IN THE SUPERIOR COURT FOR THE STATE OF ALASKA
THIRD JUDICIAL DISTRICT AT ANCHORAGE

NUNAMTA AULUKESTAI, *et al.*,	)	
Plaintiffs,	)	
vs.	)	
STATE OF ALASKA,	)	
Defendant,	)	
and	)	
PEBBLE LIMITED PARTNERSHIP,	)	
Intervenor-Defendant.	)	Case No. 3AN-09-09173CI

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FINDINGS OF FACT AND CONCLUSIONS OF LAW

I. INTRODUCTION.

Trial was held before this Court over ten days starting on December 6, 2010 and concluding on December 17, 2010. All parties to this action appeared before the Court and presented evidence, as well as opening and closing argument. Thereafter, the Court invited the parties to submit supplemental written closing argument, as well as proposed findings of fact and conclusions of law. Based on the testimonial, documentary, and demonstrative evidence in the record, the applicable law, this Court's prior orders, and

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having considered the arguments of the parties, the Court makes the following Findings of Fact and Conclusions of Law.[1]

II. THE PARTIES.

A. Plaintiffs.

Plaintiff Nunamta Aulukestai ("Nunamta") is a non-profit corporation comprised of nine Native Village Corporations including: Ekwok, Koliganek, New Stuyahok, Clarks Point, Aleknagik, Togiak, Manakotak, Levelock and Dillingham. [Andrew at Tr. 484.] Bobby Andrew is a resident of Dillingham, Alaska and is a subsistence user in the Bristol Bay region. [Andrew at Tr. 479, 504.] Rick Delkittie, Sr. is a resident of Nondalton, Alaska and is a subsistence user in that area. [Delkittie at Tr. 957, 959-963.] Violet Willson is a plaintiff but did not testify at trial. Bella Hammond is a resident of Alaska and lives on Miller Creek at Lake Clark. [Hammond at Tr. 985.] She is a subsistence user and has operated commercial set net fishing on the Naknek River, Alaska. [Hammond at Tr. 1002.] Victor Fischer is a plaintiff, but did not testify at trial.

B. Defendants.

Defendant State of Alaska, Department of Natural Resources ("DNR" or "State") is a state resource agency with the statutory authority to issue exploration permits in the

[1] Two separate companies produced transcripts of the trial. Citation to trial testimony references the transcripts created by Pacific Rim Reporting. This Court recommends to the appellate court to utilize the Pacific Rim transcript rather than the Accu-type transcript.

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form of miscellaneous land use permits (MLUPs) and temporary water use permits (TWUPs).

Defendant/Intervenor Pebble Limited Partnership ("Pebble" or "PLP") is a limited partnership registered in the State of Alaska. Pebble was formed in July 2007 and presently operates exploration and environmental baseline data collection programs at the Pebble Project study area.

III. FACTUAL BACKGROUND: LOCATION, RESOURCES, CONCURRENT USES.

A. Location.

The Pebble Project ("Pebble Area", "Pebble Project Area") is located in the interconnected watersheds of three anadromous waters: the South Fork Koktuli River, North Fork Koktuli River and Upper Talarik Creek which are the major spawning tributaries of the Kvichak and Nushagak Rivers that feed into Bristol Bay. [Trasky at Tr. 1338; Stelljes at Tr. 1500; Woody at Tr. 1263, 1272.] Bristol Bay is home to one of the richest fisheries in the world, providing "a major portion of all salmon harvest in the State of Alaska and the world annually." [Ex. 877 at SOA 15331.]

B. Resources.

The headwaters areas where the Pebble Project is located are important to the productivity of these river systems. This area contributes nutrients and the water which provide rearing habitat for species such as Coho and Chinook salmon. [Trasky at Tr.

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1338.] People are drawn to this region to enjoy one of the "finest sport fishing and hunting areas of the world." [Ex. 877 at SOA 15332.]

The Pebble Project area intermittently provides important wildlife habitat, with designated essential winter and calving habitat for the Mulchatna Caribou Herd, "essential stream concentration" for brown bears, and moose wintering grounds. [Exs. 94, 95, 96, 97, 767.] The State admits that the Pebble Project Area has provided "critical," "important," or "essential" habitat (as defined in the 1985 Bristol Bay Area Plan) to caribou and other wildlife. [Ex. 604 at 21, RFA #39.]

Fish surveys of the Pebble Project area have documented the presence of ten resident species of fish, including Arctic grayling, blackfish, burbot, Arctic char, lake trout, longnose sucker, Northern pike, smelt, rainbow trout, and whitefish. There are eight anadromous species including salmonids (sockeye, coho, Chinook and King salmon) and the facultatively anadromous Dolly Varden. There is some evidence that black fish, a historically important subsistence food when salmon runs were poor, are found in tundra ponds throughout the area. [Ex. 588 at NA 5661; Woody at Tr. 1263.]

A hyporheic zone, in which surface waters and groundwaters mix, exists in the Pebble Project area. A hyporheic zone, can extend kilometers away from a stream or river. [Woody at Tr. 1275.] Fish embryos may use a hyporheic zone for transport, and this may explain why salmon and burbot are found in small holes and ponds which have no obvious connection to an anadromous stream. [Woody at Tr. 1275-1276.] Within the Pebble Project area, however, this Court finds that there was no definitive evidence that

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fish embryos travel within the hyporheic zone and it is just as likely, if not more so, that access to small holes and ponds is the result of other natural events (e.g. flooding) rather than underground waterways.

C. Concurrent Users.

Some Alaska Natives from the region, including some of the individual plaintiffs, have ventured into the Pebble Project area and its environs for subsistence hunting, fishing, food-gathering, and cultural practices. [Ex. 588 at NA 5661; Andrew at Tr. 494, 505-506; Delkittie at 959, 962-963; Ex. 447 at 1, 30 (Fig. 1-1).] The area is most heavily used by residents of Iliamna and Nondalton as they have much easier access to the fairly remote area. Although other Bristol Bay residents will travel to the Pebble Project area, the vast majority do not because of the difficulty, expense and length of travel. The area is used by some local residents for trapping furbearing animals and alternate travel routes during inclement weather. [Delkittie at Tr. 961, 974-975.] Non-local hunters, fishermen and hunting guides have also used the Pebble Project area for recreation and commercial uses. [Morris at Tr. 886-887; Halford at Tr. 1138-1139; Trasky at Tr. 1338, 1357; Taylor at Tr. 762.]

IV. LAW OF THE CASE.

A. Mining Claim Holder Rights and Obligations.

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Mining claims are *sui generis* under Article VIII, by virtue of Section 11.[2] The second sentence of Section 11 provides that: "Prior discovery, location, and filing, as prescribed by law, shall establish a prior right to these minerals and also a prior right to permits, leases and transferable licenses for their extraction." By virtue of Section 11, holders of valid state mining claims have already acquired certain rights through their own efforts in discovery, location and recording.

