have been documented at depths of over 60 meters. The species' range is limited to Pasco and Hernando counties, Florida. There are only eight known localities which may represent fewer populations, as five of these are within five kilometers of each other. Populations are threatened by changes in water quality such as increased saltwater intrusion resulting from extraction of groundwater for human consumption. The species is additionally threatened by rapid urbanization in this part of Florida (CBD 2010a).

### Florida Cave Crayfish

The Florida Cave Crayfish (*Procambarus lucifugus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted for both the species and its two subspecies, Withlacoochee Light-fleeing Cave Crayfish (*P. l. lucifugus*) and Vampire Crayfish (*P. l. alachua*) (76 FR 59835). All three remain under review at this time (USFWS 2020a). The Florida Cave Crayfish is listed by several other entities, including Least Concern by the IUCN, Endangered and Threatened by the American Fisheries Society, and Imperiled by NatureServe (NatureServe 2020).

The Florida Cave Crayfish is a troglobitic freshwater crayfish that inhabits karstic subterranean caves and sinkholes (CBD 2010a, NatureServe 2020). Its range spans Florida counties from Citrus and Hernando north to Marion. It feeds primarily on bat guano, as well as invertebrates, and is associated with bat roosting caves. Populations are threatened directly by water quality degradation and indirectly by threats facing bat populations (CBD 2010a).

### Miami Cave Crayfish

The Miami Cave Crayfish (*Procambarus milleri*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Miami Cave Crayfish is listed by several other entities, including Critically Imperiled by NatureServe, Endangered by the IUCN, Endangered by the American Fisheries Society, and as a Species of Greatest Conservation Need in Florida (CBD 2010a).

The Miami Cave Crayfish is a rare troglobitic freshwater crayfish that inhabits wells (CBD, NatureServe 2020). The species is likely recently adapted (from an evolutionary standpoint) to subterranean living based on a lack of blindness that typify troglobitic creatures. Until recently, the species range was known only from a single population in Miami, Florida, from a well on a nursery and garden store property (CBD 2010a). It has since been found at over a dozen sites and those sites may be interconnected, including populations within the nearby Everglades (NatureServe 2020). As the species has an extremely limited range and population size within a metropolitan area, with continually increasing human pressures on aquifers, this species is especially vulnerable to extinction (CBD 2010a).

### Putnam County Cave Crayfish

The Putnam County Cave Crayfish (*Procambarus morrisi*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Putnam County Cave Crayfish is listed by several other entities, including Imperiled by NatureServe, Critically Endangered by the IUCN, Endangered by the American Fisheries Society, and as a Species of Greatest Conservation Need by the state of Florida (CBD 2010a).

The Putnam County Cave Crayfish is a troglobitic freshwater crayfish that inhabits subterranean sinkholes (CBD 2010a, NatureServe 2020). As their name implies, this species has extremely specific habitat requirements and they are limited to a single cave called Devil's Sink in Putnam County, Florida. This single population is particularly vulnerable to threats posed by water quality degradation as a result of heavy recreational use, pollution (including direct dumping), and groundwater depletion for human consumption (CBD 2010a). The population is at imminent risk of extinction if the entrance to the sinkhole is sealed by human-caused erosion (CBD 2010a).

### Pallid Cave Crayfish

The Pallid Cave Crayfish (*Procambarus pallidus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Pallid Cave Crayfish is listed by several other entities, including Imperiled by NatureServe, Vulnerable by the AFS, and as a Species of Greatest Conservation Need by the state of Florida (CBD 2010a).

The Pallid Cave Crayfish is a freshwater crayfish that inhabits caves (CBD 2010a, NatureServe 2020). It is associated with areas of high flows and karst. Its range is limited to Florida, with records from Alachua, Columbia, Gilchrist, Hamilton, Lafayette, Levy, Madison, and Suwannee counties.

Populations are threatened by pollution (because of their likely sensitivity to chemicals) and by disturbance from recreational diving. A large kill of Pallid Cave Crayfish in the upper Suwannee River was suspected to have been the result of a pollution event (CBD 2010a).

### Black Creek Crayfish

The Black Creek Crayfish, also known as the Spotted Royal Crayfish, (*Procambarus pictus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Black Creek Crayfish is listed by several other entities, including as a Species of Special Concern in the state of Florida and as as Near Threatened by the IUCN (CBD 2010a).

The species occurs in a geographically small area of northeastern Florida – Clay, Putnam, and Duval counties (FNAI 2001a). Black Creek Crayfish inhabit small, relatively swift, sand-bottomed, tannic-stained streams, often emanating from sandhills and flowing through or from swampy terrain. Black Creek Crayfish are usually found in detritus accumulations on the bottom of pools caused by root mats and logs, interspersed between areas of turbulence (Franz and Franz 1979). They are restricted to a few small stream systems. Most known localities are



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within the Black and Rice creek drainages. Black Creek Crayfish are susceptible to pollution, changes in water temperature, siltation, and other changes in water quality. Protection of inhabited headwater and secondary streams, especially within the Black and Rice creek drainages, is therefore critical to the species' survival (NatureServe 2020).

### Spider Cave Crayfish

The Spider Cave Crayfish (*Troglocambarus maclanei)* was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Spider Cave Crayfish is listed by several other entities, including as Imperiled by NatureServe, as Vulnerable by the AFS, and as a Species of Greatest Conservation Need by the state of Florida (CBD 2010a).

The Spider Cave Crayfish is a troglobitic freshwater crayfish that inhabits subterranean caves and sinkholes near areas with fresh detrital input, such as bat caves (CBD 2010a, NatureServe 2020). Its range spans 16 localities from Suwannee County to Hernando County, along an approximate 130 kilometers area in Florida. It is often associated with karst and fine silt. The Spider Cave Crayfish is frequently seen hanging upside down from cave ceilings. It is likely an aquatic predator of smaller invertebrates. Major threats to the species include anthropogenic impacts on water quality and reduced detritus flows (CBD 2010a). Three of the species' known localities are popular sites for recreational diving and face acute degradation (NatureServe 2020).

## INSECTS

### Logan's Agarodes Caddisfly

Logan's Agarodes Caddisfly (*Agarodes logani*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

The species has a very small range and has only been observed from one stream in Gadsden County, Florida (NatureServe 2020). The stream is spring-fed and runs through a deep ravine on the Florida Agriculture and Mechanical University Farm (CBD 2010a). As the population is restricted to such a small area and adjacent to an active farm, the species is at risk from farming practices, which may result in pollution, siltation, or habitat degradation (NatureServe 2020).

### Florida Leafwing Butterfly

The Florida Leafwing Butterfly (*Anaea troglodyta floridalis*) was listed as endangered effective September 11, 2014 (79 FR 47221). Critical habitat has been designated and includes areas of pine rockland habitat (79 FR 47179).

The historical range of the Florida Leafwing Butterfly spanned south Florida, including Miami-Dade, Monroe, Collier, Martin Palm Beach, and Broward counties (78 FR 49878). This may be the most imperiled butterfly subspecies given that it has experienced drastic declines and is now extirpated from nearly 96 percent of its historical range. No individuals have been detected since 2006 (78 FR 49878, NatureServe 2020) and the only population within Everglades National Park is known to be extant. The species has only one host plant, the pineland croton (*Croton linearis*), upon which larvae develop and feed (78 FR 49878). The species is highly restricted to pine rockland habitats which support its host plant. Adult diets are varied and include rotting fruit, dung, and nectar (NatureServe 2020). Both adults and larvae (instars) use cryptic mimicry to blend in with its host plant. Florida Leafwings are non-migratory butterflies with a multivoltine life history (multiple generations each year) (78 FR 49878). This species may be at imminent risk of extinction as the pine rockland habitats on which it depends are very limited and continue to be destroyed by development and tropical storm events (NatureServe 2020).

### Frosted Elfin

The Frosted Elfin (*Callophrys irus*) is proactively being assessed for listing by USFWS and a listing determination is expected by September 30, 2023. An interim Species Status Assessment was completed in 2018 (USFWS 2018h). The species remains under review at this time (USFWS 2020a).

The current range of Frosted Elfin spans 25 states in the eastern US. The three described subspecies of Frosted Elfin (*Callophrys irus irus*, *C. i. hadros*, and *C. i. arsace*) occupy separate distributions. *C. i. irus* has the largest range, spanning interior areas from Florida to New York, and east through Ohio, Michigan, and Wisconsin. Frosted Elfins are small non-migratory butterflies with a univoltine lifespan (a single adult flight period) (USFWS 2018h). They are reliant on pine barren habitat which supports their host plants, blue lupine (*Lupinus* spp.) and wild indigo (*Baptisia* spp.; USFWS 2019o). They also need various nectar plants nearby in addition to their host plants (USFWS 2018h).

There are records from 20 counties in Florida (Thom 2013). The species has been extirpated from large portions of their historical range (USFWS 2018h, USFWS 2019p). The major causes of population decline are habitat loss caused by development, invasive species, succession, and incompatible vegetation management, as well as the limiting factor of small population sizes (USFWS 2018h, USFWS 2019o).

### Miami Tiger Beetle

The Miami Tiger Beetle (*Cicindelidia floridana*) was listed as endangered effective November 4, 2016 (81 FR 68985). Critical habitat has not been designated (USFWS 2020a).

This species was rediscovered in 2007 after not being seen since 1934 (and believed to be extinct). This species was first discovered in the Northern Biscayne Pinelands region, around Miami and North Miami Cities in Miami-Dade County, Florida. The region was known for its large, quartz sand areas within rare pine rockland habitat. The 2007 rediscovery of this species was made in the Richmond Heights area of south Miami, known as Richmond Pine Rocklands on Miami Rock Ridge. Limited studies on this species' microhabitat preferences suggest that it prefers open, bare, white to gray sandy areas of two to six square meters with less than five percent organic matter. There were only two known extant populations of this beetle at the time of listing (80 FR 79533).

This species is a day-active predator that moves quickly to seize other small arthropods, such as ants. The larvae of this species are grub-like with large mandibles. Larvae occupy a permanent ground burrow that is flush with the soil surface. The larvae anchor themselves in the burrow and ambush small arthropods when they come close. Efforts in the 1970s to relocate the species found that the type locality had been destroyed and developed. Threats to this species include habitat loss, degradation, and fragmentation; development; non-native species encroachment; and specimen collection by enthusiasts (80 FR 79533).

### Nickerbean Blue Butterfly

The Nickerbean Blue Butterfly (*Cyclargus ammon*) was listed as threatened effective April 6, 2012, due to similarity of appearance to the Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) (77 FR 20948).
Critical habitat has not been designated (USFWS 2020a).

The range of the Nickerbean Blue Butterfly includes the Bahamas and Cuba, where it is native, as well as Big Pine Key in Florida, where it has colonized. It occupies tropical hardwood hammock forests, especially in forest openings and edges. Larvae develop and feed on Nickerbean (*Cesalpinia bahamensis*). Adults feed on a variety of nectar plants, including Croton (*Codiaeum variegatum*). Although listed because of similar appearance, this species seems to be stable as evidenced by range expansion and stable populations on Big Pine Key where other butterfly species are declining (NatureServe 2020).

### Miami Blue Butterfly

The Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) was listed as endangered on effective April 6, 2012.

Critical habitat has not been designated (USFWS 2020a).

The Miami Blue Butterfly is a Florida endemic that occurs in open, sunny areas of coastal hardwood hammocks, dunes, and scrub habitat in the Florida Keys (Bahia Honda State Park and Key West National Wildlife Refuge; although the Bahia Honda population may now be extirpated). Research indicates that the species is non-migratory/sedentary, but additional studies are needed to confirm this information (77 FR 20948, CBD 2011b). The species is present year-round, with multiple overlapping generations (eight to 10 generations per year). Individuals are believed to be in diapause from December through April. Adult Miami Blue Butterflies only live around nine days in the wild (77 FR 20948, CBD 2011b). Generation time from egg to adults is roughly 30 to 40 days (77 FR 20948). The species lays eggs on the following host plants: blackbead (*Pithecellobium* spp.), nickerbean (*Caesalpinia* spp.), balloonvine (*Cardiospermum* spp.) and acacia (*Acacia* spp). The Miami Blue Butterfly has a symbiotic relationship with several ant species (commonly *Camponotus floridanus*), which tend the butterfly pupae/instars on host plants and feed on liquid from their nectary organ (77 FR 20948). The butterflies feed on nectar from plants in the Boraginaceae, Asteraceae, Fabaceae, Polygonaceae, and Verbenaceae families (77 FR 20948).

The range of the species has contracted significantly (originally found from Tampa Bay to the Keys). The species was believed to be extirpated in the early 1990s, until a small population was rediscovered in 1999 on Bahia Honda Key. Reintroduction efforts of the species have largely been unsuccessful (77 FR 20948). The Miami Blue Butterfly population size is estimated to be in the low hundreds. Current threats to the species include habitat loss and fragmentation, illegal collection, pesticides, impacts to host plants from introduced iguanas, loss of genetic diversity, and stochastic environmental events (natural or human- caused) (CDB 2011, USFWS 2012c).

### Monarch Butterfly

The Monarch Butterfly (*Danaus plexippus plexippus*) was petitioned for listing on August 26, 2014 (CBD et al. 2014), and the 90-day finding determined that listing may be warranted (79 FR 78775). The listing decision has been delayed from June 2019 to December 2020 (Monarch Joint Venture 2019).

The subspecies, *D. p. plexippus*, is distributed across North America in the spring and summer months (Encyclopedia Britannica 2019). They rely on milkweed (*Asclepias* spp.) for larval development and various nectar plants for adult food (CBD et al. 2014). The Continental Divide splits their overwintering populations: those on the eastern side typically overwinter in Mexico, while those on the western side overwinter in California (Pelton et al. 2016). There are resident Monarch populations in southern Florida where growing seasons continue and climates remain temperate year-round (Williams 2015). Statewide, Florida Monarchs have experienced an 80 percent decline since 2005 (Marchese and Hoose 2018).

Monarch populations face many threats, but primary among these is the loss of their host plants (milkweed) as a result of intensive pesticide use, particularly glyphosate (CBD et al. 2014).

### Duke's Skipper Butterfly

The Duke's Skipper Butterfly (*Euphyes dukesi calhouni*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). This subspecies may become elevated to the level of a full species and, should that occur, the Center for Biological Diversity petitioned for either the subspecies or species to be listed (CBD 2010a). The subspecies is remains under review at this time (USFWS 2020a). The Duke's Skipper Butterfly is considered Imperiled by NatureServe (CBD 2010a).

This subspecies is known from at least seven and up to 12 counties in the northern Florida peninsula including: Brevard, Dixie, Duval, Hernando, Hillsborough (thought to be extirpated), Orange, Pasco, Pinellas, Polk, Seminole, Sumter, Taylor, and Volusia (NatureServe 2020). There are 17 known occurrences of this butterfly. This subspecies inhabits sedge patches within wetlands and swamps dominated by cypress (*Cupressus* spp.), gum (*Eucalyptus* spp.), red maple (*Acer rubrum)*, or mixed canopy (CBD 2010a). Larval foodplants are narrowfruit

horned beaksedge (*Rynchospora inundata*), millet beaksedge (*Rynchospora miliacea*), and an unidentified sedge (*Carex*) species. Adults visit flowers such as buttonbush (*Cephalanthus occidentalis*) and pickerel weed (*Pontederia cordata*) (NatureServe 2020). Threats to the species include conversion of wetland habitat to urbanization, development, and pesticides (CBD 2010a).

**Palatka Skipper Butterfly**

The Palatka Skipper Butterfly (*Euphyes pilatka klotsi*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Palatka Skipper Butterfly is listed by several other entities, including Critically Imperiled by NatureServe and as a Species of Greatest Conservation Need in Florida (CBD 2010a, NatureServe 2020).

The range of the Palatka Skipper Butterfly is limited to a few islands in the Florida Keys: Big Pine, Big Torch, Cudjoe, No Name, Sugarloaf, and Stock Island. They inhabit areas dominated by sawgrass near mangroves in tropical pinelands and sawgrass marshes (CBD 2010a). Larvae develop and feed on sawgrass leaves (NatureServe 2020). This species is rare, with only 10 adults detected during intensive surveys spanning two years. Major threats to the subspecies include habitat loss as a result of development and the use of insecticides (CBD 2010a).

### Westfall's Clubtail Dragonfly

The Westfall's Clubtail Dragonfly (*Gomphus westfalli*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Westfall's Clubtail Dragonfly is considered Critically Imperiled by Nature Serve (NatureServe 2020).

The Westfall's Clubtail Dragonfly is a small dragonfly which requires specialized habitat: sphagnum bog trickles and streams in areas that undergo periodic burning. Larvae develop in silt and adults forage in nearby forests. The species is limited to only four streams within or near Blackwater River State Forest in Santa Rosa County, Florida. The primary threats to their populations are "excessive clearcutting" and altered fire regimes. Their extremely limited range (only about 25 kilometers) makes their populations especially vulnerable (CBD 2010a).

### Ceraunus Blue Butterfly

The Ceraunus Blue Butterfly (*Hemiargus ceraunus antibubastus*) was emergency listed as threatened effective August 10, 2011, due to similarity of appearance to the Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) (76 FR 49408). Critical habitat has not been designated (USFWS 2020a).

The Ceraunus Blue is a neotropical butterfly that occurs in Arizona, California, Florida, Kansas, New Mexico, Nevada, and Texas (NatureServe 2020). In Florida, Ceraunus Blue Butterflies occur year-round and inhabit grasslands, parks, roadsides, and open woodlands. Host plants includes herbaceous legumes such as rosary pea (*Abrus precatorius*) (UF IFAS 2019). The population in Florida is considered Apparently Secure (NatureServe 2020).

### Schaus Swallowtail Butterfly

The Schaus Swallowtail Butterfly (*Heraclides aristodemus ponceanus*) was listed as threatened effective May 4, 1976 (41 FR 17736). Due to continued declines after listing, its status was reclassified to Endangered effective October 1, 1984 (49 FR 34501). Critical habitat has not been designated (USFWS 2020a).

The historical range of the Schaus Swallowtail Butterfly spanned Upper and Lower Matacumbe Keys and Lignumvitae Key north to areas surrounding Miami on the Florida mainland (USFWS 2008e). It is currently limited to Key Biscayne National Park (USFWS 2020a). Larvae develop and feed on torchwood (*Amyris elemifera*)

(NatureServe 2020). Adults are nectivores (NatureServe 2008). The adult flight period spans late April to June, and occasionally into late summer. Although the subspecies is non-migratory, they are known to fly between islands. Populations are threatened by habitat destruction and biocides (as a result of mosquito control) (NatureServe 2020). This species is especially vulnerable to extinction because of its isolated and small populations and limited range. Reintroduction efforts have been somewhat successful, resulting in reproduction. However, these efforts have not improved long-term population trends (USFWS 2008e).

### Gulf Coast Solitary Bee

The Gulf Coast Solitary Bee (*Hesperapis oraria*) was petitioned for listing on March 27, 2019 (CBD 2019b), and the 90-day finding determined that listing may be warranted (84 FR 69713). The species remains under review at this time (USFWS 2020a). The Gulf Coast Solitary Bee is considered Critically Imperiled by NatureServe (NatureServe 2020).

The Gulf Coast Solitary Bee is extremely rare and the only known member of its family in the eastern US (CBD 2019b). The historical range of the Gulf Coast Solitary Bee was limited to barrier islands and a narrow shoreline band (one to two km) along the Gulf Coast from eastern Mississippi to northeastern Florida (Kopec and Burd 2017, NatureServe 2020). Currently it is only found in Florida in state and national parks and is reduced to a mere six populations (CBD 2019b). The species has one obligate host plant: the Coastal Plain Honeycombhead (*Balduina angustifolia*). It relies solely on this plant for all its pollen and nectar. The Coastal Plain Honeycombhead is is reliant upon the Gulf Coast Solitary Bee to transfer its pollen and cannot reproduce without it (Kopec and Burd 2017). This plant only grows in sandy coastal dune habitats and the bee nests in these sandy soils (NatureServe 2020).

Given its extremely limited range and host specificity, this species is at imminent risk of extinction (Kopec and Burd 2017). Threats include habitat loss, degradation, and fragmentation as a result of development; pesticide use; competition with European honeybees; sea level rise and hurricanes (intensified by climate change); limited genetic diversity; and a lack of protection (Kopec and Burd 2017, CBD 2019b). The Gulf Coast Solitary Bee is considered a flagship species for habitat conservation and an indicator species of barrier island and Gulf Coast ecosystem health (CBD 2019b).

### Sykora's Hydroptila Caddisfly

Sykora's Hydroptila Caddisfly (*Hydroptila sykorai*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Sykora's Hydroptila Caddisfly is considered Critically Imperiled by NatureServe (CBD 2010a).

This species has a very small range and is only known from two spring-run streams in Gadsden County, Florida. Both localities are located 25 kilometers apart, with one stream flowing through the Florida Agriculture and Mechanical University Farm (NatureServe 2020, CBD 2010a). The species is at risk of nearby farming practices which may result in pollution, siltation, or habitat degradation (CBD 2010a).

### Morse's Little Plain Brown Sedge Caddisfly

Morse's Little Plain Brown Sedge Caddisfly (*Lepidostoma morsei*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Morse's Little Plain Brown Sedge Caddisfly is listed by several other entities, including as Critically Imperiled in Florida by NatureServe and Threatened by the Florida Committee on Rare and Endangered Plants and Animals (CBD 2010a).

This is an extremely rare species and its habitat is not well understood. This caddisfly occurs in flowing water habitats, typically soft blackwater streams, associated with decaying plant matter. Similar to other members of the



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Lepidostomatidae family, larvae are aquatic and produce protective tube-cases out of sand, vegetation, and other available materials. As caddisflies spend a large part of their life as aquatic larvae, this species is sensitive to siltation and pollution caused by practices such as unsustainable forestry and conversion of land to agricultural use (CBD 2010a). This species is endemic to the southeastern US in very limited locations within its range. In Florida, it is only known from Little Alaqua Creek in Walton County (NatureServe 2020).

### Cassius Blue Butterfly

The Cassius Blue Butterfly (*Leptotes cassius theonus*) was emergency listed as threatened effective August 10, 2011, due to similarity of appearance to the Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) (76 FR 49408). Critical habitat has not been designated (USFWS 2020a).

The Cassius Blue Butterfly occurs in Florida, Texas, Virginia, and Kansas. The species may also pass through other southeast states during migration. The Florida subspecies, *theonus*, is a primarily non- migratory resident of coastal habitats in the central and south peninsula (although the species may engage in migratory movements during cold spurts). The subspecies occurs in grassland, urban areas, hardwood forests, and scrub (NatureServe 2020). Host plants for the subspecies include members of the pea family (Fabaceae) and leadwort (Plumbaginacea). Populations are considered to be secure (NatureServe 2020).

### Purple Skimmer Dragonfly

The Purple Skimmer Dragonfly (*Libellula jesseana*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Purple Skimmer Dragonfly is listed by several other entities, including Critically Imperiled by NatureServe and Vulnerable by the IUCN (CBD 2010a, NatureServe 2020).

The Purple Skimmer Dragonfly is medium-sized, lacustrine, Florida-endemic dragonfly species. Its distribution includes nine eastern Peninsula counties, and two Panhandle counties (Bay and Washington). Historically, there were 15 known populations within this range. Currently, the species may only remain at a single lake within a state park. They utilize clear, sand-bottomed lakes bordered by maiden-cane grass and St. John's Wort shrubs (*Hypericum* spp.). Adults feed on invertebrates in nearby woodlands or shrublands. This species is extremely sensitive to pollution and eutrophication, and is unable to survive in polluted habitats. In degraded habitats, even with only slight eutrophication, the common and closely related Golden-winged Skimmer (*L. auripennis*) outcompetes and displaces Purple. The major threat to Purple Skimmer populations is lakeshore development and impacts to water quality (CBD 2010a).

### American Burying Beetle

The American Burying Beetle (*Nicrophorus americanus*) was listed as endangered effective July 13, 1989 (54 FR 29652). Critical habitat has not been designated (USFWS 2020a). The species is under consideration for downlisting to Threatened status (84 FR 19013).

The historic range of the American Burying Beetle spanned 35 states. There are no known extant populations of this species in Florida. Current populations exist in Rhode Island, South Dakota, Nebraska, Texas, Oklahoma, and Arkansas (USFWS 2019q). A Michigan record from 2017 is under investigation (84 FR 19013).

The American Burying Beetle is a nocturnal carrion beetle species active from late spring through early fall. They bury themselves in moist soil to hibernate for the winter. Reproduction occurs in the spring and early summer. They are considered habitat generalists and do not appear to be limited by vegetation types as long as food, shelter, and moisture are available. Its specialization toward the use of larger carrion compared to that used by other carrion beetles is suspected to be a factor in its decline. Changing land use practices and conversion of lands to intensive agriculture or for other development purposes fragments the habitat and reduces the availability of its preferred carrion, with other site-specific factors varying across its current range (USFWS 2019q).

### Little Oecetis Longhorn Caddisfly

Little Oecetis Longhorn Caddisfly (*Oecetis parva*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Oecetis Longhorn Caddisfly is listed by several other entities, including as Critically Imperiled in Florida by NatureServe and a State Historical in Alabama (CBD 2010a).

This species is found in northern and central Florida with only one individual recorded outside of Florida, from Wright's Creek, Alabama (NatureServe 2020). In Florida, occurrences have been recorded in the Apalachicola River, Choctawhatchee River, Kissimmee River, Oklawaha River, upper St. Johns River, and St. Marks River (CBD 2010a). The species inhabits natural lakes and springs, especially within the Ocala National Forest (NatureServe 2020). Due to their high abundances in healthy lake systems, they are thought to be an excellent bioindicator of lake health in Florida (Rasmussen et al. 2008). It is thought that this species is sensitive to activities that affect water quality and hydrologic regimes such as agriculture, urban development, forestry, water withdrawal, and nutrient loading (CBD 2010a). The primary threat to their populations is negative changes to water quality (CBD 2010a).

Findings from Rasmussen at al. (2008) report indicate six new occurrences of this species. Based on these surveys, the population trend was recommended to be reassigned from unknown to stable (Rasmussen et al. 2008).

### Southern Snaketail Dragonfly

The Southern Snaketail Dragonfly (*Ophiogomphus australis*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Southern Snaketail Dragonfly is listed by several other entities, including Critically Imperiled by NatureServe and Endangered by the IUCN flows (CBD 2010a, NatureServe 2020).

The Southern Snaketail Dragonfly may be a subspecies of *O. incurvatus* (CBD 2010a). Its historical range encompassed Florida, Georgia, Louisiana, and Mississippi (NatureServe 2020). It is known from three streams and rivers in Louisiana and Mississippi. Additionally, previously misidentified specimens of *O. australis* have been documented at Englin Air Force Base in Okaloosa County, Florida. It inhabits graveled streams and requires consistent water flows and clean water. Major threats to their populations are water quality degradation from a variety of sources including gravel mining, pesticide use, and deforestation. Recent population trends have shown an estimated 10 to 30 percent decline (CBD 2010a).

### Blue Calamintha Bee

The Blue Calamintha Bee (*Osmia calaminthae*) was petitioned for listing on February 5, 2015 (DoW 2015), and the 90-day finding determined that listing may be warranted (80 FR 56423). The species remains under review at this time (USFWS 2020a). The Blue Calamintha Bee is considered Critically Imperiled by NatureServe (NatureServe 2020).

The Blue Calamintha Bee is restricted to sandy scrub habitats at four sites in the southern Lake Wales Ridge in Highlands County, Florida. The species is believed to be a specialist on the Florida state threatened Ashe's calamint (*Calamintha ashei*), which occurs in sand pine and scrub habitat in the Florida central highlands and southeastern Georgia. Some of the bee's known populations are within protected areas, but they are still subject to pesticide drift and destructive off-road recreational activities. Other populations occur in unprotected lands (Rightmyer et al. 2011).

### Calvert's Emerald Dragonfly



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Calvert's Emerald Dragonfly (*Somatochlora calverti*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835)). The species remains under review at this time (USFWS 2020a). Calvert's Emerald Dragonfly is listed by several other entities, including as Vulnerable in Florida by NatureServe and Near Threatened by the IUCN (CBD 2010a).

Habitat is unknown but is thought to include "boggy forest seepages" (CBD 2010a). Most North American Calvert's Emerald Dragonfly are associated with cool groundwater for breeding, with adult foraging taking place in surrounding wetland and upland habitats. Other species of Calvert's Emerald breed in graminoid fens and sedge meadows fed by cool groundwater, small streams in woody ravines, or boggy wooded seeps (Mierzwa et al. 1995, CBD 2010a). Due to the typically cool temperatures associated with groundwater sources, the larval period can be prolonged - up to three to five years in some species.

Related Hine's Emerald Dragonfly (*S. hineana*) larvae escape drought or extreme temperatures by retreating into crayfish burrows (Pintor and Soluk 2006).

Calvert's Emerald Dragonfly has been reported in Florida from a handful of localities in the Panhandle including Torreya State Park, Blackwater River State Forest, Ralph E. Simmons State Forest, and Apalachicola National Forest (CBD 2010a, Odonta Central 2019, USFWS 2019o). There is an unverified report from Apalachicola Bluffs Preserve (CBD 2010a). Populations are believed to be small, and breeding habitat is often limited in extent (Paulson 2018). The short adult flight season, cryptic behavior and difficulty of sampling larvae, and difficulty distinguishing *Somatochlora* species hampers survey efforts.

### Bartram's Scrub-hairstreak Butterfly

The Bartram's Scrub-hairstreak Butterfly (*Strymon acis bartrami*) was listed as endangered effective August 12, 2014 (79 FR 47221). Critical habitat was designated within Miami-Dade and Monroe Counties, specifically on Big Pine Key, Navy Wells Pineland Preserve, Richmond Pine Rocklands, and in Everglades National Park. (79 FR 47179).

The Bartram's Scrub-hairstreak is restricted to pine rockland habitat in southern Florida (USFWS 2015f). The subspecies occurs on Big Pine Key, Everglades National Park (Long Pine Key), and in Miami-Dade County (e.g., Navy Wells Pineland Preserve and the Richmond Pine Rocklands). The pineland croton is the host plant for Bartram's Scrub-hairstreak and occurrence records for the species are never more than five meters from host plants (the species is primarily sedentary/non-migratory). The subspecies is threatened by fire suppression, habitat loss, and climate change/sea level rise (USFWS 2015f).

### Yellow-sided Clubtail Dragonfly

The Yellow-sided Clubtail Dragonfly (*Stylurus potulentus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Westfall's Clubtail Dragonfly is listed by several other entities, including as Imperiled by NatureServe and Vulnerable by the IUCN (CBD 2010a, NatureServe 2020).

The Yellow-sided Clubtail is a medium-sized slender dragonfly. Its range extends through the Florida Panhandle and coastal Mississippi (NatureServe 2020). The species requires pristine stream and river habitats with sandy bottoms. Within its range, it occupies only seven streams and one river. The species is highly sensitive to impacts to water quality. The major threat to Yellow-sided Clubtail Dragonflies is pollution as a result of development, clearcutting, and pesticide use. Its limited range makes populations particularly vulnerable (CBD 2010a).

### Three-Toothed Long-horned Caddisfly

The Three-toothed Long-horned Caddisfly (*Triaenodes tridontus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species



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remains under review at this time (USFWS 2020a). The Three-toothed Long-horned Caddisfly is listed by several other entities, including as Critically Imperiled by NatureServe and Extinct by the IUCN (CBD 2010a).

The species is only known historically from Oklahoma, the Florida Panhandle, and the Coastal Plain of Alabama. However, the last occurrence in Florida was in 1938. It is believed that the only extant population occurs in Alabama, with the most recent observation of the species occurring in coastal plains streams in Clarke and Perry County in 1991 (NatureServe 2020). Due to this species rarity and few observations, little is known about the species' specific life history and habitat requirements other than it being an aquatic benthic dweller.

## PLANTS

### Meadow Jointvetch

Meadow Jointvetch (*Aeschynomene pratensis*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Meadow Jointvetch is listed by several other entities, including as Endangered by the state of Florida and Critically Imperiled in Florida by NatureServe (CBD 2010a).

In Florida, this plant only occurs in Collier, Dade, and Monroe Counties; there are 11 known populations (CBD 2010a). Its range outside of Florida extends to the Caribbean and South America (NatureServe 2020). Meadow Jointvetch is classified as a perennial herb species, often observed growing in pine rocklands, marl prairies, cypress domes, and swales (FNAI 2001b, NatureServe 2020). The primary threats to this species are the drainage and conversion of wetland habitat and competition with invasive exotic species (CBD 2010a).

### Crenulate Lead-plant

Crenulate Lead-plant (*Amorpha crenulata* = *Amorpha herbacea* var. *crenulata*) was listed as endangered effective July 18, 1985 (50 FR 29345). Critical habitat has not been designated (USFWS 2020a).

