PETITION FOR RULEMAKING ON OCEAN DISCHARGE CRITERIA AND TO MODIFY OFFSHORE OIL AND GAS GENERAL PERMIT CAG280000

National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Oil and Gas Exploration, Development and Production Operations Off Southern California

BEFORE THE ENVIRONMENTAL PROTECTION AGENCY

FEBRUARY 26, 2014

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Notice of Petition

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Right to Petition

The right of an interested party to petition a federal agency is a freedom guaranteed by the first amendment: "Congress shall make no law … abridging the … right of people … to petition the Government for redress of grievances."[1]

Under the Administrative Procedures Act (APA), all citizens have the right to petition for the "issuance, amendment, or repeal" of an agency rule.[2] A "rule" is the "whole or a part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy."[3] Petitioner seeks amendment of agency rules: general permit CAG280000 issued on January 23, 2014,[4] and the ocean discharge criteria issued in 1980.[5] EPA has the authority to take the requested actions under the Clean Water Act and Executive Order 13,158.[6] Thus, the petitioner has the right to petition for revision of this rule. EPA is required to respond to this petition: "Prompt notice shall be given of the denial in whole or in part of a written application, petition, or other request of an interested person made in connection with any agency proceeding."[7]

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[1] U.S. Const., amend I; see also *United Mine Workers v. Illinois State Bar Ass'n*, 389 U.S. 217, 222 (1967) (right to petition for redress of grievances is among most precious of liberties without which the government could erode rights).
[2] 5 U.S.C. § 553(e).
[3] 5 U.S.C. § 551(4).
[4] Environmental Protection Agency, Reissuance of National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Oil and Gas Exploration, Development and Production Operations Off Southern California, 79 Fed. Reg. 1643 (Jan 23, 2014).
[5] Ocean Discharge Criteria, 45 Fed. Reg. 65953 (Oct. 3, 1980); codified at 40 C.F.R. Part 125, Subpart M
[6] Clean Water Act, 33 U.S.C. §1251 et seq.; Exec. Order No. 13,158, 65 Fed. Reg. 34,909 (May 26, 2000).
[7] 5 U.S.C. § 555(e).

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Further, the APA provides for judicial review of a final agency action.[8] The scope of review by the courts is determined by section 706 of the APA.[9] The APA also permits courts to compel agency action unlawfully withheld or unreasonably delayed.[10]

Petitioner

The Center for Biological Diversity is a nonprofit environmental organization dedicated to the protection of imperiled species and their habitats through science, education, policy, and environmental law. The Center's Oceans Program aims to protect marine life and ocean ecosystems in United States and international waters. The Center has over 675,000 online activists and members. The Center submits this petition on its own behalf and on behalf of its members and staff with an interest in protecting the ocean environment.

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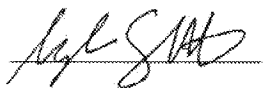

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[8] 5 U.S.C. § 704.
[9] 5 U.S.C. § 706.
[10] *Id.*

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A. Executive Summary

The Environmental Protection Agency allows offshore oil rigs to dump dangerous fracking chemicals into the ocean just off the coast of California directly into sensitive habitat for blue whales, leatherback sea turtles, and many other endangered species. On January 24, 2014, EPA approved a General Permit that lets oil companies discharge more than 9 billion gallons of wastewater into the ocean each year. That wastewater can be contaminated with chemicals from unconventional well stimulation such as hydraulic fracturing, or fracking. This petition seeks to protect human health and California's rich coastal and marine ecosystems from the hazards of fracking by prohibiting ocean dumping of well stimulation chemicals.

Despite a moratorium on new oil leases off California, oil companies operate more than 1,000 active offshore wells and are fracking hundreds of them. Fracking is an inherently dangerous activity that involves blasting water mixed with toxic chemicals into the ground at high pressures to crack rocks and increase oil production. EPA's permit essentially allows oil platforms to dump unlimited amounts of well stimulation fluids, including fracking chemicals, into the ocean once those fluids are comingled with other wastewater.

EPA must revoke or modify General Permit No. CAG280000, which authorizes 23 offshore oil and gas platforms to pollute federal waters off California, because offshore fracking and its associated discharges endanger human health and the environment. Additionally, new data about unconventional well stimulation and its impacts indicate that the permit should be modified.

EPA must find that pollution from fracking endangers human health and the environment. Oil companies have recently fracked many wells in federal waters off California, and more fracking is pending. The toxic chemicals used for fracking, acidizing, and other forms of well stimulation are severely hazardous. A recent analysis of oil industry records found that many chemicals used in offshore fracking in California cause cancer, endocrine disruption and other health concerns. Communities near fracking operations have experienced contaminated drinking water and devastating health problems such as birth defects. In the environment, fracking chemicals can contaminate habitat and poison wildlife. Devastating environmental consequences are apparent near onshore fracking activities, including fish kills, wildlife poisoning, species diversity loss, habitat loss, contaminated waters, and earthquakes. These impacts indicate the threat of offshore fracking.

Offshore, oil companies dump their wastewater directly into biologically important areas in the Santa Barbara Channel off the Southern California coast. The waters receiving the pollution provide key feeding habitat for whales and host the world's densest aggregation of endangered blue whales. The area is also important habitat for fish, endangered sea turtles, and seabirds that forage and nest in the Channel Islands. Additionally, rigs are near numerous marine protected areas, so designated because of their unique ecological values. Fracking and its pollution threaten to destroy important marine habitat.

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The hazards posed to the environment from fracking operations are too great to allow the continued dumping of wastewater with unlimited fracking chemicals into the ocean. Although EPA added a new reporting requirement for fracking fluids to the General Permit, reporting alone is insufficient to protect our nation's waters. Accordingly, the Center for Biological Diversity requests that the EPA completely prohibit the discharge of fracking fluids and other toxic chemicals used for unconventional well stimulation. The Center formally petitions the EPA to take the following actions:

> **Revoke or modify the General Permit CAG280000 for discharges from offshore oil and gas operations in federal waters off California to monitor for and prohibit the discharge of well stimulation fluids, including those comingled with produced waters;**
>
> **Amend the Effluent Limitations Guidelines (ELGs) for the Offshore Oil and Gas Extraction Category, (40 CFR Part 435) to prohibit discharges of well stimulation fluids, including those comingled with produced waters; and**
>
> **Promulgate a rule implementing revisions to ocean discharge criteria.**

Fracking is an inherently dangerous activity that should be halted entirely. While EPA is not the only agency with jurisdiction over offshore oil and gas operations, EPA at minimum must use its authority to protect public health and the environment from unlimited discharges of chemicals used for unconventional well stimulation. The risks to the marine environment and water quality from these toxic techniques warrant the requested rulemakings.

B. Background

1. Clean Water Act

Congress enacted the Clean Water Act, 33 U.S.C. §§ 1251 et seq., with the express purpose of "restor[ing] and maintain[ing] the chemical, physical, and biological integrity of the Nation's waters."[11] The goals of the Clean Water Act are to guarantee "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation" and to promptly eliminate water pollution.[12]

Toward these goals, the Clean Water Act prohibits the "discharge of any pollutant" by anyone into navigable waters without a permit.[13] A permit may be issued under the National Pollutant Discharge Elimination System (NPDES).[14]

NPDES permits are intended to protect water quality and impose technology-based controls on pollution by establishing limits on the discharge of pollutants.[15] Effluent limits seek to eliminate

[11] 33 U.S.C. § 1251(a).
[12] *Id.*
[13] 33 U.S.C. § 1311(a).
[14] 33 U.S.C. § 1342 (a).
[15] 33 U.S.C. § 1342.

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the pollution to the greatest extent technologically and economically achievable.[16] EPA has established effluent guidelines and standards for offshore oil and gas.[17] EPA may issue individual permits or general permits that cover an entire category of facilities, such as it has done for offshore oil and gas operations.[18]

Permits for ocean discharges must also comply with ocean discharge criteria.[19] EPA may issue a permit only if it concludes "on the basis of available information" that the discharge will not cause an unreasonable degradation of the marine environment.[20]

Unreasonable degradation is defined in 40 CFR § 125.121(e)(1-3) as:

(1) Significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities,
(2) Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms, or
(3) Loss of esthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

The following factors must be considered in the evaluation:[21]

(1) The quantities, composition and potential for bioaccumulation or persistence of the pollutants to be discharged;
(2) The potential transport of such pollutants by biological, physical or chemical processes;
(3) The composition and vulnerability of the biological communities which may be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species identified as endangered or threatened pursuant to the Endangered Species Act, or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain;
(4) The importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism.
(5) The existence of special aquatic sites including, but not limited to marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas and coral reefs;
(6) The potential impacts on human health through direct and indirect pathways;

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[16] 33 U.S.C. § 1311(b)(2).
[17] 40 C.F.R. § 435 (subpart A).
[18] 40 C.F.R. § 122.28(c).
[19] 33 U.S.C. § 1343.
[20] 44 C.F.R. § 125.23(a).
[21] 40 C.F.R. §125.22(a).

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(7) Existing or potential recreational and commercial fishing, including finfishing and shellfishing;
(8) Any applicable requirements of an approved Coastal Zone Management plan;
(9) Such other factors relating to the effects of the discharge as may be appropriate;
(10) Marine water quality criteria developed pursuant to section 304(a)(1).

It is through these mechanisms that the Clean Water Act seeks to protect ocean water quality. However, rulemaking is necessary to update the regulations, effluent guidelines, and NPDES permits to sufficiently protect ocean water quality from the dangers of offshore fracking.

2. Procedural History of the General Permit

In 1993, EPA issued regulations for offshore oil effluent limitation guidelines.[22] These include guidelines for well treatment fluids, which form the basis for current regulation of offshore oil and gas NPDES permits. In developing these guidelines, EPA relied only on the information available at the time with respect to well stimulation, including fracking and acidizing.[23]

On January 24, 2014, EPA Region 9 issued General Permit No. CAG280000, an Authorization to Discharge Under the National Pollutant Discharge Elimination System for Oil and Gas Exploration, Development, and Production Facilities (General Permit). The General Permit covers 23 oil and gas facilities that operate in federal waters offshore of the State of California, and establishes effluent limitations, prohibitions and other conditions on discharges from those facilities.

The General Permit for offshore oil and gas facilities contains effluent limitations and monitoring requirements for several categories of discharges. Category I discharges, drilling fluids and cuttings, require toxicity testing that utilizes a bioassay procedure on *Mysidopsis bahia* (maximum 96 hour LC50 value of 3% suspended particulate phase by volume). Category II discharges include produced water and require chronic whole effluent toxicity (WET) testing. Category III discharges (well treatment, completion and workover fluids), are those discharges which include fracking chemicals.

The General Permit allows the unlimited discharge of Category III well stimulation fluids containing fracking chemicals once those fluids are comingled with produced waters. When comingled, the "effluent limitations and monitoring requirements for well treatment, completion and workover fluids do not apply."[24] Instead, the effluent limitations for produced waters become the guiding limitations. Produced waters, in turn, only have effluent limitations for oil and grease discharges. Thus, except for oil and grease, there are no limits on fracking chemicals that may be discharged with produced waters — this means that the amount is limitless up to the bounds of the total volume of produced waters permitted to be discharged. The total annual amount of produced waters that may be discharged by the oil and gas platforms is over 9 billion gallons each year.

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[22] Environmental Protection Agency, Oil and Gas Extraction Point Source Category; Offshore Subcategory Effluent Limitations Guidelines and New Source Performance Standards, 58 Fed. Reg. 12454 (Mar. 4, 1993).
[23] *Id.*
[24] General Permit at 20.

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Facility	Max annual produced water discharged, bbls	
A	13,140,000	
B	1,425,000	
C	13,140,000	
Edith	3,285,000	
Elly, Eureka	10,950,000	
Gail	4,380,000	
Gilda/Gina	25,500,000	
Grace	2,190,000	
Habitat	1,642,500	
Harmony, Heritage, Hondo	33,762,500	
Harvest	32,850,000	
Henry	6,570,000	
Hermosa	40,250,000	
Hidalgo	18,250,000	
Hillhouse	7,300,000	
Hogan	13,900,000	
Houchin	13,900,000	
Irene	55,845,000	
Total	298,280,000	bbls
Total	9,395,820,000	gallons

TABLE 1. Maximum annual allowable produced water discharges

The issue of offshore fracking first aired in EPA's final rule that added a reporting requirement for well-treatment fluid discharges "in response to recent concerns regarding the potential effects of discharges of fluids used for offshore hydraulic fracturing operations."[25] The requirement states:

> Chemical Inventory. The Permittee shall maintain an inventory of the quantities and concentrations of the specific chemicals used to formulate well treatment, completion and workover fluids. If there is a discharge of these fluids, the chemical formulation, concentrations and discharge volumes of the fluids shall be submitted with the DMR. For discharges of well treatment, completion and workover fluids, the type of operation that generated the discharge fluids shall also be reported.[26]

[25] Envtl. Prot. Agency, Reissuance of National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Oil and Gas Exploration, Development and Production Operations Off Southern California, 79 Fed. Reg. 1643 (Jan 9, 2014); Environmental Protection Agency, Addendum to Fact Sheet at 1 (Dec. 17, 2013).

[26] Envtl. Prot. Agency, General Permit No. CAG280000, an Authorization to Discharge Under the National Pollutant Discharge Elimination System for Oil and Gas Exploration, Development, and Production Facilities at 20 (2014) (General Permit).

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Although a step in the right direction, the chemical inventory and reporting is insufficient to protect water quality and does not meet the requirements of the Clean Water Act.

C. The General Permit Must Be Revoked or Modified to Address Unconventional Well Stimulation Activities

EPA must revoke or modify the General Permit for offshore oil and gas facilities in federal waters off California because new information indicates that the use of unconventional oil and gas extraction techniques, including fracking, endangers water quality and the marine environment.