When holders of mining claims apply for the necessary permits to explore their claims, they are situated differently from applicants for permits to use state land for other non-mining purposes, like hunting camps or log storage. Those latter applicants have no rights until such time as the State issues the permit, while holders of mining claims come through DNR's door in possession of certain property rights recognized under Article VIII, Section 11 and both federal and state case law. With that right comes the obligation of "annual labor." [3]

The holder of a mining claim is required to perform "annual labor" in order to keep the claim. Exploration drilling satisfies that requirement.[4] In fact, some states recognize

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[2] *See also Best v. Humbolt Placer Mining Co.*, 371 U.S. 334, 335 (1963) (recognizing that unpatented federal mining claims are "a unique form of property").
[3] AK Const. art VIII, § 11; AS 38.05.210.
[4] *See* AS 38.05.210 (requirement of annual labor); AS 38.05.240 & .242 ('labor' defined to include geological and geophysical surveys); and 11 AAC 86.220 ("[d]rilling or excavating, including ore extraction…may qualify as annual labor").

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that exploration of a mining claim, in order to assist the claim-holder in deciding whether and how to develop the claims, through exploration drilling is considered a right.[5]

That said, holders of mining claims do not have a "right to mine" in any absolute sense, because they must still acquire the necessary authorizations from the State in order to mine.[6] For purposes of this case, PLP already has the right to explore its claims in order to determine their mineral value, but must exercise that right in conformity with permits issued by DNR. The State of Alaska, Department of Natural Resources must issue those necessary permits in conformity with the statutory and ultimately, constitutional mandates.

The State's argument of what constitutes a 'disposal' trigging constitutional public notice requirements correctly identifies that it is different in the mining context than in a non-mining context, such as the *Northern Alaska Environmental Center v. DNR (NAEC)*, 2 P.3d 629 (Alaska 2000), case. Permits in non-mining cases convey new rights to an applicant, while the challenged permits issued to PLP regulate their exercise of rights they already hold. Nevertheless, because PLP's right to explore its mining claim(s) does not give it exclusive use of public lands, the DNR must manage the permits issued so that it does not in effect create a "disposal" of the public's interest in the land. The Alaska

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[5] *See Sampson v. Page,* 276 P.2d 871, 875 (Cal. 1954). Indeed, under the doctrine of *pedis possessio,* a prospector may undertake core drilling to define a prospect even prior to recording the claim. *See Henault Mining Co. v. Tysk,* 419 F.2d 766, 769-70 (9th Cir. 1969).

[6] *See Beluga Mining Co. v. State,* 973 P.2d 570, 575 (Alaska 1999) ("no 'right' to mine could arise until the State issued Beluga the necessary mining leases"); *see also* American Law of Mining, § 36.04 (2nd Ed.) (owner of unpatented federal mining claim "holds a qualified title which is dependent upon compliance with statutory requirements.").

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Supreme Court's analysis of this issue in the *NAEC* case, although not directly on point, provides the appropriate framework from which to analyze the evidence in this case.

B. Previous Orders of the Court.

The Court previously found that the "legislature has codified constitutional policy in the Alaska Land Act, "specifically the principles contained in Article VIII, and that the statutes and regulations relative to permitting for mineral exploration comply with the Alaska Constitution." [*See* July 9, 2010 Order on Summary Judgment, at 19; July 29, 2011 Order on Reconsideration, at 3.] The Court also held that DNR appeared "to have complied with the various provisions of the Alaska Land Act, as well as its own regulations, when it issued the various permits for the Pebble Project." [July 29, 2011, Order on Reconsideration, at 7.] The question the Court ordered for trial was whether DNR, in applying these authorities and in light of Article VIII requirements, acted constitutionally, on an as-applied basis, in permitting mineral exploration activities at the Pebble Project area. [*Id.*]

Subsequently, on December 1, 2010, the Court issued an Order on Rule of Law on the case. This order stated that trial would be to receive testimony and evidence on the permits and any actual impact the exploration activities or permit issuance has had on the reasonable concurrent uses or common uses of the land and water as defined by the pertinent sections of Article VIII. [December 1, 2010 Order, at 1-2.] This testimony and evidence would be used by the Court to determine whether (1) the permits are functionally irrevocable and amount to a "disposal" under Article VIII, Section 10; (2) if

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a disposal, then whether the State provided constitutionally adequate prior public notice under Article VIII, Section 10; and (3) whether the permits and associated mineral exploration activities unconstitutionally impinged on reasonable concurrent uses. [*Id.*] The Court further noted that central to its inquiry of whether a permit is "functionally irrevocable" is the test set forth in the Alaska Supreme Court's decision in *Northern Alaska Environmental Center v. DNR*, 2 P.3d 629, 638 (Alaska 2000); a permit is functionally irrevocable if the permit is not likely to be revoked because of its magnitude or if there is long-term and harmful environmental impact. [December 1, 2010 Order, at 1, n.1.] The Court also stated that this test "reads consistent with the constitutional commentary on Section 10: 'transactions may vary in importance from routine to those of substantial value.' " [*Id.*]

C. Relevant Statutes and Regulations for Authorizing Temporary Land and, Water Uses.

The State's Management of state lands and resources is subject to an iterative process. At the land management planning level, the State determines the overall management goals, whether areas will be subject to multiple uses, and the balancing of varied interests in state lands and resources.[7] The area management plans guide the more site specific permitting decisions.[8] [*See, e.g.* Ex. 2087 at SOA 014378-379 (including the

[7] AS 38.04.005; AS 38.04.015; AS 38.04.065.

[8] Nunamta did not challenge the State's Bristol Bay Area Plan (BBAP), which includes the Pebble project area and which has classified the project area as available for multiple uses, including mineral exploration and mining. [Ex. 2086 (1984 BBAP) and Ex. 2087 (2005 BBAP).]

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statement that the BBAP "guides DNR decisions for leases, sales, and permits that authorize the use of state land").]

The following summarizes the statutes and regulations that DNR was required to follow in issuing the challenged MLUPs and TWUPs for exploration activities at Pebble. The Court found this statutory scheme constitutional. An MLUP is issued under AS 38.05.850, which provides:

> (a) The director, without the prior approval of the commissioner, may issue permits, rights-of-way, or easements on state land for roads, trails ditches, field gathering lines or transmission and distribution lines, log storage, oil well drilling sites and production facilities for the purposes of recovering minerals from adjacent land under valid lease, and other similar uses or improvements, or revocable nonexclusive permits for the personal or commercial use or removal of resources that the director has determined to be of limited value . . . In the granting, suspension, or revocation of a permit or easement of land, the director shall give preference to that use of the land that will be of greatest economic benefit to the state and the development of its resources.

Public notice is not required for revocable permits or other revocable authorizations.[9] The constitutional requirement for public notice is only tied "to a disposal or lease of state lands, or interests therein."[10]

The purpose of the permitting system is to "manage uses and activities on state public domain land, including shore land, tideland, and submerged land, in order to

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[9] AS 38.05.945(e).

[10] Alaska Const., art. VIII, § 10.