Crenulate Lead-plant is characterized as a deciduous, perennial shrub, capable of growing 1.5 meters tall. There are currently only six known populations of this species, all located within Dade County, Florida (FNAI 2001b). It is restricted to poorly drained Opalocka sands within pine rocklands or in wet prairies with Opalocka-rock outcrop complex soils. Frequent fires are a natural process of pine rocklands, and it is presumed that Crenulate Lead-plant is adapted to this environment (USFWS 1999b). It is estimated that 99 percent of Crenulate Lead-plant habitat has been lost (FNAI 2001b). This is mainly the result of development, although remaining habitat is also at risk due to fire suppression (NatureServe 2020).

Current threats to the species include fire suppression in pine rocklands, which results in encroachment by tropical hardwood hammock (unsuitable habitat for the lead-plant), invasive species, and urbanization (50 FR 29345, NatureServe 2020).

### Blodgett's Silverbush

Blodgett's Silverbush, also known as Blodgett's Wild Mercury, (*Argythamnia blodgettii*) was listed as threatened effective October 31, 2016 (81 FR 66842). Critical habitat has not been designated (USFWS 2020a).

This species is restricted to the Florida mainland and the Florida Keys in Miami-Dade and Monroe counties. There are approximately 15-20 known occurrences, and fewer than 10,000 individual plants. The species grows in the low, moist limestone areas near margins of pine rocklands, rockland hammocks, and coastal berm; particularly in open sunny gaps or along edges (NatureServe 2020). It flowers and fruits all year (FNAI 2001b). This species has a considerable amount of its habitat to urbanization. Fire suppression and exotic species invasion are immediate threats to the species. (NatureServe 2020).

### Four-petal Pawpaw

The Four-petal Pawpaw (*Asimina tetramera*) was listed as endangered effective September 26, 1986 (USFWS 2020a). Critical habitat has not been designated (USFWS 2020a).

This large shrub/tree (one to three meters) grows in sand pine scrub communities on the inland prehistoric dunes of Martin and Palm Beach Counties, Florida. It is adapted to disturbances such as fire and hurricanes and grows back from its root system (51 FR 34415). As of 2018, this species was known to be extant in only 15 locations out of 26 historically documented occurrence sites (USFWS 2019r). Threats to this species include fire suppression, overgrowth of surrounding trees, non-native species encroachment, development, habitat loss/degradation, and population fragmentation (51 FR 34415, USFWS 2009e, USFWS 2019r).

### Purpledisk Honeycombhead Sunflower

Purpledisk Honeycombhead Sunflower, also known as Purple Balduina, (*Balduina atropurpurea*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

Purpledisk Honeycombhead Sunflower is listed by several other entities, including as Endangered by the state of Florida and Critically Imperiled in Florida by NatureServe (CBD 2010a).Purpledisk Honeycombhead Sunflower is a perennial member of the Asteraceae family that occurs in southeastern and southcentral Georgia and northeast Florida. It is possibly extirpated from the Florida Panhandle and adjacent Alabama. Disjunct historic occurrences were known in southeast North Carolina and northcentral South Carolina, but these occurrences have not been observed recently. Only seven populations are known in Florida (NatureServe 2020).

General habitat for Purpledisk Honeycombhead Sunflower is wet savanna and bog (Nature Serve 2020). Specific habitats include wet pine flatwoods and savannas, seepage slopes, pitcherplant bogs, and wet ditches (FNAI 2001b). Associated species usually include either longleaf pine (*Pinus palustris*) or slash pine (*Pinus elliotti*). Much of the naturally rare habitats of this species have been altered or destroyed by fire suppression or drained and converted for agriculture and pine plantations. This species is threatened by encroachment of woody vegetation and alterations to hydrology such as wetland drainage and improper firebreak construction (Nature Serve 2020).

### Apalachicola Wild Indigo

Apalachicola Wild Indigo (*Baptisia megacarpa*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).Apalachicola Wild Indigo is listed by several other entities, including as Endangered by the state of Florida and Imperiled in Florida by NatureServe (CBD 2010a).

This plant is characterized as a perennial herb capable of growing up to 1.2 meters tall. Its range is limited to southeast Alabama, southwest Georgia and in the adjacent Holmes, Gadsden, and Liberty Counties in Florida (NatureServe 2020). It is typically observed growing in mixed hardwood and hardwood-pine forests, often in close proximity to a floodplain, streams, or ravines (CBD 2010a). This species is primarily at risk due to habitat loss and fragmentation cause by land development, stream impoundment, and forestry management practices (NatureServe 2020). Competition with invasive species such as Japanese honeysuckle (*Lonicera japonica*) and human collection add additional pressure in some localities (NatureServe 2020). Approximately 20 known populations of this species exist, often with low number of individuals (CBD 2010a).

### Florida Bonamia

The Florida Bonamia (*Bonamia grandiflora*) was listed as threatened effective November 2, 1987 (52 FR 42068). Critical habitat has not been designated (USFWS 2020a).

The Florida Bonamia is a perennial, herbaceous vine with prostrate stems reaching one meter or greater in length. The Florida Bonamia inhabits clearings or openings in shrublands and chaparral in deep, white, dry sands of

ancient dunes and sandy ridges in central Florida. Species occurrences have been documented in the following counties: Hardee, Highlands, Lake, Marion, Orange, and Polk (NatureServe 2020). Fire stimulates flowering and seed production in mature plants, germination of seed, and causes turnover of the large seed bank mainly found in the top centimeter of soil surrounding the plant (USFWS 1996b). The species is in decline as approximately 62 percent of known populations occur on private, unprotected lands vulnerable to destruction if they are developed or continue to be unmanaged (USFWS 2017b).

### Florida Brickell-bush

The Florida Brickell-bush (*Brickellia mosieri*) was listed as endangered effective October 6, 2014 (78 FR 61273). Critical habitat was designated in Miami-Dade county in Florida (80 FR 49845). *Brickellia mosieri* is a synonym for the more recently accepted taxonomic name *B. eupatorioides* var. *floridana*.

Florida Brickell-bush is a perennial herb that is endemic to Miami Rock Ridge in Miami-Dade County, Florida. Older literature suggested this species had a wider distribution, occurring in surrounding states; however, this has since been proven false. Florida Brickell-bush habitat includes pine rockland communities with sandy soils dominated by open canopy slash pine (*Pinus elliottii* var. *densa*). In addition, an open shrub canopy is required; shrubs include saw palmetto (*Serenoa repens*) and wax myrtle (*Myrica cerifera*), among others (80 FR 49845). The remaining populations are under threat from housing development, fire suppression, and encroachment of invasive plants (NatureServe 2020).

### Brooksville Bellflower

Brooksville Bellflower (*Campanula robinsiae*) was listed as endangered effective July 27, 1989 (54 FR 31190). Critical habitat has not been designated (USFWS 2020a).

Native to Brooksville Ridge, Hernando County, Florida, there are only four, possibly five, sites that are currently occupied by this species: one site at Burns Prairie (Florida Fish and Wildlife Conservation Commission Wildlife Management Area), one site on privately owned land known as the Young site, and three sites at Hillsborough River State Park. Only four of these sites, at Burns Prairie in Hernando County and Hillsborough River State Park in Hillsborough County, meet the recovery criteria of being protected.

The species is found in wet prairie and along the edges of ponds near pastureland or adjacent hardwood forests (NatureServe 2020). The population size of this species has fluctuated due to factors such as altered hydrology and drought. Seeds may remain dormant for long periods until high levels of cumulative rainfall stimulate germination and the annual life cycle. There has been a loss of large oaks that would historically have shaded the soil and kept soils moist, which is required for seed germination (USFWS 2019s). Urbanization and habitat alteration has resulted in poor water quality and low water levels resulting in the loss of populations. Cattle grazing and trampling are also threats to the species as well as invasive plant species (FNAI 2001b). Displacement by skunk vine (*Paederia foetida*) is an increasing problem. (NatureServe 2020).

### Fragrant Prickly-apple

The Fragrant Prickly-apple (*Cereus eriophorus* var. *fragrans* = *Harrisia fragrans*) was listed as endangered effective November 1, 1985. Critical habitat has not been designated (USFWS 2020a).

The Fragrant Prickly-apple occurs in at least 10 confirmed locations in Florida; nine of these are within an area of about 16 kilometers by one kilometer around Savannas Preserve State Park in St. Lucie County. There is also one disjunct population at Canaveral National Seashore in Volusia County, Florida, and one unconfirmed occurrence reported in Indian River County. Unraveling the historical distribution of this species was problematic due to misidentification with the more common Simpson's prickly-apple (*Cereus gracilis* var. *simpsonii*). The range for the fragrant prickly-apple is hypothesized to included Volusia, St. Lucie, Brevard, and Indian River Counties. It prefers to grow in coastal hammock communities but is also found in sand pine habitats. It thrives in partial sun and mature climax communities that experience infrequent fires. Threats to this varietal include habitat



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loss/degradation, population fragmentation, poaching, insect predation, invasive species encroachment (plant species as well as feral hogs), herbicide, and stochastic events (USFWS 2010f, NatureServe 2020).

### Deltoid Spurge

The Deltoid Spurge (*Chamaesyce deltoidea* ssp. *deltoidea*) was listed as endangered effective July 18, 1985 (50 FR 29345). Critical habitat has not been designated (USFWS 2020a).

The Deltoid Spurge is an herbaceous, mat-forming plant endemic to the pine rocklands with scattered shrubs and exposed limestone of Miami rock ridge in Miami-Dade Country, Florida (FNAI 2001b, USFWS 2010g). The species underwent precipitous population declines as a result of urban expansion in the Miami area (USFWS 1999b). The species is threatened by habitat destruction, fire suppression (allows for encroachment of unsuitable tropical hammock), and by invasive species (NatureServe 2020).

### Pineland sandmat

Pineland sandmat (*Chamaesyce deltoidea pinetorum*) was listed as threatened effective October 6, 2017 (82 FR 46691). Critical habitat has not been designated (USFWS 2020a).

Pineland sandmat is a perennial herbaceous species endemic to South Florida, occurring in Miami-Dade County. The historic and current range of pineland sandmat is restricted to an area of 68 kilometers, only within the southern portion of the Miami Rock Ridge, from Homestead to the Long Pine Key region of Everglades National Park. Pineland sandmat is most abundant within the Long Pine Key region of Everglades National Park. It also occurs on County-owned conservation lands adjacent to the Park (82 FR 46991). Pineland sandmat occurs in pine rocklands, which are characterized by an open canopy of South Florida slash pine (*Pinus elliottii* var. *densa*) with a patchy understory of tropical and temperate shrubs and palms, and a rich herbaceous layer containing many species that are endemic to South Florida.

Weathered oolitic limestone outcrops (known as pinnacle rock) are common in pine rocklands. Pine rocklands are maintained by regular fire, which historically occurred at three to seven-year intervals. This habitat is now maintained with prescribed fire, which prevents succession to rockland hammock, and reduces woody competition for pineland sandmat which is not shade tolerant. Pine rocklands are prone to annual flooding during the wet season; however, pineland sandmat generally occurs in higher elevation pine rocklands that are less subject to flooding (81 FR 70282). Ninety-eight percent of pine rocklands, the only habitat for pineland sandmat outside of Everglades National Park, has been lost to development (82 FR 46991). Habitat for pineland sandmat is also susceptible to natural disturbance such as hurricanes, frost events, and sea level rise (81 FR 70282, NatureServe 2020).

### Wedge spurge

The Wedge Spurge (*Chamaesyce deltoidea* ssp. *serpyllum*) was listed as endangered effective October 31, 2016. Critical habitat has not been designated (USFWS 2020a).

This short-lived, perennial, tap-rooted herb grows on upland, rocky soils in pine rocklands and along roadways where non-native lawn grasses are not the dominant vegetation. It is only known to occur on Big Pine Key in Monroe County, Florida. The spurge responds positively to fire. From 1996 to 2013, this species' population size fluctuated somewhat, but overall it has been relatively stable. Severe natural disturbances, such as hurricanes, have contracted and restricted the range and distribution of this plant on Big Pine Key (80 FR 58535). Threats to this species include habitat loss/degradation, development, roadside maintenance, invasive species encroachment, fire suppression, over-shading, and stochastic events (81 FR 66842, NatureServe 2020).

### Garber's Spurge



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Garber's Spurge (*Chamaesyce garberi* ≡ *Euphorbia garberi*) was listed as threatened effective July 18, 1985. Critical habitat has not been designated (USFWS 2020a).

As of the 2007 USFWS five-year review, this species consisted of 17 populations: 14 on the Keys of Monroe County, two in Miami-Dade County, and one at Cape Sable in Everglades National Park (USFWS 2007g). This short-lived herb grows on dry, sandy substrates in ecotone areas between hammocks and pine rocklands and coastal beach dune ridges (50 FR 29345, USFWS 2007g). Populations sprout vigorously in response to disturbances, e.g., after fires or hurricanes. Threats to this species include habitat destruction/degradation in the Keys (mainland populations exist on protected lands), fire suppression, invasive species encroachment, and possibly Key deer herbivory (USFWS 2007g).

### Big Pine Partridge Pea

Big Pine Partridge Pea (*Chamaecrista lineata keyensis*) was listed as endangered effective October 31, 2016 (81 FR 66842). Critical habitat has not been designated (USFWS 2020a).

Formerly known from several Monroe County Keys, this species is now found only on Big Pine Key. There are an estimated 10,000 plants on the island, many in the National Key Deer Refuge (FNAI 2001b). The subspecies is shade intolerant and requires periodic burning to reduce competition. Required habitat is very uncommon; these plants occur only on the edges of rockland hammocks and pinelands in the pine rocklands. It occupies a narrow habitat range, and typically occurs in small numbers. Current fire management occurs in early summer/late winter (prescribed management of co-occurring federally endangered Key Deer). Competing invasive species include Brazilian pepper (*Schinus terebinthifolius*), earleaf acacia (*Acacia auriculiformis*), natal grass (*Rhynchelytrum repens*), shrub verbena (Lantana camara), and tongue tree (*Albezia lebbeck*). Some of these species are known to affect fire return interval because of their extreme flammability. The subspecies is threatened by habitat alteration, altered fire regimes, development, and non-native plants. Based on the extremely narrow range, catastrophic events such as hurricanes and tropical storms may also result in extirpation of the subspecies (FNAI 2001b, NatureServe 2020).

### Pygmy Fringe-tree

Pygmy Fringe-tree (*Chionanthus pygmaeus*) was listed as endangered effective January 21, 1987 (52 FR 2227). Critical habitat has not been designated (USFWS 2020a).

Pygmy Fringe-tree is endemic to south-central peninsular Florida where it occurs primarily in sand pine scrub, as well as high pineland, dry hammocks, and transitional habitats (USFWS 1999b). Sand pine scrub vegetation consists of sand pine (*Pinus clausa*) with shrubby evergreen oaks (USFWS 1987).

Pygmy Fringe Tree is known from west of Lake Apopka in Lake County, northwestern Osceola County, and the Lake Wales Ridge in Polk and Highlands Counties, including the Saddle Blanket Lakes Scrub Preserve and Highlands Hammock State Park (USFWS 1999b), and in Orange County (Nature Serve 2020). One of the largest populations is in the Carter Creek scrubs in Highlands County where it occurs with turkey oak (*Quercus laevis*), a species more typical of a high pine community (USFWS 1999b).

Pygmy Fringe-tree is a fire dependent, long-lived shrub or small tree, with stems rising from branches buried by blowing sand (USFWS 1999b). Sand pine scrub vegetation burns infrequently and intensely, approximately every 20 to 70 years, and Pygmy Fringe Tree reproduces from root sprouts post fire. It is also known to reproduce occasionally by seed. The species is similar to the widespread white fringe-tree (*Chionanthus virginicus*), who's range extends into central Florida. The two species appear to hybridize in habits other than scrub, though they are distinct species (USFWS 1999b). Threats to the Pygmy Fringe- tree include habitat loss to residential development and conversion to citrus groves. It is also threatened by collection for horticultural use (USFWS 1987).

### Cape Sable Thoroughwort



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Cape Sable Thoroughwort (*Chromolaena frustrata*) was listed as endangered effective November 25, 2013 (78 FR 63795). Critical habitat was designated on January 8, 2014 (79 FR 1551).

The species is endemic to South Florida and the Keys. Current occurrences are known from Boca Grande Key in the far west, Big Munson Island in the Newfound Harbor Keys, and a cluster of keys farther east: Long Key, Lignumvitae Key, Lower Matecumbe Key, and Upper Matecumbe Key. Cape Sable Thoroughwort is also known from the Flamingo/Cape Sable region on the mainland (NatureServe 2020). Habitat consists of coastal rock barrens and berms and the sunny edges of rockland hammock (FNAI 2001b).

The Cape Sable Thoroughwort is severely threatened by loss of habitat, fragmentation of populations, and invasion of exotic plants, expecially Brazilian pepper (*Schinus terebinthifolius*), carrotwood (*Cupaniopsis anacardioides*), and latherleaf (*Colubrina asiatica*). Sea level rise is also a threat to this species. Given the species' narrow range, fragmented distribution, and the small population size, Cape Sable Thoroughwort is vulnerable to stochastic environmental events (NatureServe 2020).

### Florida Golden Aster

The Florida Golden Aster (*Chrysopsis floridana*) was listed as endangered effective May 16, 1986 (51 FR 17974). Critical habitat has not been designated (USFWS 2020a). The species has a high recovery potential and the Service recommended the species listing be reduced from Endangered to Threatened (USFWS 2009f). An initiation of review and request for information was published on September 23, 2014 (79 FR 56821).

The species is endemic to Florida and restricted to the west-central region of the state. It occurs in sunny habitats with bare patches of sand in sand pine scrub and on ecotones between this habitat and scrubby flatwoods. It also inhabits disturbed areas of loose sand (FNAI 2001b). The Florida Golden Aster is known from the following counties: Hardee, Highlands, Hillsborough, Manatee, and Pinellas (NatureServe 2020). The species is under threat due to habitat loss and degradation through residential development and suppression of natural fire regimes (USFWS 2009f). The Florida Golden Aster was introduced to 10 sites where the species was not known to occur naturally, increasing the estimated global population size from 21,000 to 46,000 individuals (NatureServe 2020).

### Florida Perforate Cladonia

The Florida Perforate Cladonia (*Cladonia perforata*) was listed as endangered effective April 27, 1993 (58 FR 25746). Critical habitat has not been designated (USFWS 2020a).

The Florida Perforate Cladonia is a conspicuous lichen, endemic to Florida and restricted to small areas in northwest, central, and southeast portions of the state (NatureServe 2020). The species inhabits rosemary scrub on the Florida Pandhandle coasts, Lake Wales Ridge, and Atlantic Coastal Ridge and it is known from fewer than 30 populations (FNAI 2001b). Florida Perforate Cladoniais threatened by trampling, over- collection, fire, and habitat loss from urbanization (NatureServe 2020). The recovery potential of the species is also hampered by slow reproductive growth as well limited opportunities for dispersal and population expansion due to habitat loss and fragmentation (USFWS 2007h).

### Pigeon Wings

Pigeon Wings (*Clitoria fragrans*) was listed as threatened effective April 27, 1993 (58 FR 25746). Critical habitat has not been designated (USFWS 2020a).

The species is a perennial herb that blooms from May to June (FNAI 2001b). Pigeon Wings are endemic to central Florida, inhabiting undisturbed clearings of xeric sandhill and scrub communities on well-drained soils, and turkey oak barrens with wire grass (*Aristida stricta*), bluejack (*Quercus incana*) and turkey oak (*Quercus laevis*) (FNAI 2001b, NatureServe 2020). Threats to the species include habitat loss from urbanization and agriculture (USFWS 2008f, NatureServe 2020).



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### Short-leaved Rosemary

The Short-leaved Rosemary (*Conradina brevifolia*) was listed as endangered effective August 11, 1993 (58 FR 37432). Critical habitat has not been designated (USFWS 2020a).

Short-leaved Rosemary is a perennial, aromatic shrub growing from a woody root to one meter high. The species is known from approximately 30 occurrences on the Lake Wales Ridge of central Florida, with only a few of those populations having greater than 25 individuals (NatureServe 2020). The Short-leaved Rosemary inhabits xeric white sands supporting evergreen-Florida rosemary-sand pine scrub (USFWS 2008g). Populations are at risk of habitat loss due to conversion to citrus groves, residential, recreational, and commercial development. Short-leaved Rosemary is also a target of over-collection for horticulture (NatureServe 2020).

### Etonia Rosemary

The Etonia Rosemary (*Conradina etonia*) was listed as endangered effective August 11, 1993 (58 FR 37432). Critical habitat has not been designated (USFWS 2020a).

This shrub species was described relatively recently in 1991. There are two known populations, one in Etonia Creek State Forest and one in Interlachen Estates Subdivision, in Putnam County, Florida. Two populations were thought to have been found in Dunn's Creek State Park, but genetic research revealed these populations to be a separate species entirely (*C. cygniflora*). This species prefers sunny, disturbed sites in sand pine or shrubby oak communities. Within the subdivision, plants are found along roadsides or with subdivided lots of at least 0.4 hectare. Healthy populations are associated with natural fire regimes.

Threats to this species include habitat degradation due to lack of management and fire suppression (USFWS 2019t, NatureServe 2020).

### Apalachicola Rosemary

The Apalachicola Rosemary (*Conradina glabra*) was listed as endangered on August 11, 1993 (58 FR 37432). Critical habitat has not been designated (USFWS 2020a).

This shrub species was described relatively recently in 1962. Most of the known populations are currently found in an extremely limited area of 1,000 to 1,470 hectares in Liberty County, Florida. It is believed this species was more abundant across former sandhill habitats, but by the 1950s the silviculture industry had destroyed most of that habitat. This species is adapted to relatively frequent, low-intensity fires that maintain healthy mature populations. Historically in sandhill communities, these fires occurred on average every one to 10 years. A few populations of this plant occur on private land, two populations have been reintroduced on Nature Conservancy land, and only one population currently exists on public land at the Sweetwater Creek Track in Torreya State Park. Continuing threats to this species include habitat destruction/modification, range curtailment, and herbicide application (USFWS 2017c).

### Florida Semaphore Cactus

The Florida Semaphore Cactus (*Consolea corallicola* = *Opuntia corallicola*) was listed as endangered effective November 25, 2013 (78 FR 63795). Critical habitat was designated in the Florida Keys (81 FR 3865).

The Florida semaphore cactus is a Florida endemic cactus. The Florida Semaphore Cactus grows on bare rock or areas of loose rock such as talus and scree slopes. It is also found in shallow soil areas of hardwood hammocks near sea level. Only three naturally occurring populations of this species remain on Swan Key, Little Torch Key, and Key Largo. Reintroduction efforts have been initiated on other keys (USFWS 2013). Threats to the species include large hurricanes, its small population size, over-collection, urbanization, sea level rise, and introduced species, such as a moth that feeds on cacti (NatureServe 2020).



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### Ciliate-leaf Tickseed Sunflower

Ciliate-leaf Tickseed Sunflower (*Coreopsis intergrifolia*) was listed as endangered effective October 6, 2014 (79 FR 52567). Critical habitat was designated effective September 16, 2015 (80 FR 49845).

This species occurs from southeastern South Carolina south to the Panhandle of Florida. It is reported from five counties in northern Florida (Calhoun, Jackson, Nassau, St. Johns, and Washington). Habitat consists of low floodplain woodlands, streambanks, floodplains of blackwater streams (especially over limestone), and the edges of swamp forests bordering longleaf pinelands or brackish marshes. Soil is characterized by moist, sandy loam. Threats to the species include damming of streams, clearcutting bottomlands, herbicides, cattle grazing, and anthropogenic disturbance at high use recreation areas (NatureServe 2020).

### Avon Park Harebells

The Avon Park Harebells (*Crotalaria avonensis*) was listed as endangered effective April 27, 1993 (58 FR 25746). Critical habitat has not been designated (USFWS 2020a).

The Avon Park Harebells is endemic to Florida and known from only three sites in Polk and Highlands counties near Avon Park (58 FR 25746, NatureServe 2020). The species is found onlyon xeric white sand scrub. Avon Park Harebells are small, deciduous, perennial herbs that grow from a deep taproot, blooming from March to June. It is thought that the deep taproot, combined with being deciduous, helps the species survive the dry winter months and fires common for their habitat (NatureServe 2020).

Populations are threatened by fragmentation and habitat loss through the development of citrus groves, cattle pastures, and housing subdivisions (USFWS 1999c). A five-year review of the species indicated a need to preserve the remaining populations of Avon Park Harebells and to research the life history and propagation with and without disturbance (USFWS 1999c, NatureServe 2020).

### Okeechobee Gourd

The Okeechobee Gourd (*Cucurbita okeechobeensis* ssp. *okeechobeensis*) was listed as endangered effective August 11, 1993 (58 FR 37432), and revised on April 1, 1994 (59 FR 15345), due to a technical correction to the scientific name. Critical habitat has not been designated (USFWS 2020a).

The Okeechobee Gourd is found in swampy forests and hammocks on muck soils and are restricted to disturbed, uncultivated areas (e.g., ditch banks, wet road shoulders; NatureServe 2020). There are only two natural populations known in Florida, one on Lake Okeechobee and the other along St. Johns River (USFWS 2009g). Threats to the species include habitat destruction and modification (USFWS 2019u).

### Florida Prairie-clover

The Florida Prairie-clover (*Dalea carthagenensis floridana*) was listed as endangered effective November 6, 2017 (82 FR 46691). Critical habitat has not been designated (USFWS 2020a).

This short-lived, perennial shrub is endemic to Florida. It grows in tropical savanna pine rockland, rockland hammock, marl prairie, and coastal berm habitats. This subspecies is likely extirpated from Everglades National Park. Only nine populations of this subspecies are currently extant. Florida Prairie-clover is threatened by habitat loss/fragmentation, fire suppression, non-native species encroachment, recreational activities, and stochastic events (82 FR 46691).

### Beautiful Pawpaw

Beautiful Pawpaw (*Deeringothamnus pulchellus*) was listed as endangered effective September 26, 1986 (50 FR 45634). Critical habitat has not been designated (USFWS 2020a).



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Half of the existing Beautiful Pawpaw shrubs are found in xeric, mesic, and hydric pine flatwoods on two preserves in western Charlotte and Lee counties (eastern Florida) (USFWS 2020a). Approximately 5,000 plants remain (FNAI 2001b). In 1996, 200 individual Beautiful Pawpaws were relocated from private agricultural land on Pine Island, where habitat destruction was anticipated, to unoccupied habitat in Lee County (USFWS 2020a).

Beautiful Pawpaw thrives alongside open slash pine (*Pinus elliotti*) or longleaf pine (*Pinus palustris*) flatwoods with evergreen blueberries (*Vaccinium myrsinites*), saw palmetto (*Serenoa repens*), wax myrtle, (*Myrica cerifera*), flag pawpaw (*Asimia reticulate*), and dwarf live oak (*Quercus minima*) in the understory. Soils in these habitats are poorly drained sandy substrates (FNAI 2001b).

Decline of the Beautiful Pawpaw is due to loss of available habitat from urbanization, degradation, and fire suppression (USFWS 1999). Fire not only creates clearings to let in sunlight, but the heat promotes germination as well. Other threats to the species include exotic invasive species such as the Brazilian pepper (*Schinus terebinthifolius*), the leafroller caterpillar (*Choristoneura parallela*), and feral pigs (FNAI 2001b).

### Rugel's Pawpaw

The Rugel's Pawpaw (*Deeringothamnus rugelii*) was listed as endangered effective October 27, 1986 (51 FR 34415). Critical habitat has not been designated (USFWS 2020a).

The Rugel's Pawpaw is a low-growing shrub (USFWS 2009h). Its range is extremely limited and it can only be found in Volusia County in the northeastern Florida peninsula (USFWS 2018i, NatureServe 2020). Its historic range included Seminole County (NatureServe 2020). The species is known from approximately 33 occurrences, mostly in the vicinity of New Smyrna Beach (USFWS 2009h, USFWS 2018i). There are two additional sites with introduced populations. It thrives in mesic and wet flatwood habitats dominated by slash pine (*Pinus elliotttii* var. *densa*) or longleaf pine (*Pinus palustris*) and associated with poorly drained sandy soils. Additionally, it is sometimes found along roadsides. Rugel's Pawpaw is often associated with netted pawpaw (*Asimina reticulate*), common pawpaw (*A. triloba*), tarflower (*Bejaria racemose*), shiny liona/fetterbrush (*Lyonia lucida*), dwarf live oak (*Quercus minima*), saw palmetto (*Serenoa repens*), and shiny blueberry (*Vaccinnium myrsinites*). These natural communities require regular fire intervals (USFWS 2018i). This species is threatened by habitat loss from urbanization, industrial timber, and fire suppression (NatureServe 2020).

### Garrett's Mint

Garrett's Mint (*Dicerandra christmanii*) was listed as endangered effective December 2, 1985 (50 FR 45621). Critical habitat has not been designated (USFWS 2020a).

Garrett's Mint is a perennial shrub; flowering occurs from July through November. It is dependent on insects for pollination as well as on regular fire disturbance for long-term survival. Based on studies of a similar mint species, populations may decline after only five years without fire. Its range is limited to Highlands County in Florida, specifically, to a six-kilometer stretch along Lake Wales Ridge. This distribution has been fragmented by development. The species thrives in gaps within xeric oak-hickory scrub habitat. It grows exclusively on soils composed of fairly well-drained yellow sands (USFWS 2009i). The limited area where this species is found is threatened by habitat loss and degradation from urbanization (NatureServe 2020).

### Longspurred Mint

The Longspurred Mint *(Dicerandra cornutissima)* was listed as endangered, effective November 1, 1985 (50 FR 45621). Critical habitat has not been designated (USFWS 2020a).

This short-lived plant has 15 known occurances in Marion and Sumter Counties, Florida (USFWS 2005b). The majority of the occurances are on the Cross Florida Greenway State Recreation and Conservation area in Maron County. Unfortunately, the Marion County sites are no longer sutabile habitat due to increasing development and



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road widening projects (USFWS 2005b). Fire suppression and invasive exotic species are also a factor. (USFWS 2005b).

Strongly aromatic, this low growing shrub is found alongside sand pine scrub and turkey oak communities. It can spread on the edges of roads and vigerously along streets (USFWS 2018j). It prefers forested woodland, shrub and chaparral communities throughout the scrub and sandhill in openings (USFWS 2018j).

### Scrub Mint

Scrub Mint (*Dicerandra frutescens*) was listed as endangered effective November 1, 1985 (50 FR 45621). Critical habitat has not been designated (USFWS 2020a).

Scrub Mint is an aromatic shrub that blooms from August to February (FNAI 2001b). Scrub Mint is endemic to Highlands County in central Florida (NatureServe 2020) and inhabits yellow sand soil types supporting sand pine scrub or oak-hickory scrub vegetation. These habitats are currently threatened by residential, commercial, and agricultural development and modification due to long-term fire suppression (USFWS 2009j).

### Lakela's Mint

The Lakela's Mint (*Dicerandra immaculata*) was listed as endangered effective May 15, 1985 (50 FR 20212). Critical habitat has not been designated (USFWS 2020a).

This short, hemispheric shrub species grows in the disturbed, well-drained, sterile sand of ancient inland dunes. It is endemic to coastal sand pine scrub in Indian River and St. Lucie Counties in Florida (50 FR 20212, NatureServe 2020). Its historical range was limited to an area approximately three kilometers wide by five kilometers long. In 1991 and 1992, transplants were introduced to the Hobe Sound National Wildlife Refuge in Martin County. Similar to other scrub mints, it is believed this species is adapted to patchy, infrequent fires to maintain an open canopy and facilitate new recruitment. Threats to this species include habitat loss, degradation, and fragmentation; altered fire regimes; development; feral hogs; and non-native plant species encroachment (USFWS 2008h).

### Florida Pineland Crabgrass

Florida Pineland Crabgrass (*Digitaria pauciflora*) was listed as threatened effective October 6, 2017 (82 FR 46691). Critical habitat has not been designated (USFWS 2020a).

The species is currently known only from one site of approximately 8,000 hectares in Everglades National Park, Florida (NatureServe 2020). Florida Pineland Crabgrass commonly occurs in the ecotone between pine rockland and grassy marl prairie habitats, extending somewhat into both (Bradley and Gann 1999). Florida Pineland Crabgrass is a perennial clump-forming grass. The main threat to this species is alteration of the hydrology of the Everglades National Park. Extensive urban development, rising sea levels, invasive species, and altered fire regimes also threaten the population (USFWS 2004).

### Clam-shell Orchid

The Clam-shell Orchid (*Encyclia cochleata* var. *triandra*) was petitioned for listing on April 20, 2010 (CBD 2010a). On October 7, 2019, listing was deemed not warranted after review (84 FR 53336). The Clam- shell Orchid is considered Imperiled by NatureServe (CBD 2010a).

The Clam-shell Orchid is relatively abundant in southern Florida from Ft. Lauderdale to further south, especially in Big Cypress and near West Lake in Everglades National Park (Dade, Collier, and Monroe counties). Habitat includes forested hardwood wetlands, hammocks, and buttonwood/cypress strands. The Clam-shell Orchid grows on buttonwood and red mangroves. Although current population levels are adequate to sustain the variety, widespread collecting of the native form has significantly impacted populations. However, populations in very inaccessible portions of Big Cypress National Preserve and Everglades National Park are well-protected

(NatureServe 2020).