EPA must exercise its authority to revoke or modify the General Permit. Revocation and reissuance of a permit is in order for activities that endanger the environment or when a changed condition requires a reduction or elimination of a discharge.[27] EPA may revoke a permit for the following causes:[28]

> (1) Noncompliance by the permittee with any condition of the permit; (2) The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time; (3) A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination; or (4) A change in any condition that requires either a temporary or permanent reduction or elimination of any discharge or sludge use or disposal practice controlled by the permit (for example, plant closure or termination of discharge by connection to a POTW).

EPA should revoke and reissue the General Permit here because the unlimited discharge of fracking chemicals endangers the environment. Additionally, the permitees have not disclosed to EPA relevant facts about their wastewater pollution, including the quantities or composition of chemicals discharged or the frequency of past or future frack or acid jobs. And conditions have changed because of new information about technological changes and impacts of fracking.

The permit also includes a reopener clause:[29]

> This permit may be modified or revoked at any time on the basis of any new data that was not available at the time of permit issuance if the new data would have justified the application of different permit conditions at the time of issuance. This includes any information indicating that cumulative effects on the environment are unacceptable. Such cumulative effects on the environment include unreasonable degradation of the marine environment due to continued discharges, in which case the Director, Water Division, Region 9 may determine that

[27] *Id.* § 122.62(b); 40 C.F.R. § 122.64.
[28] 40 C.F.R. § 122.64(a).
[29] General Permit at 3.

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> additional conditions are necessary to protect the marine environment or special aquatic sites. Permit modification will be conducted in accordance with 40 CFR Parts 122.62, 122.63 and 124.

This reopener clause tracks the Clean Water Act's regulations, 40 C.F.R. § 122.62(a), that define causes for modification.[30] New information demonstrates that EPA should reopen the permit. In addition to its authority to modify the General Permit, EPA also has broad authority to require an individual permit or to deny a permit if the chemicals could cause unreasonable degradation of the marine environment.[31]

For the reasons discussed below, the elements of revocation and the reopener clause have been satisfied.

1. Fracking Pollution Endangers Human Health and the Environment

Petitioner requests that EPA make a determination that pollution from unconventional well stimulation activities, such as fracking, endangers human health and the environment and can only be regulated to acceptable levels by permit modification.

As described in this section EPA must revoke or modify the General Permit because discharges endanger the environment and new information about offshore fracking triggers the reopener clause.[32] First, new information about offshore fracking indicates unacceptable cumulative effects on the environment. Second, offshore fracking endangers the environment and human health because pollution from unconventional well stimulation contaminates the marine environment with severe adverse impacts. Third, discharges violate the ocean discharge criteria and cause an unreasonable degradation of the marine environment.

a. New Information Indicates Adverse Cumulative Impacts of Offshore Fracking

The General Permit must be modified because new information indicates that EPA should not have allowed fracking fluid discharges into the ocean. There are new data about the intensity and impacts of fracking that were not available during EPA's development of the General Permit. Moreover, because EPA wholly relied on outdated 1993 effluent limitation guidelines for the offshore oil and gas category with respect to fracking — it must also consider the significant body of information that has developed about offshore fracking and its impacts.

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[30] Causes for modification include, but are not limited to: (1) a material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance; (2) new information arises that was not available at the time of permit issuance (other than revised regulations, guidance or test methods, but including for NPDES general permits any information indicating that cumulative effects on the environment are unacceptable); (3) new regulations; (4) when the level of discharge of a "non-limited pollutant" exceeds the level which can be achieved by the technology-based treatment requirements; and (5) when required to incorporate an applicable 307(a) toxic effluent standard or prohibition. 40 C.F.R. § 122.62(a)

[31] 40 C.F.R. § 122.28(b)(3); 44 CFR 125.23(a).

[32] 40 CFR § 122.62(a)(2)& (a)(7).

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EPA relied on the 1993 effluent limitation guidelines in making its decision that fracking chemicals are an authorized discharge under the General Permit.[33] EPA did not evaluate or consider significant new data about unconventional well stimulation. The Administrative Record for the General Permit is devoid of any evaluation of the impacts of permitting the discharge of fracking chemicals, and permittees did not provide relevant information about unconventional well stimulation activities.[34] The Administrative Record contains no information about the frequency of fracking, acidization, or other unconventional well stimulation activities; and it has no evaluation of the quantities, composition, or impacts of pollution from these activities. Therefore, the information throughout this petition presents new information that supports modification of the General Permit.

Only after the draft General Permit issued in 2012, was it disclosed that fracking is occurring in offshore drilling operations off the coast of California, in both federal and state waters. The most comprehensive review of offshore fracking in California was reported after the final General Permit issued at the California Coastal Commission's February 2014 meeting.[35] According to federal documents obtained by journalists, federal regulators at the Bureau of Safety and Environmental Enforcement (BSEE) have permitted fracking in federal waters on existing leases in the Pacific Ocean at least 12 times since the late 1990s, and have recently approved new fracking operations.[36] Records released by the agency indicate that Venoco conducted fracking on the Gail Platform Well E-8 in 2010.[37] More recently, BSEE approved an Application for Permit to Drill (APD) from DCOR to use fracking on Gilda Platform well S-05.[38] Four frack jobs are approved but pending.[39] An October 2013 investigation by journalists revealed that in waters off Long Beach, Seal Beach and Huntington Beach — some of the region's most popular surfing strands and tourist attractions — oil companies have used fracking at least 203 times at six sites in the past two decades.[40] These numbers are increasing. For example, oil industry documents confirm that four offshore wells in Long Beach Harbor were fracked in December

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[33] Bromley, Eugene, Email to Kenneth Seeley, Bureau of Safety and Environmental Enforcement, Re: Offshore Fracking and NPDES (Feb. 22, 2013).

[34] Such an omission alone gives EPA authority to revoke the General Permit. 40 C.F.R. § 122.64(a).

[35] Dettmer, Alison, Briefing on Offshore Fracking and Other Well Stimulation Treatments, presentation to the California Coastal Commission (Feb 12, 2014) ("Dettmer 2014"); Jason Marshall, Chief Deputy Director of California Department of Conservation, Well Stimulation in California, Presentation to the California Coastal Commission (Feb. 12, 2014).

[36] Dearen, Jason and Alicia Chang, Offshore Fracking Off California Coast Under Review, Drawing Calls For Increased Regulation (Aug. 3, 2013) http://www.huffingtonpost.com/2013/08/03/offshore-fracking_n_3700574.html; Dettmer 2014.

[37] Venoco, Inc., Application for Permit to Modify (APM) for API well no 043112067402 submitted to U.S. Department of the Interior MMS, dated March 15, 2010

[38] DCOR, LLC. Application for Permit to Drill (APD) for API well no 043112050100 submitted to U.S. Depatrment of the Interior BSEE dated April 27, 2012).

[39] Dettmer 2014.

[40] Chang, Alicia and Jason Dearen, California Finds More Instances Of Offshore Fracking, USA Today (Oct.19, 2013), http://www.usatoday.com/story/money/business/2013/10/19/calif-finds-more-instances-of-offshore-fracking/3045721/

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2013.[41] And a staff expert at the California Coastal Commission reported 212 fracked wells in February 2014.[42]

New information about the frequency of fracking shows that it is increasing and intensifying. Because a longstanding moratorium on new leases has inhibited expansion of California's offshore oil and gas fields, operators have an incentive to intensify oil production within existing leases. Fracking is an increasingly common method to increase oil or gas production from wells. The increased utilization of unconventional oil and gas extraction techniques has been shown to increase the overall amount of oil and gas development, as well as higher density of oil and gas wells.[43] Modern fracking allows the development of areas that were previously uneconomical to develop, and allows continued production from wells that might otherwise be retired.[44] The scale of this threat should not be underestimated: California's Monterey Shale, which extends offshore, holds an estimated 15.4 billion barrels of shale oil, or 64 percent of the nation's total shale oil resources, according to the U.S. Energy Information Administration.[45] Longer lifetimes for old wells and high pressures from fracking increase the risk of pipeline and well control failures due to aging infrastructure. For example, a recent government report concerning an old well in Santa Barbara County details the successive infrastructure failures of offshore wells and the extensive repairs needed to mitigate the resulting environmental harm.[46] EPA must consider the potential for more intense oil and gas development in the region and the cumulative safety and environmental effects.

New technology has changed oil and gas production significantly in recent years, which invalidates EPA's reliance on the 1993 effluent limitation guidelines. EPA must consider this new information because it was not considered in 1993—nor did EPA analyze the impacts from fracking pollution anew for the General Permit. Fracking was completely different two decades ago.

The latest fracking techniques, including the high volume, high-pressure use of chemical fracking fluid combined with horizontal drilling, have been in use for only about a decade, and in that time have transformed the oil and gas industry and led to drilling booms around the country by facilitating production from shale formations that could not previously be economically developed. The environmental and community destruction have been dramatic.

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[41] FracFocus, Chemical Disclosure Registry report for API No. 0423727029 Job date 12/3/13 – 12/7/13, API No. 0423722465 Job date 12/11/13 – 12/14/13, API No. 0423723622 Job date 12/2/13 – 12/27/13, API No. 0423720263 Job date 12/3/13 – 12/7/13, www.fracfocus.org (2013).

[42] Dettmer 2014.

[43] Law, Adam and Jake Hays, Insights on Unconventional Natural Gas Development from Shale: An Interview with Anthony R. Ingraffea, New Solutions: A Journal of Environmental and Occupational Health Policy 23:203 (2013).

[44] *See, e.g.*, Citi Investment, Research and Analysis, Resurging North American Oil Production and the Death of the Peak Oil Hypothesis at 9 (2012) ("CITI"); U.S. Energy Information Administration, Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays at 4 ("USEIA 2011"); Orszag, Peter, Fracking Boom Could Finally Cap Myth of Peak Oil (2011).

[45] USEIA 2011 at 4; *see also* U.S. Energy Information Administration, Today in Energy, http://www.eia.gov/todayinenergy/detail.cfm?id=7190 (2012) (estimated 13.7 billion barrels of shale oil in the Monterey shale).

[46] *See* State Lands Commission, Revised PRC Recommissioning Project Draft EIR at 2-3 (October 2013), http://www.slc.ca.gov/Division_Pages/DEPM/DEPM_Programs_and_Reports/Venoco_PRC_421/PDF/2_PD.pdf.

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It was not until the late 1990s that oil and gas companies developed "slickwater fracturing," which yielded better oil production by using more water.[47] Two other recent major developments in hydraulic fracturing technology include horizontal drilling and multistage fracking. Drilling horizontally allows operators to (1) lengthen the well and access more of the oil reservoir and (2) frack in more places than were feasible in the early 1990s. Horizontal wells require more fluid and more pressure. Multi-stage fracking allows different sections of the well to be fracked at different times. These developments increase the effectiveness, quantity, and frequency of fracking while also increasing the impacts.

Hydraulic Fracturing Technological Milestones [2]	
Early 1900s	Natural gas extracted from shale wells. Vertical wells fractured with foam.
1983	First gas well drilled in Barnett Shale in Texas
1980-1990s	Cross-linked gel fracturing fluids developed and used in vertical wells
1991	First horizontal well drilled in Barnett Shale
1991	Orientation of induced fractures identified
1996	Slickwater fracturing fluids introduced
1996	Microseismic post-fracturing mapping developed
1998	Slickwater refracturing of originally gel-fractured wells
2002	Multi-stage slickwater fracturing of horizontal wells
2003	First hydraulic fracturing of Marcellus Shale[3]
2005	Increased emphasis on improving the recovery factor
2007	Use of multi-well pads and cluster drilling

TABLE 2. Hydraulic Fracturing Technological Milestones. Source: NYSGEIS

Concomitant with these changes in technology, the chemicals and composition of fluids used for the process have also changed. But most importantly, our understanding of the chemicals and the health and environmental effects of fracking has advanced significantly. The new data on these chemicals and the consequences of their use follow.

b. Water Quality and Environmental Impacts of Fracking Pollution

Fracking pollution is dangerous for human health and wildlife. The General Permit allows fracking discharges into the Santa Barbara Channel, an area among California's most valuable marine habitats. Approximately half of the platforms in the Santa Barbara Channel discharge all or a portion of their wastewater directly to the ocean.[48] This pollution destroys water quality and wildlife habitat, and it can make waters unsafe for fishing, diving, swimming and other activities.

Well stimulation techniques can vary widely. In addition to fracking, there is also acid maxtrix stimulation, acid fracturing, and gravel packing. Each of these techniques raises a dangerous set of concerns and potential impacts on human health, safety, and the environment. New technology and techniques rely heavily on harmful chemicals to achieve high rates of production. Well stimulation uses chemicals for a variety of functions, such as: dissolving acids, biocides,

[47] New York Department of Environmental Conservation, Revised Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program ("NYSGEIS") at 393 (2011).
[48] *See* Coastal Commission Consistency Determination, General NPDES permit from discharges of offshore oil and gas platforms (2013) http://documents.coastal.ca.gov/reports/2013/6/W13a-6-2013.pdf.

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breakers, clay stabilizers, corrosion inhibitors, crosslinkers, foamers and defoamers, friction reducers, gellants, pH controllers, proppants, scale controllers, and surfactants.

Modern slickwater fracturing uses hundreds of chemicals that cause cancer or damage to the nervous, cardiovasculatory, and endocrine systems.[49] During a frack job most of these chemicals return to the surface mixed with produced waters. In turn, produced water can contain harmful substances like benzene, arsenic, lead, hexavalent chromium, barium, chloride, sodium, sulfates, and boron,[50] and it also can be radioactive.[51] Produced water itself is potentially harmful to humans, aquatic life, and ecosystems.[52] The General Permit authorizes the discharge of massive volumes of produced waters, including those mixed with fracking chemicals.