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minimize adverse effects on the land and its resources."[11] Although notice is not required for an MLUP, DNR's regulations state that DNR may give public notice of any application.[12]

The regulations, at 11 AAC 96.040, also provide:

> (a) Issuance of a permit under this chapter is not a disposal of an interest in land and does not grant a preference right to a lease or other disposal. The permit is revocable for cause for violation of a permit provision or of this chapter and is revocable at will if the department determines that the revocation is in the state's interest. The permit remains in effect for the term issued, unless revoked sooner. The department will give 30 days' notice before revoking a permit at will. A revocation for cause is effective immediately.
>
> (b) Each permit issued is subject to any provisions the department determines necessary to assure compliance with this chapter, to minimize conflicts with other uses to minimize environmental impacts, or otherwise to be in the interests of the state.

Under this section, an MLUP is revocable for cause (because some condition has been breached) or at will, so long as DNR gives 30 days' notice of revocation. MLUPs are discretionary and are issued for certain land uses, among them activities involving the use of hydraulic prospecting or mining equipment or exploratory drilling to a depth in excess of 300 feet.[13] Under an MLUP, no permanent improvements to the land are allowed, but an MLUP may be issued for temporary structures and cross-country travel

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[11] 11 AAC 96.005.

[12] 11 AAC 96.030(c).

[13] 11 AAC 90.010(a).

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that is often associated with mineral exploration, as well as other industries unrelated to mineral exploration.[14] Temporary improvements must be removed when the permit expires or when it is revoked.[15] Regulation, at 11 AAC 86.145, provides that a locator does not have exclusive use of the surface area in the location, and may only use the surface "only to the extent necessary for the prospecting for . . . mineral deposits." An MLUP may be administratively appealed in accordance with 11 AAC 02.[16]

For a TWUP, the Alaska Legislature specifically recognized that "many construction, development, commercial, and private activities require an authorization for the temporary use of state's water without the need to acquire a permanent right to appropriate water" and confirmed the authority of DNR to issue authorizations for the temporary use of water, for a period of time not to exceed five consecutive years, if the water applied for has not been appropriated.[17] Upon written request, an authorization for the temporary use of water can, in DNR's discretion, be extended one time for good cause for a period of time not to exceed five years.[18]

Authorizations for the temporary use of water are required for use of a "significant" amount of water or for an amount less than a "significant amount" if the

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[14] 11 AAC 96.040(f).

[15] 11 AAC 96.040(f).

[16] 11 AAC 96.110.

[17] Ch. 100, § 2(a)(1), SLA 2001; AS 46.15.155(a).

[18] 11 AAC 93.210(c).

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Commissioner has determined by regulation that a particular use may have an adverse effect on other water uses.[19] A "significant amount of water" is defined as:

> (3) the non-consumptive use of more than 30,000 gpd (0.05 cubic feet per second) from a single source; or
>
> (4) any water use that may adversely affect the water rights of other appropriators or the public interest.[20]

When considering an application for an authorization for temporary use of water under AS 46.15.155(d) and (e), DNR is not required to provide public notice under AS 46.15.133, nor is it required to apply the statutory criteria applicable to the issuance of a permit granting a water right.[21] Notwithstanding, safeguards of the public interest are embedded in the TWUP statutes and regulations. For example, DNR may impose reasonable conditions or limitations on an authorization for temporary use of water to protect the water rights of other persons or to protect fish and wildlife habitat, human health, or public interests.[22] Further, DNR may amend, modify, or revoke an authorization for temporary use of water if DNR determines that such action is necessary to protect the water rights of other persons or the public interest.[23]

DNR is required to request comment on an application for temporary use of water from the Alaska Department of Fish and Game (ADF&G) and the Alaska Department of

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[19] AS 46.15.155(a)&(b).

[20] 11 AAC 93.035.

[21] AS 46.15.080.

[22] AS 46.15.155(f).

[23] AS 46.15.155(i); 11 AAC 93.210(b); 11 AAC 93.220(f).

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Environmental Conservation (DEC).[24] As is the case with appeal of an MLUP, the issuance of a TWUP may be appealed in accordance with 11 AAC 02.[25]

D. Burden of Proof.

Plaintiffs bear the burden of proof at trial. The phrase "burden of proof" embodies two distinct concepts: the burden of production and the burden of persuasion. The burden of production refers to a party's obligation to introduce sufficient evidence to prove the litigant's necessary propositions of fact, i.e., proving its prima facie case.[26] Failure to make out a prima facie case will result in dismissal of Plaintiffs' claims.[27] The burden of persuasion is the obligation to introduce evidence that actually persuades or convinces the fact finder, to the requisite degree of belief, that a particular proposition of fact is true.[28] Preponderance of the evidence is the general burden of persuasion in civil cases.[29] Plaintiffs bear the burdens of production and persuasion as to each issue in this case.[30] A party is not relieved of their burden of proof by the difficulty or inconvenience of

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[24] AS 46.15.155(d).

[25] 11 AAC 93.300.

[26] 31A C.J.S. *Evidence* § 189 (West 2010).

[27] *See State v. O'Neill Investigations, Inc.*, 609 P.2d 520, 534 (Alaska 1980) (stating that "[t]he standard for granting a motion for involuntary dismissal under Alaska Rule of Civil Procedure 41(b) is whether the plaintiff has failed to present a *prima facie* case"); *Pope v. Anderson*, 370 P.2d 185 (Alaska 1962) (affirming dismissal of case when plaintiff's evidence was insufficient to establish *prima facie* case for negligence).

[28] 31A C.J.S. *Evidence* § 190 (West 2010).

[29] *Fernandes v. Portwine*, 56 P.3d 1, 5 (Alaska 2002).

[30] 31A C.J.S. *Evidence* § 192 (West 2010).

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satisfying it.[31] Indeed, the failure of Plaintiffs to sustain their burden of proof will be fatal to their case.[32]

Therefore the Plaintiff's burden at trial was to prove by a preponderance of the evidence the following:

> 1) Whether the permits issued for mineral exploration at the Pebble Project are functionally irrevocable and amount to a "disposal" under Article VIII, Section 10 of the Alaska Constitution;
>
> 2) If the permits amount to a "disposal," whether the State provided constitutionally adequate prior public notice of the disposal under Article VIII, Section 10; and
>
> 3) Whether the exploration permits and the associated mining exploration activity unconstitutionally impinged on reasonable concurrent uses under Article VIII, Section 8.

With regard to the first question, this Court observed that the Alaska Supreme Court has adopted a hybrid approach to determining whether a permit is functionally irrevocable. Under *Northern Alaska Environmental Center v. State, Department of Natural Resources*, a permit is functionally irrevocable if (1) the permit is not likely to be revoked because of its magnitude, or (2) there is long-term and harmful environmental impact.[33]

This Court considered testimony and evidence as it relates to the revocable nature of the permits and any "actual impact" the exploration activities or permit issuance has

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[31] 31A C.J.S. *Evidence* § 191 (West 2010) (citing *Jones v. Ortho Pharm. Corp.*, 209 Cal. Rptr. 456, 461 (Cal. Ct. App. 1985)).