### Big Cypress Epidendrum Orchid

The Big Cypress Epidendrum Orchid (*Epidendrum strobiliferum*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Big Cypress Epidendrum Orchid is listed by several other entities, including as Endangered by the state of Florida and Critically Imperiled by NatureServe (CBD 2010a).

Big Cypress Epidendrum Orchid is widespread in tropical America including Collier County in South Florida, the West Indies, Central and South America, Mexico to Brazil, and Cuba (USFWS 2020a). It is a very small, perennial epiphytic orchid that flowers through the winter and can be found in pop ash (*Fraxinus caroliniana*) and pond apple (*Annona glabra*) swamps and sloughs (FNAI 2001b, CBD 2010a). Big Cypress Epidendrum Orchid has been severely reduced by plant poaching and wetland habitat destruction (FNAI 2001b).

### Blackbract Pipewort

Blackbract Pipewort, also known as Dark Headed Hatpins, (*Eriocaulon nigrobracteatum*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Blackbract Pipewort is listed by several other entities, including as Endangered by the state of Florida and Critically Imperiled by NatureServe (CBD 2010a).

The species is endemic to the Gulf Coast lowlands of the east-central Florida Panhandle in Bay, Calhoun, and Gulf counties (FNAI 2001b). The Florida Natural Areas Inventory reports 12 occurrence records in its database as of 2014 (NatureServe 2020). The Blackbract Pipework occurs in open wet bog/fen wetland habitat at stream heads or on open, grassy seepage slopes. In addition, habitat includes deep sapric muck soils of nutrient-poor, somewhat oxygen-rich and acidic mires, with little wood or Sphagnum moss present in the muck (poor fens; FNAI 2001b). Within this habitat, the plants are locally abundant in areas saturated by groundwater seepage and in seep spring rivulets (NatureServe 2020). The Blackbract Pipewort flowers in March and goes to seed in April and May. This species is threatened by development and road and power line maintenance adversely affects the hydrology of seepage slope habitat in a number of the occurrences. Shading by shrubs is also a primary threat (the result of suppressed fire regimes) (NatureServe 2020).

### Scrub Buckwheat

Scrub Buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*) was listed as threatened effective April 27, 1993 (58 FR 25746). Critical habitat has not been designated (USFWS 2020a).

Scrub Buckwheat is a perennial herb that blooms from May to October or after fire (FNAI 2001b). The species is endemic to central Florida and occurs in dry pinelands, sandhills, scrub, and ecotones between scrub and high pineland. The Scrub Buckwheat is threatened by habitat loss through development of citrus groves, pine plantations, and residential housing (USFWS 2018k, NatureServe 2020).

### Snakeroot

Snakeroot, also known as Wedge-leaf Eryngo, (*Eryngium cuneifolium*) was listed as endangered effective January 21, 1987 (52 FR 2227). Critical habitat has not been designated (USFWS 2020a).

This species has an extremely restricted range with approximately 20 occurrences, all occurring in Highlands County, central Florida. Most of these occurrences are located on three preserves (FNAI 2001b). It inhabits areas of open sand, including blowouts and other highly disturbed soil surfaces such as road shoulders (Christman and Judd 1990). Snakeroot is currently threatened by habitat loss from development and modification due to long-term fire suppression (USFWS 2010h).

### Telephus Spurge

The Telephus Spurge (*Euphorbia telephioides*) was listed as threatened effective May 8, 1992 (57 FR 19813). Critical habitat has not been designated (USFWS 2020a).

The Telephus Spurge is a perennial herb (NatureServe 2020). This species is currently only known from Bay, Gulf, and Franklin counties in Florida. It inhabits longleaf pine savannas, scrubby and mesic flatwoods, and coastal scrub on low sand ridges near the Gulf of Mexico (FNAI 2001b). It can be subdioecious (having separate male and female plants) or monoecious (having both male and female flowers on the same plant). Subdioecious plants ensure genetic variation through reducing outcrossing; however, this can also reduce the effective reproductive population if the population is comprised of only one sex (USFWS 2008i). The species needs fire to maintain community structure and is threatened by habitat degradation due to forestry practices, lack of prescribed fire, and by urban development (NatureServe 2020).

### Small's Milkpea

Small's Milkpea (*Galactia smallii*) was listed as endangered effective July 18, 1985 (50 FR 29345). Critical habitat has ot been designated (USFWS 2020a).

This species is known from only 11 occurrences, all located in a small area of Dade County, South Florida (NatureServe 2020). It inhabits redland pine rocklands with South Florida slash pine (*Pinus elliottii*), saw palmetto (*Serenoa repens*), willow bustic (*Dipholis saliciolia*), and poisonwood (*Metopium toxiferum*) (FNAI 2001b). The species prefers open sun and little shade and can be threatened by shading from hardwoods (USFWS 2010i). Threats to this species include residential, commercial, and agricultural development, succession in the absence of fire, and competition from invasive species (NatureServe 2020). Ninety-eight percent of the original pine rockland habitat has disappeared, resulting in just six remaining populations on five managed areas (FNAI 2001b).

### Harper's Beauty

The Harper's Beauty (*Harperocallis flava*) was listed as endangered effective November 1, 1979 (44 FR 56862). Critical habitat has not been designated (USFWS 2020a).

This species is a perennial herb that grows in the ecotones between sunny, open wet prairies and wetter shrub/tree areas, such as cypress swamps, roadside depressions, seepage savannas between pinelands, pine flatwood bogs, and ditches in the vicinity of pine plantations near flatwood habitats. Current occurrence records are known from Liberty, Franklin, and Bay Counties in Florida (USFWS 2016c).

Genetic studies on this plant show low genetic diversity within the species and some suggestions of instability within its genetics (e.g., a threat to the species) (NatureServe 2020). Other threats to Harper's Beauty include horticultural collection, timber production processes, habitat degradation due to lack of management, road widening, development, hydrology modification, and fire suppression (USFWS 2016c).

### Aboriginal Prickly-apple

The Aboriginal Prickly-apple (*Harrisia aboriginum*) was listed as endangered effective October 24, 2013 (78 FR 63795). Critical habitat was designated on January 22, 2016. (81 FR 3865).

The Aboriginal Prickly-apple is a cylindrical-stemmed cactus measuring up to six meters in height (78 FR 63804, USFWS 2020a). It occurs on Florida's southwest coast and is often established on shell mounds or shelly substrates (NatureServe 2020, USFWS 2020a). This species occurs in coastal berms, coastal grasslands (78 FR 63805), coastal strand vegetation, and tropical coastal hammocks, with trees such as gumbo limbo (*Bursera simaruba*), wild lime (*Zanthoxylum fagara*), and/or live oak (*Quercus virginiana*). It may be found near, but never within mangrove communities (USFWS 2020a). Threats to this species include the destruction and modification of habitat, bonfires, vandalism, and competition with non-native plants such as Brazilian pepper (*Schinus*

*terebinthifolius*) and leather leaf (*Chamaedaphne calyculata*) (78 FR 63806).

### Florida Hartwrightia

Florida Hartwrightia (*Hartwrightia floridana*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Florida Hartwrightia is considered Imperiled in Florida and Critically Imperiled in Georgia by NatureServe (NatureServe 2020).

This perennial herb species is known to inhabit areas near the Florida-Georgia border. Occurrences have been documented in the following Florida counties: Highlands, Clay, Nassau, Polk, and Putnam. The species grows in wet, organic mats such as peat bogs/fens or forested wetlands (e.g., slash pine/longleaf pine/saw palmetto flatwoods, pineland swamps/bogs), and seepage areas that are acidic. In the last 40 years, only 50 occurrences of this species have been reported. Threats to this species include incompatible hydrological practices, habitat conversion (pine plantations or pasture), fire suppression, and canopy encroachment (NatureServe 2020).

### Henry's Spider-lily

Henry's Spider-lily (*Hymenocallis henryae*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Henry's Spider-lily is considered Imperiled in Florida by NatureServe (NatureServe 2020).

This perennial, bulbous herb is known only from the south-central Florida Panhandle in Bay, Franklin, Gulf, Liberty, and Walton Counties. It grows at the edges of dome swamps, between these and flatwood or wet prairie habitats. Only 20 occurrences of this species are known. Threats to Henry's Spider-lily include horticultural collecting, development, hog damage, hydrology alteration, habitat conversion (pine plantations), fire suppression, and canopy encroachment (NatureServe 2020).

### Highlands Scrub Hypericum

Highlands Scrub Hypericum (*Hypericum cumulicola*) was listed as endangered effective January 21, 1987 (52 FR 2227). Critical habitat has not been designated (USFWS 2020a).

This perennial, tap-rooted herb/subshrub grows in the openings of dry, upland sand pine, oak scrub, and rosemary scrub communities. It is known from a limited distribution in the southern Polk and Highlands Counties of Florida along the ancient, inland dune ridge or along sandy road edges (52 FR 2227, USFWS 2008j, NatureServe 2020). Populations of this species are invigorated following fire events, though effects are temporally delayed (15 years at least, but not more than 50 years between events; USFWS 2008j).

Threats to this species include citrus farming, urban development, off-highway-vehicle/trampling damage, invasive species encroachment, fire suppression, extreme climate conditions (droughts, flooding, and frost), and stochastic events (USFWS 2008j, NatureServe 2020).

### Edison's Ascyrum St. John's Wort

Edison's Ascyrum St. John's Wort (*Hypericum edisonianum*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Edison's Ascyrum St. John's Wort is considered Imperiled in Florida (CBD 2010a).

The species is endemic to central peninsular Florida and occurs in depressions in scrub, cutthroat seeps, flatwoods ponds, lake margins, and wet prairies. Although it is locally abundant due to its thicket-forming habit, it is only found at 25 sites and only in five of these sites are conservation areas (FNAI 2001b). The species has been documented in the following Florida counties: Polk, Highlands, Glades, and DeSoto.

The primary threat to the species is loss of habitat due to extreme development pressure, wetland drainage, fire



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suppression, and agriculture (NatureServe 2020).

### Smooth-barked St. John's Wort

Smooth-barked St. John's Wort (*Hypericum lissophloeus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Smooth-barked St. John's Wort is listed by several other entities, including as Endangered by the state of Florida and Imperiled by NatureServe (CBD 2010a).

Smooth-barked St. John's Wort is endemic to the karst pond area of Bay and Washington Counties in the Florida Panhandle. It occurs on the fluctuating shores and shallow water of karst sinkhole ponds and small sandhill lakes (FNAI 2001b, NatureServe 2020). Although its range is limited, it may be locally abundant, even the most abundant shrub on the shores of the ponds where it occurs. Occurrences may number in the thousands. The species is known to form a solid ring around the ponds. Smooth-barked St. John's Wort is threatened by rapid lakeshore development in the region, disturbance of upland habitats leading to increased erosion into ponds, prolonged droughts, and increased recreational use of ponds (NatureServe 2020). Future recommendations include preservation of natural lakeshore vegetation, preventing conversion of lakeshores to sandy beaches, and halting the erosion into lakes from upland developments and logging practises (FNAI 2001b).

### Yellow Anisetree

The Yellow Anisetree, also known as Star Anise, (*Illicium parviflorum*) was petitioned for listing on September 27, 2011 (76 FR 59835). On October 7, 2019, listing was deemed not warranted based on the moderate to high resiliency of the species (84 FR 53336).

The Yellow Anisetree is widely used as an ornamental landscaping plant in southeastern US; however, it is only known from fewer than 20 native occurrences in central Florida (NatureServe 2020). The species blooms from April to June. Fruit are woody, star-shaped, and distinctive all year (FNAI 2001b). The Yellow Anisetree is restricted to habitats with continually moist soils, such as sandy loams or sandy peat mucks, on the banks of spring-run or seepage streams, hydric hammock, and bottomland forest (FNAI 2001b, NatureServe 2020). Threats to the species include logging or hydrology-altering practices in forested wetlands and collection by hobbyists (FNAI 2001b).

### Beach Jacquemontia

Beach Jacquemontia (*Jacquemontia reclinata*) was listed as endangered effective November 24, 1993 (58 FR 14357). Critical habitat has not been designated (USFWS 2020a).

Beach Jacquemontia is a perennial vine endemic to coastal vegetated dunes, disturbed marine hammock, and woodland habitat in Palm Beach, Broward, and Dade Counties, Florida. There were 22 occurrences of the species in 2018 (USFWS 1999, FNAI 2001b, NatureServe 2020). Common vegetative associates include sea grape (*Coccoloba uvifera*), cabbage palm (*Sabal palmetto*), poisonwood (*Metopium toxiferum*), Madagascar periwinkle (*Catharanthus roseus*), croton (*Croton involucrate*), gopher apple (*Licania michauxii*), prickly pear cactus (*Opuntia* spp.), sandspurs (*Cenchrus* spp.), sea oats (*Uniola paniculata*) and other shrubs and dwarfed trees (USFWS 2020a). Beach Jacquemontia population are in decline due to loss of available habitat from urbanization, degradation, beach erosion, and invasive species (NatureServe 2019).

### Cooley's Water-willow

Cooley's Water-willow (*Justicia cooleyi*) was listed as endangered effective July 27, 1989 (54 FR 31190). Critical habitat has not been designated (USFWS 2020a).

This species occurs within an extremely limited range in central Florida flatwoods. The Cooley's Water- willow only occurs on Brooksville Ridge in Hernando County, Florida and at one location in Sumter County. (USFWS 2019v,

NatureServe 2020). The Cooley's Water-willow is a rhizomatous, perennial herb found in mesic hardwood hammocks and pine forests underlain by limestone (FNAI 2001b). Soil composition includes sandy loams or silty clay loams (FNAI 2001b, NatureServe 2020). The species has declined as a result of habitat loss via lime and phosphate mining, timber harvesting, and agricultural and urban development. Current threats to the species include habitat loss and encroachment of invasive species in Cooley's Water-willow habitat (USFWS 2019v).

### Scrub Blazingstar

Scrub Blazingstar (*Liatris ohlingerae*) was listed as endangered effective July 27, 1989 (54 FR 31190). Critical habitat has not been designated (USFWS 2020a).

Scrub Blazingstar is characterized as an erect, perennial herb (NatureServe 2020). This species is endemic to Florida and has a limited range, occurring along the Lake Wales Ridge in Polk and Highlands counties (FNAI 2001b). It is restricted to sand pine and open oak-rosemary scrub habitats, often along the ecotone between rosemary balds and surrounding scrub habitats (USFWS 1999, NatureServe 2020). This habitat is often a dynamic vegetative complex dependent on the frequency and intensity of fires, which maintain ideal growing conditions for this species. The species is threatened by habitat loss due to agriculture, commercial, residential, and recreational purposes. Fire suppression is another factor that has caused habitat degradation as areas that were once used by this species are continually becoming overgrown (USFWS 1999).

### Panhandle Lily

Panhandle Lily (*Lilium iridollae*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Panhandle Lily is considered Imperiled in Florida by NaturServe (CBD 2010a).

The range of the Panhandle Lily is contested due to taxonomic uncertainty regarding plants of the Carolinas and Virginia, which are treated by many as a distinct species (Sandhill Lily, *Lilium pyrophilum*) (Skinner and Sorrie 2002; Nature Serve 2020). Taking the broader view of the range, including plants that many consider to be the Sandhill Lily, the range for Panhandle Lily is discontinuous from southern Alabama and northwest Florida north to Virginia. If the Sandhill Lily is accepted as a distinct species, then the range of Panhandle Lily includes only four counties in the western Florida panhandle and three counties in adjacent southern Alabama. General habitats for Panhandle Lily include bogs and fens, herbaceous wetlands, and scrub-shrub wetlands. It inhabits baygalls, wet flatwoods, seepage slopes, and the edges of bottomland forests typically in sandy peat or loamy soils (Nature Serve 2020).

The quality and extent of potential habitat for Panhandle Lily has declined due to fire suppression and drainage for conversion to silviculture and agriculture (Nature Serve 2020). Habitat conversion has resulted in considerable permanent impacts to the species. Panhandle Lily has showy flowers that are attractive to collectors and an entire population was removed from the Conecuh National Forest by collectors. Additional threats include cattle grazing and potentially insect herbivory (CBD 2010a, Nature Serve 2020).

### Bog Spicebush

Bog Spicebush (*Lindera subcoriacea*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Bog Spicebush is considered Vulnerable by NatureServe (NatureServe 2020).

The Bog Spicebush occurs on the Atlantic and Gulf Coast plains from southern Virginia south to Florida and west to Louisiana. There are currently over 100 occurrences; most of them consist of very small populations located on sites that will require active management for the plants to persist. The plants occupy a relatively narrow ecological niche and have a correspondingly spotty distribution within the range. In the deep south, Bog Spicebush is not found outside the wettest portions of rare, sphagnum bog habitats. This species is found streamside and in

seepage bogs, with sphagnum moss, titi, and other evergreen shrubs. The species is clonal, and most sites have only one to five genetic individuals (FNAI 2001b).

The general lack of fire in these habitats during the last 50 or more years has placed the plants under increased stress from competing shrubs and trees. Restoring fire to the landscapes via controlled burns would reverse this trend. This is becoming increasingly difficult with continued development of surrounding longleaf pine/wiregrass uplands for housing, agriculture, timber management, and pinestraw raking. Other known or perceived threats to the species include siltation of streamheads, logging, road building, draining and of bogs and wetlands (NatureServe 2020).

### Sand Flax

Sand flax *(Linum arenicola,* formerly *Cathartolinum arenicola)* was listed as endangered, effective October 31, 2016 (81 FR 66842). Critical habitat has not been designated (USFWS 2020a).

Sand flax is a perennial herb that flowers from February to September. Its historical range encompasses Miami-Dade County and many islands in the Florida Keys. As of 2016, there were eight extant populations known from Miami-Dade County and four from the Florida Keys (80 FR 58535). Sand flax thrives in pine rockland and flatwoods, dry marl prairie, as well as in disturbed areas (e.g. roadsides) (80 FR 58535, FNAI 2001b, NatureServe 2020). It grows in rocky soils, often near exposed limestone. It has been described as occurring in solution pits and shallow soil of ephemeral pools on limerock in open pinelands, pineland clearings and adjacent roadsides (NatureServe 2020). These natural communities require regular fire intervals. Currently, it is more commonly found in disturbed areas than within intact pine rocklands (80 FR 58535). This species is threatened by habitat loss from urbanization, agriculture, and fire suppression (NatureServe 2020).

### Carter's Small Flowered Flax

Carter's Small Flowered Flax (*Linum carteri carteri*) was listed as endangered effective October 6, 2014 (79 FR 52567). Critical habitat was designated on August 17, 2015 (80 FR 49845).

The subspecies is restricted to eastern Miami-Dade County, Florida, in the vicinity of the Miami metropolitan area on conservation lands. Plants occur in highly disturbed margins of Miami Rockridge Pine Rocklands and in mowed open areas. Carter's Small Flowered Flax has declined as a result of habitat loss to residential and commercial development and agricultural conversion throughout South Florida pine rocklands. Pine rockland habitat in Miami-Dade County has been reduced to roughly 11 percent of its historical extent and, outside of Everglades National Park, only about one percent of these pinelands remain (as fragmented patches).The small number of populations and scarcity of individuals makes this species vulnerable to effects of stochastic processes and catastrophic phenomena. In addition, extant plants appear to exhibit somewhat weak reproduction: plants collected in August, at the end of the fruiting season, had few seeds (NatureServe 2020). Current threats to Carter's Small Flowered Flax include fire suppression and invasive species (FNAI 2000).

### West's Flax

The West's Flax (*Linum westii*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). NatureServe ranks this species as Critically Imperiled (NatureServe 2020).

This perennial herb grows in full sun, sandy, meagerly vegetated edges of wetlands such as bogs, marshes, shallow ponds, slash pine-saw palmetto flatwoods, cypress ponds, ditches, and soggy prairies. There are 20 known extant populations scattered across northeast Florida in Liberty, Franklin, Gulf, Okaloosa, and Clay Counties. It is possibly under-reported because it only blooms at dusk and is not easily distinguished from similar species. Surveys in 2013 were not able to find plants at many of the historic locations. The species responds well to controlled burning every two to three years. Threats to West's Flax include fire suppression, changes in

hydrology, and commercial logging operations (NatureServe 2020).

### Boykin's Lobelia

Boykin's Lobelia (*Lobelia boykinii*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Boykin's Lobelia is considered Imperiled by NatureServe (NatureServe 2020).

Boykin's Lobelia is a perennial herb, growing 40 to 80 centimeters tall. The species has blue flowers with a white eye at the throat. Blooming occurs from May through August; flowering is dependent on fluctuating water levels (NatureServe 2020). Boykin's Lobelia inhabits forested, herbaceous, or scrub-shrub wetlands and occurs throughout much of the Coastal Plain, from North Carolina south to Florida, and west to Mississippi (Weakley 2012). They are obligate outcrossers, meaning they may limit seed production in small populations to reduce inbreeding depression. As Boykin's Lobelia is a self-incompatible species, this can have drastic effects on population size and density across years (Bates 1996, Moreno 2003, Royo et al. 2008). The Boykin's Lobelia's wetland habitats are threatened with drainage and conversion to tree farms or agriculture; this has led to a decline in the species' populations (NatureServe 2020).

### Raven's Seedbox

Raven's Seedbox (*Ludwigia ravenii*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Raven's Seedbox is considered Critically Imperiled in Florida by NatureServe (CBD 2010a).

Raven's Seedbox is a perennial herb in the evening primrose family (*Primulaceae*) (Nature Serve 2020). Occurrences are known from the Coastal Plain of southeastern Virginia, eastern North Carolina, southeastern South Carolina, and northeastern Florida. At least 17 of the nearly 30 occurrences of this species are known to be historic and, at present, only five to six occurrences are known to be extant.

Extant occurrences are known from North Carolina and Virginia. Raven's Seedbox may be extirpated from Florida, where it has not been observed since 1982. The only record of Raven's Seedbox in Florida is from Clay County in the northeastern part of the state. Raven's Seedbox is a wetland obligate, and general habitat for this species include bogs, fens and forested wetlands. Specific habitat includes open, wet, peaty places such as ditches and the margins of swamps, ponds, or bogs. In Virginia, all extant populations are in ditches and power line right-of-ways (Nature Serve 2020).

Populations of Raven's Seedbox are composed of scattered individuals (Nature Serve 2020). The species is self-compatible, a trait that could result in low genetic diversity of the species and potentially influence its long-term survival. The ditches and power lines occupied by this species are threatened by herbicide use, excavation and deepening of ditches, and road widening and paving (Nature Serve 2020).

### Scrub Lupine

The Scrub Lupine (*Lupinus aridorum* = *Lupinus westianus* var. *aridorum*) was listed as endangered effective April 7 1987 (52 FR 11172). Critical habitat has not been designated (USFWS 2020a).

This short-lived perennial subshrub is currently known only from 12 extant populations in Orange and Polk Counties in Florida (USFWS 2016d). The Scrub Lupine grows on fine, well-drained, sandy soils in openings of sand pine scrub, oak scrub, and rosemary scrub, usually where there has been disturbance (USFWS 2016d, NatureServe 2020). Three natural populations and three introduced populations occur on protected lands, while the remaining populations exist on private land that is vulnerable to development (USFWS 2016d). Due to its short life cycle of four to six years, populations can fluctuate significantly from year to year, with some populations decreasing and increasing by hundreds from one year to the next (USFWS 2016d, NatureServe 2020). Excluding the three managed populations on protected sites, the species is declining (USFWS 2016d). Threats to this



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species include urban development, recreational damage, disease, insect herbivory, fire suppression, and stochastic events (USFWS 2016d, NatureServe 2020).

### Curtis' Loosestrife

Curtis' Loosestrife (*Lythrum curtissii*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Curtis' Loosestrife is considered Critically Imperiled by NatureServe (NatureServe 2020).

This perennial herb species grows in wet areas, such as bogs, seeps, acid or calcareous swamps, karst ponds, creek swamps, floodplains, tidal flats, streambanks, and tidal river mouths of Florida and Georgia. In Florida, occurrences of this species are known from Liberty, Franklin, Gadsden, Putnam, and St. Johns counties, Florida. There are also vague, non-specific location reports from Bay, Calhoun, and Levy counties in Florida. Threats to this species are known to be soil disturbance (tilling, grading, etc.), herbicide application on roadsides, fire suppression, and hydrology alteration (NatureServe 2020).

### Lowland Loosestrife

Lowland Loosestrife (*Lythrum flagellare*) was petitioned for listing in April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under at this time (USFWS 2020a). Lowland Loosestrife is listed by several other entities, including as Endangered by the state of Florida and Imperiled in Florida by NatureServe (CBD 2010a).

This species is characterized as a sprawling perennial herb with a creeping rhizome (NatureServe 2020). It lives in herbaceous wetlands and is often observed growing in mucky or sandy-peat muck soils on the peripheries of ponds, ditch banks, and edges of cypress depressions (NatureServe 2020). This plant has a small range in the west central portion of the Florida peninsula, with individuals found in Charlotte, Collier, Dade, Desoto, Glades, Henry, Lee, Manatee, Okeechobee, and Sarasota Counties. The primary threat to Lowland Loosestrife is habitat loss through drainage, canopy closure, fire suppression, and logging (CBD 2010a).

### White Birds-in-a-nest

The White Birds-in-a-nest (*Macbridea alba*) was listed as threatened effective June 8, 1992 (57 FR 19813). Critical habitat has not been designated (USFWS 2020a).

The White Birds-in-a-nest is a perennial herb that blooms from May to mid-July. It is endemic to the Florida Panhandle, occurring in Bay, Gulf, Franklin, and Liberty counties (USFWS 2009k), and isthreatened by habitat degradation due to intensive forestry practices and lack of prescribed fire (NatureServe 2020). This species inhabits wet to mesic pine flatwoods, seepage bogs, savannas, and occasionally drier sites with longleaf pine (*Pinus palustris*) and runner oaks (*Quercus pumila*) (FNAI 2001b, NatureServe 2020). It is capable of both sexual and vegetative (via rhizomes) reproduction; however, self-fertilized seeds have been observed to exhibit inbreeding depression (USFWS 2009k).

### Godfry's Stitchwort

Godfry's Stitchwort (*Minuartia godfreyi*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Godfry's Stitchwort is listed by several other entities, including as Endangered by the state of Florida and Critically Imperiled in Florida by NatureServe (CBD 2010a).

This perennial herb grows in herbaceous wetlands such as creek banks, roadside ditches, tidal freshwater marshes, delta post oak flatwoods, saline wet prairies, and wet meadows. As of 2011, NatureServe reported between six and 20 known occurrences of this species ranging from central Tennessee to coastal North Carolina south to Florida, with only three populations believed to be of good viability/integrity. In Florida, the species is

restricted to Taylor County. Threats to this species include habitat destruction/conversion from roadside construction or commercial logging operations (NatureServe 2020).

### Needleleaf Waternymph

Needleleaf Waternymph, also known as Narrowleaf Naiad, (*Najas filifolia*) was petitioned for listing in April 20, 2010 (CBD 2010a), and the 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Needleleaf Waternymph is listed by several other entities, including as Threatened by the state of Florida and Critically Imperiled in Florida by NatureServe (CBD 2010a).

This species is characterized as a floating annual plant, which typically inhabits shallow, dark (tannic-acid tinted) water of ponds and lakes (FNAI 2001b). The range of the Needleleaf Waternymph extends from the Florida Panhandle down through the Florida peninsula and parts of southwestern Georgia (NatureServe 2020). As of 2000, this species was only reported in Santa Rosa and Leon Counties, Florida, and in Decatur County, Georgia (CBD 2010a). Occurrences have also been recorded in the Blackwater River (FNAI 2001b). This species is at risk due to habitat destruction caused by damming and other practices that alter hydrological regimes (NatureServe 2020). As an aquatic species, the Needleleaf Waternymph also faces risk of predation by grass carp (*Ctenopharyngodon idella*), an introduced/invasive herbivorous fish (CBD 2010a).

### Britton's Beargrass

Britton's Beargrass (*Nolina brittoniana*) was listed as endangered on April 27, 1993 (58 FR 25746). Critical habitat has not been designated (USFWS 2020a).

The species is found in the following Florida counties: Hardee, Hernando, Highlands, Lake, Orange, Osceola, Polk, and Marion counties of Florida. Britton's Beargrass habitat includes forest/woodland, sand/dune, and shrubland/chaparral habitat with fine-textured, well-drained sands. Associated plant species include saw palmetoo (*Serenoa repens*), scrub palmetto (*Sabal etonia*), crooked-wood (*Lyonia ferruginea*), sand heath (*Ceratiola ericoides*), Feay's palafox (*Palafoxia feayi*), and pineland threeawn (*Aristida stricta*) (NatureServe 2020). The species flowers from March through May (USFWS 2020a).

More than 90 percent of Britton's Beargrass habitat has been lost to citrus agriculture and rapid urbanization. It is also declining due to fire suppression, which results in a dense canopy cover. About 100 populations remain, with half of these occurring on 10 conservation areas. The species has also been impacted by off-road vehicles in some locations (FNAI 2001b).

### Cape Sable Orchid

The Cape Sable Orchid (*Oncidium undulatum* = *Trichocentrum undulatum*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Cape Sable Orchid is considered Critically Imperiled in Florida by NatureServe (CBD 2010a).

The Cape Sable Orchid is an epiphytic orchid that produces a large, showy, many-flowered inflorescence. From April to September, they produce many glossy brown to yellow-green flowers that are marked with brown (NAOCC 2019). It is known to inhabit buttonwood stands in southern Florida and is infrequently found in remote cypress sloughs in Big Cypress National Preserve (NatureServe 2020). The Cape Sable Orchid consists of a shoot with one tough leathery leaf; they grow on the trunks and branches of trees and can reach one to five meters in height. Although it is widely distributed in the West Indies, Mexico, Central America, and northern South America, it was been petitioned for federal listing based on its overutilization for commercial purposes and the inadequacy of existing regulatory mechanisms (76 FR 59835).

### Papery Whitlow-wort

The species *Paronychia chartacea* was listed as threatened effective January 21, 1987 (52 FR 2227). Critical habitat has not been designated (USFWS 2020a).

The species *Paronychia chartacea* is a small, herbaceous member of the pink family (Caryophyllaceae) that forms low mats. Papery Whitlow-wort (*Paronychia chartacea* ssp. *chartacea*), is a short-lived perennial subspecies which occurs in scrub habitats on the Lake Wales Ridge and adjacent uplands in central Florida. It occurs in Lake, Polk, Highland, Orange and Glade counties (USFWS 2008k). The natural habitat for Papery Whitlow-wort is rosemary scrub, which is also known as the rosemary phase of sand pine (*Pinus clausca*) scrub (USFWS 1999). Papery Whitlow-wort also occurs in scrubby flatwoods or adjacent firelines and sandy roads (USFWS 2008k). The subspecies depends on occasional fires, or equivalent mechanical land disturbance to maintain bare sand habitats. It is vulnerable to destruction by off-road vehicles that drive through openings between shrubs, and it is threatened by lack of fire or other disturbance (USFWS 1999). Crystal Lake Nailwort, (*P. c. minima*) was first recognized as a separate subspecies in 1991 and its prior range is unknown. The Crystal Lake Nailwort is an annual occurring almost exclusively on the sandy margins of karst ponds in the Florida Panhandle. It is currently known from only Washington and Bay Counties (USFWS 2008k). At the time of listing, the two distinct subspecies of *Paronychia chartacea* were not recognized. Both subspecies are endemic to Florida, and geographically isolated (USFWS 2008k). *Paronychia chartacea* is primarily threatened by habitat loss (USFWS 1999).

### Key Tree Cactus

The Key Tree Cactus (*Pilosocereus robinii* = *Cereus robinii*,) was listed as endangered effective July 19, 1984 (49 FR 29237). Critical habitat has not been designated (USFWS 2020a).

This tree-cactus is found only on the Keys of Monroe County, Florida and in Cuba; only seven populations are extant. It grows on sandy soils with limestone geology in hardwood hammocks and thorn scrub communities just above high tide levels. Threats to this species include illegal horticultural collection, development/habitat conversion, population fragmentation, sea level rise/increased soil salinity, deer herbivory, and stochastic events (USFWS 2010j, NatureServe 2020).

### Godfrey's Butterwort

Godfrey's Butterwort (*Pinguicula ionantha*) was listed as threatened effective August 11, 1993 (58 FR 37432). Critical habitat has not been designated (USFWS 2020a).

Godfrey's Butterwort is a perennial herb. Flowering occurs February to April (FNAI 2001b). This carnivorous plant thrives in bog habitats within longleaf pine savannas including bogs, seeps, wet pine flatwoods, wet prairies, and ditches; it is frequently seen growing directly in the water (FNAI 2001b, USFWS 2018l, NatureServe 2020). Godfrey's Butterwort may also occur in open peat or sandy peat soils (USFWS 2018l). It is highly dependent upon regular fire regimes for population growth (NatureServe 2020). Its range includes in Bay, Calhoun, Franklin, Gulf, Liberty, and Wakulla counties in Florida (USFWS 2018l). The main threats facing this species are habitat conversion and degradation associated with fire suppression and silviculture practices (NatureServe 2020). It has already been extirpated from several sites as a result of these threats. Recent survey efforts have documented 24 remaining populations out of 83 known historical occurrence sites (USFWS 2018l).