While the oil and gas industry has until very recently successfully resisted the full disclosure of fracking chemicals, what is known is cause for extreme concern.[53] Harmful chemicals present in these fluids can include volatile organic compounds (VOCs), such as benzene, toluene, xylenes, and acetone.[54] A congressional report sampling incomplete industry self-reports found that "[t]he oil and gas service companies used fracking products containing 29 chemicals that are (1) known or possible human carcinogens, (2) regulated under the Safe Drinking Water Act for their risks to human health, or (3) listed as hazardous air pollutants under the Clean Air Act."[55] One peer-reviewed scientific study examined a list of 944 fracking fluid products containing 632 chemicals, 353 of which could be identified with Chemical Abstract Service numbers.[56] The study concluded that more than 75 percent of the chemicals could affect the skin, eyes, and other sensory organs, and the respiratory and gastrointestinal systems; approximately 40 to 50 percent could affect the brain/nervous system, immune, and cardiovascular systems, and the kidneys; 37 percent could affect the endocrine system; and 25 percent could cause cancer and mutations.[57] Another study reviewed exposures to fracking chemicals from onshore wells and noted that trimethylbenzenes are among the largest contributors to non-cancer threats for people living within a half mile of a well, while benzene is the largest contributor to cumulative cancer risk for people, regardless of the distance from the wells.[58] Another recent study has found increased

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[49] Colborn, Theo et al., Natural Gas Operations for a Public Health Perspective, 17 Human and Ecological Risk Assessment 1039 (2011) ("Colborn 2011").

[50] Mall, Amy, *Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy* at 8 (2010).

[51] *See* E&E News staff, Proposed law would force drillers to test waste for radiation. E&E News (Feb. 14, 2013).

[52] *See* Kiparsky, Michael & Jayni Foley Hein, Regulation of Hydraulic Fracturing: A Wastewater and Water Quality Perspective (April 2013). http://www.law.berkeley.edu/files/ccelp/Wheeler_HydraulicFracturing_April2013%281%29.pdf

[53] *See, e.g.,* United States House of Representatives, Committee on Energy and Commerce Minority Staff, Chemicals used in hydraulic fracturing ("House Report") at 11-12 (2011); Colborn 2011 at 1039; McKenzie, Lisa et al., Human health risk assessment of air emissions form development of unconventional natural gas resources, Sci. Total Environ. (2012) ("McKenzie 2012").

[54] United States Environmental Protection Agency, *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (2011).

[55] House Report at 8.

[56] Colborn 2011 at 1.

[57] Colborn 2011 at 1.

[58] McKenzie 2012 at 5.

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arsenic and heavy metals in groundwater near fracking sites in Texas.[59] Moreover, researchers found greater hormone-disrupting properties in water located near hydraulic fracturing drilling sites than in areas without drilling, and they found that 11 chemicals commonly used for fracking are endocrine disruptors.[60] The newest science on fracking shows that birth defects are more common in babies born to mothers living near fracked wells, according to researchers at the Colorado School of Public Health.[61]

The fracking chemicals known to be used in California state waters are alarming. Petitioner's analysis of chemicals used in 12 wells and disclosed by the voluntary reporting site FracFocus reveals that almost all of the chemicals used are suspected of causing gastrointestinal, respiratory, and liver hazards, as well as skin, eye, and sensory organ risks. More than half of the chemicals are suspected of being hazardous to the kidneys, immune and cardiovascular systems, and more than one third are suspected of affecting the developmental and nervous systems. Between one-third and one-half of the chemicals used are suspected ecological hazards.[62]

As a specific example of the hazardous materials used by fracking operations in state waters, the chemical "X-Cide," manufactured by Baker-Hughes and used in all fracked wells, is classified as a hazardous substance under both the Occupational Safety and Health Act (OSHA) and the Comprehensive Environmental Response, Cleanup, and Liability Act (CERCLA, or Superfund). According to OSHA, X-Cide causes eye and skin burns, is harmful if swallowed, causes respiratory tract irritation, and is a cancer hazard. ("Major injury likely unless prompt action is taken and medical treatment is given."). According to its Material Safety Data Sheet, the product is listed as hazardous to both fish and wildlife. Below is a list of some of the most common chemicals found in wells in California waters and their health and environmental effects.[63]

Seven Harmful Chemicals used in 12 California Offshore Wells		
Chemical	**Number of Wells Used**	**Known Health Effects**[64]
Crystalline Silica (X-Cide)	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory system, immune system and kidneys; mutagen. Known human carcinogen.[65]

[59] Fontenot, Brian E et al., An evaluation of water quality in private drinking water wells near natural gas extraction sites in the Barnett Shale Formation. Environmental Science & Technology (2013) ("Fontenot 2013"); U.S. GAO, *Information on Shale Resources, Development, and Environmental and Public Health Risks* (2012) ("US GAO 2012").

[60] Kassotis, Christopher D., et al. Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region. Endocrinology, doi 10.1210/en.2013-1697 (2013).

[61] McKenzie, Lisa, et al., Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado, Environmental Health Perspectives (2014).

[62] Colborn 2011.

[63] *Id.*

[64] Unless otherwise noted, health effects are documented by TEDX Endocrine Disruptor Exchange. Spreadsheet of health effects listed by chemical *available at* http://www.endocrinedisruption.com/chemicals.multistate.php.

[65] SCAQMD Staff Report for Proposed Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas Well Chemical Suppliers (April 2013) Appendix A, p. A-14, a*vailable at* http://www.aqmd.gov/hb/attachments/2011-2015/2013Apr/2013-Apr5-031.pdf.

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Methanol	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, brain and nervous system, immune system, kidneys, reproductive and cardiovascular system; mutagen, developmental inhibitor and endocrine disruptor. Ecological risks.
Glyoxal	11 wells	Harmful to skin, eyes and other sensory organs, respiratory and reproductive system, gastrointestinal system and liver, brain and nervous system, immune system, cardiovascular system and blood, endocrine disruptor; mutagen, promoter of cancer. Ecological risks.
Sodium Tetraborate	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, brain and nervous system, kidneys, cardiovascular system. Ecological risks.
2-Butoxyethanol	3 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, brain and nervous system, immune system, kidneys, reproductive system and cardiovascular system; mutagen, developmental inhibitor and endocrine disruptor; linked to liver cancer. Also linked to adrenal tumors. Ecological risks.[66]
Merhyl-4-isothiazolin	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory, reproductive system, brain and nervous system, immune system; mutagen; developmental inhibitor. Ecological risks.
Ethoxylated nonylphenol	9 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, immune system, reproductive and cardiovascular system; developmental inhibitor and endocrine disruptor.

TABLE 3. Chemicals reported used in offshore fracking in California waters.

Hydrofluoric acid is also commonly used for acidization, as well as other chemicals such as corrosion inhibitors, surfactants, clay-stabilizers, solvents, and iron control agents. A review by NRDC revealed that tens of thousands of gallons of acidizing fluid have been injected into wells in California from 2011-2012.[67]

Because the chemicals used for fracking and other well stimulation processes are so dangerous, they should not be disposed of at sea where they will enter the marine ecosystem. Fracking has a devastating track record of environmental and wildlife impacts.[68] While the impacts of fracking chemicals to marine life have received too little study, research from the experience of fracking on land demonstrates how dangerous these practices are for the environment.

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[66] U.S. EPA Integrated Risk Information System, Ethylene glycol monobutyl ether (EGBE)(2-Butoxyethanol) (CASRN 111-76-2), http://www.epa.gov/iris/subst/0500.htm; *See also* Abraham Lustgarten, ProPublica, Buried Secrets: Is Natural Gas Drilling Endangering US Water Supplies?

[67] Mordick, Briana, This is California on Acid (Sept. 13, 2013) http://switchboard.nrdc.org/blogs/bmordick/this_is_california_on_acid.html.

[68] Wolf, Shaye, Review of Impacts of Fracking and Other Unconventional Oil and Gas Extraction on Wildlife: A Review (2014) ("Wolf 2014"). *See also* Wolf, Shaye, Review of Impacts of Oil and Gas Exploration and Development on Wildlife in California (2014) ; Bamberger, M. and Oswald, R.E.,Impacts of gas drilling on human and animal health. New Solutions, 22(1):51-77 (2012) ("Bamberger 2012"); Betsey Piette BP oil spill, fracking cause wildlife abnormalities, Workers World (April 27, 2012); Pennsylvania Fish and Boat Commission, Ongoing problems with the Susquehanna River smallmouth bass, A case for impairment ("Penn Fish & Boat 2012") (2012) http://www.fish.state.pa.us/newsreleases/2012press/senate_susq/SMB_ConservationIssuesForum_Lycoming.pdf.

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Studies demonstrate fracking's broad ranging environmental effects. Surveys near fracking activities in multiple states have revealed adverse health impacts, including mortality for many types of animals including fish, birds, amphibians, domestic pets and farm animals.[69] Bird deaths associated with exposure to fracking wastewater have been documented.[70] And releases of fracking fluids have led to fish kills and abnormalities.[71] Indeed, there are numerous reports of fish mortalities resulting from surface water contamination by fracking pollution,[72] which illustrates the severe threat the permitted discharges here pose to marine fish.

Negative ecosystem impacts also stem from fracking. Habitat loss in areas where fracking is used extensively for natural gas development has led to wildlife population impacts.[73] Decreases in the diversity of aquatic life also correlate with fracking operations.[74] Meanwhile, fracking can exacerbate the susceptibility of wildlife to disease and competition by introducing additional stressors from degraded water quality, fitness, or habitat quality.

In summary, the chemicals used for fracking are health hazards, and their fate in the environment when discharged endangers human health and the environment. EPA must revoke or modify the permit because of these water quality risks, which are further elaborated in the next section that evaluates why fracking discharges run afoul of the Clean Water Act's requirement that NPDES permits do not cause an unreasonable degradation of the marine environment.

c. Discharges Cause an Unreasonable Degradation of the Marine Environment

At present, the General Permit is unlawful because it violates the ocean discharge criteria, which is also a cause for permit modification and reopening. The Clean Water Act prohibits EPA from issuing a permit for ocean discharge unless it establishes that the permit will not cause an unreasonable degradation of the marine environment.[75] And even where "insufficient information exists on any proposed discharge to make a reasonable judgment on any of the [ocean discharge criteria] no permit shall be issued."[76]

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[69] Bamberger,2012.

[70] Ramirez, P. Jr. , Bird Mortality in Oil Field Wastewater Disposal Facilities Environ manage, 46(5):820-6 (2010).

[71] *See* Papoulias, Diana M. and Velasco, Anthony L., Histopathological analysis of fish from Acorn Fork Creek, Kentucky, exposed to fracking fluid releases. Southeastern Naturalist, 12:92-111(2013); MIT Energy Initiative, The Future of Natural Gas, An Interdisciplinary MIT Study (2011) http://web.mit.edu/mitei/research/studies/natural-gas-2011.shtml ("MIT Energy Initiative"); Penn Fish & Boat 2012.

[72] Wolf 2014.

[73] Beckmann, J.P., Murray, K., Seidler, R.G., and Berger, J., Human-mediated shifts in animal habitat use: Sequential changes in pronghorn use of a natural gas field in Greater Yellowstone. Biological Conservation, 147(1):222-3 (2012); Gilbert, M.M, and Chalfoun, A.D, Energy Development Affects Populations of Sagebrush Songbirds in Wyoming. The Journal of Wildlife Management, 75(4):816-824 (2011).

[74] Susan Phillips, Researchers Wade Into Streams to Study Gas Drilling Impacts, State Impact, NPR, (Oct. 6, 2011) http://stateimpact.npr.org/pennsylvania/2011/10/06/researchers-wade-into-streams-to-study-gas-drilling-impacts/

[75] 33 U.S.C. §1343.

[76] 33 U.S.C. § 1343(c)(2).

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First, EPA never made a determination whether the discharge of fracking chemicals causes an unreasonable degradation of the marine environment as required by the ocean discharge criteria. Because public disclosure of offshore fracking activities did not occur until 2013, to the extent that EPA prepared an ocean discharge criteria evaluation in 2012 it failed to take offshore fracking discharges into account. EPA's ocean discharge criteria evaluation was prepared for the proposed rule and was not updated for the final rule.[77] The evaluation did not mention fracking or other unconventional well stimulation, and instead tiered the analysis to the 2004 evaluation and concluded that the changes and new science did not lead to any new conclusions.[78] Because new information arose about offshore fracking after the completion of the no unreasonable degradation determination, it has failed to take the discharge of these chemicals into consideration.

Second, the General Permit cannot pass the unreasonable degradation test because the General Permit essentially allows unlimited discharge of well stimulation chemicals. This is because once the chemicals are comingled with produced waters, which is an inherent part of the well stimulation process, there is only an overall annual volume limit of billions of gallons of produced waters.[79] This provides no meaningful limit on the chemicals that may be discharged. Such an approach was rejected by the Ninth Circuit in *NRDC v. EPA*,[80] in which a loophole in the permit made it impossible for EPA to ensure against ocean degradation. The Ninth Circuit found a violation of ocean discharge criteria where EPA set a toxicity limit for drilling muds and established an alternative toxicity limit for operations with pre-approval.[81] The court found fault with the alternative approach because it gave EPA unfettered discretion to set the limit on a well-by-well basis with incalculable limits.[82] The permit provided "no way of ascertaining to what extent this alternative procedure may result in degradation of the ocean environment."[83] The court held that the alternative procedure violated the statute and regulations on ocean discharge criteria.[84] Here, where there General Permit allows unlimited discharges of fracking chemicals, it is an even greater violation of the ocean discharge criteria than in the alternative well-by-well procedure rejected in *NRDC v. EPA,* in which at least there were defined toxicity limits on drilling muds with only some exceptions.

The General Permit must be modified because the cumulative effects of discharges from these techniques will cause an unreasonable degradation of the marine environment. EPA acknowledged that new information that fracking could cause an unreasonble degradation of the marine environment would reopen the General Permit. "[T]he permit may be reopened and modified if new information indicates that the discharges (including chemicals used and discharged in hydraulic fracturing operations offshore) could cause unreasonable degradation of the marine environment."[85] An unreasonable degradation means significant adverse ecosystem impacts, a threat to human health, or an unreasonable loss of esthetic, recreational, scientific or

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[77] See Fact Sheet at 21-32.
[78] *Id.*
[79] General Permit.
[80] *NRDC v. EPA,* 863 F.2d 1420, 1429 (9th Cir. 1998),
[81] *Id.* at 1431-32.
[82] *Id.* at 1432.
[83] *Id.*
[84] *Id.*
[85] Environmental Protection Agency, Addendum to Fact Sheet 15-16 (Dec. 17, 2013).