[32] 31A C.J.S. *Evidence* § 193.

[33] *Northern Alaska Environmental Center v. State, Department of Natural Resources*, 2 P.3d 629, 638-39 (Alaska 2000).

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had on the reasonable concurrent uses or common uses of the land and water as defined by the pertinent sections of Article VIII and as pled by Plaintiffs. The Court did not entertain or consider evidence or argument about the speculation of prospective harm due to the development of a mine or actual mining within the concerned geographical area. Similarly, this Court makes no findings that the development of a mine or actual mining in the Pebble area would or would not harm the environment and/or the fish and wildlife in Bristol Bay. The Court would have considered evidence about prospective harm had it been shown that although the harm had not yet occurred, there was scientific certainty that the harm would occur in the future due to exploration.[34]

V. THE MLUPS AND TWUPS ISSUED BY THE STATE ARE REVOCABLE AND DO NOT AMOUNT TO A DISPOSAL UNDER ARTICLE VIII, SECTION 10, OF THE ALASKA CONSTITUTION (Count IV).

A. The Permits.

The Pebble mineral deposit is located on state land in the Lake and Peninsula Borough approximately 20 air miles northwest of Iliamna, Alaska. The deposit was discovered in the 1980s. From 1989 to the present, the area has undergone varying levels of mineral exploration and study from several different exploration companies. The Pebble Limited Partnership is currently conducting mineral exploration and environmental baseline studies in the area.

Pebble's exploration activity is authorized predominately by two kinds of state-issued temporary use permits: a miscellaneous land use permit ("MLUP") and temporary

[34] Scientific certainty here means "more likely than not."

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water use permit ("TWUP"). [Exs. 2043-2084.] Under the most recent round of state permitting, the State of Alaska, Department of Natural Resources ("State" or "DNR") issued Pebble MLUP A096118 authorizing Pebble's activities related to hardrock mineral exploration and reclamation. [Exs. 2043-2045; Fredericksen at Tr. 1209.] The permit terms provide that the MLUP is effective "through December 31, 2010, unless sooner revoked for cause." [Exs. 2043-2045.] The permit also provides on its face that it is "revocable at will." [Exs. 2043-2045.] The State has once suspended Pebble's MLUP and TWUP permits, and has also revoked MLUPs from other state permittees in the past. [Fredericksen at Tr. 1238-39.]

1. MLUP's – Miscellaneous Land Use Permits.

DNR Mining Section's MLUPs for the Pebble project contain several conditions. [Tr. 1210.] For example, the MLUP upon which plaintiffs filed their lawsuit provides the following:

a. it is revocable for cause or at will [Ex. 2043 at SOA 005254] and also contains a provision concerning "default' and the Director's discretion to cancel the permit upon default [*Id.* at SOA 005256];

b. it requires reclamation activities [*Id.* at SOA 005255], including

(i) the separate stockpiling of soil for future use;

(ii) the reclaimed area be reshaped to blend with surrounding area and protected from erosion;

(iii) the backfilling of exploration trenches;

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(iv) the plugging of holes;

(v) measures for handling artesian water if it is encountered;

(vi) reclamation of drill pads and promotion of revegetation; and

(vii) that surface disturbance be kept to a minimum;

c. instruction that PLP avoid known bear dens by on-half mile unless otherwise authorized by DNR and ADF&G, and that PLP report and avoid occupied bear dens encountered in the field [*Id.*];

d. compliance with other state and federal permits [*Id.*]

e. any structures used in connection with the activities must be approved and are temporary and must be removed [*Id.* at SOA 005256];

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f. instruction that PLP halt activities if archaeological or paleontological remains are encountered and give immediate notification to DNR's Division of Parks, Office of History and Archaeology [*Id.*];

g. that PLP provide access to DNR for inspection purposes at reasonable times without notice [*Id.* at SOA 005257];

h. stipulations regarding the storage and handling of fuel and hazardous substance, including provision of secondary containment, the presence of spill response equipment, no refueling within the annual floodplain or tidelands, and no storage containers with a capacity of more than 55 gallons with be located within 100 feet of water bodies [*Id.*];

i. instructions concerning the notice PLP must give to DNR and DEC regarding unauthorized discharges [*Id.*];

m. prohibitions against drilling within certain distance of water courses [*Id.* at SOA 005258];

j. stipulations regarding the handling and use, including required setback distances from bear dens as well as from fish-bearing streams and lakes, of any explosives used in geophysical surveying, should they be undertaken [*Id.* at SOA 5257-5258]; and

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k. no exclusive use is authorized, and PLP may not restrict public access to the area, and the issuance of the MLUP "does not preclude the issuance of permits or leases on the same lands" [*Id.* at SOA 005256].

In addition to the MLUP requirements, Pebble also committed to several additional conditions. These conditions were included in Pebble's Plan of Operation submitted with its MLUP application, and the approval of the application made these conditions part of the permit. [Tr. at 1213-14.] These conditions include:

a. use of helicopters for transporting drill rigs and personnel;

b. handling procedures for garbage and human waste;

c. protocols for backfilling trenches;

d. protocols for handling drill fluids and fuel;

e. procedures for seismic geophysical activities; and

f. operational protocols to avoid caribou.

2. TWUP's – Temporary Water Use Permits.

In January 2007, after 12 years of exploration, DNR issued the first nine TWUPs for the Pebble Project. [Exs. 932, 934, 936, 938, 940, 942, 944, 946, 948.] The TWUPs allowed water withdrawal from 20 streams and 18 ponds. [Ex. 932 at SOA 7636.] In May 2009, DNR issued two additional TWUPs for withdrawals from eight additional streams

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and three additional ponds. [Ex. 2081 at SOA 12343; Ex. 2082 at SOA 12750.] In 2010, after Nunamta informed the Court of possible water use violations, PLP was found to have violated its TWUPs by taking water from 45 unpermitted sources in the three affected drainages (North Fork Koktuli, South Fork Koktuli and Upper Talarik Creek) between 2007 and 2009. [Ex. 345.] In a settlement agreement with PLP, the State required significant changes to the water withdrawal procedures, including: (i) submission of maps showing water sources; (ii) identification of intake points within each stream reach; (iii) identification of each drill hole, TWUP and Fish Habitat permit associated with each water source; (iv) a plan for coordination and training of field staff, geologists, engineers, drillers and other workers involved in the placement of intake hoses; (v) provision of GPS identification of each intake, submitted by email to DNR and ADF&G; (vi) photographic evidence of each intake point prior to and after intake equipment had been placed and removed; (vii) appointment of a field inspector to be responsible for confirming water sources and TWUPs and checking locations; and (viii) submission of a water withdrawal plan. [*Id.*] In 2010, DNR issued nine additional TWUPs. [Exs. 2072-2080.]