### Lewton's Polygala

The Lewton's Polygala, as known as Lewton's polygala milkwort, (*Polygala lewtonii*) was listed as endangered effective May 7, 1993 (58 FR 25746). Critical habitat has not been designated (USFWS 2020a).

This short-lived, perennial, tap-rooted herb grows exclusively on dry, well-drained, yellow sand areas of sandhill and oak-hickory scrub communities. In Florida, the species occurs in the following counties: Marion, Lake, Osceola, Orange, Polk, and Highlands. Its range includes the Lake Wales Ridge and Mount Dora Ridge. This species is adapted to patchy, infrequent fires to maintain an open canopy and facilitate new recruitment. While

mature plants rarely survive fires, seedlings sprout readily. Threats to this species include habitat loss, degradation, and fragmentation; altered fire regimes; urbanization; off-highway- vehicle/trampling damage; and non-native plant species encroachment (USFWS 2010k).

### Tiny Polygala Milkwort

The Tiny Polygala Milkwort (*Polygala smallii*) was listed as endangered effective July 18, 1985 (50 FR 29345). Critical habitat has not been designated (USFWS 2020a).

The species is endemic to the southern portion of Florida's Atlantic Coastal Ridge, an area that is rapidly being converted into commercial and residential developments (NatureServe 2020). The Tiny Polygala Milkwort is a small perennial herb that grows up to 10 centimeters high and blooms year-round (FNAI 2001b). The species inhabits areas of open grassy pineland, sandy pine rockland, scrubby flatwoods, and sandhill. It is often found in disturbed areas and relies on fire or other means of suppressing competition from other plants (NatureServe 2020). Its distribution is fragmented and clusters of sites are separated by an average of 61 kilometers (USFWS 2010l). Threats to the species include urban development, invasive species, and fire suppression (FNAI 2001b).

### Horton Wireweed

Horton Wireweed (*Polygonella basiramia*) was listed as endangered effective Febuary 20, 1987 (52 FR 2227). Critical habitat has not been designated (USFWS 2020a).

This species is a short-lived, tap-rooted herb that is endemic to central Florida's Polk and Highlands counties along the Winter Haven, Bombing Range, and Lake Wales Ridges. It grows only on moderately drained, white sand gaps, typically in rosemary scrub or oak scrub communities. It is semi-dependent on patchy, infrequent fire to maintain the open scrub canopy and the bare sand microhabitat it requires. Fire kills mature plants, and the species does not have a persistent soil seed bank. Reestablishment is reliant on neighboring, unburned plants for reseeding (USFWS 2010m). Threats to this species include off-road vehicle damage, habitat degradation due to lack of management/altered fire regimes, development, citrus grove conversion, pedestrian trampling, and non-native plant species encroachment (USFWS 2010m, NatureServe 2020).

### Sandlace

Sandlace, also known as Woody Wireweed or Small's Jointweed, (*Polygonella myriophylla*) was listed as endangered effective May 27, 1993 (58 FR 25746). Critical habitat has not been designated (USFWS 2020a).

Sandlace is a sprawling perennial subshrub, which forms large mats along the ground through clonal growth (58 FR 25746, USFWS 2010n). It is a slow-growing and long-lived species. Flowering occurs throughout much of the year, except January and February (USFWS 2010n). Its range includes Orange, Osceola (just one location), and Polk counties in Florida (58 FR 25746). The species has been documented recently at 113 occurrences of 140 known historic occurrences. Sandlace inhabits sandy gaps in Florida scrublands (USFWS 2010n), as well as disturbed areas. The species prefers to grow in areas with xeric, white sandy soils. It is adapted to long intervals of eight to 30 years between fire disturbances (USFWS 2010n). This species is threatened by habitat loss from urbanization and agriculture (NatureServe 2020).

### Florida Pondweed

The Florida Pondweed (*Potamogeton floridanus*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a).

This species is known from only four recorded occurrences within a single drainage (the Blackwater River and its tributaries) in Santa Rosa County, Florida (NatureServe 2020). It is a submerged aquatic herb that inhabits slow-moving blackwater streams and rivers (FNAI 2001b). The species is at risk of destruction, modification, or



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curtailment of its habitat or range, and from inadequate protection under existing regulatory mechanisms (76 FR 59835).

### Scrub Plum

The Scrub Plum (*Prunus geniculata*) was listed as endangered effective January 21, 1987 (52 FR 2227). Critical habitat has not been designated (USFWS 2020a).

The Scrub Plum is a deciduous shrub that blooms from January to February (FNAI 2001b). It is endemic to central Florida and inhabits fairly open areas of sandhill and oak scrub, responds vigorously to fire disturbance, and cannot withstand soil disturbance or shade (NatureServe 2020). The species is declining due to rapid loss of habitat from conversion to citrus groves and residential housing and fire suppression (NatureServe 2020). The Scrub Plum has extremely low recruitment, which impedes population growth (USFWS 2017d).

### White Meadowbeauty

White Meadowbeauty, also known as the Small-flowered Meadowbeauty, (*Rhexia parviflora*)) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). White Meadowbeauty is listed by several other entities, including as Endangered by the state of Florida and Imperiled in Florida by NatureServe (CBD 2010a).

It is a perennial herb that blooms from June to August (FNAI 2001b). The species occurs mainly in the Florida Panhandle, southeast Alabama, and Georgia. It is uncommon within its known range and only a few individuals exist per population. The White Meadowbeauty inhabits seepage slopes, margins of ponds, and shallow depressions associated with pine-palmetto flatwoods and savannas of the Gulf Coastal Plain (NatureServe 2020). The species is sensitive to changes in ground and surface hydrology and has been nearly eliminated from private lands due to logging and wetland drainage (FNAI 2001b).

### Panhandle Meadowbeauty

Panhandle Meadowbeauty (*Rhexia salicifolia*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Panhandle Meadowbeauty is listed by several other entities, including as Threatened by the state of Florida, Imperiled in Florida by NatureServe, and a Species of Concern by the USFWS (CBD 2010a).

Panhandle Meadowbeauty is a tall, perennial, herbaceous species in the Melastomataceae (meadow beauty) family. It is known from approximately 50 to 80 occurrences scattered through the western and central Florida Panhandle and adjacent to Alabama, and from one location in Georgia (Nature Serve 2020). Panhandle Meadowbeauty is an obligate wetland species and grows in full sun in wet sandy or sandy-peaty areas of sinkhole pond shores, interdunal swales, margins of depression marshes, flatwood ponds, and sandhill upland lakes. Approximately half of the known occurrences of Panhandle Meadowbeauty are from the shores of private karst ponds that are often scraped to create “beaches” (FNAI 2001b). Panhandle Meadowbeauty is highly threatened by land use conversion, habitat fragmentation, and human disturbance (off-road vehicle use and mowing of pond margins), and threatened to a lesser extent by forest management practices. Additional threats include erosion and run- off from pine plantations and lakeside developments, which cause damage to shorelines and alter the hydrology of karst ponds (Nature Serve 2020).

### Chapman Rhododendron

Chapman Rhododendron (*Rhododendron chapmanii* = *R. minus* var. *chapmanii*) was listed as endangered effective May 23, 1979 (44 FR 24248). Critical habitat has not been designated (USFWS 2020a).

The Chapman Rhododendron is a perennial, evergreen shrub with egg-shaped or elliptic leaves alternately arranged on the stem; the plant can reach heights of three meters. It has a fairly narrow flowering period of two to three weeks beginning in mid-March or early-April (NatureServe 2020). The Chapman Rhododendron inhabits the transitional area between upland mesic or scrubby flatwoods and floodplain swamps or baygalls. The species is occasionally found within mesic pine flatwoods or on sandhills at low elevations. These habitats are fire-dependent and the species prolifically resprouts and flowers following fire (USFWS 2019w). Threats to the species include development, timber harvesting, agriculture, inadequate fire management, and invasive species (USFWS 2019w).

### Hairy-peduncled Beaked-rush

Hairy-peduncled Beaked-rush (*Rhynchospora crinipes*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). The Hairy-peduncled Beaked-rush is listed by several other entities, including as Endangered by the state of Florida and Critically Imperiled in Florida by NatureServe (CBD 2010a).

This perennial sedge was first collected and described in the 1800s. Over 100 years passed before additional sightings were reported. Since then, 18 occurrences were discovered in Florida, 11 in Alabama, four in North Carolina, one in Mississippi, and eight in Georgia. The Hairy-peduncled Beaked rush is known to occur in Gulf, Liberty, Okaloosa, and Santa Rosa Counties in Florida. It grows in riparian habitats, along the stream channels and terraces, or sand-clay bars. Threats to the species include hydrology alteration (river damming and flow alteration), sand and gravel extraction, urbanization, military training activities, siltation from logging, and water quality degradation (NatureServe 2020).

### Miccosukee Gooseberry

Miccosukee Gooseberry (*Ribes echinellum*) was listed as threatened effective August 19, 1985 (50 FR 29338). Critical habitat has not been designated (USFWS 2020a).

This shrub was first discovered on the shores of Lake Miccosukee in Jefferson County, Florida. It has since been found at two more locations around the lake, and two locations 322 kilometers to the northeast in McCormick and Edgefield Counties, South Carolina. The Miccosukee Gooseberry grows in mesic forest communities, such as oak-hickory. Threats to this species include development, invasive species encroachment, and logging activity (NatureServe 2020, USFWS 2015g).

### Eared Coneflower

Eared Coneflower (*Rudbeckia auriculata*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Eared Coneflower is considered Critically Imperiled in Florida by NatureServe (CBD 2010a).

The species is almost completely restricted to the Coastal Plain and has been reported in Alabama, Georgia, and Florida. In Florida, the species occurs in Walton County (Panhandle) (Wunderlin et al. 2020). It occurs in full sun in open bogs, seeps, swamps, ditches, swales, wet openings in woodlands, and occasionally in the partial shade at the edges of hardwood swamps. Only a few number of occurrences inhabit healthy native habitat, with the majority inhabiting highly modified habitat conditions such as utility corridors, roadsides, and pastures. Threats to this species include herbicide application, grazing, silviculture practices impacting soil hydrology, and encroachment of woody species into the open habitat (NatureServe 2020).

### Florida Willow

Florida Willow (*Salix floridana*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90- day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Florida Willow is listed by several other entities, including as Imperiled in Florida by NatureServe



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and Vulnerable by IUCN (CBD 2010a).

According to NatureServe, there are only 22 known occurrences of this species, with less than 500 individuals left. There are 18 extant populations in Florida, two in Alabama, and two in Georgia. Many of these populations are on protected lands. This small tree/shrub grows in saturated, calcareous soils. It is found growing in roadside ditches, near springs, hydric hammocks, and densely wooded floodplains.

Threats to this species include hydrology changes, ditch clearing, water quality degradation, invasive species encroachment, and pine plantation conversion (NatureServe 2020).

### Gulf Sweet Pitcherplant

Gulf Sweet Pitcherplant (*Sarracenia rubra* ssp. *gulfensis*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Gulf Sweet Pitcherplant is listed by several other entities, including as Imperiled in Florida by NatureServe and Endangered by the IUCN (CBD 2010a).

This perennial, carnivorous herb grows in saturated sandy-muck conditions. It thrives in full sunlight or partial shade; the subspecies is not drought tolerant. Habitat includes springhead bogs, the heads of small streams, shallow pond borders, or meandering watercourses. The subspecies occurs in Florida's western Panhandle from Holmes County to Santa Rosa County. There is little information on population size for this subspecies. Threats to Gulf Sweet Pitcherplant include urbanization, habitat destruction/conversion, and altered hydrological conditions (NatureServe 2020).

### American Chaffseed

American Chaffseed (*Schwalbea americana*) was listed as endangered effective September 29, 1992 (57 FR 44703). Critical habitat has not been designated (USFWS 2020a).

American Chaffseed is a perennial herb that blooms from April to June/July along the eastern seaboard and Gulf Coast (USFWS 2019x). In Florida, the species is known from the following counties: Gadsden, Leon, Okaloosa, and Putnam in populations throughout the Southeastern US (NatureServe 2020). Recent surveys have documented only three extant populations in the state (all of which are protected, on Blackwater River State Forest and Horseshoe Plantation) (USFWS 2019y). Habitat consists of open landscapes dominated by frequent fire: pine flatwoods, savannas, and peaty wetlands (USFWS 1995). In terms of microhabitat, the species occurs in areas of disturbance (e.g., roadside ditches, canal banks, and railroad crossings) (USFWS 2019y). Soils are acidic and moist to dry and sandy, sandy/peat, or sandy loam (USFWS 1995). American Chaffseed is dependent on frequent fires to thrive (USFWS 2019y).

Historically, the species occurred along coastal plains from New England to Florida and along the Gulf to the west. Most populations were extirpated as a result of habitat loss from urban and agricultural development. Current threats to the species include habitat loss, collection by hobbyists, and fire suppression (NatureServe 2020). The species is currently in decline (USFWS 2019x).

### Florida Skullcap

The Florida Skullcap (*Scutellaria floridana*) was listed as threatened effective May 8, 1992 (57 FR 19813). Critical habitat has not been designated (USFWS 2020a).

This species is a Florida endemic that grows in only four counties of the Panhandle region: Bay, Gulf, Franklin, and Liberty. Since the 1980s, there has been a 30 percent decline in the species population size; many of the losses are due to development and timber harvest. This species grows in wet areas in longleaf pine flatwoods, prairies, and grassy bog communities near forests and shrub wetlands that are fire-dependent. It grows in sandy, acidic, low nutrient soils in the ecotones between wetlands and mesic areas. Florida Skullcap grows in full sun or light

shade and flowers vigorously after fire. The species is under threat from timber industry practices, habitat modification/destruction, and fire suppression (USFWS 2019z).

### Everglades Bully

The Everglades Bully (*Sideroxylon reclinatum* ssp. *austrofloridense*) was listed as threatened effective October 6, 2017 (82 FR 46691). Critical habitat has not been designated (USFWS 2020a).

There is some debate about the taxonomic distinction of this subspecies of the Everglades Bully (*S. reclinatum* ssp. *reclinatum*). The Everglades Bully is a Florida endemic shrub that grows only in tropical savanna pine rockland and marl prairie habitats of the southeastern peninsular Florida. The Everglades Bully is adapted to natural fire regimes, as well as the seasonal, months-long flooding of marl prairie communities. Its current range includes only Big Cypress National Park and Long Pine Key. This subspecies is threatened by habitat loss/fragmentation, fire suppression, non-native species encroachment, recreation activities, and stochastic events (82 FR 46691).

### Georgia Bully

Georgia Bully, also known as Swamp Buckthorn, (*Sideroxylon thornei*) has been under review for listing many times since 1975 (USFWS 2020a). It was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). Georgia Bully is listed by several other entities including as Critically Imperiled in Florida by NatureServe, and as Endangered by the State of Georgia (CBD 2010a).

Georgia Bully is a thorny shrub (NatureServe 2020). Flowering occurs in May and June (CBD 2010a). It thrives in low-lying oak flatwoods. Soils in these habitats include wetlands atop limestone and areas of high moisture saturation. Its range covers southern Georgia and scattered locations in Alabama and Florida. In Florida, it is known from Franklin, Escambia, and Jackson Counties. The primary threat to this species is habitat degradation, particularly associated with hydrological shifts (e.g., conversion of wetlands for agricultural or silviculture uses) (CBD 2010a).

### Fringed Campion

The Fringed Campion (*Silene polypetala* = *Silene catesbaei*) was listed as endangered effective February 19, 1991 (56 FR 1932). Critical habitat has not been designated (USFWS 2020a).

This perennial herb grows in two disjunct areas, one in central Georgia and the other on the Georgia- Florida border near the Flint and Apalachicola Rivers (56 FR 1932). It grows on well-drained, sandy-loam soils in mesic hardwood forests, typically on north-facing slopes or in ravines (56 FR 1932, USFWS 2015h). Threats to this species include habitat loss/degradation, logging management practices, and invasive species, as well as population fragmentation/low genetic diversity, and deer herbivory (USFWS 2015h, NatureServe 2020).

### Gentian Pinkroot

Gentian Pinkroot (*Spigelia gentianoides*) was listed as endangered effective December 26, 1990 (55 FR 49046). Critical habitat has not been designated (USFWS 2020a).

Gentian Pinkroot is a perennial herb (FNAI 2001b). Flowering typically occurs in May and June, but may be observed earlier or later in the year. The species thrives in upland mixed oak-pine forests (FNAI 2001b, USFWS 2018m). Preferred soils are well-drained and commonly include exposed limestone and calcareous soil types, as well rich in humus (USFWS 2018m). This species is currently limited to Jackson and Calhoun counties, Florida. Its historic range encompasses several adjacent counties (55 FR 9472), including Washington, Calhoun, Jackson, Gadsden, and Liberty counties in Florida and Geneva County in southern Alabama (FNAI 2001b, USFWS 2018m,



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NatureServe 2020). There were only three populations at the time of listing (55 FR 9472). Since that time, five new populations were discovered; however, two of them have been extirpated and currently only two remain (FNAI 2001b, NatureServe 2020). The main threat to these remaining populations is silviculture practices (NatureServe 2020).

A new variety of Gentian Pinkroot was described in 1996: *Spigelia gentianoides* var. *alabamensis* (USFWS 2018). This was included in recovery plan analyses. Based on recent genetic research, Spigelia gentianoides var. alabamensis is now considered a distinct species, pinkroot (*Spigelia alabamensis*). This species inhabits nearly treeless glades associated with Ketona Dolomite (USFWS 2018m).

### Cooley's Meadowrue

Cooley's Meadowrue (*Thalictrum cooleyi*) was listed as endangered effective February 7, 1989 (54 FR 5935). Critical habitat has not been designated (USFWS 2020a).

Cooley's Meadowrue is a perennial herb that occurs in grass-sedge bogs and wet pine savannahs, flatwoods, and seepage slopes in North Carolina, Florida, and Georgia. The species needs some type of disturbance such as fire or mowing to maintain its open habitat (FNAI 2001b, USFWS 2017e). In Florida, the species is restricted to one occurrence in Walton County on a timber company land utility right-of-way through former flatwoods. However, this occurrence may be extirpated (FNAI 2001b, USFWS 2009l, NatureServe 2020). Plants often found in association with Cooley's Meadowrue include tulip poplar (*Liriodendron tulipifera*), bald cypress (*Taxodium distichum*), and/or Atlantic white cedar (*Chamaecyparis thyoides*) (USFWS 2017e). The species is threatened by fire suppression, herbicides, urbanization, timber harvest, and utility maintenance in habitat areas (USFWS 2017e).

### Florida Torreya

The Florida Torreya (*Torreya taxifolia*) was listed as endangered effective January 23, 1984 (49 FR 2783). Critical habitat has not been designated (USFWS 2020a).

This conifer tree species is found only along ravine slopes on the eastern bank of the Apalachicola River in Florida and Georgia. In Florida, the species occurs in the Panhandle in Liberty and Gadsten counties. Before the 1950s, the Florida Torreya used to be one of the most abundant tree species in the Apalachicola Bluff region. Experts estimate that the species has lost at least 98.5 percent of its population since that time, with only an estimated 500 to 600 trees still left on the landscape. These remaining trees do not appear to reach reproductive maturity due to disease-related mortality, and all population viability models show that natural populations of this species will inevitably go extinct. Some conservationists are making controversial efforts to translocate this species to areas north of its current known range. Threats to this species include soil chemistry changes associated with hydrology disruption, fire suppression, and disease (USFWS 2010o).

#### Florida Bristle Fern

The Florida Bristle Fern, also known as Florida Filmy Fern, (*Trichomanes punctatum* ssp. *floridanum*) was listed as endangered effective October 6, 2015 (80 FR 60440). Critical habitat has not been designated (USFWS 2020a).

The subspecies has two distinct metapopulations, one in Central and one is South Florida (Sumter and Miami-Dade Counties) (USFWS 2018n). Within these metapopulations, there are only six documented populations (USFWS 2018n). The subspecies inhabits tree trunks in hammocks, edges of limesinks, and limestone boulders, often with mosses and liverworts (FNAI 2001b). The Florida Bristly Fern is threatened by multiple factors: extreme curtailment of its habitat; habitat destruction, conversion and fragmentation; destruction or damage from foot traffic and recreational vehicles; invasive species; sea level rise; incompatible hydrological management strategies; and climatic changes in seasonal precipitation as well as temperature and storm cycles (USFWS 2018, NatureServe 2020).

### Ocala Vetch

Ocala Vetch (*Vicia ocalensis*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90- day finding determined that listing may be warranted (76 FR 59835). On October 10, 2019, the species was determined to not be warranted for listing (84 FR 53336).

This species is characterized as an herbaceous perennial vine. It is often observed growing in sandy peat of open, wet thickets along the margins of spring runs and streambanks. This plant has a small range and is only found in two Florida counties (Lake and Marion) (NatureServe 2020). All known occurrences are from Ocala National Forest and Lake Woodruff National Wildlife Refuge (FNAI 2001b). This species is not particularly vulnerable to agriculture and land development as it is currently only known to occur on federally protected land; however, hydrological changes caused by logging and competition with invasive species still pose a threat to this species (NatureServe 2020).

### Wide-leaf Warea

Wide-leaf Warea, also known as the Clasping Warea and Wideleaf Pinelandcress, (*Warea amplexifolia*) was listed as endangered effective April 29, 1987 (52 FR 15501). Critical habitat has not been designated (USFWS 2020a).

The Wide-leaf Warea is an annual herb growing from 30 to 100 centimeters high. It flowers in September and October (FNAI 2001b). Occurrence records are from the following Florida counties: Lake, Polk, Osceola, and Orange. The species is restricted to longleaf pine and turkey oak sandhill habitats in central Florida and requires frequent fire (every one to three years) to maintain the open habitat in which it thrives. Microhabitat features include sandy substrate and direct sunlight. This habitat has been highly fragmented and degraded, and is threatened by the development of citrus groves and residential housing (NatureServe 2020).

### Carter's Mustard

Carter's Mustard (*Warea carteri*) was listed as endangered effective January 21, 1987 (52 FR 2227). Critical habitat has not been designated (USFWS 2020a).

Carter's Mustard occurs along Lake Wales Ridge in central Florida. One occurrence is also known from coastal scrub habitat in Brevard County on Florida's Atlantic Coast (however, this occurrence has not been recently relocated). The species occurred historically in the Miami metropolitan area but is extirpated from that region (USFWS 2020a). The species occurs in xeric, shrub-dominated, sandhill, scrubby flatwood, inland, and coastal scrub habitats. Carter's Mustard appears only after fire (USFWS 1999). The primary threat to the species is habitat loss or modification (habitat frequently converted to citrus groves or urban development) (FNAI 2001b).

### Karst Pond Xyris

The Karst Pond Xyris (*Xyris longisepala*) was petitioned for listing on April 20, 2010 (CBD 2010a), and the partial 90-day finding determined that listing may be warranted (76 FR 59835). The species remains under review at this time (USFWS 2020a). NatureServe has designated this species Imperiled in Florida (NatureServe 2020).

This perennial herb has between 50 to 90 known occurrences. Occurrences are from Bay, Leon, Okaloosa, Wakulla, Walton, and Washington counties in Florida, and two sites in Covington County, Alabama. It grows in open, sunny wetlands; along the edges of sandy lime-sink lakes/ponds; and upland, sandhill lakes. It usually grows in abundance along the shores of water. Threats to this species include vegetation removal/mowing associated with residential infrastructure, silt deposition from upland disturbance, and recreational activities (off-road vehicles and other shore edge trampling; NatureServe 2020).

### Florida Ziziphus

The Florida Ziziphus (*Ziziphus celata*) was listed as endangered effective July 27, 1989 (54 FR 31190). Critical



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habitat has not been designated (USFWS 2020a).

This species was thought to be extinct when it was first described from a 36-year-old herbarium specimen in 1984. Since then, 14 locations of this species were discovered (USFWS 2009m). All remaining populations exist in Polk and Highlands Counties, on the Lake Wales Ridge in central Florida. It grows on the xeric, yellow sand paleo-dunes of Central Florida (USFWS 2019aa). Florida Ziziphus is a short (1.5 meter), thorny, clonal, hermaphroditic shrub. Research shows that this species is sterile when fertilized with its own pollen or with the pollen of an individual of the same genotype. Almost all the remaining wild populations have become so isolated from one another that they are now composed of genetically identical, fragmented individuals (USFWS 2009m, USFWS 2019aa). Since the most recent USFWS five- year review in 2009, four populations were reintroduced on protected lands (USFWS 2019aa). Threats to this species include habitat destruction/conversion, fire suppression, invasive plants, and genetic isolation (USFWS 2009m).



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# Appendix C
## Effects of the Action on ESA-listed Species