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economic values.[86] A finding of unreasonable degradation is based upon the nine ocean discharge criteria evaluated below.

i. The quantities, composition and potential for bioaccumulation or persistence of the pollutants to be discharged

Between 2005 and 2009, fourteen of the primary oil and gas service companies used 780 million gallons of hydraulic fracturing chemicals nationwide, not including the water mixed with the chemicals for injection into the wells.[87] The quantities of chemicals used for offshore oil well stimulation in California have not been tracked. According to state officials, a typical frack job in California uses 160,000 gallons of water combined with chemicals, and much of this wastewater returns to the surface and must be discharged.[88] This may be a significant underestimate of water usage, however, given that that mandatory reporting requirement for water use came into effect only in January, 2014, and it is therefore based on voluntary reporting which may be unreliable.While documents show that fracking has occurred at least 15 times in federal waters, this is likely to increase and with it the quantities of wastewater and chemical discharge will also increase. The Monterey Shale holds one of the nation's largest reserves of oil and there is industry interest in exploiting those resources. The General Permit allows more than 9 billion gallons of produced waters to be directly discharged into the ocean each year. With no limit on well stimulation chemicals that may be discharged once mixed with produced waters, the quantity of chemicals that could potentially be discharged is practically unlimited.

While EPA has recently required quarterly reporting of fracking chemical discharges, it must seek to understand and evaluate the quantities and composition of chemicals that are predicted to be used over the five years of the permit term before allowing any such discharge.

Until recently disclosure of the composition of the chemicals used in these operations has been limited, but we do know some of the chemicals that have been used or self-reported. There are 750 different chemicals used in fracking fluids, and methanol is the most common.[89] The chemicals used in fracking are extremely dangerous for human health and the environment as described in section C(1)(b).

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[86] 40 C.F.R. § 125.121(e)(1-3).
[87] House Report at 5.
[88] Marshall 2014.
[89] House Report at 5.

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Table 1. Chemical Components Appearing Most Often in Hydraulic Fracturing Products Used Between 2005 and 2009	
Chemical Component	**No. of Products Containing Chemical**
Methanol (Methyl alcohol)	342
Isopropanol (Isopropyl alcohol, Propan-2-ol)	274
Crystalline silica - quartz (SiO2)	207
Ethylene glycol monobutyl ether (2-butoxyethanol)	126
Ethylene glycol (1,2-ethanediol)	119
Hydrotreated light petroleum distillates	89
Sodium hydroxide (Caustic soda)	80

TABLE 4. Chemical Components Appearing Most Often in Hydraulic Fracturing Products Used Between 2005 and 2009. Source: House Report

Some of the wastes that result from unconventional well stimulation have the potential for bioaccumulation and persistence in the marine environment. For example, the fracking chemical called ethoxylated 4-nonylphenol is a "persistent, bioaccumulative, endocrine disruptor, very toxic to aquatic organisms and causing sexual deformities in exposed oyster larvae, found to increase the incidence of breast cancer in lab animals."[90] Additionally, fracking can bring radioactive materials from underground to the surface and lead to exposures through wastewater. Horizontal drilling used with fracking creates significantly more exposure to radioactive materials that can be transported through wastewater to the surface and migrate through fractures.[91] Radioactive materials in produced waters are long-lived and bioaccumulate in the environment.[92]

In sum, the chemicals used for unconventional well stimulation pose an environmental hazard. Many of the chemicals are toxic to humans and wildlife and some are persistent in the environment.

[90] Deihl, Jennifer, et al., The distribution of 4-nonylphenol in marine organisms of North American Pacific Coast estuaries, Chemosphere, 87:490-97 (Apr. 2012) http://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1402&context=bio_fac; *see also,* Mergel, Maria, Nonylphenol and Nonylphenol Ethoxylates, Toxipedia (2011)http://www.toxipedia.org/display/toxipedia/Nonylphenol+and+Nonylphenol+Ethoxylates.

[91] White, Ivan E., Consideration of radiation in hazardous waste produced from horizontal hydrofracking, National Council on Radiation Protection (2012).

[92] *Id.* at 5.

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i. The composition and vulnerability of the biological communities which may be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species identified as endangered or threatened pursuant to the Endangered Species Act, or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain

The Santa Barbara Channel waters where the offshore oil and gas platforms operate are highly productive and host a wealth of biodiversity. Species from invertebrates to sea birds to whales are at risk from continued discharges of chemicals used for unconventional well stimulation. The General Permit's produced water discharges, exacerbated by offshore fracking contaminants, will harm sensitive habitat. Here, there are incredibly important biological communities, including numerous species that are protected under the Endangered Species Act. Southern California has many species of whales, porpoises, dolphins, pinnipeds, and sea otters. More than 500 species of fish live off the shores of southern California.

Of particular importance are the eighteen species of whales and dolphins that are considered residents of the area and four species of pinnipeds that have breeding habitat in the Channel Islands National Marine Sanctuary. A variety of large baleen and toothed whales occur in the area including: blue whales (*Balaenoptera musculus*), gray whales (*Eschrichtius robustus*), humpback whales (*Megaptera novaeangliae*), killer whales (*Orcinus orca*), minke whales (*Balaenoptera acutorostrata*), fin whales (*Balaenoptera physalus*), sperm whales (*Physeter macrocephalus*), and right whales (*Eubalaena glacialis*). Of these whales, five species are listed as endangered under the ESA including: blue, gray, humpback, fin, and sperm whales. Blue whales are known to aggregate in the Santa Barbara Channel because of the rich feeding grounds that it provides during their migration. The blue whale is the largest animal known to have ever lived on earth. Once numbering over 300,000, the global blue whale population has been reduced by commercial whaling to likely fewer than 10,000 individuals. Blue whales off California are part of a population comprised of about 1,200 animals; scientists estimate that more than one human-caused death each year will impede the recovery of the California population.

Leatherback, loggerhead, green, and olive ridley sea turtles also occur in the area. Critically endangered leatherback sea turtles are the largest sea turtles on the planet. Some of these turtles, weighing between 550 and 2,000 pounds with lengths of up to six feet, migrate across the Pacific Ocean to feed in waters off the U.S. coast. A 2013 study found that the Western Pacific population of leatherback sea turtles, which includes the leatherbacks that feed in West Coast waters, has continued to decline since the 1980s. If these trends continue, researchers predict that extinction may be inevitable in 20 years because the number of turtles will be so low.[93] This population represents the last remaining stronghold of leatherbacks in the Pacific Ocean. During certain seasons the leatherbacks migrate to this area to feed on jellyfish. Leatherback sea turtles have been protected under the Endangered Species Act since 1970, and in 2012 Pacific leatherbacks were designated as California's official state marine reptile symbol.

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[93] Storr, Kevin, UAB research says 2,000 pound turtle could be extinct within 20 years (Feb. 26, 2013) http://www.uab.edu/news/latest/item/3216-uab-research-says-2000-pound-turtle-could-be-extinct-within-20-years.

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There is a dire risk of extinction facing North Pacific loggerhead sea turtles as well. In August 2009, NMFS issued a loggerhead sea turtle status review, finding that the North Pacific population of loggerheads faces a "high likelihood of quasi-extinction."[94] Though this population nests in Japan, where the results of nesting beach census data indicate a decline of 50-90 percent over the past fifty years, it forages further east – including in waters under U.S. jurisdiction. Recent tagging results confirm previous studies showing that southern California is important habitat for loggerhead sea turtles.[95] In fact, loggerhead sea turtles occupy the waters off the coast of Southern California in large enough numbers that NMFS designated a specific conservation area east of the 120° W meridian during an El Nino event in order to protect loggerheads from entanglement in fishing gear. To protect loggerheads, fishing is also heavily restricted and generally prohibited within the west coast U.S. EEZ[96] and on the high seas east of 150° W and north of the equator.[97]

Although not protected under the Endangered Species Act, North Pacific white sharks provide a key role in this ecosystem. This distinct population numbers only about 300 individuals and has fidelity to waters off of California[98] Top predators play an important top-down role in structuring the California Current Large Marine Ecosystem given that there is an extensive density of top predators in the region.[99] White sharks play a key role in regulating prey populations,[100] and impacts of shark depletion can radiate through the food web in complex and unpredictable ways. The role of white sharks as apex predators consuming other large predators such as elephant seals and sea lions has been reported routinely at the Farallones.

Protected fish include the tidewater goby and southern California steelhead population, and closer to shore endangered seabirds such as the western snowy plover and California clapper rail nest near the shore while endangered white and black abalone inhabit the intertidal area of the Santa Barbara Channel.

The biological community in the vicinity of the offshore oil and gas platforms is extremely sensitive, and the area is among California's most important marine habitats. In this area, many special status species are already struggling for their survival, and several species can claim environmental contaminants as a threat to their continuing existence. Water pollution from offshore fracking poses a risk to the conservation and recovery of these imperiled species.

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[94] T. A. Conant et al., Loggerhead Sea Turtle (*Caretta caretta*) 2009 Status Review Under the U.S. Endangered Species Act, Report of the Loggerhead Biological Review Team to the National Marine Fisheries Service, 46 (Aug. 2009).

[95] M. Abecassis et al., *A* Model of Loggerhead Sea Turtle (Caretta caretta) Habitat and Movement in the Oceanic North Pacific, PLoS ONE 8(9): e73274. (2013) http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0073274 at Fig.9B (showing predicted hotspots of habitat on Sept. 12, 2005).

[96] Gear and Fishing Restrictions, 50 C.F.R. § 660.712(a).

[97] Exceptions to Prohibitions Relating to Sea Turtles, 50 C.F.R. § 223.206(d)(9).

[98] Chapple, T., S. Jorgensen, S. Andersen, P. Kanive, P. Klimley, L. Botsford and B. Block, A first estimate of white shark, *Carcharodon carcharias*, abundance off Central California, Biology Letters 7(4): 581-583(2011).

[99] *Id.*

[100] Brown, A., D. Lee, R. Bradley and S. Anderson,Dynamics of white shark predation on pinnipeds in California: Effects of prey abundance. Copeia 2: 232-238 (2010).

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ii. The importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism

The receiving waters for the offshore oil and gas platforms are especially important for whales and seabirds.

The Santa Barbara Channel is vitally important blue whale habitat. Between June and November, high densities of endangered blue whales spend time feeding on the abundant planktonic krill in the area of these oil and gas activities. In fact, blue whales have developed a particular affinity for the area such that the Santa Barbara Channel hosts the world's densest summer seasonal congregation of blues. Another endangered whale, the humpback whale, congregates in the area from May to September. Little is known about the elusive endangered fin whales; however, congregations have been observed near feeding aggravations of blue and humpback whales. Although rare, endangered sperm, right, and killer whales occasionally occur in the area. Gray whales migrate through the region in the late fall on their way south to breeding grounds and again in the late winter and early spring on their way north to feeding areas, and minke whales are known to occupy the region year-round.

The Santa Barbara Channel is also a biologically important area for seabirds. The Channel Islands provide important breeding habitat for 13 seabird species, including Scripps's murrelet, ashy storm-petrel, black storm-petrel, leach's storm-petrel, Cassin's auklet, rhinoceros auklet, tufted puffin, pigeon guillemot, common murre, California brown pelican, western gull, pelagic cormorant, Brandt's cormorant, and double-crested cormorant. The Channel Islands support about half the global population of ashy storm-petrels and western gulls, about 80 percent of the breeding population of Scripps's murrelet, and the only breeding populations of California brown pelicans in the United States. The Santa Barbara Basin is ranked as one of five seabird hotzones in the California Current Ecosystem.[101] It provides important foraging habitat for the region's breeding seabirds and migratory species including sooty shearwaters, pink-footed shearwaters, black-vented shearwaters, and red-necked phalaropes. Several imperiled birds use this area including the state-threatened Scripps's murrelet and IUCN-endangered ashy storm-petrel.

Offshore oil and gas platforms attract seabirds by concentrating prey and by attraction to night lighting.[102] This may expose seabirds directly to discharges from energy platforms and to prey species that may have bioaccumulated contaminants from these discharges.

There is also designated critical habitat for black abalone, leather back sea turtles, and snowy plovers in the vicinity of California's offshore oil platforms. These biologically sensitive and

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[101] Sydeman, W.J. et al. Hotspots of Seabird Abundance in the California Current: Implications for Important Bird Areas. The Farallon Instiute, Audubon California, and the Canadian Wildlife Service (March 23, 2012) http://ak.audubon.org/sites/default/files/documents/report_audubon_marine_ibas_011813.pdf.

[102] Wiese, F.K. et al. Seabirds at risk around offshore oil platforms in the northwest Atlantic. Marine Pollution Bulletin 42: 1285-1290 (2001): http://play.psych.mun.ca/~mont/pubs/seabirds.pdf.

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important habitat areas will be significantly impacted by water pollution associated with fracking.