The TWUPs issued to PLP and its predecessor expressly state that the permits are revocable for cause or at will. [Tr. at 1771.] For example, the TWUPs issued in January of 2007 provide: "Pursuant to 11 AAC 93.210(b), authorized temporary water use is subject to amendment, modification, or revocation [DNR] if [DNR] determines that amendment, modification, or revocation is necessary to supply water to lawful

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appropriators of record or to protect the public interest." [Ex. 2083 at SOA 007635.] DNR could terminate the permit for cause if the permittee issued "false statements or representations, in any application, record, report, plan or other document filed or required to be maintained under this authorization." [*Id.* at SOA 007634, paragraph 11.] The TWUPs also provide that "[n]o water right or priority is established by a [TWUP issued under] 11 AAC 93.220." [*Id.* at SOA 007634.] Further, a water use authorized under a TWUP "is subject to appropriation by others (11 AAC 93.220)." [*Id.*; *See also*, Prokosch, Tr. at 1770-71, 1784 (describing the difference between a temporary water use and a water right/appropriation).]

Patricia Bettis, formerly a DNR Natural Resource Manager in the Water Division and the staff member responsible for developing and issuing TWUPs for Pebble mineral exploration, as well as the staff member formerly tasked to site visits and inspections, provided extensive testimony with respect to both her personal knowledge of the permits issued for mineral exploration activities at Pebble, as well as to her personal knowledge of how permitted activities on-the-ground at the Pebble project area were being conducted in light of those permits. [Tr. at 1700-1743.]

Ms. Bettis explained what the TWUPs contained, their conditions, and that they were intended to minimize and avoid adverse impacts that might be associated with the requested water withdrawals, including protection of fish and fish habitat, and documents relating to the permits, including GCD-8 and the Review and Determination documentation. [Tr. at 1710-1718.] She stated that for the TWUPs, DNR requires that the

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use of screened intake structures regardless of whether or not the water body has been determined to be fish bearing. [Tr. at 1717-1718.]

TWUP conditions include:

a. implementation of acceptable engineering standards;

b. compliance with other applicable state and federal permits and approvals, (and this would include compliance with FHPs);

c. DNR's inspection of water withdrawal equipment and activities;

d. DNR's ability to "modify this authorization to include different limitations, expand monitoring requirements, evaluate impacts, or require restoration at the site;"

e. screened water intake structures in fish bearing waters and other appropriate equipment that "must be designed, operated, and maintained to prevent fish entrapment, entrainment, or injury at the maximum diversion rate;"

f. screen mesh of .25 inch mesh;

g. set water velocity rates for the intakes structures not to exceed 0.5 feet per second;

h. the terms and conditions contained in GCD-8, where those terms and conditions are applicable.;

i. suspension of the permit if necessary "to protect the water rights of other persons or in the public interest."

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[Ex. 2083 at SOA 007633-34.]

More recent permits include additional conditions. For example, a June 2010 permit requires PLP to "inspect the water intake screen for damage . . . before and after each use," and that any damage be repaired prior to use. [*See, e.g.*, Ex. 2080 at SOA 007635, paragraph 14 and Ex. 2072 at SOA 66935, paragraph 16.] The design specification of water intake structures "must always conform to the original design specifications approved by the [ADF&G]." [*Id.*] Further, "[a]dequate flow and water levels must remain to support indigenous aquatic life, and the watercourse must not be blocked to the passage of fishes." [*Id.* at paragraph 15.] PLP, based on a settlement agreement concerning previous unauthorized water withdrawals, is also required to "adhere to the terms of the State approved Pebble Project Water Withdrawal Plan." [*Id.*, at paragraph 16; Tr. at 1766-1767.]

Both the February 18, 2010 and the July 13, 2010 Revision 1 of the Water Withdrawal Plan were admitted into evidence. [Exs. 2128-2129.] These documents reflect additional measures that the State requires PLP to implement to assure PLP's compliance with TWUP and FHP authorizations as a consequence of earlier unauthorized water withdrawals and the State's enforcement action. [*Id.*; Tr. 1766-67.]

3. Other Permits and Permitting Processes – State and Federal.

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Other selected state and federal authorizations were also offered by the parties and entered into evidence. [*See, e.g.,* Exs. 2088-2127 (Fish Habitat Permits (FHPs)), Ex. 2172 (State Final Consistency Review under the Alaska Coastal Management Program (ACMP)); Ex. 88A (Nationwide Permit 6 issued March 19, 2007, by the U.S. Army Corps of Engineers, and applied by the Corps to mineral exploration activities at the Pebble project).] Neither the process used for, nor the issuance of, these additional authorizations or permits were challenged in any of the counts in Nunamta's First Amended Complaint. As a consequence, any allegations by Nunamta that the additional authorization and permits and their underlying processes were inadequate or should be questioned are not properly before the Court and will not be adjudicated.

B. Pebble's Exploration Activity.

Pebble implemented an entirely helicopter-supported drilling program. [Taylor at Tr. 784-785.] The drilling is conducted using portable drill rigs which are flown to each drill site by helicopter. [Fredericksen at Tr. 1211-1212.] The drill rigs are placed on a drilling platform which consists of wood decking or tundra mats supported by timbers laid on the tundra surface. [Fredericksen at Tr. 1212.] The drilling platform itself sits above the tundra and protects the vegetation during the drilling process. [Fredericksen at Tr. 1212.] A typical drill rig setup temporarily occupies a space of approximately 500 to 1,500 square feet. [Fredericksen at Tr. 1211; Wober at Tr. 338.]

Before the drilling begins, Pebble's reclamation crew will prepare the site by excavating between one and three sump pits alongside the drilling platform, down

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gradient from the drill collar. [Wober at Tr. 259, 265.] The crew cuts out and removes the overburden where the sumps will be dug and hand digs a one-foot by one-foot ditch that connects the drill collar to the sumps. [Wober at Tr. 258; Taylor at Tr. 772.] The sumps are used to contain the return water from the drilling process and allow for sediment and drill cuttings to settle out of suspension. [Wober at Tr. 258-59, 265; Gleitsmann at Tr. 2133-36.] The smaller sump pits are approximately eight feet long, four feet wide and six feet deep. [Taylor at Tr. 817.] The larger sump pits are about 15 to 20 feet long, five feet wide and six feet deep. [Wober at Tr. 264-65.]

Once the drilling operation is complete, the drill rig, drill platform and associated structures are demobilized and removed by helicopter. [Fredericksen at Tr. 1211-12.] The reclamation crew will then return and remediate the site. [Taylor at Tr. 772.] The sumps are back-filled with the excavated soil and recontoured using a "rubber-tracked small backhoe" so as to protect vegetation. [Gleitsmann at Tr. 2141; Ex. 3055.21.] The vegetative mat is replaced on top of the reclaimed sump and the area is reseeded and revegetated as necessary. [Taylor at Tr. 772.] Other than a few exceptions, Pebble's reclamation efforts have been successful. [Taylor at Tr. 773.] After one or two growing seasons, it becomes very difficult to distinguish a reclaimed site from the natural landscape. [Taylor at Tr. 773, 783; Fredericksen at Tr. 1215, 1221 (stating impacts are "Very local. Very small. And very temporary" and after reclamation "it is very difficult to find many of the old drill sites").] Once the drill site has been reclaimed, the only thing that remains is a drill collar marker in the form of a wood stake. [Wober at Tr. 340.]