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**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | IS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| ***Mammals*** | | | | | | | | | | | | | | | |
| Wetland/ marsh | Sherman's Short-tailed Shrew (*Blarina brevicauda shermani*) | URS | N | Y | N/A | - | | | | X | X | X | X | | X |
| Forest/ grasslands/ swamp | Gray Wolf (*Canis lupus*) | E | Y | N | N/A | - | | | | X | | X | | | |
| Forest/ grasslands/ swamp | Red Wolf (*Canis rufus*) | E | N | Y | N/A | - | X | | | X | | X | | | |
| Tropical hardwood hammock/ mangrove | Florida Bonneted Bat (*Eumops floridanus*) | E | N | Y | N/A | 411 | | | | X | | X | X | | X |
| Wetland/ marsh | Florida Salt Marsh Vole (*Microtus pennsylvanicus dukecampbelli*) | E | N | Y | N/A | | | | | X | X | X | X | | X |
| Caves | Gray Bat (*Myotis grisescens*) | E | N | Y | N/A | - | | | | X | | X | | | |
| Caves | Little Brown Bat (*Myotis lucifugus occultus*) | UR | N | Y | N/A | - | | | | X | | X | X | | X |
| Caves | Indiana Bat (*Myotis sodalis*) | E | Y | N | N/A | - | | | | X | | X | | | |
| Tropical hardwood hammock/ mangrove | Key Largo Woodrat (*Neotoma floridana smalli*) | T | N | Y | N/A | 1 | | X | | X | | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Pine rockland | Key Deer (*Odocoileus virginianus clavium*) | E | N | N | N/A | 5 | | | | X | | X | X | | X |
| Wetland/ marsh | Rice Rat (*Oryzomys palustris natator*) | E | Y | Y | N/A | 5 | X | X | | X | X | X | X | | X |
| Wetland/ marsh | Pine Island Rice Rat (*Oryzomys palustris planirostris*) | URS | N | Y | N/A | - | | | X | X | X | X | X | | X |
| Wetland/ marsh | Sanibel Island Rice Rat (*Oryzomys palustris sanibeli)* | URS | N | Y | N/A | - | | | X | X | | X | X | | X |
| Caves | Tricolored Bat (*Perimyotis subflavus*) | URS | N | Y | N/A | - | | | | X | | X | X | | X |
| Tropical hardwood hammock/ mangrove | Key Largo Cotton Mouse (*Peromyscus gossypinus allapaticola*) | E | N | Y | N/A | 1 | | X | | X | X | X | X | | X |
| Beach/ scrub dune | Choctawhatchee Beach Mouse (*Peromyscus polionotus allophrys*) | E | N | N | N/A | 1 | | | | X | X | X | | | |
| Beach/ scrub dune | Southeastern Beach Mouse (*Peromyscus polionotus niveiventris*) | T | N | N | N/A | 3 | | | | X | X | X | | | |
| Beach/ scrub dune | St. Andrew Beach Mouse (*Peromyscus polionotus peninsularis*) | E | Y | N | N/A | 4 | | X | | X | X | X | | | |
| Beach/ scrub dune | Anastasia Island Beach Mouse | E | N | N | N/A | - | | | | X | X | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| | | | | | | | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| | (*Peromyscus polionotus phasma*) | | | | | | | | | | | | | | |
| Beach/ scrub dune | Perdido Key Beach Mouse (*Peromyscus polionotus trissyllepsis*) | E | N | N | N/A | - | | X | X | X | X | X | | | |
| Forests/ grasslands/ swamps | Florida Panther (*Puma* [=*Felis*] *concolor coryi*) | E | N | Y | N/A | 197 | | | | X | X | X | X | | |
| Wetland/ marsh | Insular Hispid Cotton Rat (*Sigmodon hispidus insulicola*) | URS | N | N | N/A | - | | | | X | | X | X | | X |
| Wetland/ marsh | Lower Keys Rabbit (*Sylvilagus palustris hefneri*) | E | N | Y | N/A | 6 | | X | X | X | X | X | X | | X |
| Aquatic | West Indian Manatee (*Trichechus manatus*) | T | Y | Y | N/A | 493 | | | | X | X | X | X | | X |
| ***Birds*** | | | | | | | | | | | | | | | |
| Wetland/ marsh | Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*) | E | Y | Y | N/A | 9 | | | | X | X | X | X | | X |
| Grassland | Florida Grasshopper Sparrow (*Ammodramus savannarum floridanus*) | E | N | N | N/A | 57 | | | | X | | X | X | | |
| Wetland/ marsh | Saltmarsh Sparrow (*Ammospiza caudacutas*) | UR | N | Y | N/A | - | | | | X | X | X | X | | X |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Upland scrub | Florida Scrub-jay (*Aphelocoma coerulescens*) | T | N | N | N/A | 199 | | | | X | | X | X | | |
| Coastal tidal/marine | Rufa Red Knot (*Calidris canutus rufa*) | T | N | Y (tidal flats) | N/A | 9 | | | | X | X | X | X | | X |
| Forest/ forested wetland | Ivory-billed Woodpecker (*Campephilus principalis*) | E | N | T | N/A | 1 | | | | X | | X | X | | X |
| Coastal tidal/marine | Piping Plover (*Charadrius melodus*) | T* | Y | Y (intertidal beaches) | N/A | 29 | | | | X | X | X | X | | X |
| Grassland | Whooping Crane (*Grus americana*) | E | Y | Y | N/A | | | | | X | X | X | X | | X |
| Wetland/ marsh | Eastern Black Rail (*Laterallus jamaicensis* ssp. *jamaicensis*) | URS | N | Y | N/A | - | | | | X | X | X | X | | X |
| Wetland/ marsh | Wood Stork (*Mycteria americana*) | T | N | Y | N/A | 2681 | | X | | X | X | X | X | | X |
| Grassland | Eskimo Curlew (*Numenius borealis*) | E | N | Y | N/A | - | | | | X | | X | X | | |
| Pine savanna | Red-cockaded Woodpecker (*Picoides borealis*) | E | N | N | N/A | 298 | | | | X | | X | X | | |
| Grassland | Audubon's Crested Caracara (*Polyborus plancus audubonii*) | T | N | Y | N/A | 175 | | X | | X | | X | X | | X |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Coastal tidal/marine | Black-capped Petrel (*Pterodroma hasitata*) | P | N | N | N/A | - | | | | | X | | | | |
| Wetland/ marsh | Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*) | E | Y | Y | N/A | 159 | | X | X | X | | X | X | X | X |
| Forest/ forested wetland | Kirtland's Warbler (*Setophaga kirtlandii = Dendroica kirtlandii*) | D | N | N | N/A | 2 | | | | X | | X | | | |
| Coastal tidal/marine | Roseate Tern (*Sterna dougallii dougallii*) | T* | N | N | N/A | 1 | | | | X | X | X | | | |
| Forest/ forested wetland | Bachman's Wood Warbler (*Vermivora bachmanii*) | E | N | Y | N/A | - | | | | X | | X | X | | |
| Forest/ forested wetland | Golden-winged Warbler (*Vermivora chrysoptera*) | URS | N | Y | N/A | - | | | | X | | X | X | | X |
| ***Reptiles*** | | | | | | | | | | | | | | | |
| Wetland/ marsh/ freshwater | American Alligator (*Alligator mississippiensis*) | TS | N | Y | N/A | 2 | | X | | X | X | X | X | | X |
| Wetland/ marsh/ freshwater | Spotted Turtle (*Clemmys guttata*) | URS | N | Y | N/A | - | X | X | X | X | X | X | X | | X |
| Swamp/ saltwater | American Crocodile (*Crocodylus acutus*) | T | Y | Y | N/A | 33 | | X | | X | X | X | X | | X |
| Pine flatwoods | Eastern Diamondback Snake | URS | N | N | N/A | - | | | | X | | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| | (*Crotalus adamanteus*) | | | | | | | | | | | | | | |
| Pine rocklands | Key Ringneck Snake (*Diadophis punctatus acricus*) | URS | N | N | N/A | - | | | | X | | X | | | |
| Pine flatwoods | Eastern Indigo Snake (*Drymarchon corais couperi*) | T | N | Y | N/A | 2697 | | | | X | | X | X | | |
| Sandhill/ scrub flatwoods | Gopher Tortoise (*Gopherus polyphemus*) | C* | N | N | N/A | 1 | | | | X | | X | | | |
| Wetland/ marsh/ freshwater | Escambia Map Turtle (*Graptemys ernsti*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | | X |
| Sandhill/ scrub flatwoods | Southern Hognose Snake (*Heterodon simus*) | NW | N | N | N/A | - | | | | X | | X | | | |
| Wetland/ marsh/ freshwater | Apalachicola Common Kingsnake (*Lampropeltis getula meansi*) | URS | N | Y | N/A | - | | X | | X | X | X | X | | |
| Wetland/ marsh/ freshwater | Alligator Snapping Turtle (*Macrochelys termminckii*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | | X |
| Wetland/ marsh/ freshwater | Atlantic Salt Marsh Snake (*Nerodia clarkii taeniata*) | T | N | Y (streams) | N/A | 6 | | X | | X | X | X | X | | X |
| Sandhill/ scrub flatwoods | Florida Pine Snake (*Pituophis melanoleucus mugitus*) | URS | N | N | N/A | - | | | | X | | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Sandhill/ scrub flatwoods | Bluetail Mole Skink (*Plestiodon egregius lividus*) | T | N | N | N/A | 31 | | | | X | | X | | | |
| Sandhill/ scrub flatwoods | Sand Skink (*Plestiodon reynoldsi*) | T | N | N | N/A | 66 | | | | X | | X | | | |
| Wetland/ marsh/ freshwater | Florida Red-bellied Turtle (*Pseudemys nelsoni*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | | X |
| Sandhill/ scrub flatwoods | Florida Scrub Lizard (*Sceloporus woodi*) | URS | N | N | N/A | - | | | | X | | X | | | |
| Sandhill/ scrub flatwoods | Short-tailed Snake (*Stilosoma extenuatum*) | URS | N | N | N/A | - | | | | X | | X | | | |
| Pine rocklands | Rim Rock Crowned Snake (*Tantilla oolitica*) | URS | N | N | N/A | - | | | | X | | X | | | |
| ***Amphibians[a]*** | | | | | | | | | | | | | | | |
| Pond breeding | Reticulated Flatwoods Salamander (*Ambystoma bishopi*) | E | N | Y | N/A | 6 | | | | X | | X | X | | X |
| Pond breeding | Frosted Flatwoods Salamander (*Ambystoma cingulatum*) | T | N | Y | N/A | - | | | | X | | X | X | | X |
| Cave | Georgia Blind Salamander (*Eurycea wallacei*) | URS | N | Y (aquatic caves) | N/A | - | | | | | | | X | | X |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Pond breeding | Gopher Frog (*Lithobates capito*) | URS | N | Y | N/A | - | | | | X | | X | X | | X |
| Aquatic | Gulf Hammock Dwarf Siren (*Pseudobranchus striatus lustricolus*) | URS | N | Y | N/A | - | | | X | X | X | X | X | X | X |
| ***Fishes*** | | | | | | | | | | | | | | | |
| Sturgeon | Shortnose Sturgeon (*Acipenser brevirostrum*) | E | N | Y (streams) | N/A | - | | X | | X | X | X | X | | X |
| Sturgeon | Gulf Sturgeon (*Acipenser oxyrinchus* [=*oxyrhynchus*] *desotoi*) | T | Y | Y (streams) | N/A | - | | X | | X | X | X | X | | X |
| Sturgeon | Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) | E* | Y | Y (streams) | N/A | - | | X | | | | | | | X |
| Benthic insectivore | Okaloosa Darter (*Etheostoma okalossae*) | T | N | Y (streams) | N/A | 1 | X | X | X | X | X | X | X | X | X |
| Topminnow | Saltmarsh Topminnow (*Fundulus jenkinsi*) | URS | N | Y (streams) | N/A | - | X | X | X | X | X | X | X | X | X |
| Sawfish | Smalltooth Sawfish (*Pristis pectinate*) | E* | Y | Y (streams) | N/A | 305 | | X | | X | X | X | X | X | X |
| ***Mollusks*** | | | | | | | | | | | | | | | |
| Mussel | Southern Elktoe (*Alasmidonta triangulata*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | X | X |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Mussel | Fat Threeridge (*Amblema neislerii*) | E | Y | Y (streams) | N/A | 6 | | X | | X | X | X | X | X | X |
| Mussel | Rayed Creekshell (*Anodontoides radiatus*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | X | X |
| Snail | Pygmy Siltsnail Snail (*Cincinnatia parva*) | URS | N | Y (streams) | N/A | - | | | | X | X | X | X | X | X |
| Snail | Ponderous Siltsnail Snail (*Cincinnatia ponderosa*) | URS | N | Y (streams) | N/A | - | | | | X | X | X | X | X | X |
| Mussel | Delicate Spike (*Elliptio arctata*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | X | X |
| Mussel | Chipola Slabshell (*Elliptio chiplolaensis*) | T | Y | Y (streams) | N/A | 6 | | X | | X | X | X | X | X | X |
| Mussel | Purple Bankclimber (*Elliptoideus sloatianus*) | T | Y | Y (streams) | N/A | 8 | | X | | X | X | X | X | X | X |
| Mussel | Tapered Pigtoe (*Fusconaia burki*) | T | Y | Y (streams) | N/A | 8 | | X | | X | X | X | X | X | X |
| Mussel | Narrow Pigtoe (*Fusconaia escambia*) | T | Y | Y (streams) | N/A | 3 | | X | | X | X | X | X | X | X |
| Mussel | Round Ebonyshell (*Fusconaia rotulata*) | E | Y | Y (streams) | N/A | 2 | | X | | X | X | X | X | X | X |
| Mussel | Southern Sandshell (*Hamiota australis*) | T | Y | Y (streams) | N/A | 7 | | X | | X | X | X | X | X | X |
| Mussel | Shinyrayed Pocketbook (*Lampsilis subangulata*) | E | Y | Y | N/A | 6 | | X | | X | X | X | X | X | X |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Mussel | Gulf Moccasinshell (*Medionidus penicillatus*) | E | Y | Y (streams) | N/A | 6 | | X | | X | X | X | X | X | X |
| Mussel | Ochlockonee Moccasinshell (*Medionidus simpsonianus*) | E | Y | Y (streams) | N/A | 6 | | X | | X | X | X | X | X | X |
| Mussel | Suwannee moccasinshell (*Medionidus walker*) | T | Y | Y (streams) | N/A | | X | X | X | X | X | X | X | X | X |
| Snail | Stock Island Tree Snail (*Orthalicus reses* [not incl. *nesodryas*]) | T | N | Y | N/A | 2 | | | | X | | X | | | |
| Mussel | Oval Pigtoe (*Pleurobema pyriforme*) | E | Y | Y (streams) | N/A | 11 | | X | | X | X | X | X | X | X |
| Mussel | Fuzzy Pigtoe (*Pleurobema strodeanum*) | T | Y | Y (streams) | N/A | 7 | | X | | X | X | X | X | X | X |
| Mussel | Southern Kidneyshell (*Ptychobranchus jonesi*) | E | Y | Y (streams) | N/A | 7 | | X | | X | X | X | X | X | X |
| Mussel | Choctaw Bean (*Villosa choctawensis*) | E | Y | Y | N/A | 9 | | X | | X | X | X | X | X | X |
| ***Crustaceans*** | | | | | | | | | | | | | | | |
| Pond/ river/ stream | Cypress Crayfish (*Cambarellus blacki*) | URS | N | Y | N/A | - | | | | X | X | X | X | | X |
| Cave/well/ sinkhole | Florida Cave Amphipod | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| | (*Crangonyx grandimanus*) | | | | | | | | | | | | | | |
| Cave/well/ sinkhole | Hobb's Cave Amphipod (*Crangonyx hobbsi*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |
| Cave/well/ sinkhole | Squirrel Chimney Cave Shrimp (*Palaemonetes cummingi*) | T | N | Y (aquatic caves) | N/A | - | | | X | X | | X | X | X | X |
| Cave/well/ sinkhole | Orange Cave Crayfish (*Procambarus acherontis*) | URS | N | Y | N/A | - | | | | X | | X | X | | X |
| Pond/river/ stream | Coastal Flatwoods Crayfish (*Procambarus apalachicolae*) | URS | N | Y | N/A | - | | | | X | X | X | X | | X |
| Cave/well/ sinkhole | Silver Glen Springs Crayfish (*Procambarus attiguus*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |
| Cave/well/ sinkhole | Bigcheek Cave Crayfish (*Procambarus delicatus*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |
| Pond/river/ stream | Panama City Crayfish (*Procambarus econfinae*) | P | N | Y | N/A | - | | | | X | X | X | X | | X |
| Cave/well/ sinkhole | Santa Fe Cave Crayfish (*Procambarus erythrops*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Cave/well/ sinkhole | Orange Lake Cave Crayfish (*Procambarus franzi*) | URS | N | Y (aquatic caves) | N/A | - | | X | | X | | X | X | X | X |
| Cave/well/ sinkhole | Coastal Lowland Cave Crayfish (*Procambarus leitheuser*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |
| Cave/well/s inkhole | Florida Cave Crayfish (*Procambarus lucifugus*) | URS | N | Y (aquatic caves) | N/A | - | | X | | X | | X | X | X | X |
| Cave/well/ sinkhole | Miami Cave Crayfish (*Procambarus milleri*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |
| Cave/well/ sinkhole | Putnam County Cave Crayfish (*Procambarus morrisi*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |
| Cave/well/ sinkhole | Pallid Cave Crayfish (*Procambarus pallidus*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | | X | X | | X |
| Cave/well/ sinkhole | Black Creek Crayfish (*Procambarus pictus*) | URS | N | Y (aquatic caves) | N/A | - | | | | X | X | X | X | | X |
| Cave/well/ sinkhole | Spider Cave Crayfish (*Troglocambarus maclanei*) | URS | N | Y (aquatic caves) | N/A | - | | X | | X | | X | X | X | X |
| ***Insects*** | | | | | | | | | | | | | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Caddisfly | Logan's Agarodes Caddisfly (*Agarodes logani*) | URS | N | Y (streams) | N/A | - | | | | X | X | X | X | X | X |
| Butterfly | Florida Leafwing (*Anaea troglodyta floridalis*) | E | Y | N | N/A | - | | | | X | | X | | | |
| Butterfly | Frosted Elfin Butterfly (*Callophrys irus*) | UR | Y | N | N/A | - | | | X | X | | X | | | |
| Beetle | Miami Tiger Beetle (*Cicindelidia floridana*) | E | N | N | N/A | - | | | X | X | | X | | | |
| Butterfly | Nickerbean Blue Butterfly (*Cyclargus ammon*) | TS | N | N | N/A | - | | | | X | | X | | | |
| Butterfly | Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) | E | N | N | N/A | 1 | | | X | X | | X | | | |
| Butterfly | Monarch Butterfly (*Danaus plexippus plexippus*) | URS | N | N | N/A | - | | | | X | | X | | | |
| Butterfly | Duke's Skipper Butterfly (*Euphyes dukesi calhouni*) | URS | N | Y | N/A | - | | | | X | | X | X | | X |
| Butterfly | Palatka Skipper Butterfly (*Euphyes pilatka klotsi*) | URS | N | Y | N/A | - | | | | X | | X | X | | |
| Dragonfly | Westfall's Clubtail Dragonfly (*Gomphus westfalli*) | URS | N | Y (streams) | N/A | - | X | X | | X | X | X | X | | X |
| Butterfly | Ceraunus Blue Butterfly (*Hemiargus ceraunus antibubastus*) | TS | N | N | N/A | - | | | | X | | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Butterfly | Schaus Swallowtail Butterfly (*Heraclides aristodemus ponceanus*) | E | N | N | N/A | 1 | | | | X | | X | X | | |
| Bee | Gulf Coast Solitary Bee (*Hesperapis oraria*) | URS | N | N | N/A | - | | | | X | | X | | | |
| Caddisfly | Sykora's Hydroptila Caddisfly (*Hydroptila sykorai*) | URS | N | Y (streams) | N/A | - | | | | X | X | X | X | | X |
| Caddisfly | Morse's Little Plain Brown Sedge Caddisfly (*Lepidostoma morsei*) | URS | NN | Y (streams) | N/A | - | | | | X | X | X | X | | X |
| Butterfly | Cassius Blue Butterfly (*Leptotes cassius theonus*) | TS | | N | N/A | - | | | | X | | X | | | |
| Dragonfly | Purple Skimmer Dragonfly (*Libellula jesseana*) | URS | N | Y (lakes) | N/A | - | X | X | | X | X | X | X | X | X |
| Beetle | American Burying Beetle (*Nicrophorus americanus*) | E | N | N | N/A | - | | | | | | X | | | |
| Caddisfly | Little oecetis longhorn caddisfly (*Oecetis parva*) | URS | N | Y (lakes) | N/A | - | | | | X | X | X | X | X | X |
| Dragonfly | Southern Snaketail Dragonfly (*Ophiogomphus australis*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | | X |
| Bee | Blue Calamintha Bee (*Osmia calaminthae*) | URS | N | N | N/A | - | | | | X | | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Major Stressors Associated with the Proposed Action | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | | |
| | | | | | | | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ | |
| Dragonfly | Calvert's Emerald Dragonfly (*Somatochlora calverti*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | | X | |
| Butterfly | Bartram's Scrub-hairstreak (*Strymon acis bartrami*) | E | Y | N | N/A | - | | | | X | | X | | | | |
| Dragonfly | Yellow-sided Clubtail Dragonfly (*Stylurus potulentus*) | URS | N | Y (streams) | | - | | X | | X | X | X | X | | X | - |
| Caddisfly | Three-toothed Long-horned Caddisfly (*Triaenodes tridontus*) | URS | N | Y (streams) | N/A | - | | X | | X | X | X | X | | X | |
| ***Plants*** | | | | | | | | | | | | | | | | |
| Subshrub | Meadow Joint-vetch (*Aeschynomene pratensis*) | URS | N | Y | OBL | | | | X | X | | | | | | |
| Shrub | Crenulate Lead-plant (*Amorpha crenulata*) | E | N | N | FAC | 2 | | | | X | | X | | | | |
| Perennial Forb | Blodgett's Silverbush (*Argythamnia blodgettii*) | T | N | N | NL (UPL) | | | | X | | | X | | | | |
| Shrub | Four-petal Pawpaw (*Asimina tetramera*) | E | N | N | NL (UPL) | | | | X | | | X | | | | |
| Perennial Forb | Purpledisk Honeycombhead Sunflower (*Balduina atropurpurea*) | URS | N | Y | FACW | | | | | X | | | X | | | |
| Perennial Forb | Apalachicola Wild Indigo (*Baptisia megacarpa*) | URS | N | Y | FACW | | | | X | X | | X | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Perennial Forb | Florida Bonamia (*Bonamia grandiflora*) | T | N | N | NL (UPL) | | | | | | | | | | |
| Subshrub | Florida Brickell-bush (*Brickellia mosieri*) | E | Y | N | NL (UPL) | | | | X | | | | | | |
| Annual Forb | Brooksville Bellflower (*Campanula robinsiae*) | E | N | Y | FACW | | | | X | X | | | X | | X |
| Cactus | Fragrant Prickly-apple (*Cereus eriophorus* var. *fragrans*) | E | N | N | NL (UPL) | | | | X | | | X | | | |
| Perennial Forb | Deltoid Spurge (*Chamaesyce deltoidea* ssp. *Deltoidea*) | E | N | N | NL (UPL) | | | | X | | | | | | |
| Perennial Forb | Pineland Sandmat (*Chamaesyce deltoidea pinetorum*) | T | N | N | NL (UPL) | | | | | | | X | | | |
| Perennial Forb | Wedge Spurge (*Chamaesyce deltoidea serpyllum*) | E | N | N | NL (UPL) | | | | X | | | | | | |
| Annual Forb | Garber's Spurge (*Chamaesyce garberi*) | T | N | N | NL (UPL) | | | | X | | | | | | |
| Subshrub | Big Pine Partridge Pea (*Chamaecrista lineata keyensis*) | E | N | N | NL (UPL) | | | | X | | | | | | |
| Shrub | Pygmy Fringe-tree (*Chionanthus pygmaeus*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Subshrub | Cape Sable Thoroughwort | E | N | N | NL (UPL) | 1 | | | X | | | | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| | (*Chromolaena frustrate*) | | | | | | | | | | | | | | |
| Perennial Forb | Florida Golden Aster (*Chrysopsis floridana*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Lichen | Florida Perforate Cladonia (*Cladonia perforate*) | E | N | N | N/A | | | | | | | X | | | |
| Perennial Forb | Pigeon Wings (*Clitoria fragrans*) | F | N | N | NL (UPL) | | | | | | | | | | |
| Shrub | Short-leaved Rosemary (*Conradina brevifolia*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Shrub | Etonia Rosemary (*Conradina etonia*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Shrub | Apalachicola Rosemary (*Conradina glabra*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Cactus | Florida Semaphore Cactus (*Consolea corallicola*) | E | Y | N | NL (UPL) | | | | X | | | | | | |
| Perennial Forb | Ciliate-leaf Tickseed Sunflower (*Coreopsis integrifolia*) | E | Y | Y | FACW | | | | | X | | X | X | | |
| Perennial Forb | Avon Park Harebells (*Crotalaria avonensis*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Annual Forb | Okeechobee Gourd (*Cucurbita okeechobeensis* ssp. *okeechobeensis*) | E | N | Y | OBL | | | | | X | | X | X | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Shrub | Florida Prairie-Clover (*Dalea carthagenensis floridana*) | E | N | N | NL (UPL) | | | | X | | | X | | | |
| Subshrub | Beautiful Pawpaw (*Deeringothamnus pulchellus*) | E | N | Y | FAC | | | | X | | | | | | |
| Subshrub | Rugel's Pawpaw (*Deeringothamnus rugelii*) | E | N | Y | FACW | | | | | X | | | X | | |
| Perennial Forb | Garrett's Mint (*Dicerandra christmanii*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Perennial Forb | Longspurred Mint (*Dicerandra cornutissima*) | E | N | N | NL (UPL) | | | | X | | | X | | | |
| Perennial Forb | Scrub Mint (*Dicerandra frutescens*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Perennial Forb | Lakela's Mint (*Dicerandra immaculate*) | E | N | N | NL (UPL) | | | | X | | | X | | | |
| Graminoid | Florida Pineland Crabgrass (*Digitaria pauciflora*) | T | N | Y | FACW | | | | X | X | | | X | | |
| Perennial Forb | Clam-shell Orchid (*Encyclia cochleata* var. *triandra*) | NW | N | N | NL (UPL) | | | | | X | | | X | | |
| Perennial Forb | Big Cypress Epidendrum Orchid (*Epidendrum strobiliferum*) | URS | N | N | NL (UPL) | | | | | X | | | X | | |
| Perennial Forb | Blackbract Pipewort (*Eriocaulon nigrobracteatum*) | URS | N | Y | OBL | | | | | X | | | X | X | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Perennial Forb | Scrub Buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*) | T | N | N | NL (UPL) | | | | | | | X | | | |
| Perennial Forb | Snakeroot (Wedgeleaf Eryngo) (*Eryngium cuneifolium*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Perennial Forb | Telephus Spurge (*Euphorbia telephioides*) | T | N | N | NL (UPL) | | | | | | | | | | |
| Perennial Forb | Small's Milkpea (*Galactia smallii*) | E | N | N | NL (UPL) | | | | X | | | X | | | |
| Perennial Forb | Harper's Beauty (*Harperocallis flava*) | E | N | N | FACW | | | | | X | | | X | | |
| Cactus | Aboriginal Prickly-apple (*Harrisia* (=*Cereus*) *aboriginum* (=*gracilis*)) | E | Y | N | FACU | 3 | | | X | | | | | | |
| Perennial Forb | Florida Hartwrightia Sunflower (*Hartwrightia floridana*) | URS | N | Y | OBL | | | | | X | | | | X | |
| Perennial Forb | Henry's Spider-lily (*Hymenocallis henryae*) | URS | N | N | OBL | | | | | X | | | | | |
| Perennial Forb | Highlands Scrub Hypericum (*Hypericum cumulicola*) | E | N | N | NL (UPL) | | | | X | | | | | | |
| Shrub | Edison's Ascyrum St. Johns Wort | URS | N | Y | OBL | | | | | X | | | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| | (*Hypericum edisonianum*) | | | | | | | | | | | | | | |
| Subshrub | Smooth Barked St. Johns Wort (*Hypericum lissophloeus*) | URS | N | Y | OBL | 1 | | | | X | | | X | | X |
| Tree | Yellow Anisetree (*Illicium parviflorum*) | NW | N | Y | OBL | | | | | X | | | X | | |
| Perennial Forb | Beach Jacquemontia (*Jacquemontia reclinata*) | E | N | N | NL (UPL) | | | | X | | | X | | | |
| Perennial Forb | Cooley's Water-willow (*Justicia cooleyi*) | E | N | Y | FACW | | | | X | X | | | X | | |
| Perennial Forb | Scrub Blazingstar (*Liatris ohlingerae*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Perennial Forb | Panhandle Lily (*Lilium iridollae*) | URS | N | Y | OBL | | | | | X | | X | | | |
| Shrub | Bog Spicebush (*Lindera subcoriacea*) | URS | N | Y | OBL | 1 | | | | X | | | X | | |
| Perennial Forb | Sand Flax (*Linum arenicola*) | E | N | Y | OBL | | | | X | X | | | X | | |
| Annual Forb | Carter's Small Flowered Flax (*Linum carteri carteri*) | E | Y | Y | FACW | | | | X | X | | X | | | |
| Perennial Forb | West's Flax (*Linum westii*) | URS | N | Y | OBL | | | | | X | | | X | | |
| Perennial Forb | Boykin's Lobelia (*Lobelia boykinii*) | URS | N | Y | OBL | | | | | X | | | X | | |
| Perennial Forb | Raven's Seedbox (*Ludwigia ravenii*) | URS | N | Y | OBL | | | | | X | | | X | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Subshrub | Scrub Lupine (*Lupinus aridorum*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Subshrub | Curtis' Loosestrife (*Lythrum curtissii*) | URS | N | Y | OBL | 1 | | | | X | X | | X | | |
| Perennial Forb | Lowland Loosestrife (*Lythrum flagellare*) | URS | N | Y | OBL | | | | | X | | | X | | |
| Perennial Forb | White Birds-in-a-nest (*Macbridea alba*) | T | N | Y | FACW | | | | | X | | | X | | |
| Perennial Forb | Godfrey's Stitchwort (*Minuartia godfreyi*) | URS | N | Y | FACW | | | | | X | | | X | | |
| Annual Forb | Needleleaf or Narrowleaf Naiad Water-nymph (*Najas filifolia*) | URS | N | Y | OBL | | | | X | X | | | X | | |
| Subshrub | Britton's Beargrass (*Nolina brittoniana*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Perennial Forb | Cape Sable Orchid (*Oncidium undulatum*) | URS | N | Y | NL (UPL) | | | | | X | | | X | | |
| Annual Forb | Papery Whitlow-wort (*Paronychia chartacea*) | T | N | N | NL (UPL) | | | | | X | | | X | | |
| Cactus | Key tree Cactus (*Pilosocereus robinii*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Perennial Forb | Godfrey's Butterwort (*Pinguicula ionantha*) | T | N | Y | OBL | | | | | X | | | | | |
| Perennial Forb | Lewton's Polygala Milkwort (*Polygala lewtonii*) | E | N | N | NL (UPL) | | | | X | | | | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Perennial Forb | Tiny Polygala Milkwort (*Polygala smallii*) | E | N | N | FACU | | | | X | | | | | | |
| Annual Forb | Horton Wireweed (small) (*Polygonella basiramia*) | E | N | N | NL (UPL) | | | | X | | | | | | |
| Perennial Forb | Sandlace (Woody Wireweed) (*Polygonella myriophylla*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Perennial Forb | Florida Pondweed (*Potamogeton floridanus*) | URS | N | Y | OBL | | | | | X | | | X | | X |
| Shrub | Scrub Plum (*Prunus geniculate*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Perennial Forb | White Meadowbeauty (*Rhexia parviflora*) | URS | N | Y | OBL | | | | | X | | | X | | |
| Perennial Forb | Panhandle Meadowbeauty (*Rhexia salicifolia*) | URS | N | Y | OBL | | | | | X | | X | X | X | X |
| Shrub | Chapman Rhododendron (*Rhododendron chapmanii*) | E | Y | Y | FACW | 2 | | | X | X | | | | | |
| Graminoid | Hairy Peduncled Beakrush (*Rhynchospora crinipes*) | URS | N | Y | OBL | | | | | X | X | | X | | X |
| Shrub | Miccosukee Gooseberry (*Ribes echinellum*) | T | N | Y | FAC | 1 | | | X | X | | | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | iS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| Perennial Forb | Eared Coneflower (*Rudbeckia auriculata*) | URS | N | Y | FACW | | | | | X | | | X | | |
| Tree | Florida Willow (*Salix floridana*) | URS | N | Y | FACW | | | | X | X | | | X | | X |
| Perennial Forb | Gulf Sweet Pitcherplant (*Sarracenia rubra* ssp. *gulfensis*) | URS | N | Y | OBL | | | | | X | | | X | | |
| Perennial Forb | American Chaffseed (*Schwalbea americana*) | E | N | Y | FAC | | | | | X | X | | X | | |
| Perennial Forb | Florida Skullcap (*Scutellaria floridana*) | T | N | Y | OBL | | | | | X | | | X | | |
| Shrub | Everglades Bully (*Sideroxylon reclinatum* ssp. *austrofloridense*) | T | N | Y | FAC | | | | | X | | | X | | |
| Shrub | Georgia Bully (*Sideroxylon thorne*) | URS | N | N | NL (UPL) | | | | | X | | | | | |
| Perennial Forb | Fringed Campion (*Silene polypetala*) | E | N | N | NL (UPL) | | | | X | | | | | | |
| Perennial Forb | Gentian Pinkroot (*Spigelia gentianoides*) | E | N | N | NL (UPL) | | | | | | | | | | |
| Perennial Forb | Cooley's Meadow Rue (*Thalictrum cooleyi*) | E | N | Y | FACW | | | | | X | | | X | | |
| Tree | Florida Torreya (*Torreya taxifolia*) | E | N | N | NL (UPL) | | | | | | | | X | | |
| Perennial Forb | Florida Bristle Fern (*Trichomanes* | E | N | N | NL (UPL) | | | | X | | | X | | | |

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | IS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |
| | *punctatum* ssp. *floridanum*) | | | | | | | | | | | | | | |
| Perennial Forb | Ocala Vetch (*Vicia ocalensis*) | NW | N | Y | OBL | 3 | | | X | | | | X | | |
| Annual Forb | Wide-leaf Warea (*Warea amplexifolia*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Annual Forb | Carter's Mustard (*Warea carteri*) | E | N | N | NL (UPL) | | | | | | | X | | | |
| Perennial Forb | Karst Pond Xyris (*Xyris longisepala*) | URS | N | Y | OBL | | | | | X | | | X | | |
| Shrub | Florida Ziziphus (Jujube) (*Ziziphus celata*) | E | N | N | NL (UPL) | 1 | | | X | | | X | | | |

**Header Key:**
CN (SN) - Common Name (Scientific Name)
FLS – Federal Listing Status under the Endangered Species Act (ESA)
CH? – Has critical habitat been designated?
Wetlands - Are wetlands or waters regularly utilized by the species?
# ESA – Number of ESA consultations for this species in Florida over the last five years
IS – Wetland indicator status (plant-specific)
Competition – Competitive balance alteration
Predation – Predator/prey relationship alteration
Invasive species – Invasive species introduction/colonization
Hydro – Changes in hydrologic regime
Nutrients – Nutrient cycle exchange/alteration
WQ – Water Quality

**Table Text Key:**
[a] – Certain amphibian species may also be threatened by relocation during project activities (as this impact was not broadly applicable to other species, it was not included as a column in the table)

**C.1.a. - Effects of the Action on ESA-listed Species - Stressors**

| | | | | | | | Major Stressors Associated with the Proposed Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Biotic | | | Physical | | | | Chemical | |
| Guild | CN (SN) | FLS | CH? | Wetlands | IS | # ESA | Competition | Predation | Invasive Species | Fill | Dredging | Habitat Fragmentation | Hydro | Nutrients | WQ |

FLS – E (Endangered), T (Threatened), TS (Threatened due to Similarity of Appearance), C (Candidate), P (Proposed for listing), UR (Under Review), URS (Under Review, Substantial Finding), NW (Not Warranted Finding), * (Listing status of DPS that occurs in Florida. Other DPSs may have different listing statuses in other region).

CH – Y (Yes), N (No)

IS – OBL (Obligate), FACW (Facultative Wetland), FAC (Facultative), UPL (Upland), FACU (Facultative Upland), NL UPL (Not Listed, Generally Assumed to be Upland)



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B

C

C.1

C.1.a.