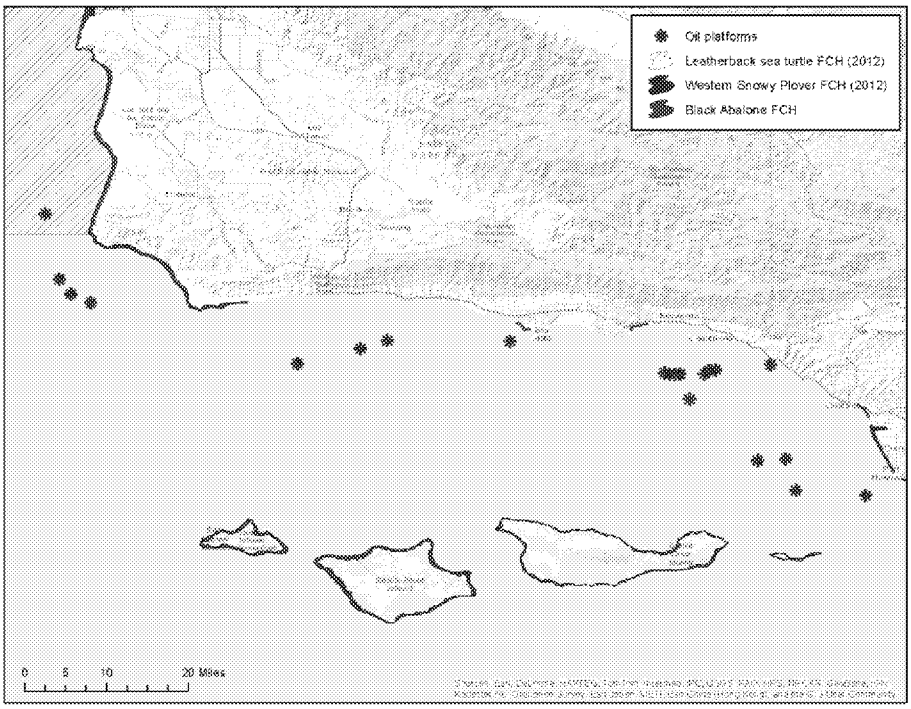

FIGURE 1. Critical habitat in relationship to the offshore oil and gas platforms.

iii. The existence of special aquatic sites including, but not limited to marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas and coral reefs

The areas surrounding these offshore oil and gas platforms are unparalleled for their richness of marine protected areas and special aquatic sites. These areas were protected because of their recreational value and significance as wildlife habitat and are now directly at risk from discharges associated with offshore fracking.

The offshore oil and gas platforms are adjacent to the Channel Islands National Marine Sanctuary. The Sanctuary was established in 1980 with the primary goal of protecting the natural and cultural resources. The 1,470 square mile area that extends approximately six nautical miles from the islands and rocks that make up the Channel Islands was selected as a National Marine Sanctuary because of its biological importance and rich diversity. The unique warm and cool currents make the area extremely productive. The area is excellent habitat for wildlife including kelp forests, fish and invertebrates, pinnipeds, cetaceans and sea birds.

There are also numerous new Marine Protected Areas and Reserves in proximity to offshore oil and gas platforms in the Santa Barbara Channel and San Pedro Channel. In 2010, several areas in Southern California were approved as marine protected areas implementing the California Marine Life Protection Act. Approximately 8% of the South Coast has been protected. These

areas have been given special status because of their values for marine life, habitat, water quality, recreation, and cultural resources.

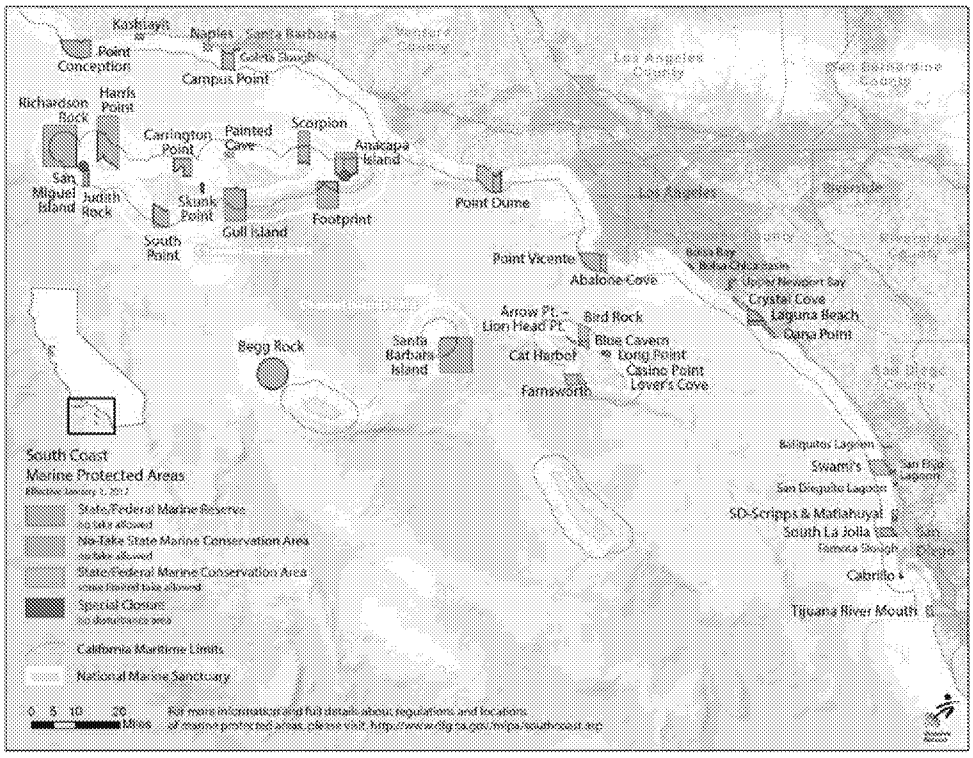

FIGURE 2. South Coast Marine Protected Areas

iv. The potential impacts on human health through direct and indirect pathways.

While the chemicals used for fracking and other extraction techniques are associated with some severe human health impacts, fortunately the pathways for human exposure to these chemicals are limited because of the distance from shore that the wastewater is discharged for these offshore platforms in federal waters. The human health impacts, nonetheless, are an important analog for marine life impacts because they have been evaluated more thoroughly than impacts to wildlife and the environment.

An analysis of chemicals used for fracking and other extraction for natural gas operations showed that most of the 353 chemicals evaluated are known for causing adverse effects on human health. [103] A profile of the health effects is in the table below.

[103] Colborn 2011.

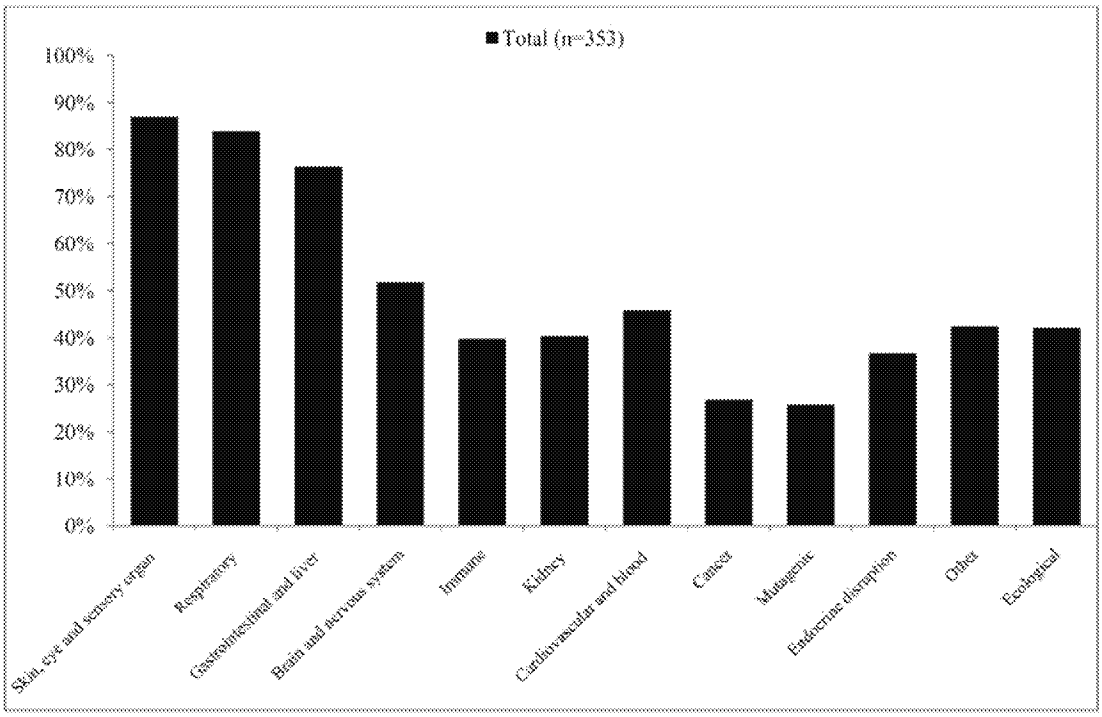

FIGURE 3. Profile of possible health effects of chemicals with CAS numbers used in natural gas operations. Source: Colborn 2011.

For fracking on land, the human health impacts of fracking have been concerning. Water samples taken from a region with extensive fracking activites in Colorado were shown to have greater endocrine disrupting properties than waters that were not located near fracking operations. [104] Studies have shown that people who live closer than 0.5 miles from a natural gas operation have a greater risk of health effects from exposure to air emissions from fracking.[105] Other reasearch found that proximity to natural gas wells had an association with birth defects.[106]

Although limited, there are still pathways for human exposure to fracking chemicals. People scuba dive and spear fish under oil rigs in Southern California because the platforms attract wildlife.[107] Additionally, exposure can occur from spills and leaks during storage and transportation of the chemicals. Some chemicals that are more persistent in the environment could also lead to exposure through currents to the nearshore areas where people recreate or through contaminated seafood.

[104] Kassitosis 2013.
[105] McKenzie 2012.
[106] McKenzie 2014.
[107] Cole, Brandon, Southern California Oil Rigs, SCUBAdiving.com (Nov. 2007) http://www.scubadiving.com/travel/pacific-western/southern-californias-oil-rigs; Sato, Ricky, Spearfishing Under The Eureka Oil Rig (June 6, 2013) https://www.youtube.com/watch?v=AoHpO9HKjG8&noredirect=1.

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v. Existing or potential recreational and commercial fishing, including finfishing and shellfishing

Fish kills have been some of the most obvious wildlife impacts associated with fracking on land, and similarly the impact of wastewater discharges with fracking and acidization chemicals would impact marine fisheries in the vicinity of offshore oil and gas rigs.

In 2012, commercial fish landings in Santa Barbara and Los Angeles were two of the three highest in the state, bringing in over $37 million dollars and $47 million, respectively. More than half of that value came from market squid, with sea urchins, spiny lobsters, spot prawn, sablefish, Pacific sardine, and albacore tuna all having landings valued over $1 million. Barred sand bass (*Paralabrax nebulifer*) and kelp bass (*Paralabrax clathratus*) comprised the two most important marine recreational fisheries of southern California for three decades, until the late 1990s when the stocks collapsed. Similar trends have been reported for several other recreational fisheries in southern California.

The health of these fisheries depends on clean water, which is already a problem due to their location near major cities. Bottom-living fish, such as halibut, turbot and other flatfish can act as indicator species because they feed on the bottom and have a higher risk of exposure to chemicals that accumulate in sediments. Many of these species also live in a limited area, allowing water quality investigators to localize the site of chemical pollution.

These fish and fisheries are at risk from water contamination resulting from well stimulation fluid discharges. On land, fracking has been linked to fish kills.[108] For example, in Pennsylvania fish kills have been associated with the contamination of streams, creeks and wetlands by fracking fluid.[109] Moreover, the diversity of species in streams close to fracking activity in Pennsylvania was found to be reduced, even though drilling was done in accordance with all current state rules.[110] Preliminary results of a study in Arkansas also shows reduced diversity of fish species in areas with dense natural gas and fracking operations.[111]

Additionally, fracking wastewater is suspected to be the cause of fish abnormalities in Susquehanna River. There is intense natural gas drilling in the basin of the Susquehanna River, and over 15 water treatment plants in Pennsylvania had been accepting waste water from hydraulic fracturing activity, subsequently discharging it into streams.[1] Fish in the Susquehanna River have been exhibiting abnormalities — for example, 40% of adult small-bass within one river section had black spots and lesions,[1] and in some cases, 90-100% of fish observed were cases of intersex, possibly due to endocrine disruption.[2]

A spill of fracking fluid in Kentucky also caused a significant die-off of aquatic life, including threatened blackside dace, creek chub and green sunfish. Researchers concluded that the fracking

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[108] *See generally* Wolf 2004.
[109] MIT Energy Initiative 2011.
[110] Phillips, Susan, Researchers Wade Into Streams to Study Gas Drilling Impacts, State Impact, NPR (October 6, 2011) http://stateimpact.npr.org/pennsylvania/2011/10/06/researchers-wade-into-streams-to-study-gas-drilling-impacts/.
[111] Furtado, Brittany, Examining Natural Gas Development and Fish Communities of the Fayetteville Shale, Arkansas, abstract (2013) https://afs.confex.com/afs/2013/webprogram/Paper12249.html.

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fluids degraded water quality in the creek causing fish to develop gill lesions, and suffer liver and spleen damage.[112]

In sum, exposure of the fish and fisheries in the Santa Barbara Channel to wastewater from fracking operations threatens to cause contamination, mortalities and sublethal effects on these fish populations.

vi. Any applicable requirements of an approved Coastal Zone Management plan

The General Permit is inconsistent with California's coastal zone management plan. By statute, the Coastal Commission is the California agency responsible for Coastal Zone Management Act review, and the Coastal Act is part of California's federally approved "coastal zone management program."[113] Any federally permitted activity which affects the coastal zone must therefore be consistent with the goals of the Coastal Act.

The California Coastal Commission is concerned about the discharges from unconventional well stimulation activities. Following an investigation into offshore fracking, the staff reported at the February 2014 meeting that while the chemical inventory and reporting in the General Permit is a good first step, this measure is insufficient to ensure consistency with the Coastal Act. Staff recommended that the Commission request a modification of the General Permit and that it be subject to consistency review.

The goals of the Coastal Act are broad and directly relate to the effects of fracking on the coastal environment. The California Legislature passed the Act in order to "[p]rotect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment" and to "[a]ssure orderly, balanced utilization and conservation of coastal zone resources."[114] In so doing, the legislature recognized that the coastal zone is a "distinct and valuable recourse of vital and enduring interest to all the people and exists as a delicately balanced ecosystem."[115] "The permanent protection of the state's natural and scenic resources is a paramount concern to present and future residents of the state and nation."[116] As stated by the California Court of Appeals in *Gherini v. California Coastal Commission*, 204 Cal. App. 3d 699 (1988), "[t]he Legislature further found that in order to promote the public safety, health and welfare, protect public and private property, wildlife, marine fisheries, ocean resources and the natural environment, 'it is necessary to protect the ecological balance of the coastal zone and prevent its deterioration and destruction.'"