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Photographs of abandoned Pebble drill sites are consistent with this testimony, depicting a primarily successful reclamation program and very little, if any, ground disturbance. [Exs. 3056.46, 3056.22, 3056.55, 3055.52, 3056.31, 3055.29, 3056.37, 3055.54, 3055.40-.42, 3055.37, 3055.48, 3055.35, 3056.7.] Lars Gleitsmann, a photographer hired to "fly out to the Pebble site and take pictures of every man-made object [he] could find [and] every ground disturbance [he] could find," did not observe or photograph any unsuccessful reclamation efforts, even after making two separate trips to the site. [Gleitsmann at Tr. 2109-10, 2187.] The Court found Mr. Gleitsmann to be a credible witness and without bias even though hired by Pebble. His demeanor, thoroughness and precision in his answers left the Court with the impression that had Mr. Gleitsmann found significant ground disturbances he would have been compelled to tell the Court regardless of who was paying his bill.

To support Pebble's drilling operation, there is a supply depot and staging area which occupies an area of approximately 30 meters by 300 to 350 meters. [Wober at Tr. 340.] Photographs of the supply depot depict temporary structures and storage areas on tundra mats so as not to rest directly on the underlying vegetation; there are also wooden walkways to protect the tundra from being trampled. [Gleitsmann at Tr. 2119-20; Ex. 3055.4, 3055.10, 3055.29, 3055.68, 3056.4, 3056.5, 3056.39.] Mr. Gleitsmann testified:

> Q: Are there any permanent buildings that you saw at this staging area?
>
> A: No. There is only wall tents and plywood shacks, and there is nothing there that can't be flown out by

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> helicopter. There is nothing in there that wasn't brought in by helicopter. [Gleitsmann at Tr. 2120.]

Mr. Fredericksen similarly testified that the staging area consists of two temporary structures, one of which is about 24 feet by 60 feet and the other is 10 feet by 20 feet. [Fredericksen at Tr. 1212.] There are also storage racks and several other miscellaneous structures used for storage. [Fredericksen at Tr. 1213.]

A fueling station was erected at Big Wiggly Lake which occupies a space of about 30 meters by 15 meters. [Wober at Tr. 340.] Photographs of the fuel storage area depict two helicopter landing pads, five fuel tanks in a welded aluminum containment structure and an associated tundra pad with a temporary shelter. [Gleitsmann at Tr. 2122-27; Ex. 3055.24, 3056.15, 3056.16, 3056.19, 3056.3, 3056.49, 3056.17.] There is also a small weather station on the top of Kaskanak Mountain range, along a barren ridgeline. [Gleitsmann at Tr. 2131; Ex. 3056.28.]

Additionally, there is an area called the watershed storage near Lincoln Lakes. Photographs from 2009 depict several "plywood shacks," "wall tents" and tundra mats used for storage of hoses and fuel containment structures. [Gleitsmann at Tr. 2128-29; Exs. 3055.27, 3055.26, 3055.25.] Photographs from 2010 depicting the same storage site show that at least two of the temporary structures have been removed from the area without leaving any visual impact to the surrounding vegetation. [Gleitsmann at Tr. 2129-30; Ex. 3056.1.]

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Photographs from 2009 also depict a small collection of five or six structures comprising of an emergency medical treatment facility (the "med port"), the west bay shack and several containers used for exposing rock to weather and rain for experimentation purposes. [Gleitsmann at Tr. 2130; Exs. 3055.14, 3055.31.] Photographs from 2010, however, show that the med port has been "completely removed" from the site, further demonstrating the temporary nature of the facilities used at the Pebble site. [Gleitsmann at Tr. 2130-31; *compare* Ex. 3055.14 and 3055.31 *with* Ex. 3056.12, 3056.34 and 3056.13.]

Although there are some protruding well casings and drill collar markers, there are no permanent structures in the Pebble study area. There are no roads or wheeled vehicles as it is an entirely helicopter-supported program. [Fredericksen at Tr. 1211-12; Taylor at Tr. 781, 784-85.] There is no permanent airstrip, no residential camp facilities, no four-wheel trails, no sewage lagoon, no water treatment plant, no bridges and no obstructions to any water body. [Taylor at Tr. 781-82.] All of the structures found at Pebble are temporary and can be deconstructed and removed by helicopter. [Fredericksen at Tr. 1211-12; Gleitsmann at Tr. 2120.]

It is realistic to conclude that Pebble could cease operations, remove all equipment and structures from the site and completely vacate the area in a matter of a few weeks. [Taylor at Tr. 782.] Within approximately one year, there would likely be no visible trace of human activity or impact at the site. [Taylor at Tr. 783.] There was general agreement amongst witnesses for both the plaintiffs and the defendants that a helicopter-only

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operation will have less significant environmental impacts, particularly on fish habitat, than would a terrestrial-based operation that required roads and stream crossings. [Woody at Tr. 1321-1322; Fredericksen at Tr. 1213.] Plaintiffs' fisheries expert, Dr. Carol Ann Woody testified:

> Q: From the perspective of a fish biologist who used to work on fish habitat issues, you would agree that the use of helicopters to get to and from a location is preferable to roads and river crossings, right?
>
> A: It depends on how the helicopters are – you know, heights, et cetera, but I would say yes, it's much preferable over building roads across salmon streams, yes. [Woody at Tr. 1321-22.]

In making such definitive findings regarding the lack of ground disturbance or signs of past drilling activity, the absence of evidence to the contrary weighs significantly in the Court's decision making. Not only is there persuasive affirmative evidence of no lasting disturbances or signs of permanent structures, there was little or no competing evidence presented by the plaintiff.

C. State Enforcement and Oversight.

Many of the state employees testifying at the trial described field inspections and site visits that they conducted at the Pebble project to gauge PLP's permit compliance. [*See, e.g.,* Tr. 1710, 1734-1743, 1811-1819.] The state agencies' field inspection reports and site reports were admitted into evidence at trial. [Exs. 2000-2031.] From approximately 2003 through 2006, the State was conducting one or two field inspections to the Pebble project area per year. [Tr. 1222.] Starting in 2007, the State implemented a

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roughly monthly field inspection schedule during the time drilling was conducted. [*Id.*] A diversified team of employees from DNR, DEC and ADF&G conducted the inspections and assessed permit compliance. [Tr. 1222-1223.]

State witnesses also testified regarding reclamation required by the permits, as well as reclamation efforts associated with mineral exploration activities. [*See, e.g.,* Tr. 1209, 1817-1823.] Annual reclamation reports submitted by PLP and its predecessors to DNR were also admitted into evidence. [Exs. 2032-2042.] This evidence was consistent with the evidence presented by Pebble.