C.1.b.- Effects of the Action on ESA-listed Species - Findings

| Guild | CN (SN) | FLS | CH? | Finding | Comments (ESA determinations made for all species, including proposed, to encompass possibility for future listings) |
|---|---|---|---|---|---|
| ***Mammals*** | | | | | |
| Wetland/ marsh | Sherman's Short-tailed Shrew (*Blarina brevicauda shermani*) | URS | N | No effect | Habitat is described as edges of marshes or shallow depressions, mesic flatwoods, with abundant grasses; also drainage ditches with abundant grass cover. Threats include habitat loss and predation by cats. Current status is unknown, and it is possible the species has been extirpated (has not been located since 1995). As the species is likely extirpated, this action will have no effect on the subspecies. |
| Forest/ grasslands/ swamp | Gray Wolf (*Canis lupus*) | E | Y | No effect | As this species is extirpated from Florida, this action will have no effect on the species. |
| Forest/ grasslands/ swamp | Red Wolf (*Canis rufus*) | E | N | NLAA | The species occupies coastal prairies, forests, and swamps within these areas. In Florida, range limited to one island (St. Vincent; a USFWS National Wildlife Refuge). A major threat to Red Wolf populations is loss of genetic diversity from interbreeding with coyotes. As the species only occurs on protected lands, this action is NLAA the species. |
| Tropical hardwood hammock/mangrove | Florida Bonneted Bat (*Eumops floridanus*) | E | N | LAA | Occupies pineland, tropical hardwood, and mangrove habitat. Areas of freshwater wetlands are also important to the species. The bats roost singly or in small colonies in tree cavities (including Red-cockaded Woodpecker cavities), buildings, foliage, and rock crevices, as well as artificial roosts. Current threats to the species include a restricted range and small population size, habitat loss, limited roost sites, environmental stochasticity, and pesticides. Through impacts to habitat (loss and fragmentation) and water quality, the action could result in a LAA determination. |
| Wetland/ marsh | Florida Salt Marsh Vole (*Microtus pennsylvanicus dukecampbelli*) | E | N | LAA | Species occurs in salt marsh habitat. Decline of the species appears to be due to climatic changes and associated rise in sea level. Through impacts to habitat (loss and fragmentation) and water quality, the action could result in a LAA determination. |



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|---|---|---|---|---|---|
| Caves | Gray Bat (*Myotis grisescens*) | E | N | NLAA | In Florida, the species occurs in a single county (Jackson) in the northwest Panhandle (limestone karst region). Threats to the species include roost disturbance (environmental or human-caused) and white-nose syndrome. Roosting (including some maternity roosts) has been documented in nine caves in this county (on both public and private and). Due to the restricted range of the species in Florida and the fact that the species has not recently used maternity caves in the state, the action is NLAA the species. |
| Caves | Little Brown Bat (*Myotis lucifugus occultus*) | UR | N | NLAA | The Little Brown Bat has been occasionally detected in northern Florida, although it is not common in the state. General habitat requirements include forested or herbaceous wetlands, hardwood and mixed forest, grassland, and scrub. Threats to the species include white-nose syndrome, climate change, pesticides, mortality from wind turbines, and habitat modification or destruction. Species is extremely uncommon in Florida and the action is NLAA the subspecies. |
| Caves | Indiana Bat (*Myotis sodalis*) | E | Y | NLAA | There are no current records of the species in Florida. However, there has been one historical winter record of the species in Old Indian Cave in Jackson County. Due to the restricted range of the species in Florida and the fact that the species has not recently been detected in the state, the action is NLAA the species. |
| Tropical hardwood hammock/mangrove | Key Largo Woodrat (*Neotoma floridana smalli*) | T | N | LAA | Inhabits tropical hardwood hammock forests. Currently the species is limited to North Key Largo, with is approximately half of its historical range. The woodrat's small and isolated populations are especially vulnerable to extinction because of a wide range of threats including demographic factors and natural catastrophes. Predation poses another significant risk, as they are depredated by a wide range of raptorial, reptilian, and mammalian (including free-roaming cats) predators. Based on the limited range and habitat preferences of the species, the action could result in a LAA determination. |
| Pine rockland | Key Deer (*Odocoileus virginianus clavium*) | E | N | LAA | Key Deer is found in the Florida Keys within 11 island complexes from Johnson Keys to Sugarloaf Key. Selectively uses hammock and pine rockland upland habitats. These habitats contain a substantial portion of their forage plants, fresh water, and cover, which is especially important for fawning. Ongoing threats include urbanization and vehicular collisions. Through direct impacts to habitat via fill, habitat fragmentation, and water quality, the action could result in a LAA determination. |
| Wetland/ marsh | Rice Rat (*Oryzomys palustris natator*) | E | Y | LAA | Inhabits mangrove swamps, saltmarsh flats, buttonwood transition vegetation, and fresh water cattail marshes in the lower Florida Keys. Rice rats are impacted by the continued development of the Lower Keys (dredge and fill), increased populations of predators (such as raccoons, cats, and dogs), and through competition with introduced black rats (*Rattus rattus*). Based on all the above-listed threats and impacts, this action could result in a LAA determination. |



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|---|---|---|---|---|---|
| Wetland/ marsh | Pine Island Rice Rat (*Oryzomys palustris planirostris*) | URS | N | LAA | Subspecies is known from only two occurrences: on Pine Island (Florida Keys) and the adjacent mainland. Occurs in herbaceous wetlands. The rat's habitat is threatened with habitat destruction by filling and draining of wetlands and invasion of woody plants. Through impacts to habitat, water quality, and introduction of invasive species, this action could result in a LAA determination. |
| Wetland/ marsh | Sanibel Island Rice Rat (*Oryzomys palustris sanibeli)* | URS | N | LAA | Restricted to Sanibel island. Occurs along the edge of freshwater swamps of artesian origin, including swales and cattail stands. While the subspecies is protected in part on Ding Darling National Wildlife Refuge, it is threatened by habitat destruction through drainage, filling of marshes, lowering of the water table for human use, and woody plant invasion. Through impacts to habitat, water quality, and introduction of invasive species, the action could result in a LAA determination. |
| Caves | Tricolored Bat (*Perimyotis subflavus*) | URS | N | LAA | The species is a permanent resident throughout the Florida peninsula. However, the majority of records are from the Panhandle. Habitat preferences include open landscapes bordered by woodland (e.g. hardwood woodlands, grasslands, abandoned fields, and urban landscapes. Roosts in caves and mines in the winter and trees, man-made structures, and caves in the summer. Tricolored Bats forage near water and in early successional forests. Threats to the species include white-nose syndrome, human disturbance of hibernacula, habitat loss and modification, pesticides, climate change, and mortality from wind energy . Action could result in habitat fragmentation for the species as well as impacts to hydrology and water quality. This could result in a LAA determination. |
| Tropical hardwood hammock/mangrove | Key Largo Cotton Mouse (*Peromyscus gossypinus allapaticola*) | E | N | NLAA | Inhabits tropical hardwood hammock forests as well as nearby Salicornia coastal strands. Currently the species is limited to North Key Largo (mostly on protected habitat). Free-roaming cats loss of hammock forest habitat through sea level rise (e.g., salt intolerant forest) are ongoing threats to their populations. Due to the species restricted range, primarily on protected land, the action is NLAA the subspecies. |
| Beach/ scrub dune | Choctawhatchee Beach Mouse (*Peromyscus polionotus allophrys*) | E | N | LAA | This species occurs in beach dune systems vegetated by sea oats (*Uniola paniculata*) and beach grasses, and adjacent interior scrub areas populated by oaks and sand pine or palmetto. Remaining populations of this subspecies exist in the sand dunes on Shell Island, Grayton Beach, and Topsail Hill in Florida. The predominant factor of decline for this species is habitat loss due to alteration or conversion of dunes (from human development and use). Through direct impacts to habitat via fill, dredging, and habitat fragmentation, the action could result in a LAA determination. |
| Beach/ scrub dune | Southeastern Beach Mouse (*Peromyscus polionotus niveiventris*) | T | N | LAA | Species occurs in beach dune systems vegetated by sea oats (*Uniola paniculata*) and dune panic grass, and adjacent interior scrub areas populated by oaks and sand pine or palmetto. The predominant factors of decline for this species are habitat loss due to alteration of conversion of dunes due to human development and use, and destruction of habitat due to hurricanes and storms. Through direct impacts to habitat via fill, dredging, and habitat fragmentation, the action could result in a LAA determination. |

| | | | | | |
|---|---|---|---|---|---|
| Beach/ scrub dune | St. Andrew Beach Mouse (*Peromyscus polionotus peninsularis*) | E | Y | LAA | Two existing populations of St. Andrew Beach Mouse inhabit East Crooked Island in Bay County and St. Joseph Peninsula in Gulf County. Habitat requirements include primary and secondary scrub dune ecosystems. St. Andrew Beach Mice face a suite of threats primarily related to habitat loss or degradation via urbanization and stochastic environmental events. Predation by feral cats is also a significant threat. Impacts to habitat could result in a LAA determination. |
| Beach/ scrub dune | Anastasia Island Beach Mouse (*Peromyscus polionotus phasma*) | E | N | LAA | Currently, two populations of this subspecies exist on Anastasia Island: at Anastasia Island State Park and Fort Matanzas National Monument. This species occurs in beach dune systems vegetated by sea oats and dune panic grass and adjacent interior scrub areas populated by oaks and sand pine or palmetto. As the species strictly occurs on protected lands, the action is NLAA the subspecies. Possible adverse effects with restoration projects |
| Beach/ scrub dune | Perdido Key Beach Mouse (*Peromyscus polionotus trissyllepsis*) | E | N | LAA | Restricted to Perdido Key in Florida. Requires a mosaic of frontal and scrub dunes for food, burrow sites, and refuge habitat. Threats to the species include loss/fragmentation of habitat for land development, tropical storm damage and mortality, and predation by non-native species. Impacts to could result in a LAA determination. |
| Forests/ grasslands/swamps | Florida Panther (*Puma* [=*Felis*] *concolor coryi*) | E | N | LAA | Subspecies is limited to a single population in southern Florida. Panthers have vast home ranges, occur at low densities, and require large swaths of contiguous habitat. Incompatibility with urbanization continues to limit the recovery of this subspecies. Habitat fragmentation and loss also serve as significant threats to panthers. Additionally, vehicular collisions continue to limit panther population growth. Impacts to habitat (fragmentation) could result in a LAA determination. |
| Wetland/ marsh | Insular Hispid Cotton Rat (*Sigmodon hispidus insulicola*) | URS | N | LAA | Occurs within peninsular Florida and the Keys. The preferred habitat is herbaceous wetlands, grasslands, shrubland, and mixed woodlands. The rat is threatened by habitat destruction from urbanization. Impacts to habitat could result in a LAA determination. |
| Wetland/ marsh | Lower Keys Rabbit (*Sylvilagus palustris hefneri*) | E | N | LAA | Restricted to a small area of the Florida Keys. Occurs in saltmarsh, hammocks, and flatwoods. The rabbit's habitat is at risk due to development, dredging and filling of wetlands, human exploitation of very limited fresh water, and impacts from predators such as cats, dogs, and human poachers. Impacts to habitat could result in a LAA determination. |
| Aquatic | West Indian Manatee (*Trichechus manatus*) | T | Y | LAA | Florida manatees occur in freshwater, brackish and marine environments including coastal river estuaries, sloughs, canals, creeks, and lagoons. The species requires a source of freshwater for drinking. Threats to the species include human-caused mortality (watercraft collisions), interactions with commercial fishing gear, pollution, exposure to cold/loss of warm-water refugia, red tides, and impacts to habitat. Impacts to habitat and water quality could result in a LAA determination. |
| ***Birds*** | | | | | |

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| Wetland/ marsh | Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*) | E | Y | LAA | Non-migratory residents of freshwater to brackish marshes. Inhabits freshwater marl prairies with muhly grass (short-hydroperiods, densely clumped grasses, and periodic fires). Impacts to wetland habitat and changes in hydrological regimes and water quality could result in a LAA determination. |
| Grassland | Florida Grasshopper Sparrow (*Ammodramus savannarum floridanus*) | E | N | LAA | Inhabits dry, treeless, flat prairies in central and southern Florida. Species is a ground nester and changes in hydrologic regimes have resulted in nest loss via flooding. Action could result in habitat fragmentation and changes in hydrologic regimes. This could result in a LAA determination. |
| Wetland/ marsh | Saltmarsh Sparrow (*Ammospiza caudacutas*) | UR | N | LAA | Species inhabits coastal tidal marshes. Impacts to habitat, hydrology, and water quality could result in a LAA determination. |
| Upland scrub | Florida Scrub-jay (*Aphelocoma coerulescens*) | T | N | LAA | Restricted to early successional xeric scrub and scrub flatwood habitat in relict dunes located on Florida's central ridges and coasts, in areas defined by historic fires. Habitat interspersed with wetlands/swales. Action could result in habitat fragmentation for the species. This could result in a LAA determination. |
| Coastal tidal/marine | Rufa Red Knot (*Calidris canutus rufa*) | T | N | LAA | Any impacts to coastal waters (fill, dredging, etc.) could impact this species and could result in a LAA determination. |
| Forest/ forested wetland | Ivory-billed Woodpecker (*Campephilus principalis*) | E | N | No effect | This species is extirpated and potentially extinct. The action will have no effect on this species. |
| Coastal tidal/marine | Piping Plover (*Charadrius melodus*) | T* | Y | LAA | Wintering habitat preferences in Florida include bay beaches (vs. ocean facing beaches) and inlets with exposed intertidal areas and tide cast wrack. Threats to the species include habitat loss and degradation from urbanization and some shoreline stabilization efforts and sea level rise. Impacts to habitat, hydrology, and water quality could result in a LAA determination. |
| Grassland | Whooping Crane (*Grus americana*) | E | Y | NLAA | Wintering locations included tall grass prairie, wetlands, deltas, and interior tablelands along the southeast and Gulf Coast, including Florida. Reintroduced Whooping Cranes in Florida, located in the Kissimmee Prairie area (state protected land), are designated as an experimental, non-essential population (outside of federal lands, experimental populations are treated as proposed species; within federal lands, treated as threatened). Population size in Florida was 5 as of March 2019. The species is extirpated from all other areas of Florida. If actions occur on Kissimmee Prairie, the action may affect but is not likely to adversely affect the species. |
| Wetland/ marsh | Eastern Black Rail (*Laterallus jamaicensis* ssp. *jamaicensis*) | URS | N | LAA | Inhabits brackish, freshwater, and saltwater wetlands with dense vegetation cover. Impacts to habitat, hydrology, and water quality could result in a LAA determination. |
| Wetland/ marsh | Wood Stork (*Mycteria americana*) | T | N | LAA | Inhabits freshwater, estuarine wetlands, cypress and mangrove swamps, stock ponds, and seasonally flooded agricultural areas. Species dependent on hydrology to concentrate prey (fish). Altered hydrology regimes could impact foraging habitat. Impacts to prey resources, habitat, hydrology, and water quality could result in a LAA determination. |

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| Grassland | Eskimo Curlew (*Numenius borealis*) | E | N | No effect | Extirpated (Florida likely only a historic stopover site only during migration). This action would have no effect on the species. |
| Pine savanna | Red-cockaded Woodpecker (*Picoides borealis*) | E | N | LAA | Endemic to old growth, pine savanna ecosystems. Action could result in habitat fragmentation for the species and could result in a LAA determination. |
| Grassland | Audubon's Crested Caracara (*Polyborus plancus audubonii*) | T | N | LAA | Inhabits open, upland prairies, interspersed with ponds, marshes, and cabbage palm hammocks in south-central Florida. The majority of occupied habitat and nesting occurs on private lands. The species feeds on road-kill carrion as well as invertebrates and a variety of vertebrate prey (fish, reptiles, birds, eggs, etc.). Impacts to prey, habitat, and water quality could result in a LAA determination. |
| Coastal tidal/marine | Black-capped Petrel (*Pterodroma hasitata*) | P | N | No effect | Nests on the island of Hispaniola and forages offshore of the southeastern U.S. Off the coast of Florida, Black-capped Petrels may be found year-round in relatively shallow waters near shore. As this action does not encompass marine fill off the coast of Florida, the action will have no effect on this species. |
| Wetland/ marsh | Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*) | E | Y | LAA | Species habitat preferences include freshwater marshes with shallow water, patchy emergent vegetation, and large expanses of open water for foraging. Threats to the species include habitat loss and fragmentation, hydrology management practices in the state (that may directly or indirectly impact both the kite and its prey), predation, invasive species (predators as well as the exotic apple snail (*Pomacea* spp.). Impacts associated with the action (including all of the above) could result in a LAA determination. |
| Coastal tidal/marine | Roseate Tern (*Sterna dougallii dougallii*) | T* | N | LAA | A metapopulation of the Caribbean Roseate Tern is known to breed in 12 areas of the Florida Keys. Species may nest on the ground or the roofs of buildings. Microhabitat features at nest sites include open sand, coral rubble, or rock. Impacts of the action associated with fill, and dredging in coastal areas could result in a LAA determination. |
| Forest/ forested wetland | Bachman's Wood Warbler (*Vermivora bachmanii*) | E | N | No effect. | The species is not known to currently occur in Florida. Species inhabited bottomland hardwood forested wetlands but is now believed to be extirpated. This action will have no effect on the species. |
| Forest/ forested wetland | Golden-winged Warbler (*Vermivora chrysoptera*) | URS | N | LAA | The species occurs in Florida strictly during migration. Habitat on migration is not well-documented, but may include forest edge and second-growth forest. Species hybridizes with Golden-winged Warbler, but this is not an issue in Florida as no breeding occurs in the state. Impacts to habitat, including fragmentation, and changes in hydrology/water quality could result in a LAA determination. |
| ***Reptiles*** | | | | | |
| Wetland/ marsh/ freshwater | American Alligator (*Alligator mississippiensis*) | TS | N | LAA | Inhabits variety of wetland habitats including but not limited to marshes, ponds, lakes, rivers, swamps, bayous, canals, and canals. The species is no longer considered to be "biologically endangered or threatened" but remains listed because of similarity of appearance. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |

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| Wetland/ marsh/ freshwater | Spotted Turtle (*Clemmys guttata*) | URS | N | LAA | Inhabits variety of shallow, isolated wetlands with clean water, soft substrate, and emergent or submerged vegetation. Major threats include habitat destruction and loss of wetlands, collection for the pet trade, road mortality, and invasive species. Through impacts to habitat, hydrology, and water quality, as well as aiding in the spread of invasive species, the action is LAA the species. |
| Swamp/ saltwater | American Crocodile (*Crocodylus acutus*) | T | Y | LAA | Inhabits mangrove-lined bays, swamps, creeks, and inland swamps. Major threats include habitat loss from development. Through impacts to habitat, hydrology, and water quality, the action is LAA the species. |
| Pine flatwoods | Eastern Diamondback Snake (*Crotalus adamanteus*) | URS | N | LAA | Inhabits longleaf pine savanna, and other open-canopy habitats with a dense herbaceous understory. Major threats include habitat conversion or loss, and malicious killing by humans. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands may be impacted. |
| Pine rocklands | Key Ringneck Snake (*Diadophis punctatus acricus*) | URS | N | LAA | Inhabits pine rocklands and rockland hammocks, usually near permanent fresh water in the Florida Keys. Storm surge and sea level rise could be a future risk given the low elevation of much of the remaining habitat. Action could result in habitat fragmentation of this species and could result in a LAA determination. |
| Pine flatwoods | Eastern Indigo Snake (*Drymarchon corais couperi*) | T | N | LAA | Inhabits variety of upland and lowland habitat types. Major threats to the species include habitat fragmentation, fire suppression leading to eventual habitat degradation, and road mortality. Action could result in habitat fragmentation of this species and could result in a LAA determination. |
| Sandhill/ scrub flatwoods | Gopher Tortoise (*Gopherus polyphemus*) | C* | N | LAA | Inhabits areas characterized by dry sandy soils, open canopy cover, and abundant herbaceous vegetation. Major threats include habitat loss, degradation, and fragmentation. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Wetland/ marsh/ freshwater | Escambia Map Turtle (*Graptemys ernsti*) | URS | N | LAA | Inhabits rivers with good flow, avoids backwaters and salt water, and nests along sandbars and river berms. Major threats include pollution. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Sandhill/ scrub flatwoods | Southern Hognose Snake (*Heterodon simus*) | NW | N | LAA | Inhabits open, xeric habitats with well-drained, sandy soils, dominated by pine or pine-oak woodland with an open canopy and grassy understory. Further studies are required to determine the factor or combination of factors that have caused the population to decline. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Wetland/ marsh/ freshwater | Apalachicola Common Kingsnake (*Lampropeltis getula meansi*) | URS | N | LAA | Inhabits wetland margins within longleaf pine flatwoods. Major threats include habitat loss. Through impacts to habitat, and hydrology, the action could result in a LAA determination. |

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| Wetland/ marsh/ freshwater | Alligator Snapping Turtle (*Macrochelys termminckii*) | URS | N | LAA | Inhabits permanent water bodies. Major threats include overharvest in the exotic trade market and habitat loss.Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Wetland/ marsh/ freshwater | Atlantic Salt Marsh Snake (*Nerodia clarkii taeniata*) | T | N | LAA | Inhabits brackish coastal marshes. Major threats include habitat loss due to development and habitat degradation resulting from ditching, diking, and impoundments. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Sandhill/ scrub flatwoods | Florida Pine Snake (*Pituophis melanoleucus mugitus*) | URS | N | LAA | Inhabits well-drained sandy soils and relatively open canopy, including sandhills, xeric hammock, scrubby flatwoods, and dry prairie. Major threats are thought to include collecting, road mortality, and habitat loss. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Sandhill/ scrub flatwoods | Bluetail Mole Skink (*Plestiodon egregius lividus*) | T | N | LAA | Inhabits scrub and sandhill habitat, and is believed to require loose soils, moderate soil temperatures, and presence of vegetation. Major threats include habitat fragmentation and a lack of site management resulting in dense overgrown vegetation. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Sandhill/ scrub flatwoods | Sand Skink (*Plestiodon reynoldsi*) | T | N | LAA | Inhabits scrub and sandhill habitat and loose, un-compacted, coarse-grained soil is thought to be an important habitat component. Major threats include habitat fragmentation and a lack of site management resulting in dense overgrown vegetation. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Wetland/ marsh/ freshwater | Florida Red-bellied Turtle (*Pseudemys nelsoni*) | URS | N | LAA | Inhabits water rich with aquatic plant life, such as streams, ponds, lakes, ditches, sloughs, marshes, and mangrove-bordered creeks. Major threats include drought, predators, and illegal harvesting for food by turtle trappers. Through impacts to habitat, and hydrology, the action could result in a LAA determination. |
| Sandhill/ scrub flatwoods | Florida Scrub Lizard (*Sceloporus woodi*) | URS | N | LAA | Inhabits evergreen oak scrub and young sand pine scrub; and to a lesser extent sandhills adjacent to scrub or scrubby flatwoods. Major threats include habitat loss and fragmentation, and fire suppression. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Sandhill/ scrub flatwoods | Short-tailed Snake (*Stilosoma extenuatum*) | URS | N | LAA | Inhabits dry upland habitats of sandhill, xeric hammock, and sand pine scrub. Little is known about threats to this species. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Pine rocklands | Rim Rock Crowned Snake (*Tantilla oolitica*) | URS | N | LAA | Inhabits pine rockland and rockland hammock as well as disturbed urban environments including vacant lots, roadsides, and pastures. Major threats include habitat loss and fragmentation. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to |

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| ***Amphibians*** | | | | | |
| Pond breeding | Reticulated Flatwoods Salamander (*Ambystoma bishopi*) | E | N | LAA | Requires breeding ponds and surrounding upland; impacts or fragmentation of either can cause LAA. |
| Pond breeding | Frosted Flatwoods Salamander (*Ambystoma cingulatum*) | T | N | LAA | Requires breeding ponds and surrounding upland; impacts or fragmentation of either can cause LAA. |
| Cave | Georgia Blind Salamander (*Eurycea wallacei*) | URS | N | NLAA | Limited to aquatic caves, alteration of hydrology or WQ is major concern. Based on habitat preferences, this action is NLAA the species. |
| Pond breeding | Gopher Frog (*Lithobates capito*) | URS | N | LAA | Requires breeding ponds and surrounding upland; impacts or fragmentation of either can cause LAA. |
| Aquatic | Gulf Hammock Dwarf Siren (*Pseudobranchus striatus lustricolus*) | URS | N | No effect | Extirpated, limited historic range. The action will have no effect on this species. |
| ***Fishes*** | | | | | |
| Sturgeon | Shortnose Sturgeon (*Acipenser brevirostrum*) | E | N | No effect | Inhabits rivers and estuaries. Major threats include habitat impediment (e.g., dams), habitat degradation (e.g., dredging and poor water quality), and fisheries bycatch. Through impacts to aquatic habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Sturgeon | Gulf Sturgeon (*Acipenser oxyrinchus* [=*oxyrhynchus*] *desotoi*) | T | Y | No effect | Inhabits rivers and Gulf of Mexico waters, but not expected in Action Area. Major threats include damming and disconnection of spawning grounds, as well as habitat modification due to dredging, navigation maintenance activities, and water pollution. Impacts to aquatic habitat, hydrology, and water quality. |
| Sturgeon | Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) | E* | Y | No effect | Inhabits riverine and Atlantic coast waters, but not expected in Action Area. Major threats include fisheries bycatch, habitat degradation (e.g., dredging and poor water quality), habitat impediment (e.g. dams), and vessel strikes. Impacts to aquatic habitat, hydrology, and water quality. |
| Benthic insectivore | Okaloosa Darter (*Etheostoma okalossae*) | T | N | LAA | Inhabits dense vegetation, root mats, and detritus along clear, flowing stream margins in rivers. Most populations are believed to be stable or increasing at present, and vulnerability is primarily due to the small range and limited number of occurrences. Through impacts to aquatic habitat, hydrology, and water quality, the action could result in a LAA determination. |



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| Topminnow | Saltmarsh Topminnow (*Fundulus jenkinsi*) | URS | N | LAA | Inhabits small meandering channels of brackish marshes. Major threats include pollution and habitat destruction. Impacts to aquatic habitat, hydrology, and water quality. |
| Sawfish | Smalltooth Sawfish (*Pristis pectinate*) | E* | Y | No effect | Inhabits estuaries and coastal waters, but not expected in Action Area. Major threats include habitat loss and bycatch. Impacts to aquatic habitat, hydrology, and water quality. |
| ***Mollusks*** | | | | | |
| Mussel | Southern Elktoe (*Alasmidonta triangulata*) | URS | N | LAA | Inhabits sandy substrates, such as sandbars, of rivers and larger creeks with moderate currents. Major threats include habitat degradation and fragmentation caused by dredging, impoundment, sedimentation, water extraction, and drought. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Fat Threeridge (*Amblema neislerii*) | E | Y | LAA | Inhabits the main channels of small to large rivers where the current is slow to moderate and the substrate varies from gravel to cobble to a mixture of sand and sandy mud. Major threats include anthropogenic habitat degradation caused by sedimentation, channelization, impoundment, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Rayed Creekshell (*Anodontoides radiatus*) | URS | N | LAA | Inhabits mud, sand, or gravel of large rivers as well as medium to small sized creeks in areas of moderate currents. Major threats are associated with stream modifications and come from a variety of sources including pesticide use, deforestation, damming, and water extraction. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Snail | Pygmy Siltsnail Snail (*Cincinnatia parva*) | URS | N | LAA | Inhabits Blue Spring, a freshwater karst spring run. Major threats include recreational activities, increased sedimentation from erosion and logging practices, invasive species, and any impacts to water quality. Impacts to freshwater spring habitat, changes in hydrological regimes and water quality could result in a LAA determination. |
| Snail | Ponderous Siltsnail Snail (*Cincinnatia ponderosa*) | URS | N | LAA | Inhabits vegetated areas, as well as in sand and gravel, in springs and rivers. Major threats include saltwater intrusion, groundwater extraction for human consumption, and pollution from development. Impacts to freshwater spring and stream habitat, changes in hydrological regimes and water quality could result in a LAA determination. |
| Mussel | Delicate Spike (*Elliptio arctata*) | URS | N | LAA | Inhabits areas of moderate currents among large rocks or in the sand and gravel underneath them. Major threats are related habitat degradation including damming, eutrophication and pollution, water extraction, deforestation, bank scouring, and sedimentation. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |

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| Mussel | Chipola Slabshell (*Elliptio chiplolaensis*) | T | Y | LAA | Inhabits muddy and silty- sandy substrates in areas with slow to moderate currents. Major threats include dams, stream channelization, pollution, and sedimentation. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Purple Bankclimber (*Elliptoideus sloatianus*) | T | Y | LAA | Inhabits small to large rivers, often in the main channels, where there is moderate current. Major threats include habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Tapered Pigtoe (*Fusconaia burki*) | T | Y | LAA | Inhabit areas with slow to moderate currents in medium creeks to medium rivers and occasionally floodplain lakes, where the substrate is stable and consists of sand, small gravel, or sandy mud. Major threats are habitat degradation caused by excessive sedimentation, stream bed destabilization, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Narrow Pigtoe (*Fusconaia escambia*) | T | Y | LAA | Inhabits substrate consisting of sand, gravel, sandy gravel, or silty sand and prefers slow to moderate currents within small to medium sized streams and rivers. Major threats include habitat degradation caused by excessive sedimentation, stream bed destabilization, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Round Ebonyshell (*Fusconaia rotulata*) | E | Y | LAA | Inhabits areas in rivers with moderate current on sand and gravel substrate. Major threats include habitat degradation caused by excessive sedimentation, stream bed destabilization, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Southern Sandshell (*Hamiota australis*) | T | Y | LAA | Inhabits areas with slow to moderate currents in small creeks and rivers, where the substrate is stable and consists of sand or a mix of sand and fine gravel. Major threats include habitat degradation caused by excessive sedimentation, stream bed destabilization, impoundment, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Shinyrayed Pocketbook (*Lampsilis subangulata*) | E | Y | LAA | Inhabits areas with slow to moderate currents in medium sized creeks to rivers, where the substrate consists of clean sand or silty sand. Major threats include anthropogenic habitat degradation caused by sedimentation, channelization, impoundment, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |

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| Mussel | Gulf Moccasinshell (*Medionidus penicillatus*) | E | Y | LAA | Inhabits areas with a slow to moderate current in medium sized creeks to large rivers where the substrate consists of sand and gravel or silty sand. Major threats include habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Ochlockonee Moccasinshell (*Medionidus simpsonianus*) | E | Y | LAA | Inhabits sand with some gravel substrates in large creeks with current. Major threats include habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Suwannee moccasinshell (*Medionidus walker*) | T | Y | LAA | Inhabits mud, muddy sand, sand, and gravel of larger streams with moderate flows. Major threats include chemical pollution, sedimentation from logging and agriculture, development, pollution from mining and agriculture, invasive species (experiences with the Asiatic Clam (*Corbicula fluminea*)), stream channel instability, water extraction, and eutrophication. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Snail | Stock Island Tree Snail (*Orthalicus reses* [not incl. *nesodryas*]) | T | N | LAA | Inhabits tropical hammock hardwood trees. Major threats include habitat degradation and loss. Action could result in habitat fragmentation of this species and could result in a LAA determination. |
| Mussel | Oval Pigtoe (*Pleurobema pyriforme*) | E | Y | LAA | Inhabits areas with slow to moderate current in medium-sized creeks to small rivers, where the substrate is silty sand to sand and gravel. Major threats include habitat alteration caused by impoundments, channelization, stream flow depletion, sedimentation, gravel mining, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Fuzzy Pigtoe (*Pleurobema strodeanum*) | T | Y | LAA | Inhabits areas with moderate flow in medium sized creek and rivers where the substrate is sand to silty sand. Major threats include habitat degradation caused by excessive sedimentation, stream bed destabilization, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| Mussel | Southern Kidneyshell (*Ptychobranchus jonesi*) | E | Y | LAA | Inhabits areas with slow to moderate currents in medium creeks tor small rivers, where the substrate consists of firm sand and near bedrock outcroppings. Major threats include habitat degradation caused by excessive sedimentation, stream bed destabilization, impoundment, and environmental contaminants. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |

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| Mussel | Choctaw Bean (*Villosa choctawensis*) | E | Y | LAA | Inhabits silty sand and sandy clay substrates in medium-sized creeks and rivers with moderate currents. Major threats are habitat loss and degradation. Impacts to stream habitat, changes in hydrological regimes and water quality, or those that could affect their fish host species could result in a LAA determination. |
| ***Crustaceans*** | | | | | |
| Pond/ river/ stream | Cypress Crayfish (*Cambarellus blacki*) | URS | N | LAA | Inhabits cypress ponds. It is usually found within submergent and emergent vegetation. The major threat facing Cypress Crayfish is expansion of a nearby oil production facility. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Florida Cave Amphipod (*Crangonyx grandimanus*) | URS | N | LAA | Inhabits caves, wells, and karst springs. The species is likely threatened by changes in detrital flows and depletion of aquifers. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Hobb's Cave Amphipod (*Crangonyx hobbsi*) | URS | N | LAA | Inhabits subterranean caves and wells. It is often associated with limestone and detritus, and found near cave entrances. It is likely threatened by changes in detrital flows and depletion of aquifers. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Squirrel Chimney Cave Shrimp (*Palaemonetes cummingi*) | T | N | LAA | Only known from the Squirrel Chimney, a small sinkhole that connects to a flooded cave system near Gainesville, Alachua County, Florida. Habitat for this species includes groundwater within a flooded limestone cave. Threats to the species include expanded development associated with the growth of Gainesville, Florida, which may alter land uses and groundwater in the vicinity of Squirrel Chimney. Stormwater runoff, septic tank drainage fields, aquifer recharge, herbicide/fertilizer use, and erosion/sediment deposition are some of the primary factors impacting groundwater quality. A small fish, the Redeye Chub (*Notropis harperi*), was detected in Squirrel Chimney during 1994-1996 surveys; this species is believed to prey on Squirrel Chimney Cave Shrimp. Therefore predation may also constitute a threat to the species. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Orange Cave Crayfish (*Procambarus acherontis*) | URS | N | LAA | Inhabits aquifers. It is associated with karst and the entrances of springs, sinkholes, and underground water features. The major threat facing Orlando Cave Crayfish is expanding human populations and development. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Pond/river/stream | Coastal Flatwoods Crayfish (*Procambarus apalachicolae*) | URS | N | LAA | Inhabits still waters when water levels are high and burrows when waters recede. The species is usually found in detritus accumulations on the bottom of pools caused by root mats and logs, interspersed between areas of turbulence. They are restricted to a few small stream systems. Species is susceptible to pollution, changes in water temperature, siltation, and other changes in water quality. Protection of inhabited headwater and secondary streams is critical to the species' survival. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |

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| Cave/well/ sinkhole | Silver Glen Springs Crayfish (*Procambarus attiguus*) | URS | N | LAA | This species has been documented from only one cave system in Ocala Natural Forest, Silver Glen Springs, Marion County, Florida. The species is threatened potentially by water pollution and disturbance from tourists (snorkelers and scuba divers, as the cave is a popular recreation area). Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Bigcheek Cave Crayfish (*Procambarus delicatus*) | URS | N | NLAA | Inhabits subterranean caves. Limited to only one cave system at Alexander Springs within the Ocala National Forest, Lake County, Florida. Their population is threatened by disturbance and habitat degradation from recreational use. As the species only occurs on federally-protect land, the action is NLAA the species. |
| Pond/river/stream | Panama City Crayfish (*Procambarus econfinae*) | P | N | LAA | Occupies shallow, often ephemeral, vegetated, freshwater systems in pine flatwoods or wet prairie/marsh habitats of Bay County, Florida. Threats to this species include habitat loss/degradation/fragmentation, development, hydrologic alterations, silviculture practices, and collection for fish bait. Through impacts to habitat, hydrology, and water quality, the action is could result in a LAA determination. |
| Cave/well/ sinkhole | Santa Fe Cave Crayfish (*Procambarus erythrops*) | URS | N | LAA | Inhabits subterranean pools within southern Suwannee County, Florida. The Santa Fe Cave Crayfish requires waters with low flows. The species is threatened hydrological changes, pollution, and saltwater intrusion. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Orange Lake Cave Crayfish (*Procambarus franzi*) | URS | N | LAA | Inhabits subterranean caves. It is associated with bat colonies and the detrital input provided. Its range is limited to Marion County, Florida, where it is known from three cave locations near Orange Lake. The species is particularly vulnerable because of its limited range and small numbers. The species may be sensitive to impacts to water quality from nearby quarrying. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Coastal Lowland Cave Crayfish (*Procambarus leitheuser*) | URS | N | LAA | Inhabits deep, subterranean, karst cave systems. Most areas of occurrence are tidally influenced and associated with silt. Populations are threatened by changes in water quality such as increased saltwater intrusion resulting from extraction of groundwater for human consumption. The species is additionally threatened by rapid urbanization. Through impacts to habitat, hydrology, and water quality, the action is could result in a LAA determination. |
| Cave/well/sinkhole | Florida Cave Crayfish (*Procambarus lucifugus*) | URS | N | LAA | Inhabits karstic subterranean caves and sinkholes. Populations are threatened directly by water quality degradation and indirectly by threats facing bat populations (species feeds on bat guano; "prey"). Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Miami Cave Crayfish (*Procambarus milleri*) | URS | N | LAA | Inhabits wells. It has been found at over a dozen sites, those these sites may be interconnected, including populations within the nearby Everglades As the species has an extremely limited range and population size within a metropolitan area, with continually increasing human pressures on aquifers, this species is especially vulnerable to extinction. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |



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| Cave/well/ sinkhole | Putnam County Cave Crayfish (*Procambarus morrisi*) | URS | N | LAA | Limited to a single cave called Devil's Sink in Putnam County, Florida. This single population is particularly vulnerable to threats posed by water quality degradation as a result of heavy recreational use, pollution (including direct dumping), and groundwater depletion for human consumption. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Pallid Cave Crayfish (*Procambarus pallidus*) | URS | N | LAA | Inhabits caves. It is associated with areas of high flows and karst. Populations are threatened by pollution (because of their likely sensitivity to chemicals) and by disturbance from recreational diving. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Black Creek Crayfish (*Procambarus pictus*) | URS | N | LAA | Inhabits small, relatively swift, sand-bottomed, tannic-stained streams, often emanating from sandhills and flowing through or from swampy terrain. Black Creek Crayfish are susceptible to pollution, changes in water temperature, siltation, and other changes in water quality. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Cave/well/ sinkhole | Spider Cave Crayfish (*Troglocambarus maclanei*) | URS | N | LAA | Inhabits subterranean caves and sinkholes near areas with fresh detrital input, such as bat caves. Major threats to the species include anthropogenic impacts on water quality and reduced detritus flows. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| ***Insects*** | | | | | |
| Caddisfly | Logan's Agarodes Caddisfly (*Agarodes logani*) | URS | N | LAA | Has only been observed from one stream in Gadsden County, Florida. As the population is restricted to such a small area and adjacent to an active farm, the species is at risk from farming practices which may result in pollution, siltation, or habitat degradation. Impacts to stream habitat near this species location, changes in hydrological regimes and water quality could result in a LAA determination. |
| Butterfly | Florida Leafwing (*Anaea troglodyta floridalis*) | E | Y | LAA | Inhabits pine rocklands. The species has only one host plant, the pineland croton (*Croton linearis*). Only one population within Everglades National Park is known to be extant. This species may be at imminent risk of extinction as the pinelands habitats on which it depends are very limited and continue to be destroyed by development and tropical storm events. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Butterfly | Frosted Elfin Butterfly (*Callophrys irus*) | UR | Y | LAA | Inhabits pine barrens. The major causes of population decline to their populations are habitat loss caused by development, invasive species, succession, and incompatible vegetation management, as well as the limiting factor of small population sizes. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |



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| Beetle | Miami Tiger Beetle (*Cicindelidia floridana*) | E | N | LAA | Prefers open, bare, white to gray sandy areas in pine rockland habitat. Threats to this species include habitat loss/degradation/fragmentation, development, non-native species encroachment, and specimen collection by enthusiasts. Habitat fragmentation could result in a LAA determination. |
| Butterfly | Nickerbean Blue Butterfly (*Cyclargus ammon*) | TS | N | LAA | Inhabits tropical hardwood hammock forests. Listed because of similar appearance, otherwise species seems stable. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Butterfly | Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) | E | N | LAA | Inhabits coastal hardwood hammocks, dunes, and scrub habitats. Current threats to the species include habitat loss and fragmentation, illegal collection, pesticides, impacts to host plants from introduced iguanas, loss of genetic diversity, and stochastic environmental events (natural or human-caused). Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Butterfly | Monarch Butterfly (*Danaus plexippus plexippus*) | URS | N | LAA | Widespread. Monarch populations face many threats, but primary among these is the loss of their host plants (milkweed, *Asclepias* spp.) as a result of intensive pesticide use, particularly glyphosate. Habitat fragmentation associated with the action could result in a LAA determination. |
| Butterfly | Duke's Skipper Butterfly (*Euphyes dukesi calhouni*) | URS | N | LAA | Inhabits sedge patches within wetlands and swamps. Threats include conversion of wetland habitat to urbanization, and pesticides. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Butterfly | Palatka Skipper Butterfly (*Euphyes pilatka klotsi*) | URS | N | LAA | Inhabits areas dominated by sawgrass near mangroves in tropical pinelands and sawgrass marshes. Major threats to the subspecies include habitat loss as a result of development, and the use of insecticides. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Dragonfly | Westfall's Clubtail Dragonfly (*Gomphus westfalli*) | URS | N | LAA | Inhabits sphagnum-bog trickles and streams. The primary threats to their populations are "excessive clearcutting" and altered fire regimes. Their extremely limited range (only about 25 kilometers) makes their populations especially vulnerable. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Butterfly | Ceraunus Blue Butterfly (*Hemiargus ceraunus antibubastus*) | TS | N | LAA | Inhabits grasslands, parks, along roadsides, and open woodlands. Listed because of similar appearance. The population in Florida is considered secure. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Butterfly | Schaus Swallowtail Butterfly (*Heraclides aristodemus ponceanus*) | E | N | LAA | It is currently limited to the Florida Keys. Populations are threatened by habitat destruction and biocides (as a result of mosquito control). This species is especially vulnerable to extinction because of its small size, isolated and small populations, and limited range. Through impacts to habitat (fragmentation and changes in hydrology), the action could result in a LAA determination. |

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| Bee | Gulf Coast Solitary Bee (*Hesperapis oraria*) | URS | N | LAA | Inhabits sandy coastal dunes. Threats include: habitat loss, degradation, and fragmentation as a result of development; pesticide use; competition with European Honeybees; sea level rise and hurricanes (intensified by climate change); limited genetic diversity; and a lack of protection. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Caddisfly | Sykora's Hydroptila Caddisfly (*Hydroptila sykorai*) | URS | N | LAA | This species has a very small range and is only known from two spring- run streams in Gadsden County, Florida. The species is at risk of nearby farming practices which may result in pollution, siltation, or habitat degradation. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Caddisfly | Morse's Little Plain Brown Sedge Caddisfly (*Lepidostoma morsei*) | URS | NN | LAA | Inhabits flowing waters, typically soft blackwater streams. This species is sensitive to siltation and pollution caused by practices such as unsustainable forestry and conversion of land to agricultural use. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Butterfly | Cassius Blue Butterfly (*Leptotes cassius theonus*) | TS | | LAA | Inhabits grassland, urban areas, hardwood forests, and scrub. Listed because of similar appearance, otherwise species seems stable. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Dragonfly | Purple Skimmer Dragonfly (*Libellula jesseana*) | URS | N | LAA | Inhabits "clear-water, sand-bottomed lakes bordered by maiden-cane grass and St. John's Wort shrubs. Currently, the species might may only remain at a single lake within a state park. This species is extremely sensitive to pollution and eutrophication. The major threat to populations is lakeshore development and impacts to water quality. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Beetle | American Burying Beetle (*Nicrophorus americanus*) | E | N | No effect | Extirpated in Florida. This action would have no effect on the species. |
| Caddisfly | Little oecetis longhorn caddisfly (*Oecetis parva*) | URS | N | LAA | Inhabits natural lakes and springs. This species is sensitive to activities that affect water quality and hydrologic regimes such as agriculture, urban development, forestry, water withdrawal, and nutrient loading. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Dragonfly | Southern Snaketail Dragonfly (*Ophiogomphus australis*) | URS | N | LAA | Inhabits graveled streams. Major threats to their populations are water quality degradation from a variety of sources including gravel mining, pesticide use, and deforestation. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Bee | Blue Calamintha Bee (*Osmia calaminthae*) | URS | N | LAA | Inhabits sand pine and scrub habitat, as a specialist on the threatened Asher's calamint (*Calamintha ashei*).Threats include pesticide drift and destructive off-road recreational activities. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |

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| Dragonfly | Calvert's Emerald Dragonfly (*Somatochlora calverti*) | URS | N | LAA | Habitat is unknown but is thought to include "boggy forest seepages." Little is known about the threats that affect this species. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Butterfly | Bartram's Scrub-hairstreak (*Strymon acis bartrami*) | E | Y | LAA | Inhabits pine rocklands. The pineland croton is the host plant. The subspecies is threated by fire suppression, habitat loss, and climate change/sea level rises. Although the species does not use wetlands/waters of the US during any stage of their life history, the action is LAA the species because uplands adjacent to wetlands could be impacted. |
| Dragonfly | Yellow-sided Clubtail Dragonfly (*Stylurus potulentus*) | URS | N | LAA | Inhabits pristine stream and river habitats with sandy bottoms. The major threat is pollution as a result of development, clearcutting, and pesticide use. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Caddisfly | Three-toothed Long-horned Caddisfly (*Triaenodes tridontus*) | URS | N | No effect | Extirpated in Florida. This action would have no effect on the species. |
| ***Plants*** | | | | | |
| Subshrub | Meadow Joint-vetch *(Aeschynomene pratensis*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and potential for invasive species introduction, the action could result in a LAA determination. |
| Shrub | Crenulate Lead-plant (*Amorpha crenulata*) | E | N | LAA | This species is restricted to poorly-drained Opalocka sands within pine rocklands or in wet prairies with Opalocka-rock outcrop complex soil. Impacts to wetlands may affect this species. Through impacts to habitat, the action could result in a LAA determination. |
| Perennial Forb | Blodgett's Silverbush (*Argythamnia blodgettii*) | T | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Shrub | Four-petal Pawpaw (*Asimina tetramera*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Purpledisk Honeycombhead Sunflower (*Balduina atropurpurea*) | URS | N | LAA | Habitat for this species includes wet pine flatwoods and savannas, seepage slopes, pitcherplant bogs, and wet ditches. Through impacts to habitat and changes in hydrologic regime, the action could result in a LAA determination. |
| Perennial Forb | Apalachicola Wild Indigo (*Baptisia megacarpa*) | URS | N | LAA | Habitat includes mixed hardwood and hardwood-pine forests, in proximity to floodplains, streams, or ravines. Through impacts to habitat, changes in hydrologic regime, and potential for invasive species introduction, the action could result in a LAA determination. |
| Perennial Forb | Florida Bonamia (*Bonamia grandiflora*) | T | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |

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| Subshrub | Florida Brickell-bush (*Brickellia mosieri*) | E | Y | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Annual Forb | Brooksville Bellflower (*Campanula robinsiae*) | E | N | LAA | There are only four, possibly five sites where this wetland dependent species occurs. Four of these sites meet recovery criteria of being protected. If wetland impacts occurred at the site on private land, this could result in a LAA determination. This species occurs in wet prairies and along the edges of ponds near pastureland or in adjacent hardwood forests. |
| Cactus | Fragrant Prickly-apple (*Cereus eriophorus* var. *fragrans*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the varietal. |
| Perennial Forb | Deltoid Spurge (*Chamaesyce deltoidea* ssp. *Deltoidea*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the subspecies. |
| Perennial Forb | Pineland Sandmat (*Chamaesyce deltoidea pinetorum*) | T | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the subspecies. |
| Perennial Forb | Wedge Spurge (*Chamaesyce deltoidea serpyllum*) | E | N | No effect | This species is has a very restricted range. It is endemic to, and known only from Big Pine Key. However, habitat for this species is upland pine rocklands and along roadways. Based on habitat requirements, the action is anticipated to have no effect on the subspecies. |
| Annual Forb | Garber's Spurge (*Chamaesyce garberi*) | T | N | No effect. | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Subshrub | Big Pine Partridge Pea (*Chamaecrista lineata keyensis*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Shrub | Pygmy Fringe-tree (*Chionanthus pygmaeus*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Subshrub | Cape Sable Thoroughwort (*Chromolaena frustrate*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Florida Golden Aster (*Chrysopsis floridana*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Lichen | Florida Perforate Cladonia (*Cladonia perforate*) | E | N | No effect. | Occurs in dry scrub environments. The action is anticipated to have no effect on the species. |



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| Perennial Forb | Pigeon Wings (*Clitoria fragrans*) | F | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Shrub | Short-leaved Rosemary (*Conradina brevifolia*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Shrub | Etonia Rosemary (*Conradina etonia*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Shrub | Apalachicola Rosemary (*Conradina glabra*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Cactus | Florida Semaphore Cactus (*Consolea corallicola*) | E | Y | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Ciliate-leaf Tickseed Sunflower (*Coreopsis integrifolia*) | E | Y | LAA | This species occurs in floodplain and streambank habitats, on the edges of swamp forests, and the borders of brackish marshes. Through impacts to habitat and changes in hydrology, the action could result in a LAA determination. |
| Perennial Forb | Avon Park Harebells (*Crotalaria avonensis*) | E | N | No effect | Habitat is xeric white sand scrub. However, this species is known from only three sites in Polk and Highlands Counties near Avon Park. The action is anticipated to have no effect on the species. |
| Annual Forb | Okeechobee Gourd (*Cucurbita okeechobeensis* ssp. *okeechobeensis*) | E | N | LAA | There are only two natural populations of this annual vine in Florida. It is a wetland obligate formerly known from swampy forest and hammocks. This species is presently restricted to the banks of ditches and wet road shoulders. Through impacts to habitat and changes in hydrologic regime, the action is LAA the species. |
| Shrub | Florida Prairie-Clover (*Dalea carthagenensis floridana*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the subspecies. |
| Subshrub | Beautiful Pawpaw (*Deeringothamnus pulchellus*) | E | N | LAA | This facultative species generally occurs in upland habitat in xeric and mesic pine flatwoods. As pine flatwoods are often bordered by wetlands, impacts to wetland habitats may affect this species. Through potential introduction of invasive species, the action could result in a LAA determination. |
| Subshrub | Rugel's Pawpaw (*Deeringothamnus rugelii*) | E | N | LAA | This species occurs in mesic and wet flatwood habitats. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | Garrett's Mint (*Dicerandra christmanii*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |



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| Perennial Forb | Longspurred Mint (*Dicerandra cornutissima*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Scrub Mint (*Dicerandra frutescens*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Lakela's Mint (*Dicerandra immaculate*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Graminoid | Florida Pineland Crabgrass (*Digitaria pauciflora*) | T | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat, hydrology, and potential invasive species introduction, the action could result in a LAA determination. |
| Perennial Forb | Clam-shell Orchid (*Encyclia cochleata* var. *triandra*) | NW | N | LAA | Epiphytic orchid occurring on trees in wetlands so impacts to wetlands may impact this species. Through impacts to habitat and changes in hydrologic regime, the action could result in a LAA determination. |
| Perennial Forb | Big Cypress Epidendrum Orchid (*Epidendrum strobiliferum*) | URS | N | LAA | Habitat for this epiphytic orchid is generally pop ash and pond apple inhabiting swamps and sloughs which would be affected by impacts to wetlands. Impacts to habitat could result in LAA determination. |
| Perennial Forb | Blackbract Pipewort (*Eriocaulon nigrobracteatum*) | URS | N | LAA | This species is endemic to Florida and occurs in wetland habitats. Impacts to habitat and changes in hydrology/nutrient cycles could result in a LAA determination. |
| Perennial Forb | Scrub Buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*) | T | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the varietal. |
| Perennial Forb | Snakeroot (Wedgeleaf Eryngo) (*Eryngium cuneifolium*) | E | N | No effect | This is an upland species and although it has an extremely restricted range, most of the 20 known occurrences are located on three preserves. The action is anticipated to have no effect on the species. |
| Perennial Forb | Telephus Spurge (*Euphorbia telephioides*) | T | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Small's Milkpea (*Galactia smallii*) | E | N | No effect | This Florida endemic species is known from only six populations in pine rockland habitat. However, five of these populations are on managed areas. Based on this restricted range on protected lands, the action is anticipated to have no effect on the species. |
| Perennial Forb | Harper's Beauty (*Harperocallis flava*) | E | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Impacts to habitat and changes in hydrology could result in a LAA determination. |



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| | | | | | |
|---|---|---|---|---|---|
| Cactus | Aboriginal Prickly-apple (*Harrisia* (=*Cereus*) *aboriginum* (=*gracilis*)) | E | Y | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Florida Hartwrightia Sunflower (*Hartwrightia floridana*) | URS | N | LAA | This species occurs in a variety of wetland habitats including acidic seeps and bogs among others. Impacts to habitat, hydrology, and nutrient cycles could result in a LAA determination. |
| Perennial Forb | Henry's Spider-lily (*Hymenocallis henryae*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Impacts to habitat and changes in hydrology could result in a LAA determination. |
| Perennial Forb | Highlands Scrub Hypericum (*Hypericum cumulicola*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Shrub | Edison's Ascyrum St. Johns Wort (*Hypericum edisonianum*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Subshrub | Smooth Barked St. Johns Wort (*Hypericum lissophloeus*) | URS | N | LAA | This species occurs on the fluctuating shores of karst ponds and small sandhill lakes. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Tree | Yellow Anisetree (*Illicium parviflorum*) | NW | N | LAA | Occurs on the banks of spring run or seepage springs, hydric hammock, and bottomland forest. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | Beach Jacquemontia (*Jacquemontia reclinata*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Cooley's Water-willow (*Justicia cooleyi*) | E | N | LAA | This Florida endemic species occurs in several wetland habitats including streams, swamp woodlands, and also in mesic hammocks. Through impacts to habitat, hydrology, and the potential fo invasive species introduction, the action could result in a LAA determination. |
| Perennial Forb | Scrub Blazingstar (*Liatris ohlingerae*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Panhandle Lily (*Lilium iridollae*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat, the action could result in a LAA determination. |
| Shrub | Bog Spicebush (*Lindera subcoriacea*) | URS | N | LAA | This species has a narrow ecological niche. It is often found in sphagnum bogs, or seepage bogs. Through impacts to habitat and hydrology, the action could result in a LAA determination. |

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| Perennial Forb | Sand Flax (*Linum arenicola*) | E | N | LAA | Nature Serve reports this species occurs in temporary pools of palustrine habitats, and further states that it is documented from solution pits and shallow soils of ephemeral pools on limerock in open pinelands. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Annual Forb | Carter's Small Flowered Flax (*Linum carteri carteri*) | E | Y | LAA | This species occurs in disturbed margins of pine rocklands. Pine rockland habitat has been greatly reduced, especially outside of Everglades National Park, where only one percent of pinelands remain as fragmented patches. Through impacts to habitat and potential for invasive species introduction, the action is LAA the species. |
| Perennial Forb | West's Flax (*Linum westii*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | Boykin's Lobelia (*Lobelia boykinii*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | Raven's Seedbox (*Ludwigia ravenii*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Subshrub | Scrub Lupine (*Lupinus aridorum*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Subshrub | Curtis' Loosestrife (*Lythrum curtissii*) | URS | N | LAA | Occurs in bogs, seeps, acid or calcareous swamps, karst ponds, creek swamps, floodplains, tidal flats, streambanks, and tidal river mouths. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | Lowland Loosestrife (*Lythrum flagellare*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | White Birds-in-a-nest (*Macbridea alba*) | T | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | Godfrey's Stitchwort (*Minuartia godfreyi*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Annual Forb | Needleleaf or Narrowleaf Naiad Water-nymph (*Najas filifolia*) | URS | N | LAA | Habitat for this annual aquatic species is typically tannic-acid tinted ponds and lakes. Through impacts to habitat, hydrology, and potential invasive species introduction, the action is LAA the species. |

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| Subshrub | Britton's Beargrass (*Nolina brittoniana*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Cape Sable Orchid (*Oncidium undulatum*) | URS | N | LAA | This is an epiphytic orchid that attaches to tree trunks in hammocks, cypress swamps, buttonwood forest, and cypress swamps. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Annual Forb | Papery Whitlow-wort (*Paronychia chartacea*) | T | N | LAA | There are two distinct subspecies, both are listed. *Paryonychia chartacea* ssp. *minima* occurs almost exclusively on the sandy margins of karst ponds and impacts to Karst ponds could result in a LAA determination for this subspecies. |
| Cactus | Key tree Cactus (*Pilosocereus robinii*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Godfrey's Butterwort (*Pinguicula ionantha*) | T | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat, the action could result in a LAA determination. |
| Perennial Forb | Lewton's Polygala Milkwort (*Polygala lewtonii*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Tiny Polygala Milkwort (*Polygala smallii*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Annual Forb | Horton Wireweed (small) (*Polygonella basiramia*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Sandlace (Woody Wireweed) (*Polygonella myriophylla*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Florida Pondweed (*Potamogeton floridanus*) | URS | N | LAA | Submerged aquatic herb inhabiting slow moving backwater streams and rivers. Known form only the Blackwater River and its tributaries. Through impacts to habitat and hydrology/water quality, the action could result in a LAA determination. |
| Shrub | Scrub Plum (*Prunus geniculate*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | White Meadowbeauty (*Rhexia parviflora*) | URS | N | LAA | Occurs in wetland habitats and is sensitive to changes in ground and surface hydrology. Through impacts to habitat and hydrology, the action could result in a LAA determination. |



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| Perennial Forb | Panhandle Meadowbeauty (*Rhexia salicifolia*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat, hydrology, nutrient cycles, and water quality, the action could result in a LAA determination. |
| Shrub | Chapman Rhododendron (*Rhododendron chapmanii*) | E | Y | LAA | This species usually inhabits the transitional area between upland mesic or scrubby flatwoods and floodplain swamps or baygalls. Through impacts to habitat and potential introduction of invasive species, the action could result in a LAA determination. |
| Graminoid | Hairy Peduncled Beakrush (*Rhynchospora crinipes*) | URS | N | LAA | Occurs in riparian habitats along stream channels and terraces and sand-caly bars. Through impacts to habitat, hydrology, and water quality, the action could result in a LAA determination. |
| Shrub | Miccosukee Gooseberry (*Ribes echinellum*) | T | N | LAA | This species occurs in mesic forest communities. Through impacts to habitat and potential introduction of invasive species, the action could result in a LAA determination. |
| Perennial Forb | Eared Coneflower (*Rudbeckia auriculata*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Tree | Florida Willow (*Salix floridana*) | URS | N | LAA | This species occurs in roadside ditches, near springs, hydric hammocks, and densely wooded floodplains. Through impacts to habitat, hydrology, and potential introduction of invasive species, the action could result in a LAA determination. |
| Perennial Forb | Gulf Sweet Pitcherplant (*Sarracenia rubra* ssp. *gulfensis*) | URS | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | American Chaffseed (*Schwalbea americana*) | E | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Perennial Forb | Florida Skullcap (*Scutellaria floridana*) | T | N | LAA | A LAA finding without a species-specific comment presented in this column, was made for several wetland associated species. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Shrub | Everglades Bully (*Sideroxylon reclinatum* ssp. *austrofloridense*) | T | N | LAA | This species occurs in low-lying oak flatwoods. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Shrub | Georgia Bully (*Sideroxylon thorne*) | URS | N | LAA | This species occurs in wet woods bordering streams or cypress ponds so there is potential for this species to be affected by impacts to wetlands. Through impacts to habitat, the action could result in a LAA determination. |
| Perennial Forb | Fringed Campion (*Silene polypetala*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |



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|---|---|---|---|---|---|
| Perennial Forb | Gentian Pinkroot (*Spigelia gentianoides*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Cooley's Meadow Rue (*Thalictrum cooleyi*) | E | N | LAA | This species occurs in bogs and wet pine savannahs, flatwoods and seepage slopes. In Florida this species is known from only one occurrence, on a timber company land utility right of way through former flatwoods. This population may be extirpated (USFWS 2009). However as this possible occurrence is on private property, impacts could occur. Through impacts to habitat and hydrology, the action could result in a LAA determination. |
| Tree | Florida Torreya (*Torreya taxifolia*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Perennial Forb | Florida Bristle Fern (*Trichomanes punctatum* ssp. *floridanum*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on this subspecies. |
| Perennial Forb | Ocala Vetch (*Vicia ocalensis*) | NW | N | NLAA | All known occurrences of this obligate wetland species are from the Ocala National Forest and Lake Woodruff National Wildlife Refuge. It is threatened by hydrologic changes from logging. However, since all known occurrences are on protected land, the action is NLAA the species. |
| Annual Forb | Wide-leaf Warea (*Warea amplexifolia*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |
| Annual Forb | Carter's Mustard (*Warea carteri*) | E | N | No effect | A no effects finding without a species-specific comment presented in this column, was generally made for upland species not thought to occur in or on margins of wetland habitats. The action is anticipated to have no effect on the species. |

FLS – Federal Listing Status under the Endangered Species Act (ESA) CH? – Has critical habitat been designated?

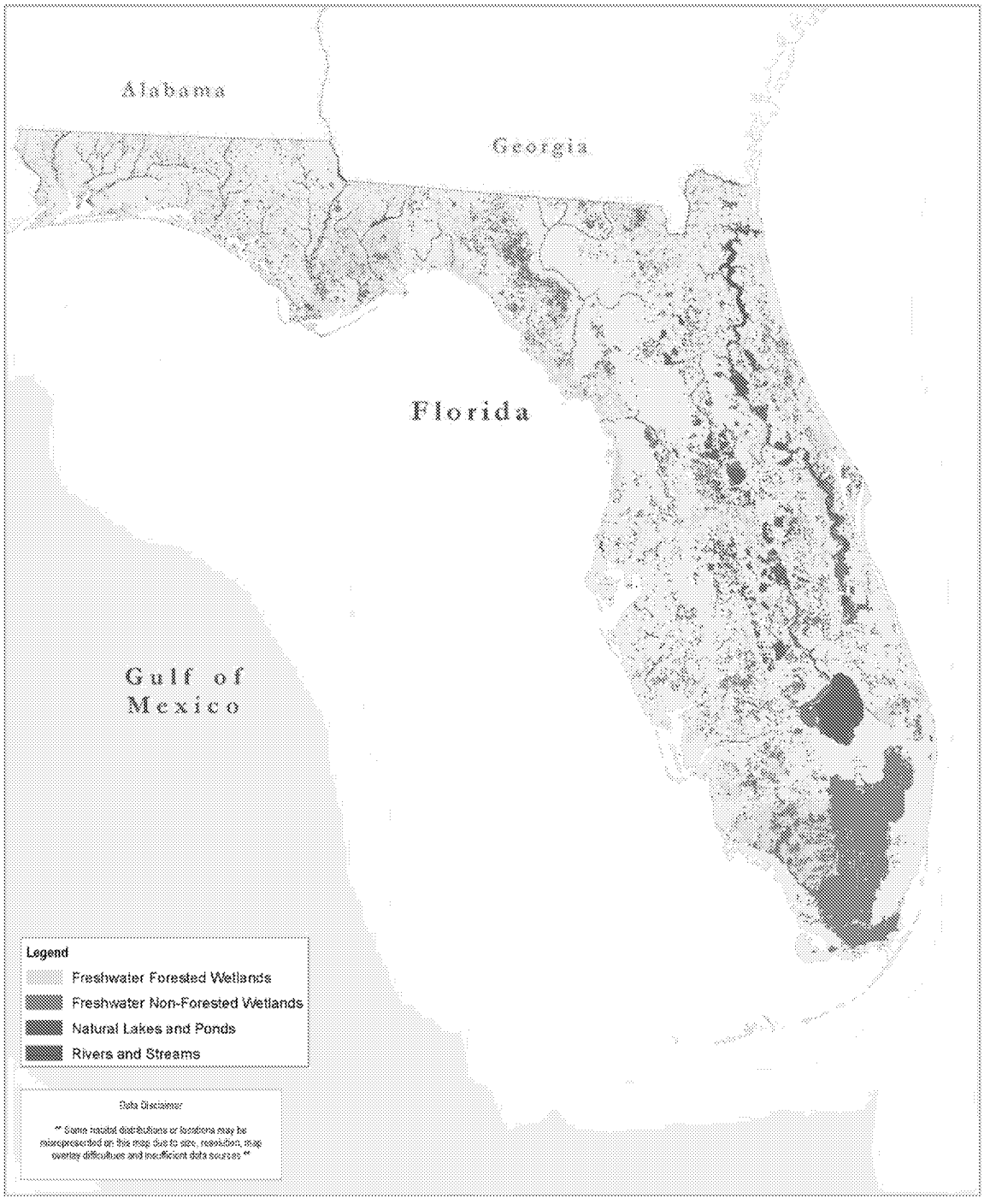
**Table Text Key:**

FLS – E (Endangered), T (Threatened), TS (Threatened due to Similarity of Appearance), C (Candidate), P (Proposed for listing), UR (Under Review), URS (Under Review, Substantial Finding), NW (Not Warranted Finding), * (Listing status of DPS that occurs in Florida. Other DPSs may have different listing statuses in other region).

CH – Y (Yes), N (No)

Finding – NLAA (May Affect Not Likely to Adversely Affect), LAA (May Affect Likely to Adversely Affect)

# Appendix D
## Figures 1 through 6




Paper Size ANSI A

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Miles

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

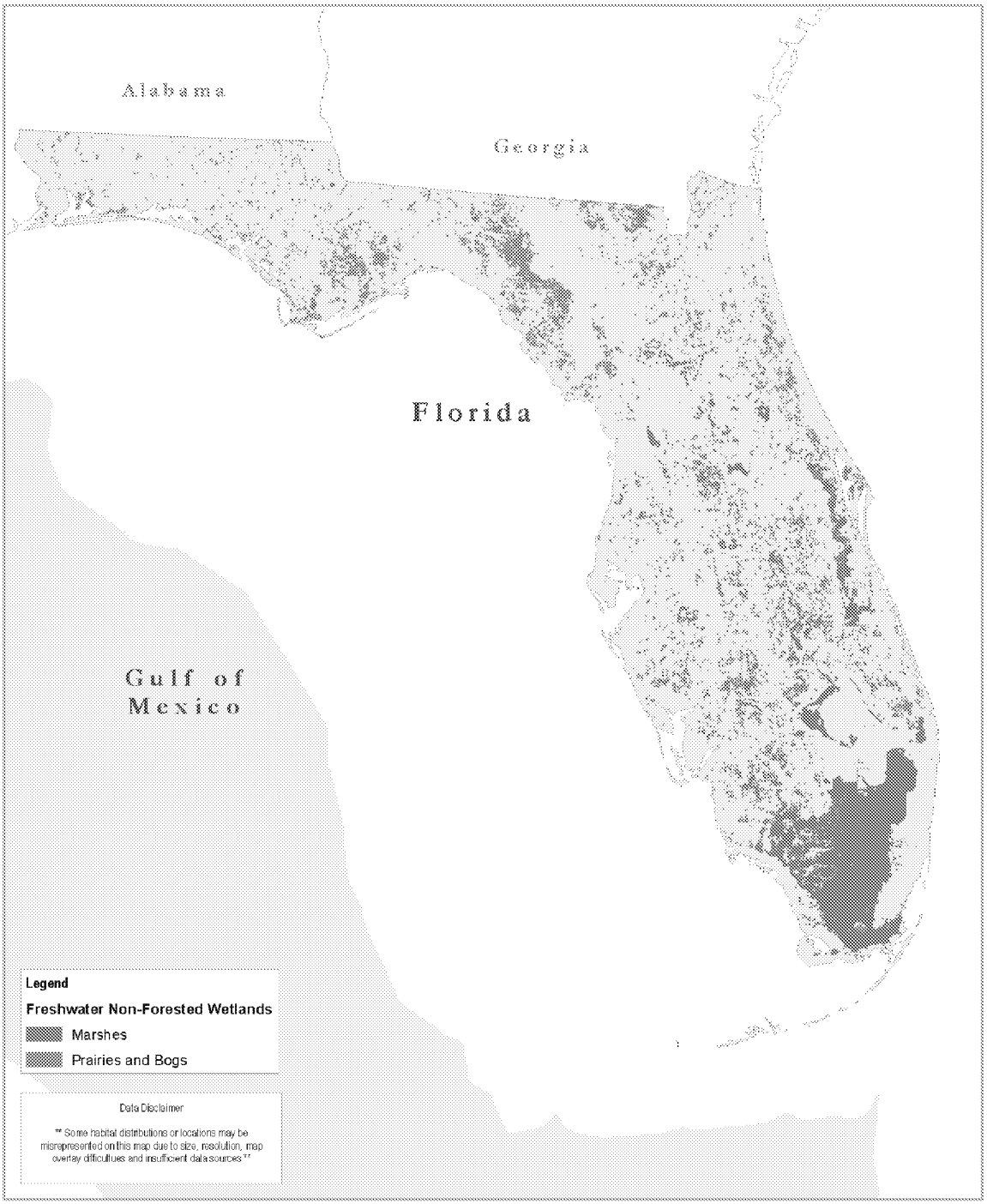
N

Florida Department of Environmental Protection
404 Assumption Biological Assessment