Fracking lies in direct opposition to many of the Coastal Act's directives. Article 4 of the Coastal Act requires the protection of marine resources and water quality.[117] It provides that marine

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[112] Papoulias 2013,
[113] Cal. Pub. Res. Code § 30008; *see also American Petroleum Institute v. Knecht* (C.D.Cal. 1978) 456 F. Supp. 889, 895.
[114] Cal. Pub. Res. Code § 30001.5.
[115] *Id.*
[116] *Id.*
[117] Cal. Pub. Res. Code §§ 30230, 30231.

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resources shall be not only maintained but also enhanced, and that uses shall "sustain the biological productivity of coastal waters."[118] The law requires the protection of the "quality of coastal waters . . . appropriate to maintain optimum populations of marine organisms and for the protection of human health."[119] This is achieved through, among other means, "minimizing adverse effects of waste waters discharges."[120] There is also a duty to protect against spills of oil and hazardous substances.[121] Fracking causes a suite of risks to the coastal environment, including, but not limited to: hazardous wastewater dumping; vessel traffic and light pollution; navigation risks from the increased number of platforms, exploratory rigs, and support vessel activity; production of drill muds and cuttings dumping, and the impact of this dumping on the water column and bottom communities in the vicinity of the drilling platform. All of these impacts could prove injurious to the biological productivity and integrity of coastal waters.[122] Further effects that may impact marine resources and biological productivity include degraded air quality from exploration, production, and transportation activities, as well as oil spills from a variety of oil exploration, production, or transportation operations.

In addition, the Coastal Act requires that "[d]evelopment in areas adjacent to environmentally sensitive habitat areas . . . shall be sited and designed to prevent impact which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas."[123] Environmentally sensitive habitat areas are defined as those areas in which "plant or animal life or their habitat are either rare or especially valuable."[124] Waters where fracking is occurring are adjacent to areas of ecological significance which provide habitat for a number of endangered species. Blue, fin, sei, humpback, and sperm whales, as well as other marine mammals like sea otters, use southern California seawaters. Leatherback, loggerhead, green, and olive ridley sea turtles also occur in this area. Endangered white and black abalone are found in the intertidal zones. Protected fish, including the tidewater goby and southern California steelhead population, are in the area, and the endangered California clapper rail, endangered snowy plover, endangered California least tern, and the state endangered savannah sparrow all inhabit the beaches at issue. Fracking development and the resulting environmental harms, including the production of wastewater, will impair the use of these sensitive habitat areas.

The Coastal Act also mandates that all new development will "neither create nor contribute significantly to . . . geologic instability."[125] Evidence from many states where fracking is occurring indicates that fracking and other unconventional production techniques have contributed to seismic activity, both directly through fracking and via wastewater injection. In California, oil and gas extraction has in the past likely induced strong earthquakes, including two over 6.0 in magnitude. Based upon the available evidence, fracking in the coastal environment risks "geologic instability" and may lead to future seismic events in California.

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[118] *Id.* at §30230.
[119] Cal. Pub. Res. Code § 30231.
[120] *Id.*
[121] *Id.* at § 30232.
[122] Cal. Pub. Res. Code. §§ 30230-30231.
[123] Cal. Pub. Res. Code § 30240.
[124] *Id.* at § 30107.5.
[125] *Id.* at § 30252.

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In sum, the California Coastal Commission has recognized that this General Permit may not conform with California's Coastal Act due to the impacts of fracking on the coastal ecosystem. EPA must modify this permit to ensure consistency with the state's coastal zone management program and prevent further degradation of the marine environment.

vii. Such other factors relating to the effects of the discharge as may be appropriate

Degradation of the marine environment from the General Permit's authorized wastewater discharges will be compounded by accidental discharges of fracking pollution. There are risks from (1) transportation of chemicals, (2) storage of chemicals, (2) underground migration, and (3) seismic activity.

First, risks to water quality can arise from the storage and transport of well stimulation chemicals. Onshore, unconventional well stimulation relies on numerous trucks to transport chemicals to the site as well as collect and carry disposal fluid from the site to processing facilities. A U.S. GAO study found that up to 1,365 truck loads can be required just for the drilling and fracturing of a single well pad[126] while the New York Department of Conservation estimated the number of truck trips to be about 3,950 per horizontal well.[127] Offshore, chemicals still need to be transported for a frack job. A combination of trucks and vessels are used to transport the fracking fluids to the platforms that are more than three miles offshore. During this transportation there is the potential for a chemical leak or spill.

Second, chemicals that are being stored for fracking can also be susceptible to accidental spills and leaks. Natural occurrences such as storms and earthquakes may cause accidents, as can negligent operator practices. The recent West Virginia chemical spill that contaminated drinking water for 300,000 people demonstrates the risk that chemical storage can pose.[128] Approximately 10,000 gallons of a chemical compound that is used in coal processing leaked from a hole in a storage tank.[129] Floods in Colorado have shown how weather events may result in uncontrolled chemical spills and leaks on a massive scale.[130] Fracking operations on offshore oil and gas platforms exacerbate the risk of a chemical spill.

Third, chemicals and naturally occurring substances can migrate to the surface through newly created fractures underground. The migration may occur over a number of years.[131] Contaminants from well stimulation fluids and from naturally occurring contaminants can

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[126] US GAO 2012.

[127] NYSGEIS 2011 at 810.

[128] Plumer, Brad, Five big questions about the massive chemical spill in West Virginia, *Washington Post* (Jan. 21, 2014) http://www.washingtonpost.com/blogs/wonkblog/wp/2014/01/21/five-big-questions-about-the-massive-chemical-spill-in-west-virginia/.

[129] NPR, How Industrial Chemical Regulation Failed West Virginia (Jan. 29, 2014) http://www.npr.org/2014/01/29/268201454/how-industrial-chemical-regulation-failed-west-virginia

[130] Trowbridge, A. "Colorado Floods Spur Fracking Concerns" CBS News, available at http://www.cbsnews.com/8301-201_162-57603336/colorado-floods-spur-fracking-concerns/ (accessed Oct. 2, 2013)("Trowbridge 2013").

[131] Myers, Tom, Potential Contamination Pathways from Hydraulically Fractured Shale to Aquifers, National Groundwater Association (2012).

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migrate into shallower aquifers through a number of pathways.[132] Fluids can travel through fractures in the rock that are created by the high pressures, which fluids tend to travel vertically to lower pressure zones.[133] Faults can also contribute to the migration of chemicals.[134] High pressures used in fracturing operations can also alter the hydroecology of an area and stimulate migration of chemicals.[135] Poorly constructed or abandoned wells are recognized as one of the most likely ways by which contaminants migrate underground. Improper well construction is cited as a confirmed or potential cause of groundwater contamination in numerous incidents at locations across the US.[136] A well in which stimulation operations are being conducted may also "communicate" with nearby wells, which may lead to groundwater contamination, particularly if the nearby wells are improperly constructed or abandoned.[137] Ground and surface water contamination onshore provides an analogy to seabed release of fracking fluids offshore due to their geologic similarities. Additionally, many of California's offshore wells are aging and the infrastructure does not meet the modern requirements to adequately ensure mechanical integrity. For example, the State Lands Commission has noted concerns about pressure build-up in reservoirs causing oil to leak from seeps or old abandoned wells because historic "well-capping techniques [] are not adequate by current standards" and the "structural stability of older abandoned facilities is unreliable ."[138]

Finally, increased seismicity from fracking could also contribute to migration of fracking chemicals into the ocean. Scientists have long known that oil and gas activities are capable of triggering earthquakes, with records of the connection going back to the 1920s. [139] In California, oil and gas extraction has in the past likely induced strong earthquakes, including two over 6.0 in magnitude.[140] Recent studies have also drawn a strong connection between the recent rise in

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[132] *Id.*
[133] *Id.*
[134] *Id.*
[135] *Id.*
[136] Pennsylvania Department of Environmental Protection, Consent Order and Agreement between Cabot Oil and Gas Corporation and the Pennsylvania Department of Environmental Protection, November 4, 2009, from http://loggerhead.epa.gov/arweb/public/pdf/2141700.pdf. (Retrieved August 30, 2012); URS Corporation, Phase I hydrogeologic characterization of the Mamm Creek Field area in Garfield County: Prepared for the Board of County Commissioners, Garfield County, Colorado(2006); Papadopulos & Associates, Inc., Phase II hydrogeologic characterization of the Mamm Creek Field area, Garfield County, Colorado: Prepared for the Board of County Commissioners, Garfield County, Colorado (2008); Thyne, G., Review of Phase II Hydrogeologic Study prepared for Garfield County: Prepared for Garfield County (2008); McMahon, P. B., Thomas, J. C., & Hunt, A. G., Use of diverse geochemical data sets to determine sources and sinks of nitrate and methane in groundwater, Garfield County, Colorado, 2009. U.S. Geological Survey Scientific Investigations Report 2010–5215 (2010); Ohio Department of Natural Resources, Report on the Investigation of the Natural Gas Invasion of Aquifers in Bainbridge Township of Geauga County, Ohio (Sept. 2008) ; U.S. Environmental Protection Agency, Draft Investigation of Ground Water Contamination near Pavillion, Wyoming (2011)
[137] *See, e.g.,* Detrow, Scott, Perilous Pathways: How Drilling Near An Abandoned Well Produced a Methane Geyser, StateImpact Pennsylvania (Oct. 9 2012) http://stateimpact.npr.org/pennsylvania/2012/10/09/perilous-pathways-how-drilling-near-anabandoned-well-produced-a-methane-geyser/; Alberta Energy Board, Directive 083: Hydraulic Fracturing – Subsurface Integrity (May 2013) http://www.aer.ca/documents/directives/Directive083.pdf.
[138] State Lands Commission, Final Environmental Impact Report for the Revised PRC 421 Recommissioning Project, 3-12 (Jan. 30, 2014).
[139] National Research Council, *Induced Seismicity Potential in Energy Technologies* ("NRC 2012") at 3 (2012).
[140] *Id.* at 28.

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waste water injection and increased earthquake rates.[141] Waste water injection has likely been triggering seismic events in Ohio,[142] Oklahoma,[143] and Texas.[144] In addition, fracking has been found to contribute directly to seismic events,[145] and even if the earthquakes that fracking directly generates are small, fracking could be contributing to increased stress in faults that leaves those faults more susceptible to otherwise naturally triggered earthquakes of a greater magnitude.[146]

viii. Marine water quality criteria developed pursuant to section 304(a)(1).

EPA has a duty to protect the marine water quality from pollutants associated with unconventional well stimulation. Most of the hundreds of chemicals used by oil companies do not yet have established numeric water quality criteria. As discussed further below, EPA should establish water quality standards for federal waters including designated uses and numeric standards, including new standards that allow zero detectable contaminants from unconventional well stimulation. Moreover, as discussed above, since EPA did not have full information on the chemicals to be discharged prior to issuing the permit, it is not possible to determine compliance with marine water quality criteria. Therefore, this factor also weighs in favor of revoking or modifying the permit.

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In summary, EPA must revoke or modify the General Permit because there is robust scientific information about the dangers of fracking pollution. An evaluation of the nine ocean discharge criteria demonstrate that the General Permit's allowance of discharges of well stimulation chemicals comingled with produced waters cause an unreasonable degradation of the marine environment.[147] Not only are the chemicals highly toxic to humans and wildlife, but also the receiving waters for the offshore oil and gas discharges are some of the nation's most biologically sensitive marine areas. Accordingly, EPA must revoke, reopen, and modify the General Permit to prohibit fracking pollution discharges that harm water quality.

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[141] van der Elst, Nicholas, et al., Enhanced Remote Earthquake Triggering at Fluid-Injection Sites in the Midwestern United States, Science 341, 164 (2013) ("van der Elst 2013").

[142] Ohio Department of Natural Resources *Executive Summary: Preliminary Report on the Northstar 1 Class II Injection Well and the Seismic Events in the Youngstown, Ohio, Area* (2012) ("Ohio DNR Northstar"); Fountain, Henry, Disposal halted at well after new quake in Ohio, *New York Times*, January 1.

[143] Keranen, Katie, et al. Potentially induced earthquakes in Oklahoma, USA: Links between wastewater injection and the 2011 Mw5.7 Earthquake Sequence, Geology (March 26, 2013); Holland, Austin, *Examination of possibly induced seismicity from hydraulic fracturing in the Eola Field, Garvin County, Oklahoma, Oklahoma Geological Survey Open-File Report* OF1-2011 (2011) .

[144] Frohlich, Cliff, Two-year survey comparing earthquake activity and injection-well locations in the Barnett Shale, Texas. *Proceedings of the National Academy of Sciences* (2012).

[145] BC Oil and Gas Commission, Investigation of Observed Seismicity in the Horn River Basin (2012).

[146] *See* van der Elst 2013.

[147] Furthermore, if EPA finds that the information contained in this petition is insufficient to make a determination of unreasonable degradation, it may not permit the discharge. 33 USC § 1343(c)(2).

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2. EPA Must Adopt an Effluent Limitation of Zero for Fracking Fluids and Other Toxic Chemicals Used for Well Stimulation

Petitioner requests that EPA revise the General Permit to prohibit discharges of chemicals used in unconventional oil and gas extraction such as fracking and acidization. This prohibition is warranted because the General Permit must ensure against unreasonable degradation of the marine environment.

Specifically, in modifying or reissuing the general permit, EPA should prevent discharges of unconventional well stimulation chemicals and adopt a zero-detectable effluent limitation for such chemicals. It must also include a monitoring condition to ensure compliance. These steps are consistent with and mandated by both the Clean Water Act's (1) ocean discharge requirements and (2) effluent limitation provisions.