Ricky Fredericksen, DNR's Mining Section Chief, a licensed geologist in the State of Alaska, has at least 30 years of extensive experience working in the mining industry, a majority of which he gained in Alaska. [Tr. at 1203-1206.] He obtained a bachelor's degree in geology. [Tr. 1203.] He demonstrated considerable experience and knowledge with respect to mineral exploration activities, particularly drilling, reclamation, and logistical activities associated with mineral exploration. [Tr. 1203-1227.]

Mr. Fredericksen was responsible for overseeing staff's development of MLUPs for mineral exploration at the Pebble project. [Tr. 1203-1209.] He provided extensive testimony with respect to both his personal knowledge of the permits issued for mineral exploration activities at Pebble, as well as his personal knowledge of how permitting activities on–the-ground at the Pebble project area were being conducted in light of those permits. [Tr. 1209-1239.] He also participated in a number of the on-site field visits or

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inspections and co-authored some of the field reports. [Tr. 1209, 1218-1227; Exs. 2022, 2010, 2005.]

Ms. Bettis is a geologist, and has several years of experience. [Tr. 1700-1703.] During her tenure with the Water Division, Ms. Bettis researched and prepared water permits for large projects involving both oil and gas exploration and mineral activities. [Tr. 1702-1703.] She demonstrated considerable experience and knowledge with respect to temporary water permitting for Pebble exploration activities. [Tr. 1700-1743.] Ms. Bettis also participated in several site visits and field inspections, and co-authored some of the field reports. [Tr. 1710, 1740-1743.]

Ms. Bettis testified that when deciding whether she would issue a TWUP for Pebble's mineral exploration she considered the "types of sources, whether it's ground water, whether it's surface water," that is ponds, rivers, or streams. [Tr. 1703.] She considered the location of requested water sources, as well as the "quantity of water requested in comparison to the water available from the proposed sources." [*Id.*] Among the things she would verify was whether North or South Forks of the Koktuli River or the Upper Talarik Creek were on DEC's list of impaired water bodies, the method of withdrawal, and the effect of water withdrawal on fish and wildlife and their habitats. [Tr. 1703-1704.] She considered possible conditions to impose in the TWUPs so that impacts to fish and wildlife resources would be minimized. [Tr. 1704] She also looked at what the effect of the water withdrawal would be on navigable or public waters or what other common uses were. [*Id.*]

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The Plaintiffs presented Dr. Stuart Smith, an expert in using Graphical Information Systems (GIS). Mr. Smith's GIS analysis of the TWUP maps established that the low resolution and water data quality of these maps precluded an accurate assessment of location or size of the water bodies. [Smith at Tr. 390-393; Dem. Ex. 1004 at NA 6454; Smith at Tr. 475 ("Were there some instances where you couldn't determine whether there was a pond there at all? A: That's correct.").] Despite the inaccuracy of the maps relied upon by Ms. Bettis, she did conduct a review of the water sources and this in part establishes that the DNR actively oversaw the exploration process in the Pebble Area. Furthermore, although Dr. Smith's testimony established that DNR should have utilized more accurate maps and water withdrawal site location by PLP, the evidence does not prove the environmental harm actually or even likely occurred.

The 2006 TWUP applications contained a worksheet attachment that calculated maximum daily water volume usage, based on 15 gallon per minute pump intake capacity, and assuming a drill rig was running continuously, 24 hours per day. [Ex. 2083 at SOA 007862]. The worksheet attachment also identified water flows based on available gauging station information. [*Id.*]

Ms. Bettis described the volume of water taken relative to the water available at the source. The example she cited is also documented in a set of Amended TWUPs, where there would be an increased take of 16,5000 gallons of water per day, which meant there could be a combined maximum water withdrawal of 129,900 gallons per day, or a maximum water withdrawal of 32,475,000 gallons per year from the permitted sources.

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[Tr. 1726.] Ms. Bettis stated that to put this volume into perspective, "129,000 gallons of water per day is equivalent to .2 cubic feet per second. For the Upper Talarik River, this represents less than 10 percent at the mean minimum daily flow for the gage station on the Upper Talarik Creek." [*Id.*; Ex. 2084 at SOA 008127.]

Ms. Bettis also described calculations of water volumes available in requested water sources. Nunamta argues that Ms. Bettis did not make these calculations concurrently with her review of TWUP applications for the Pebble project. [Tr. 1727-1729; Exs. 2139, 2084]. The Court accepts Ms. Bettis as a credible witness and accepts her testimony that the calculations were made concurrently. Her calculations were based on the assumption of five feet of depth, which allowed for a conservative calculation to determine whether those sources would be able to supply the water requested. [Tr. 1729; Ex. 2084.] Based on the calculations, plus the in-stream flow and borehole information, Ms. Bettis determined with respect to the permit applications, the water volume of water in the proposed sources would accommodate the volume of water requested. [*Id.*]

The Plaintiff established that prior to 2006, no TWUP applications had been required of the companies exploring these mining claims. The State, through Ms. Bettis, confirmed this. [Tr. 1732-35, 1747-48]. Ms. Bettis explained that she raised this concern with DNR Mining's Rick Fredericksen and Kerwin Krause, and opined that DNR and Northern Dynasty Minerals misinterpreted the regulatory definition for what constitutes a significant amount of water and did not believe a TWUP was required. [Tr. 1733-34].

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Within a month after Ms. Bettis' discussion with Mr. Fredericksen and Kerwin Krause, Northern Dynasty Minerals submitted TWUP applications. [Tr. 1734]

The Court finds that the error of Mr. Fredericksen and Mr. Krause disturbing and it raises questions regarding their diligence to perform their duties as stewards of the State of Alaska's public lands. Nonetheless, this Court finds that when the issue was raised by Ms. Bettis, the DNR staff acted quickly and appropriately to satisfy the requirement. [Tr. 1734.] Furthermore, despite Mr. Fredericksen's and Mr. Kraus's lack of diligence, their testimony that no environmental harm was observed was corroborated by other witnesses.

Ms. Bettis testified as to the observations she made during field visits and inspections and that she authored or co-authored several of the reports based on these inspections. [Tr. 1710, 1736-1744; Exs. 2014, 2017, 2020.] She noted employees of other agencies (DNR, ADF&G, and DEC) participated in the inspections. [Tr. 1710.]

Gary Prokosch, DNR's Water Resources Section Chief, is responsible for overseeing staff's development of TWUPs for mineral exploration at the Pebble project. [Tr. 1754-1757.] He described roughly 34 years of experience in natural resource management. [*Id.*] Fifteen of those years he has spent as the Water Resources Section Chief. [Tr. 1756.] Mr. Prokosch provided extensive testimony with respect to both his personal knowledge of the permits issued for mineral exploration activities at Pebble, as well as to his personal knowledge of how permitted activities on the ground at the Pebble project area were being conducted in light of those permits. [Tr. 1757-1784.]