Combined Freshwater Wetlands

Project No 11206416
Revision No -
Date June 16, 2020

FIGURE 1




Paper Size ANSI A

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Miles

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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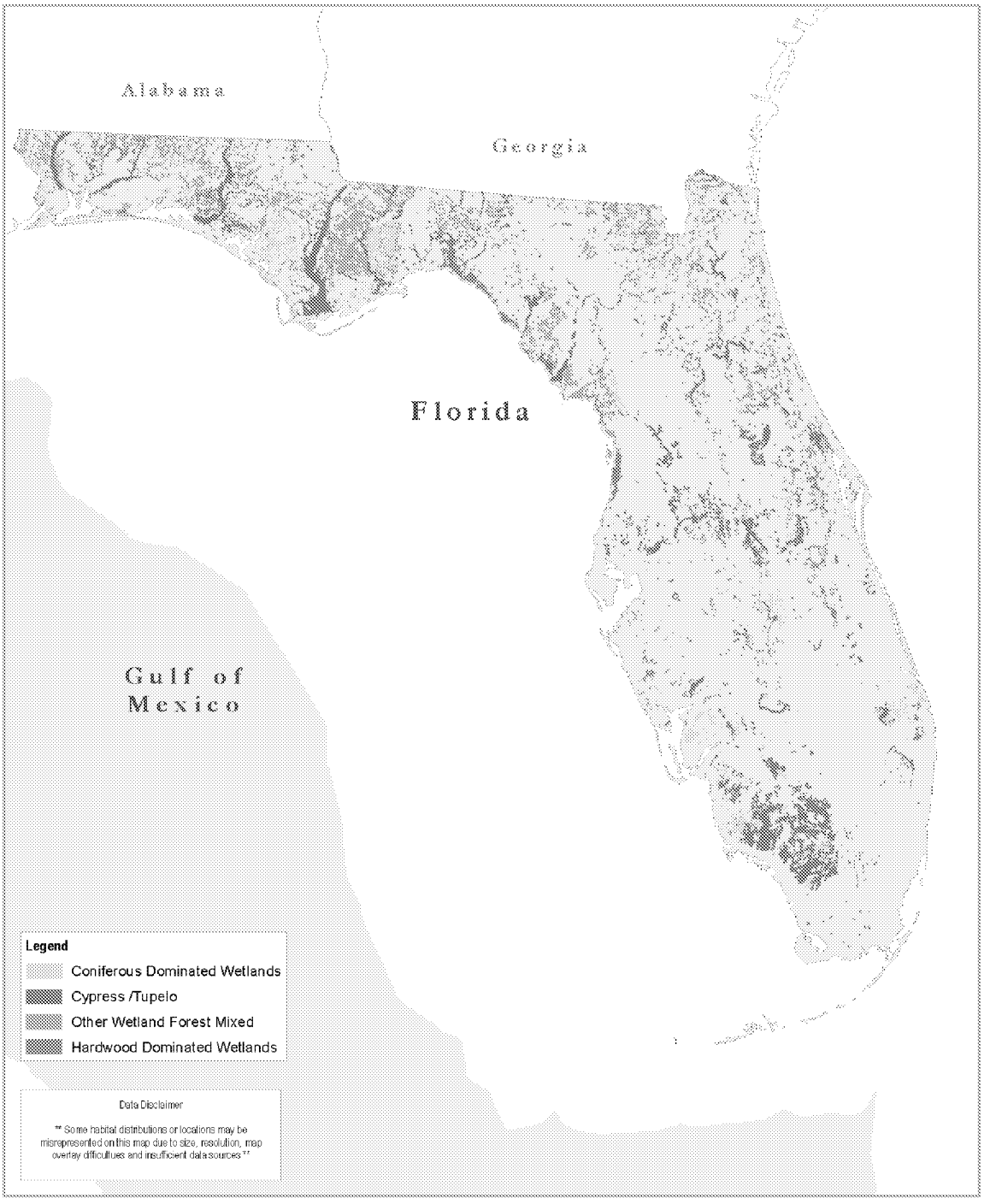
**Florida Department of Environmental Protection**
**404 Assumption Biological Assessment**

Freshwater Habitats
Non-Forested Wetlands

Project No. **11206416**
Revision No. -
Date **June 16, 2020**

**FIGURE 2**

Data source: . Created by: ddunn

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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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**Florida Department of Environmental Protection**
**404 Assumption Biological Assessment**

Freshwater Habitats
Freshwater Forested Wetlands

Project No. **11206416**
Revision No. -
Date **June 16, 2020**

**FIGURE 3**

Data source: . Created by: ddunn

Paper Size ANSI A

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Miles

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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**Florida Department of Environmental Protection**
**404 Assumption Biological Assessment**

Freshwater Habitats
Lakes

Project No. **11206416**
Revision No. -
Date **June 16, 2020**

**FIGURE 4**

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Data source: . Created by: ddunn

Paper Size ANSI A

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Miles

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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**Florida Department of Environmental Protection**
**404 Assumption Biological Assessment**

Freshwater Habitats
Rivers and Streams

Project No. **11206416**
Revision No. -
Date **June 16, 2020**

**FIGURE 5**

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Paper Size ANSI A

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Miles

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

N

**Florida Department of Environmental Protection**
**404 Assumption Biological Assessment**

**Estuarine Wetlands**

Project No. **11206416**
Revision No. -
Date **June 16, 2020**

**FIGURE 6**

Data source: . Created by: ddunn

# Appendix E
## Dredge and Fill Activities as Defined in the Corps Database



ED_005978_00025063-00286 FL CWA 404 Assumption FOIA_Interim Release 7

| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ AGRICULTURE \ CONVERSION |
| \ AGRICULTURE \ NON-EXEMPT |
| \ AQUACULTURE \ FINFISH |
| \ AQUACULTURE \ PLANTS |
| \ AQUACULTURE \ SHELLFISH |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RECREATIONAL, \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ ENERGY GENERATION \ NUCLEAR |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ STRUCTURE \ INTAKE/OUTFALL |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ TRANSPORTATION \ UTILITY \ AERIAL |
| \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ INDUSTRIAL |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ INDUSTRIAL, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RECREATIONAL |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ COMMERCIAL, \ STRUCTURE \ BULKHEAD |
| \ DEVELOPMENT \ COMMERCIAL, \ STRUCTURE \ INTAKE/OUTFALL |
| \ DEVELOPMENT \ COMMERCIAL, \ TRANSPORTATION \ AIRPORT \ FACILITY |
| \ DEVELOPMENT \ COMMERCIAL, \ TRANSPORTATION \ RAIL \ FACILITY |
| \ DEVELOPMENT \ COMMERCIAL, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ STRUCTURE \ INTAKE/OUTFALL |
| \ DEVELOPMENT \ COMMERCIAL, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ DEVELOPMENT \ INDUSTRIAL |
| \ DEVELOPMENT \ INDUSTRIAL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ COMMERCIAL |

| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ DEVELOPMENT \ INDUSTRIAL, \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ RECREATIONAL |
| \ DEVELOPMENT \ RECREATIONAL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ DEVELOPMENT \ RECREATIONAL, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ RECREATIONAL, \ MITIGATION \ RESTORATION \ WETLAND, \ MITIGATION \ ENHANCEMENT |
| \ DEVELOPMENT \ RECREATIONAL, \ STRUCTURE \ BOAT RAMP |
| \ DEVELOPMENT \ RECREATIONAL, \ STRUCTURE \ DOCK \ FIXED, \ STRUCTURE \ BREAKWATER |
| \ DEVELOPMENT \ RECREATIONAL, \ TRANSPORTATION \ ROADS \ CULVERT, \ STRUCTURE \ BULKHEAD |
| \ DEVELOPMENT \ RECREATIONAL, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
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| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ MITIGATION \ ENHANCEMENT, \ MITIGATION \ CREATION |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ STRUCTURE \ MARINA, \ DREDGING \ NAVIGATION \ PRIVATE |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ STRUCTURE \ MARINA, \ STRUCTURE \ BOAT RAMP |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ TRANSPORTATION \ UTILITY \ BURIED |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ COMMERCIAL, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ RECREATIONAL |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY, \ DEVELOPMENT \ COMMERCIAL |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ DREDGING \ CHANNELIZATION, \ STRUCTURE \ BOAT LIFT |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ OTHER \ BANK STABILIZATION |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ OTHER \ INDIAN TRIBE OR STATE 404 PROGRAM |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ STRUCTURE \ BULKHEAD |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ STRUCTURE \ DOCK \ FIXED |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ STRUCTURE \ MARINA |

| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ STRUCTURE \ MISCELLANEOUS |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ ROADS \ CULVERT |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ DREDGING \ BOAT SLIP |
| \ DREDGING \ CHANNELIZATION |
| \ DREDGING \ CHANNELIZATION, \ STRUCTURE \ WEIR |
| \ DREDGING \ DISPOSAL |
| \ DREDGING \ DISPOSAL, \ DREDGING \ MAINTENANCE, \ STRUCTURE \ INTAKE/OUTFALL |
| \ DREDGING \ GENERAL |
| \ DREDGING \ GENERAL, \ OTHER \ BANK STABILIZATION, \ MITIGATION \ ENHANCEMENT |
| \ DREDGING \ GENERAL, \ STRUCTURE \ BOAT RAMP, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ DREDGING \ GENERAL, \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW), \ OTHER \ BANK STABILIZATION |
| \ DREDGING \ MAINTENANCE |
| \ DREDGING \ MAINTENANCE, \ DREDGING \ BOAT SLIP, \ STRUCTURE \ BOAT HOUSE |
| \ DREDGING \ MAINTENANCE, \ DREDGING \ CHANNELIZATION |
| \ DREDGING \ MAINTENANCE, \ DREDGING \ GENERAL |
| \ DREDGING \ MAINTENANCE, \ OTHER \ BANK STABILIZATION |
| \ DREDGING \ MAINTENANCE, \ OTHER \ INDIAN TRIBE OR STATE 404 PROGRAM |
| \ DREDGING \ MAINTENANCE, \ STRUCTURE \ BULKHEAD |
| \ DREDGING \ MAINTENANCE, \ STRUCTURE \ GABION |
| \ DREDGING \ MAINTENANCE, \ STRUCTURE \ WATER CONTROL |
| \ DREDGING \ MAINTENANCE, \ STRUCTURE \ WATER CONTROL, \ STRUCTURE \ WEIR |
| \ DREDGING \ MAINTENANCE, \ TRANSPORTATION \ PIPELINE \ MAINTENANCE |
| \ DREDGING \ NAVIGATION \ PRIVATE, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ ENERGY GENERATION \ NATURAL GAS |
| \ ENERGY GENERATION \ NATURAL GAS, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ ENERGY GENERATION \ NATURAL GAS, \ TRANSPORTATION \ UTILITY \ STRUCTURE |
| \ ENERGY GENERATION \ SOLAR |
| \ MINING AND DRILLING \ DRILLING \ ACCESS |
| \ MINING AND DRILLING \ DRILLING \ FACILITIES |
| \ MINING AND DRILLING \ MINING \ FACILITES |
| \ MINING AND DRILLING \ MINING \ GRAVEL, \ MINING AND DRILLING \ MINING \ SAND |
| \ MINING AND DRILLING \ MINING \ OTHER MINERAL |
| \ MINING AND DRILLING \ MINING \ PHOSPHATE |

| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ MINING AND DRILLING \ MINING \ ROCK |
| \ MINING AND DRILLING \ MINING \ SAND |
| \ MINING AND DRILLING \ MINING \ SAND, \ MINING AND DRILLING \ MINING \ ROCK |
| \ MITIGATION \ CREATION |
| \ MITIGATION \ CREATION, \ DREDGING \ MAINTENANCE |
| \ MITIGATION \ ENHANCEMENT |
| \ MITIGATION \ ENHANCEMENT, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ MITIGATION \ FISH/WILDLIFE \ CREATION |
| \ MITIGATION \ FISH/WILDLIFE \ CREATION, \ OTHER \ BANK STABILIZATION |
| \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT |
| \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT, \ DEVELOPMENT \ RECREATIONAL |
| \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT, \ MITIGATION \ FISH/WILDLIFE \ CREATION, \ MITIGATION \ RESTORATION \ WETLAND |
| \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT, \ MITIGATION \ RESTORATION \ WETLAND, \ MITIGATION \ FISH/WILDLIFE \ CREATION |
| \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT, \ OTHER \ DAMS \ LOW WATER, \ MITIGATION \ RESTORATION \ WETLAND |
| \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ MITIGATION \ FISH/WILDLIFE \ PLANTING |
| \ MITIGATION \ FISH/WILDLIFE \ RESTORATION |
| \ MITIGATION \ MITIGATION BANK |
| \ MITIGATION \ MITIGATION BANK, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ MITIGATION \ MITIGATION BANK, \ MITIGATION \ PRESERVATION, \ MITIGATION \ RESTORATION \ WETLAND |
| \ MITIGATION \ RESTORATION \ STREAM |
| \ MITIGATION \ RESTORATION \ STREAM, \ MITIGATION \ CREATION, \ MITIGATION \ RESTORATION \ WETLAND |
| \ MITIGATION \ RESTORATION \ STREAM, \ MITIGATION \ RESTORATION \ WETLAND |
| \ MITIGATION \ RESTORATION \ STREAM, \ MITIGATION \ RESTORATION \ WETLAND, \ OTHER \ DAMS \ REMOVAL |
| \ MITIGATION \ RESTORATION \ WETLAND |
| \ MITIGATION \ RESTORATION \ WETLAND, \ AGRICULTURE \ CONVERSION |
| \ MITIGATION \ RESTORATION \ WETLAND, \ DEVELOPMENT \ RECREATIONAL |
| \ MITIGATION \ RESTORATION \ WETLAND, \ MITIGATION \ CREATION, \ MITIGATION \ RESTORATION \ STREAM |
| \ MITIGATION \ RESTORATION \ WETLAND, \ MITIGATION \ RESTORATION \ STREAM |
| \ MITIGATION \ RESTORATION \ WETLAND, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ MITIGATION \ WETLAND RECLAMATION |
| \ MITIGATION \ WETLAND RECLAMATION, \ DREDGING \ MAINTENANCE |
| \ OTHER \ BANK STABILIZATION |
| \ OTHER \ BANK STABILIZATION, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ OTHER \ BANK STABILIZATION, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |

| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ OTHER \ BANK STABILIZATION, \ DREDGING \ GENERAL |
| \ OTHER \ BANK STABILIZATION, \ DREDGING \ MAINTENANCE |
| \ OTHER \ BANK STABILIZATION, \ DREDGING \ NAVIGATION \ PRIVATE |
| \ OTHER \ BANK STABILIZATION, \ MITIGATION \ ENHANCEMENT |
| \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ BULKHEAD |
| \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ GABION |
| \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ INTAKE/OUTFALL |
| \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ INTAKE/OUTFALL, \ DREDGING \ GENERAL |
| \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ MAINTENANCE |
| \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ MARINA, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ WATER CONTROL |
| \ OTHER \ BANK STABILIZATION, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ OTHER \ BANK STABILIZATION, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ OTHER \ BANK STABILIZATION, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ BRIDGE \ MAINTENANCE |
| \ OTHER \ BANK STABILIZATION, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ OTHER \ CLEANUP HAZARDOUS OR TOXIC WASTES |
| \ OTHER \ DAMS \ COFFER |
| \ OTHER \ DAMS \ COFFER, \ OTHER \ BANK STABILIZATION |
| \ OTHER \ DAMS \ GENERAL |
| \ OTHER \ DAMS \ LOW WATER, \ OTHER \ DAMS \ REMOVAL |
| \ OTHER \ DAMS \ MAINTENANCE |
| \ OTHER \ DAMS \ MAINTENANCE, \ STRUCTURE \ GABION, \ STRUCTURE \ WATER CONTROL |
| \ OTHER \ DAMS \ REMOVAL |
| \ OTHER \ DAMS \ REMOVAL, \ MITIGATION \ WETLAND RECLAMATION |
| \ OTHER \ DAMS \ RESERVOIR |
| \ OTHER \ DAMS \ WEIR |
| \ OTHER \ DAMS \ WEIR, \ OTHER \ DAMS \ MAINTENANCE |
| \ OTHER \ INDIAN TRIBE OR STATE 404 PROGRAM |
| \ OTHER \ RESTRICTED AREAS |
| \ OTHER \ SURVEY ACTIVITIES |
| \ STRUCTURE \ BOAT LIFT |
| \ STRUCTURE \ BOAT LIFT, \ STRUCTURE \ DOCK \ FIXED |
| \ STRUCTURE \ BOAT LIFT, \ STRUCTURE \ MISCELLANEOUS, \ STRUCTURE \ DOCK \ FIXED |
| \ STRUCTURE \ BOAT RAMP |
| \ STRUCTURE \ BOAT RAMP, \ DREDGING \ GENERAL, \ DEVELOPMENT \ COMMERCIAL |
| \ STRUCTURE \ BOAT RAMP, \ STRUCTURE \ DOCK \ FIXED, \ DEVELOPMENT \ RECREATIONAL |

| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ STRUCTURE \ BOAT RAMP, \ STRUCTURE \ MARINA |
| \ STRUCTURE \ BREAKWATER |
| \ STRUCTURE \ BREAKWATER, \ MITIGATION \ FISH/WILDLIFE \ CREATION |
| \ STRUCTURE \ BRIDGE/RELATED WORK |
| \ STRUCTURE \ BRIDGE/RELATED WORK, \ STRUCTURE \ INTAKE/OUTFALL |
| \ STRUCTURE \ BRIDGE/RELATED WORK, \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ BRIDGE/RELATED WORK, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ STRUCTURE \ BRIDGE/RELATED WORK, \ TRANSPORTATION \ PIPELINE \ BURIED, \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW) |
| \ STRUCTURE \ BRIDGE/RELATED WORK, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ STRUCTURE \ BRIDGE/RELATED WORK, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ STRUCTURE \ BULKHEAD |
| \ STRUCTURE \ BULKHEAD, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ STRUCTURE \ BULKHEAD, \ DREDGING \ BOAT SLIP |
| \ STRUCTURE \ BULKHEAD, \ DREDGING \ BOAT SLIP, \ STRUCTURE \ DOCK \ FIXED |
| \ STRUCTURE \ BULKHEAD, \ DREDGING \ MAINTENANCE, \ STRUCTURE \ DOCK \ FIXED |
| \ STRUCTURE \ BULKHEAD, \ OTHER \ BANK STABILIZATION |
| \ STRUCTURE \ BULKHEAD, \ STRUCTURE \ DOCK \ FIXED |
| \ STRUCTURE \ BULKHEAD, \ STRUCTURE \ DOCK \ FIXED, \ STRUCTURE \ BOAT LIFT |
| \ STRUCTURE \ BULKHEAD, \ STRUCTURE \ INTAKE/OUTFALL |
| \ STRUCTURE \ BULKHEAD, \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ BULKHEAD, \ STRUCTURE \ MARINA |
| \ STRUCTURE \ BULKHEAD, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ STRUCTURE \ BULKHEAD, \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ DOCK \ FIXED |
| \ STRUCTURE \ DOCK \ FIXED, \ DEVELOPMENT \ COMMERCIAL |
| \ STRUCTURE \ DOCK \ FIXED, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ STRUCTURE \ DOCK \ FIXED, \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ BREAKWATER |
| \ STRUCTURE \ DOCK \ FIXED, \ STRUCTURE \ BOAT LIFT |
| \ STRUCTURE \ DOCK \ FIXED, \ STRUCTURE \ BULKHEAD |
| \ STRUCTURE \ DOCK \ FIXED, \ TRANSPORTATION \ AIRPORT \ RUNWAY, \ STRUCTURE \ BOAT RAMP |
| \ STRUCTURE \ DOCK \ FLOATING |
| \ STRUCTURE \ ELEV REC DECK |
| \ STRUCTURE \ GABION |
| \ STRUCTURE \ GABION, \ STRUCTURE \ MAINTENANCE, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ STRUCTURE \ GABION, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ STRUCTURE \ INTAKE/OUTFALL |



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| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ STRUCTURE \ INTAKE/OUTFALL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ STRUCTURE \ INTAKE/OUTFALL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ INTAKE/OUTFALL, \ DEVELOPMENT \ COMMERCIAL |
| \ STRUCTURE \ INTAKE/OUTFALL, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ STRUCTURE \ INTAKE/OUTFALL, \ DREDGING \ MAINTENANCE |
| \ STRUCTURE \ INTAKE/OUTFALL, \ ENERGY GENERATION \ NATURAL GAS |
| \ STRUCTURE \ INTAKE/OUTFALL, \ OTHER \ BANK STABILIZATION |
| \ STRUCTURE \ INTAKE/OUTFALL, \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ INTAKE/OUTFALL, \ OTHER \ DAMS \ WEIR |
| \ STRUCTURE \ INTAKE/OUTFALL, \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ INTAKE/OUTFALL, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ STRUCTURE \ INTAKE/OUTFALL, \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ INTAKE/OUTFALL, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ STRUCTURE \ INTAKE/OUTFALL, \ TRANSPORTATION \ UTILITY \ MAINTENANCE |
| \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ MAINTENANCE, \ OTHER \ BANK STABILIZATION |
| \ STRUCTURE \ MAINTENANCE, \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ MAINTENANCE, \ STRUCTURE \ INTAKE/OUTFALL |
| \ STRUCTURE \ MAINTENANCE, \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ MAINTENANCE, \ STRUCTURE \ WATER CONTROL, \ STRUCTURE \ WEIR |
| \ STRUCTURE \ MAINTENANCE, \ STRUCTURE \ WEIR |
| \ STRUCTURE \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ STRUCTURE \ MARINA |
| \ STRUCTURE \ MARINA, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ STRUCTURE \ MARINA, \ DREDGING \ NAVIGATION \ PRIVATE |
| \ STRUCTURE \ MARINA, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ STRUCTURE \ MISCELLANEOUS |
| \ STRUCTURE \ MISCELLANEOUS, \ DEVELOPMENT \ RECREATIONAL |
| \ STRUCTURE \ MISCELLANEOUS, \ OTHER \ BANK STABILIZATION, \ STRUCTURE \ BULKHEAD |
| \ STRUCTURE \ MISCELLANEOUS, \ STRUCTURE \ WATER CONTROL, \ OTHER \ DAMS \ WEIR |
| \ STRUCTURE \ PIER \ NON-RESIDENTIAL |
| \ STRUCTURE \ PILE/DOLPHIN, \ DREDGING \ BOAT SLIP |
| \ STRUCTURE \ RAMP |
| \ STRUCTURE \ RAMP, \ STRUCTURE \ RECREATIONAL |
| \ STRUCTURE \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ STRUCTURE \ MARINA |



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| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ STRUCTURE \ RECREATIONAL |
| \ STRUCTURE \ RECREATIONAL, \ DEVELOPMENT \ RECREATIONAL |
| \ STRUCTURE \ RECREATIONAL, \ STRUCTURE \ PIER \ NON-RESIDENTIAL, \ OTHER \ BANK STABILIZATION |
| \ STRUCTURE \ RECREATIONAL, \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ REMOVAL |
| \ STRUCTURE \ REMOVAL, \ TRANSPORTATION \ UTILITY \ MAINTENANCE |
| \ STRUCTURE \ SCIENTIFIC DEVICE |
| \ STRUCTURE \ UNSPECIFIED |
| \ STRUCTURE \ UNSPECIFIED, \ DREDGING \ MAINTENANCE |
| \ STRUCTURE \ UNSPECIFIED, \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ DEVELOPMENT \ INDUSTRIAL |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ DEVELOPMENT \ RECREATIONAL |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ ENERGY GENERATION \ OIL |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ MITIGATION \ ENHANCEMENT |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ OTHER \ BANK STABILIZATION |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ STRUCTURE \ INTAKE/OUTFALL |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ TRANSPORTATION \ UTILITY \ ACCESS ROAD |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ TRANSPORTATION \ UTILITY \ AERIAL |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ TRANSPORTATION \ UTILITY \ BURIED |
| \ STRUCTURE \ UTILITY LINE OR STRUCTURE, \ TRANSPORTATION \ UTILITY \ MAINTENANCE |
| \ STRUCTURE \ WATER CONTROL |
| \ STRUCTURE \ WATER CONTROL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ STRUCTURE \ WATER CONTROL, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ STRUCTURE \ WATER CONTROL, \ DEVELOPMENT \ RECREATIONAL |
| \ STRUCTURE \ WATER CONTROL, \ DREDGING \ MAINTENANCE |
| \ STRUCTURE \ WATER CONTROL, \ MITIGATION \ CREATION |
| \ STRUCTURE \ WATER CONTROL, \ STRUCTURE \ INTAKE/OUTFALL |
| \ STRUCTURE \ WATER CONTROL, \ STRUCTURE \ MAINTENANCE |
| \ STRUCTURE \ WATER CONTROL, \ STRUCTURE \ WEIR |
| \ STRUCTURE \ WATER CONTROL, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ STRUCTURE \ WEIR |
| \ STRUCTURE \ WEIR, \ STRUCTURE \ BULKHEAD |



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| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ TRANSPORTATION \ AIRPORT \ FACILITY |
| \ TRANSPORTATION \ AIRPORT \ FACILITY, \ TRANSPORTATION \ AIRPORT \ MAINTENANCE |
| \ TRANSPORTATION \ AIRPORT \ FACILITY, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ AIRPORT \ MAINTENANCE |
| \ TRANSPORTATION \ AIRPORT \ MAINTENANCE, \ STRUCTURE \ WATER CONTROL |
| \ TRANSPORTATION \ AIRPORT \ RUNWAY |
| \ TRANSPORTATION \ AIRPORT \ RUNWAY, \ TRANSPORTATION \ AIRPORT \ FACILITY |
| \ TRANSPORTATION \ AIRPORT \ RUNWAY, \ TRANSPORTATION \ AIRPORT \ MAINTENANCE |
| \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW) |
| \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW), \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW), \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW), \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW), \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ BRIDGE \ MAINTENANCE |
| \ TRANSPORTATION \ BRIDGE \ MAINTENANCE, \ STRUCTURE \ BRIDGE/RELATED WORK |
| \ TRANSPORTATION \ BRIDGE \ MAINTENANCE, \ TRANSPORTATION \ BRIDGE \ PROTECTION |
| \ TRANSPORTATION \ BRIDGE \ PROTECTION |
| \ TRANSPORTATION \ BRIDGE \ REMOVAL, \ MITIGATION \ FISH/WILDLIFE \ ENHANCEMENT |
| \ TRANSPORTATION \ BRIDGE \ REMOVAL, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ TRANSPORTATION \ BRIDGE \ REMOVAL, \ TRANSPORTATION \ RAIL \ FACILITY |
| \ TRANSPORTATION \ BRIDGE \ REMOVAL, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ OTHER \ BANK STABILIZATION |
| \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ STRUCTURE \ BRIDGE/RELATED WORK |
| \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ STRUCTURE \ MAINTENANCE |
| \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ STRUCTURE \ UNSPECIFIED |
| \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ PIPELINE \ ACCESS ROAD |
| \ TRANSPORTATION \ PIPELINE \ ACCESS ROAD, \ TRANSPORTATION \ PIPELINE \ BURIED, \ TRANSPORTATION \ PIPELINE \ STRUCTURE |
| \ TRANSPORTATION \ PIPELINE \ AERIAL |
| \ TRANSPORTATION \ PIPELINE \ BURIED |
| \ TRANSPORTATION \ PIPELINE \ BURIED, \ OTHER \ DAMS \ COFFER |
| \ TRANSPORTATION \ PIPELINE \ BURIED, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ TRANSPORTATION \ PIPELINE \ BURIED, \ TRANSPORTATION \ PIPELINE \ AERIAL |
| \ TRANSPORTATION \ PIPELINE \ BURIED, \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |



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| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ TRANSPORTATION \ PIPELINE \ BURIED, \ TRANSPORTATION \ UTILITY \ STRUCTURE |
| \ TRANSPORTATION \ PIPELINE \ MAINTENANCE |
| \ TRANSPORTATION \ PIPELINE \ MAINTENANCE, \ TRANSPORTATION \ PIPELINE \ BURIED |
| \ TRANSPORTATION \ PIPELINE \ STRUCTURE |
| \ TRANSPORTATION \ PIPELINE \ STRUCTURE, \ DREDGING \ GENERAL |
| \ TRANSPORTATION \ PIPELINE \ STRUCTURE, \ TRANSPORTATION \ PIPELINE \ BURIED, \ TRANSPORTATION \ PIPELINE \ ACCESS ROAD |
| \ TRANSPORTATION \ PIPELINE \ SUBMERGED |
| \ TRANSPORTATION \ RAIL \ BRIDGE |
| \ TRANSPORTATION \ RAIL \ FACILITY |
| \ TRANSPORTATION \ RAIL \ FACILITY, \ STRUCTURE \ WATER CONTROL |
| \ TRANSPORTATION \ RAIL \ MAINTENANCE |
| \ TRANSPORTATION \ RAIL \ MAINTENANCE, \ TRANSPORTATION \ RAIL \ BRIDGE |
| \ TRANSPORTATION \ RAIL \ TRACK |
| \ TRANSPORTATION \ RAIL \ TRACK, \ TRANSPORTATION \ RAIL \ BRIDGE, \ TRANSPORTATION \ UTILITY \ SUBMERGED |
| \ TRANSPORTATION \ RAIL \ TRACK, \ TRANSPORTATION \ RAIL \ MAINTENANCE, \ DEVELOPMENT \ INDUSTRIAL |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ DEVELOPMENT \ RECREATIONAL |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ MINING AND DRILLING \ MINING \ PHOSPHATE |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW) |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ BRIDGE \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE), \ TRANSPORTATION \ UTILITY \ ACCESS ROAD |
| \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ DEVELOPMENT \ RESIDENTIAL \ SINGLE FAMILY |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ DREDGING \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ MITIGATION \ ENHANCEMENT |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ OTHER \ BANK STABILIZATION |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ STRUCTURE \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ STRUCTURE \ WATER CONTROL |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ STRUCTURE \ WEIR |

| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW) |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ DEVELOPMENT \ RECREATIONAL |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ OTHER \ BANK STABILIZATION |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ OTHER \ BANK STABILIZATION, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ STRUCTURE \ INTAKE/OUTFALL |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ STRUCTURE \ RECREATIONAL |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ BRIDGE \ CONSTRUCTION (NEW) |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ ROADS \ CROSSING (NON BRIDGE) |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ IMPROVEMENTS, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ LOGGING |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ DEVELOPMENT \ RECREATIONAL |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ OTHER \ BANK STABILIZATION |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ OTHER \ BANK STABILIZATION, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ STRUCTURE \ BRIDGE/RELATED WORK |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ TRANSPORTATION \ BRIDGE \ REPLACEMENT |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ CULVERT |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ CULVERT, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ ROADS \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ UTILITY \ ACCESS ROAD |
| \ TRANSPORTATION \ UTILITY \ ACCESS ROAD, \ DREDGING \ BOAT SLIP, \ STRUCTURE \ DOCK \ FLOATING |
| \ TRANSPORTATION \ UTILITY \ ACCESS ROAD, \ TRANSPORTATION \ UTILITY \ AERIAL |
| \ TRANSPORTATION \ UTILITY \ ACCESS ROAD, \ TRANSPORTATION \ UTILITY \ MAINTENANCE |
| \ TRANSPORTATION \ UTILITY \ AERIAL |



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| Appendix E Dredge and Fill Activities as Defined in the Corps Database (WorkType.xlsx) |
|---|
| \ TRANSPORTATION \ UTILITY \ AERIAL, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ AERIAL, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ UTILITY \ AERIAL, \ TRANSPORTATION \ UTILITY \ ACCESS ROAD |
| \ TRANSPORTATION \ UTILITY \ AERIAL, \ TRANSPORTATION \ UTILITY \ MAINTENANCE |
| \ TRANSPORTATION \ UTILITY \ AERIAL, \ TRANSPORTATION \ UTILITY \ STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ AERIAL, \ TRANSPORTATION \ UTILITY \ SUBMERGED |
| \ TRANSPORTATION \ UTILITY \ BURIED |
| \ TRANSPORTATION \ UTILITY \ BURIED, \ DEVELOPMENT \ ASSOCIATED INFRASTRUCTURE, \ DEVELOPMENT \ RESIDENTIAL \ MULTI- FAMILY |
| \ TRANSPORTATION \ UTILITY \ BURIED, \ DEVELOPMENT \ COMMERCIAL, \ TRANSPORTATION \ UTILITY \ STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ BURIED, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ BURIED, \ TRANSPORTATION \ PIPELINE \ BURIED |
| \ TRANSPORTATION \ UTILITY \ BURIED, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ UTILITY \ BURIED, \ TRANSPORTATION \ UTILITY \ AERIAL |
| \ TRANSPORTATION \ UTILITY \ BURIED, \ TRANSPORTATION \ UTILITY \ SUBMERGED |
| \ TRANSPORTATION \ UTILITY \ MAINTENANCE |
| \ TRANSPORTATION \ UTILITY \ MAINTENANCE, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ MAINTENANCE, \ TRANSPORTATION \ ROADS \ MAINTENANCE |
| \ TRANSPORTATION \ UTILITY \ MAINTENANCE, \ TRANSPORTATION \ UTILITY \ BURIED |
| \ TRANSPORTATION \ UTILITY \ MAINTENANCE, \ TRANSPORTATION \ UTILITY \ STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ STRUCTURE, \ STRUCTURE \ REMOVAL |
| \ TRANSPORTATION \ UTILITY \ STRUCTURE, \ STRUCTURE \ UTILITY LINE OR STRUCTURE |
| \ TRANSPORTATION \ UTILITY \ STRUCTURE, \ TRANSPORTATION \ PIPELINE \ BURIED |
| \ TRANSPORTATION \ UTILITY \ STRUCTURE, \ TRANSPORTATION \ ROADS \ IMPROVEMENTS |
| \ TRANSPORTATION \ UTILITY \ STRUCTURE, \ TRANSPORTATION \ UTILITY \ BURIED |
| \ TRANSPORTATION \ UTILITY \ STRUCTURE, \ TRANSPORTATION \ UTILITY \ MAINTENANCE |
| \ TRANSPORTATION \ UTILITY \ SUBMERGED |
| \ TRANSPORTATION \ UTILITY \ SUBMERGED, \ STRUCTURE \ WEIR |
| \ TRANSPORTATION \ UTILITY \ SUBMERGED, \ TRANSPORTATION \ UTILITY \ AERIAL |