First, to comply with ocean discharge criteria, EPA may not permit the discharge of chemicals used for unconventional well stimulation. The Clean Water Act prohibits any ocean discharge unless EPA makes a determination that the permitted discharge will not cause an unreasonable degradation of the marine environment.[148] EPA may issue a permit only if it concludes "on the basis of available information" that the discharge will not cause an unreasonable degradation of the marine environment.[149]

EPA has arbitrarily reversed the ocean discharge criteria evaluation process. Because public scrutiny of offshore fracking did not occur until 2013, when EPA prepared its ocean discharge criteria evaluation and draft general permit in 2012 it did not evaluate the discharge of fracking fluids.[150] In issuing the final General Permit, EPA failed to make a determination regarding new concerns about discharge of fracking fluid. Instead, EPA is only now gathering information about such discharges, and it is holding open a clause that it may modify the permit "if new information indicates that the discharges (including chemicals used and discharged in hydraulic fracturing operations offshore) could cause an unreasonable degradation of the marine environment."[151] This turns the requirement to evaluate the impacts of the discharge *before* issuing the permit on its head. This also deprived the public an opportunity for participation in the rulemaking as required by the Clean Water Act.[152] Even if EPA desires additional information about any discharge to make such a determination, then it may not permit the discharge.[153]

Second, permit limits must seek to eliminate discharges of pollutants, including fracking chemicals, to the extent that they may be reduced in consideration of existing technology.[154] The Clean Water Act not only requires that permits meet water quality standards, but also that discharges are limited based on available pollution control technology. Therefore, effluent

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[148] 33 U.S.C. § 1343.
[149] 44 C.F.R. § 125.23(a).
[150] See Environmental Protection Agency, Fact Sheet (Dec. 5, 2012).
[151] Addendum to Fact Sheet at 15-16.
[152] *See* 5 U.S.C. § 553(b), (c); 33 U.S.C. § 1251(e); 40 CFR § 124; *NRDC v. EPA,* 279 F.3d 1180, 1186 (9th Cir. 2002) (additional public review is required if the public could not anticipate the changes to the final rule).
[153] 33 U.S.C. § 1343(c)(2).
[154] 33 U.S.C. § 1311.

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limitations are established for the purpose of achieving the greatest reduction of water pollution that is technologically feasible. Conventional pollutants[155] must be controlled through application of either the "best practicable control technology currently available" , or the "best conventional pollutant control technology." Toxic pollutants[156] and non-conventional pollutants must be controlled via "best available technology," a more stringent standard. Numerous chemicals are used for unconventional well stimulation, and the stringent "best available technology" standard generally applies. Here, the technology-based criteria make it necessary to eliminate such discharges entirely.

While the EPA has developed effluent limitation guidelines for produced waters from offshore oil and gas discharges, individual fracking chemicals are not assigned any effluent limitations [157] When no effluent limitation guidelines have been set for a particular pollutant, EPA must use its best professional judgment on a case-by-cases basis, using technology based treatment requirements.[158] The permit's effluent limits do not need to ensure uniformity for the entire sector.[159] EPA must consider the appropriate technology for the category of point source and unique factors relating to the applicant.[160] Such considerations include costs, a cost-benefit analysis, engineering aspects of the application of various types of control techniques, age of equipment, non-water quality environmental impacts, and the process employed.[161]Additionally, where effluent limitation guidelines apply to only particular aspects of the operation or only certain pollutants, a combination of requirements can be applied on a case-by-case basis.[162]

A no discharge, zero-detectable limit for unconventional well stimulation chemicals in wastewater is necessary and feasible. It is inconsistent for EPA to allow unlimited fracking fluid discharges with wastewater into the ocean when it prohibits such discharges onshore. Furthermore, the demonstrated ability of both federal and state offshore oil and gas facilities to achieve zero discharge of produced waters underscores that this approach meets the best available technology standard.

A prohibition on discharge of wastewater with well stimulation chemicals aligns with the EPA's approach for regulating onshore fracking facilities and unifies environmental protection efforts. The effluent guidelines at 40 C.F.R. § 435, Subpart C establish the best practicable control technology for onshore facilities: "there shall be no discharge of waste water pollutants into navigable waters from any source associated with production, field exploration, drilling, well completion or well treatment (i.e., produced water, drilling muds, drill cuttings, and produced sand)."In contrast, EPA does not impose this prohibition on offshore gas and oil extraction.[163] Although the processes are not identical, it is a significant departure to prohibit all discharges

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[155] "Conventional" pollutants are BOD, TSS, oil and grease, pH, and fecal cloriform. 40 C.F.R. § 401.16.
[156] "Toxic" pollutants are listed in 40 C.F.R. § 401.15, and "nonconventional" pollutants are those which are neither conventional nor toxic.
[157] 40 C.F.R § 435.12-435.15
[158] 40 C.F.R. § 125.3(c)(2);40 C.F.R. § 125.3 requires consideration of the same factors that EPA considers in establishing categorical effluent guidelines.
[159] *Natural Res. Def. Council, Inc. v. EPA*, 859 F.2d 156, 199 (D.C. Cir. 1988).
[160] 40 C.F.R. § 125.3(c)(2)(i) & (ii).
[161] 40 C.F.R. § 125.3(d).
[162] 40 C.F.R. § 125.3(c)(3).
[163] *See* 40 C.F.R. 435.12-435.15.

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from onshore facilities, while allowing the same chemicals to be directly dumped into the nation's marine waters.[164]

In federal waters, several of the platforms have already demonstrated the ability and feasibility to avoid ocean discharges altogether. Ten of the platforms already have the ability to direct produced waters to injection wells, thus reducing discharges into the ocean. This includes four platforms (Elly, Irene, Gail and Grace) that have either accomplished or proposed drilling plans with no discharge of produced waters through 100% reinjection. Platform Harmony, Heritage and Hondo are all connected and use a pipeline to shore for processing produced water before shipping back to Platform Harmony for dumping the wastewater offshore. Meanwhile similarly situated onshore facilities dispose of produced waters through alternative methods, which could be required for these platforms' wastewater. Of course, the best approach for permittees to prevent discharges of fracking chemicals is to abandon this dangerous practice.

The ability of offshore oil and gas facilities to achieve zero discharge of produced waters is also demonstrated in California state waters. EPA must similarly adopt a restrictive effluent limitation of zero for fracking fluids because it meets the technology-based criteria for effluent limitations.

In state waters, discharges of well treatment fluids and produced waters are prohibited. The State Lands Commission regulations contain a prohibition on pollution, which has been incorporated into the offshore oil and gas leases. Article 3.4 §2136 states that "[p]ollution and contamination of the ocean and tidelands and any impairment of or interference with recreation, fishing, or navigation in the waters of the ocean or any bay or any inlet thereof is prohibited; and no oil, tar, residuary product of oil or any refuse of any kind from any well or facility that is deleterious to marine life shall be permitted to be deposited on or pass into the waters of the ocean or any bay or any inlet thereof." This is implemented, for example, by California-issued NPDES permits for platforms Eva and Esther that prohibit the discharge of produced waters and well treatment chemicals, except in emergencies.[165] Moreover, the Coastal Act requires that new facilities reinject all "oilfield brines."[166] This approach to state water oil and gas operations indicates that it is feasible to impose a restriction on discharge of produced waters, and at minimum to apply it to well treatment fluids that are comingled with produced waters.

It is arbitrary for EPA to allow toxic fracking chemicals to be dumped in unlimited quantities into the ocean because this approach is inconsistent with onshore fracking requirements and because zero-discharge has already been demonstrated as a viable technology for offshore oil and gas platforms in state and federal waters off California. This means that the best available technology requirement of the Clean Water Act can be met only by establishing a zero-discharge limit for chemicals used in unconventional well stimulation.

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[164] *See* 40 C.F.R. part 124 (allowing general permits to be based on entire groups or categories of similarly situation facilities).
[165] NPDES Permit Nos. CA 0105996, CA 0106828.
[166] Cal. Pub. Res. Code § 30262(a)(6).

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The offshore oil and gas category effluent limitation guidelines are a floor, not a ceiling.[167] Imposing more stringent effluent limitations furthers the policy and purpose of the Act.[168] Moreover, federal requirements should be no less protective than what California State requires of the oil and gas facilities in state waters to protect against water pollution. There is no rational explanation why it is infeasible to prohibit wastewater discharges for offshore oil and gas platforms in federal waters, while an adjacent facility in state waters is required to do so.

While no allowable discharge is both feasible and necessary to protect water quality, in the event that EPA determines that some portions of the requested revisions are not consistent with the Clean Water Act, the Center alternatively requests that EPA adopt meaningful limits for the discharge of chemicals that are used in unconventional drilling techniques.

As described above the General Permit is currently insufficient to protect water quality, and it needs modification to include a stringent limitation that prohibits discharge of chemicals used in unconventional well stimulation.

3. Alternatively, Individual Permits Should Be Required

EPA should revoke or modify the General Permit. However, even if EPA declines to do so, it must require that any facilities engaging in unconventional oil and gas extraction techniques, including fracking and acidization, obtain an individual NPDES permit.

As provided in 40 CFR § 122.28(b)(3), any interested person may petition the Director to require any discharger authorized by a general permit to apply for an individual NPDES permit. This directive also applies to offshore oil and gas.[169] In determining whether an individual permit is necessary, EPA must consider several factors. Relevant here, EPA must consider whether circumstances have changed so that a permanent reduction or elimination of the authorized discharge is necessary, and whether the discharger is a significant contributor of pollutants.[170] A discharge in an area of biological concern can also necessitate the need for an individual offshore oil and gas permit.[171]

Offshore oil and gas operators using fracking and other unconventional techniques must be required to obtain an individual NPDES permit. As detailed above, new information and data on the scope of offshore fracking operations in California and the extent of the environmental harms emanating from such operations constitutes a change in circumstances warranting an individual permit.[172] In addition to the risks to water quality and the attendant harms to marine wildlife,

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[167] 40 C.F.R. § 125.3(a) (stating that "[t]echnology-based treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a [section 402] permit").

[168] *See e.g.,* 33 U.S.C. § 1312(a) (authorizing the Administrator to set more stringent water quality related effluent standards when the current standards would interfere with the attainment or maintenance of that water quality); 33 U.S.C.A. § 1370 (authorizing states to set more stringent effluent limitations than federal guidelines); 33 U.S.C.A. § 1342(o) (the anti-backsliding provision which prohibits relaxing effluent standards based on best professional judgment, even when less stringent ELGs are established afterward).

[169] 40 C.F.R. § 122.28(c)(3).

[170] 40 C.F.R. § 122.28(b)(3)(i)(E),(G).

[171] 40 C.F.R.§ 122.28(c)(1).

[172] *See* 40 C.F.R. § 122.28(b)(3)(i)(E).

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fracking also increases air pollution and vessel traffic, and increases the amount and duration of drilling beyond that previously contemplated.

Based upon records obtained via FracFocus and other sources, it is apparent that fracking operations are poised to be a significant contributor of pollutants into the marine environment.[173] While the exactly quantity of the pollutants discharged from fracking operations is unknown, their hazardous nature weighs strongly in favor of requiring individual NPDES permits. The Center's analysis of chemicals used in 12 wells and disclosed on FracFocus reveals that almost all of the chemicals used are suspected of causing gastrointestinal, respiratory, and liver hazards, as well as skin, eye, and sensory organ risks. More than half of the chemicals are suspected of being hazardous to the kidneys, immune and cardiovascular systems, and more than one third are suspected of affected the developmental and nervous systems. Between one-third and one-half of the chemicals used are suspected ecological hazards. This factor weighs heavily in favor or requiring individual NPDES permits for fracking operators pursuant to 40 C.F.R. 122.28(b)(3)(i)(G).

Finally, fracking operations are occurring in areas of biological concern, as detailed above.[174] The Santa Barbara Channel is a biologically important area for seabirds and blue whales. There is designated critical habitat for black abalone, leatherback sea turtles, and snowy plovers in the vicinity of California's offshore oil platforms, all which will be significantly impacted by water pollution associated with fracking. There are also numerous new Marine Protected Areas and Reserves in proximity to offshore oil and gas platforms in the Santa Barbara Channel and San Pedro Channel.

In light of changed circumstances and information regarding the risks of offshore fracking described in this petition, regulatory factors demonstrate that individual NPDES permits should be required for offshore fracking operations.

D. EPA Must Amend the Effluent Limitation Guidelines for Offshore Oil and Gas to Reduce Pollution from Unconventional Oil and Gas Drilling

EPA must also amend the effluent limitation guidelines for offshore oil and gas to address the new water pollution threats posed by fracking and acidization. EPA has a duty to review effluent limitation guidelines annually.[175] A revision here is required because new information indicates that fracking operations may intensify and there is significant new information about the toxicity of chemicals used in modern fracking.

EPA should prevent discharges of fracking fluid into the ocean by establishing a limitation of zero for unconventional well stimulation chemicals. The current effluent limitation guidelines are

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[173] *See* 40 C.F.R. 122.28(b)(3)(i)(G) (including the size, quantity, and nature of the pollutant discharge in determining whether an individual permit is necessary).
[174] *See* 40 C.F.R. 122.28(c)(1) (individual NPDES permits may be required when oil and gas operations occur in "areas of biological concern").
[175] 33 U.S.C. § 1314 (b)(1).

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wholly inadequate in preventing hazardous pollutants from entering the marine environment. Not only do the oil and gas extraction effluent limitations fail to include limitations on any chemicals used in the fracking and acidization process, they were last amended in 2001, before the effects of fracking were understood.[176]

The Clean Water Act and federal regulations require that EPA annually review, and if appropriate, revise effluent guidelines.[177] Every two years, EPA is required to publish a plan establishing a schedule for the annual review and revision of effluent guidelines.[178] This plan must also identify industries discharging more than trivial amounts of toxic or "nonconventional" pollutants for which the Agency has not yet promulgated effluent guidelines.[179] Here, EPA has failed to update the offshore oil and gas effluent guidelines, 40 C.F.R. Part 351, Subpart A, in over 10 years, and must do so in order to ensure the agency is carrying out the duties under the Clean Water Act. Technology-based limitations are constantly evolving, and EPA must ensure that offshore oil and gas operators are using the most appropriate control and treatment in their facilities.

The need for revision is underscored by EPAs actions with regard to onshore fracking. EPA is developing a proposed rule to amend these guidelines to address unconventional oil and gas drilling for onshore wells.[180] EPA described the need to revise such guidelines because of recent advances in hydraulic facturing and horizontal drilling techniques and concerns about the wastewaters generated by these activities. This rationale applies equally to offshore drilling. It is arbitrary for EPA to ignore the need to revise offshore oil and gas effluent limitation guidelines in light of hydraulic fracturing while advancing a rulemaking for onshore operations when fracking is happening both on and offshore.

While the information about water quality impacts of fracking are described thoroughly throughout this petition, EPA must also consider non-water quality factors in revising its effluent limitation guidelines for offshore oil and gas.[181] For example, EPA pointed out that various non-water quality factors (such as air emissions, energy use and solid waste management) must be considered in developing the guidelines for drilling fluids.[182]

Here, EPA should consider the air pollution from offshore fracking. Fracking operations emit numerous air pollutants, including volatile organic compounds ("VOCs"), nitrogen oxides ("NO_X"), [183] non-methane hydrocarbons ("NMHCs"), particulate matter ("PM"), hydrogen sulfide, and methane. VOC emissions, which make up about 3.5 percent of the gases emitted by

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[176] *See* 40 C.F.R. Part 435, Subpart A.
[177] 33 U.S.C. § 1314(b).
[178] 33 U.S.C. § 1314(m).
[179] *Id.*
[180] See EPA, Unconventional Extraction in the Oil and Gas Industry, http://water.epa.gov/scitech/wastetech/guide/oilandgas/unconv.cfm ("USEPA Unconventional Extraction").
[181] 40 C.F.R. § 125.3(d).
[182] USEPA Unconventional Extraction at 31,
[183] Sierra Club et al., Comments on New Source Performance Standards: Oil and Natural Gas Sector; Review and Proposed Rule for Subpart OOOO ("Sierra Club Comments") at 13 (2011).

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oil or gas operations,[184] are particularly hazardous.[185] VOC emissions include the BTEX compounds – benzene, toluene, ethyl benzene, and xylene – which are Hazardous Air Pollutants.[186] Health effects associated with benzene include "acute and chronic nonlymphocytic leukemia, acute myeloid leukemia, chronic lymphocytic leukemia, anemia, and other blood disorders and immunological effects."[187] Further, maternal exposure to benzene has been associated with an increase in birth prevalence of neural tube defects. Xylene exposure also can cause eye, nose, and throat irritation, difficulty in breathing, impaired lung function, and nervous system impairment.[188] In fact, many of the volatile chemicals associated with drilling and oil and gas waste are associated with serious effects to the respiratory, nervous, or circulatory systems.[189]

The South Coast Air Quality Management District (SCAQMD) has identified several areas of new, dangerous and unregulated air emissions from fracking: the use of silica as a proppant, which causes the deadly disease silicosis, and the storage of fracking fluid once it comes back to the surface.[190] Preparation of the fluids used for well completion often involves onsite mixing of gravel or proppants with fluid, a process that potentially results in major amounts of particulate matter emissions.[191] Further, these proppants often include silica, which increases the risk of lung disease and silicosis when inhaled.[192] Finally, as flowback returns to the surface and is deposited in pits or tanks that are open to the atmosphere, there is the potential for organic compounds and toxic air pollutants to be emitted, which are harmful to human health as described above.[193] Air pollution caused by fracking has been shown to contribute to health problems in people living near natural-gas drilling sites.[194]

Just as EPA is developing a proposal to amend its effluent limitation guidelines for onshore oil and gas operations because of new information about unconventional well stimulation techniques such as fracking and horizontal drilling, it must also revise the effluent limitation guidelines for offshore oil and gas operations in light of offshore fracking.

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[184] Brown, Heather, Memorandum to Bruce Moore USEPA / OAQPS / SPPD re Composition of Natural Gas for use in the the Oil and Natural Gas Sector Rulemaking. July 28at 3 (2011)

[185] McKenzie 2012; Food & Water Watch, The Case for a Ban on Fracking (2012); Colborn, Theo, et al. (2012) An exploratory study of air quality near natural gas operations. Human and Ecological Risk Assessment: An International Journal (November 9, 2012).

[186] 42 U.S.C. § 7412(b).

[187] McKenzie 2012 at 2.

[188] *Id.*

[189] Colborn 2011.

[190] South Coast Air Quality Management District, Revised Draft Staff Report PR1148-2, Notification and Reporting Requirements for Oil and Gas Wells and Chemical Suppliers (January 2013) at 15 ("SCAQMD Revised Draft Staff Report PR1148-2).

[191] *Id.*

[192] South Coast Air Quality Management District, Submission to Joint Senate Hearing (2013) at 3.

[193] SCAQMD Revised Draft Staff Report PR1148-2 at 15.

[194] McKenzie 2012.

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E. EPA Should Revise Ocean Discharge Criteria and Adopt Federal Water Quality Standards

Finally, EPA should adopt meaningful water quality standards for ocean waters within federal jurisdiction that lack standards, including a limit of zero detectable well treatment chemicals.

Under its authority to promulgate ocean discharge criteria, EPA should strengthen protections for ocean waters. While very important for protecting marine water quality, the current ocean discharge criteria could be enhanced in significant ways that would further the purpose of the Clean Water Act. The Center requests a revision of ocean discharge criteria to designate robust water quality standards for all federal waters, as was previously proposed by EPA in 2000.

At the end of his administration, President Clinton issued an Executive Order directing that EPA shall use its Clean Water Act authorities to "expeditiously propose new science-based regulations, as necessary, to ensure appropriate levels of protection for the marine environment." EPA drafted a proposed rule slated for publication in the Federal Register in January 2000, but it was subsequently withdrawn by the incoming Bush administration. EPA's rule would have strengthened requirements for a permit to discharge into ocean waters and would have required dischargers to consider alternative disposal sites that do not require NPDES permits.

1. Procedural History

In 2000, President Clinton issued Executive Order 13158 directing federal agencies to make the creation of marine protected areas, and protection of ocean water quality to support them, a priority. Specifically, the Executive Order provided:

> To better protect beaches, coasts, and the marine environment from pollution, the Environmental Protection Agency (EPA), relying upon existing Clean Water Act authorities, shall expeditiously propose new science-based regulations, as necessary, to ensure appropriate levels of protection for the marine environment.[195]

EPA responded to this directive by drafting proposed rules to protect water quality. Relying on existing Clean Water Act authority, EPA's proposed rules focused on revising the regulations under section 403 to designate the water quality standards for all federal waters.[196] As proposed, the standards for federal ocean waters, or Healthy Ocean Waters, would have had both a narrative description of desired water quality and specific numerical limitations.[197] The narrative criteria directed that Healthy Ocean Waters must support a balanced, indigenous population of aquatic life,[198] and, if revived, they would establish a number of aesthetic qualities that should be

[195] Clinton Executive Order, § 4(f), 65 Fed. Reg. 34909 (May 26, 2000).
[196] U.S. Environmental Protection Agency, Ocean Discharge Criteria: Revisions to Ocean Discharge Criteria Regulations 10 (2000) (rules withdrawn) [hereinafter Clinton Rules].
[197] *Id.* at 47.
[198] *Id.*

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protected.[199] The numeric criteria for Health Ocean Waters were expressed as both short term and long run averages for specific pollutants.[200]

EPA's rule would have strengthened requirements for a permit to discharge into ocean waters and would have required dischargers to consider alternative disposal sites that do not require NPDES permits.[201] The proposed rule also required that discharge permits not be issued unless there was sufficient information available to evaluate the impacts of the proposed discharge.[202]

EPA's proposed rule provided a mechanism to afford extra protection to areas of outstanding value through the establishment of Special Ocean Sites. Special Ocean Sites were defined as areas of outstanding ecological, environmental, recreational, scientific, or esthetic value.[203] Under the proposed rule, new discharges and significantly increased discharges would have been prohibited in a designated Special Ocean Site.[204] In addition to designating Special Ocean Sites in federal waters, EPA proposed to work with states to designate Special Ocean Sites in state waters as "no discharge zones" under section 312 of the Clean Water Act.[205] Each Special Ocean Site was to be further protected by including a 1,000-meter buffer of protected water around the site.[206]

However, EPA's proposed revision to the Ocean Discharge Criteria never came to fruition. On the eve of finalization, the Bush administration interfered with this rule, as well as others, by directing agencies to halt pending regulations.[207]

2. EPA Should Revise Ocean Discharge Criteria Regulations to Strengthen Protections for Federal Ocean Waters

EPA has authority to revise ocean discharge criteria to protect federal ocean waters and further the purposes of Executive Order 13158. Under section 403 of the Clean Water Act, EPA must determine guidelines for preventing ocean degradation. The Clean Water Act provides that, EPA "shall, within one hundred and eighty days after October 18, 1972 (*and from time to time thereafter*), promulgate guidelines for determining the degradation of the waters of the territorial seas, the contiguous zone, and the oceans."[208]

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[199] *Id.* at 48. Healthy Ocean Waters are to be free from substances attributable to discharges that settle to form objectionable deposits; float as debris, scum oil, or other nuisances; produce objectionable color, odor, or turbidity; injure or are toxic or produce adverse physiological responses in humans, animals or plants; or produce undesirable or nuisance aquatic life.

[200] *Id.* at 50. Standards are set for the following pollutants: arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc, chlorine, cyanide, pentachlorophenol, alpha-endosulfan, beta-endosulfan, and chloropyrifos. *Id.* at 122-23.

[201] *Id.* at 9-10.

[202] *Id.* at 10.

[203] *Id.* at 42.

[204] *Id.* at 12. Significantly increased discharge is defined in the regulation as an increase of 20% or more in pollutant loading. *Id.*

[205] *Id. See also* 33 U.S.C. § 1322 (West 2008).

[206] Clinton Rules at 68.

[207] Memorandum for the Heads and Acting Heads of Executive Departments and Agencies, 66 Fed. Reg. 7701 (Jan. 24, 2001).

[208] 33 U.S.C. § 1343 (emphasis added).

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NPDES permits may only be issued when the proposed discharge will not result in the degradation of ocean water quality. However, while the regulatory guidance for determining degradation of ocean waters include important criteria, they do not specify designated uses or numeric criteria.[209] These factors should be strengthened to protect marine water quality. In order to ensure the maintenance of ocean water quality, the EPA must establish robust standards to which all dischargers must adhere. EPA has recognized both its authority and the need to create water quality standards for the ocean: existing regulations for determining degradation of ocean waters explicitly refer to water quality standards and recognize that they are necessary to protect marine water quality.[210] Additionally, in its former proposed rules, EPA established water quality standards to create and maintain Healthy Ocean Waters.[211]

Through this petition, the Center requests that EPA establish a designation of Healthy Ocean Waters applicable to all United States ocean waters, consistent with its previous proposal.[212] Designated uses should include waters of a quality necessary to maintain healthy native ecosystems. This standard should require that key indicators of water quality, including temperature, pH, nutrients, oil, and toxic pollutants, be kept within safe or historical ranges.[213] The designated use of Healthy Ocean Waters should be crafted such that it will support healthy fish populations and other important marine ecosystems, and should be supported by the establishment of numerical criteria for pH, biological oxygen demand, sewage, oil, and nutrients. It should also establish numeric standards for contaminants that may result from unconventional well stimulation of offshore oil and gas operations.

Specifically, EPA should adopt as water quality standards for Healthy Ocean Waters the federal water quality criteria, established under 33 U.S.C. § 1314(a)(1).[214] The national water quality criteria and information required by section 304 establish a baseline for nationwide implementation of the Clean Water Act. States must either adopt the national recommended water quality criteria in their water quality standards or provide a science-based explanation for their alternate criteria.[215] Likewise, such water quality standards should apply in full force for federal ocean waters. Additionally, as shown in this petition, water quality standards specific to address the threats from offshore oil and gas operations must be developed, including a limitation of zero chemicals from unconventional well stimulation.

Not only does the Clean Water Act empower and require that EPA protect ocean water quality, but such protection also is necessary to enable states to meet their obligations under both the Clean Water Act and the Coastal Zone Management Act. The Coastal Zone Management Act

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[209] 40 C.F.R. § 125.122(a).
[210] *Id.* § 125.122(a)(10).
[211] Clinton Rules at 10.
[212] *See* Clinton rules.
[213] We acknowledge that standards for some of these variables, including pH, have been set. *See* Environmental Protection Agency, Quality Criteria for Water 1986 [the Gold Book] 1227-32 (1986). However, we are asking that EPA evaluate the ecosystem impacts of rising pH and specify a narrower range of acceptable values necessary to promote ecosystem services.
[214] http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
[215] 40 C.F.R. § 131.11(b).

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expresses a particular concern for protecting water quality in the coastal zone.[216] To meet this goal, coastal states must invoke their particular Clean Water Act authority and issue water quality standards for state ocean waters.[217] EPA should issue similar standards so that efforts by the states are not impaired by a lack of regulation of water quality in federal waters.

While EPA's quashed proposed rule would have provided a consistent and robust approach to protecting ocean water quality, if EPA declines to adopt the same regulations, in the alternative this petition requests that EPA evaluate the ocean discharge criteria and propose new regulations based on the latest scientific knowledge that implement water quality standards for federal ocean waters.

F. Conclusion

In conclusion, offshore fracking presents a new and unique risk to ocean water quality that necessitates a revision of the General Permit for offshore oil and gas discharges in Southern California. Discharges of toxic chemicals used for these operations pose a severe threat to wildlife and sensitive habitat. Moreover, EPA should revise effluent guidelines and ocean discharge criteria. EPA should use its full authority to protect our oceans from unconventional oil and gas operations.

EPA must promptly answer this petition and address the petitioned-for rulemakings.[218]

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[216] 16 U.S.C. § 1451.

[217] *See id.* § 1455(d)(2)(D) (requiring that coastal zone management plans list authorities the state will use in its implementation) and 33 U.S.C. § 1311 (requiring states to issue water quality standards for those waters under their jurisdiction).

[218] The provisions of this Petition are severable. If any provision of this Petition is found to be invalid or unenforceable, the invalidity or lack of legal obligation shall not affect other provisions of the Petition.

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