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Mr. Prokosch testified that PLP was required, based on a settlement agreement with the State from an enforcement action dealing with earlier unpermitted water withdrawals, to take additional steps to ensure compliance with PLP's TWUPs. [Tr. 1766-1768.] The Court makes no finding as to whether the State's enforcement actions regarding PLP illegal withdrawals were appropriate as that specific issue is not before the Court. The Court does find, however, that this enforcement action corroborates the State's position that TWUP's were, in fact, revocable. In addition, Mr. Prokosch also testified that PLP's TWUPs could be revoked for cause or for any reason that the Water Section deems necessary. [Tr. 1771.]

Ron Benkert, a habitat biologist with ADF&G's Habitat Division, was responsible for providing Habitat's input on coordinated agency reviews of PLP's MLUP and TWUP applications. [Tr. 1811.] Mr. Benkert was also responsible for issuing FHPs associated with mineral exploration activities at the Pebble project. [*Id.*] Mr. Benkert participated in some of the on-site field inspections and co-authored some of the field reports [Tr. 1812, 1813; Exs. 2004, 2006.] Mr. Benkert testified that the measures being taken by Pebble were sufficient to prevent detrimental effects to fish. [Tr. 1814.]

Beginning in 2006, DNR's office of Habitat Management & Permitting issued fish habitat permits to PLP for the project. [Ex. 2126.] In 2009, the responsibility for issuing the permits shifted to ADF&G's, Division of Habitat. [Ex. 2109.] The permits regulated specific watersheds, streams, rivers, ponds and other water bodies. [Ex. 2109 at SOA 011889.] The permits provided that:

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a. no activities were to occur in the water bodies except for the placement of screened pump intake enclosures;
b. no surface disturbing activities would occur within 100 feet of the water body;
c. water was to be withdrawn at 15 gallons per minute unless special conditions applied;
d. the specifications for the screens on the pump intoak disclosure were provided;
e. PLP was to inspect the intake screens for damage before and after each use; and
f. the failure to meet the terms and conditions of the permit constituted a violation of AS 16.05.861. [Ex. 2109.]

Melinda (O'Donnell) Smodey, Project Review Supervisor with DNR's Division of Coastal and Ocean Management (DCOM), is responsible for coordinating and consulting with other agency staff on mineral exploration activities at the Pebble project that require coastal consistency determinations. [Tr. 2089-2090.] Ms. Smodey provided testimony with respect to both her personal knowledge of consistency reviews and permits issued for mineral exploration activities at Pebble, as well as to her personal knowledge of how permitted activities on-the-ground at the Pebble project area were being conducted in light of those permits. [Tr. 2089-2093.]

The record reflects that the State, through a coordinated review, conducted a coastal consistency review in 2007 of then-proposed mineral exploration activities for the Pebble project. [Ex. 2172.] The review considered and responded to public comments that had been received on the proposed activities. [*Id.*] Those commenting included Geoffrey Parker, attorney for Nunamta, who provided written comments in a letter dated

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January 22, 2007.[35] [Tr. 2090-91; Ex. 2172 at SOA 004476-004483; Ex. 2180 at SOA 016269-01276.] The concerns covered were among those raised in this litigation, including potential for impact to cultural resources, caribou, subsistence, fish and fish habitat, public access, as well as potential impacts from fuel storage, seismic activities. [*Id.*] The final consistency determination discusses the permit conditions that addressed the concerns. [Ex. 2172 at SOA 004469-004483.] These included, for instance, (a) vertical and horizontal setbacks for helicopter traffic to avoid, to the maximum extent practicable, caribou [*Id.* at SOA 4473 and 4481], (b) seismic survey setbacks [*Id.*], (c) cultural resource survey conditions [*Id.* at SOA 4474 and 4483], (d) reclamation of drill holes by plugging [*Id.* at SOA 4471, 4478], and (e) provisions for fuel storage and handling[*Id.* at SOA 4473]. The State also responded to Mr. Parker's concerns in a separate letter dated February 9, 2007, signed by Thomas Crafford. [Ex. 2180 at SOA 016269-016276.]

All of these documented efforts support the conclusion that the State was proactive when issuing permits with appropriate restrictions on Pebble's activities and not merely rubber-stamping the applications. Further, the review processes as well as the field surveys/ investigations indicate that the State was actively enforcing the permits issued and thus placing itself in a reasonable position to revoke the permits if necessary. Last, by responding to concerns by Nunamta both in the review process as well as in enforcing the

[35] Clearly as early as 2007, the Plaintiffs had actual notice of the on-going permitting process.

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TWUP conditions, the State showed a concern for the concurrent users of the Pebble Area.

D. Character of Environmental Impact at the Pebble Project Study Area; Plaintiffs Failed to Prove that there were Long-Term or Harmful Environmental Impacts from Pebble's Drilling Operation.

Plaintiffs allege that exploration drilling at the Pebble study area has caused permanent environmental harm from three activities: drilling core holes, discharge of drill cuttings and discharge of drill muds and fluids. Plaintiffs claim that these activities have generated acid rock drainage or otherwise contaminated the Pebble study area. The evidence presented at trial, however, is insufficient for this Court to find it more likely true than not that the exploration activities at the Pebble study area have actually caused or will in fact cause long-term, harmful environmental impacts from acid rock drainage or other contamination.

This Court heard testimony from numerous lay and expert witnesses regarding Pebble's drilling practices and whether its operations have impacted surface or groundwater quality in the area. Plaintiffs presented testimony about acid rock generation, contamination and water quality from three expert witnesses: Doctors Robert Moran, David Chambers and Kendra Zamzow. Dr. Moran has a bachelor's degree in zoology and chemistry and a doctorate in geological sciences with an emphasis on water geochemistry. [Moran at Tr. 681.] He was qualified to provide testimony on hydrology, geochemistry and hydrogeology. [Moran at Tr. 684.] Dr. Chambers is a geophysicist and

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has a bachelor's degree in engineering physics, a master's in geophysics and a doctorate in environmental planning. [Chambers at Tr. 833.] Dr. Chambers was qualified to provide testimony on geophysics and environmental impacts from mining. [Chambers at Tr. 836.] Dr. Zamzow has a bachelor's degree in cellular and molecular biology and a doctorate in environmental sciences and health. [Zamzow at Tr. 1004.] She was qualified to provide expert testimony on environmental chemistry and biogeochemistry. [Zamzow at Tr. 1005.]

Pebble presented expert testimony on water quality and toxicology from Dr. Mark Stelljes. Dr. Stelljes is an environmental toxicologist and risk assessment scientist with 20 years of experience evaluating chemicals in the environment and the risks associated with the presence of those chemicals. [Stelljes at Tr. 1469.] Dr. Stelljes has a bachelor's degree in zoology, a master's degree in wildlife ecology and a doctorate in environmental toxicology and pharmacology. [Stelljes at Tr. 1471.] He has published seven peer-reviewed scientific studies in his field and authored one book on toxicology which was published by the Government Institutes. [Stelljes at Tr. 1478-79.] He has analyzed and assessed surface and groundwater quality for "[s]everal hundred projects," many located in Alaska. [Stelljes at Tr. 1474-77.] Dr. Stelljes was qualified to provide expert testimony on environmental toxicology and specifically as to whether the exploration activity at Pebble has caused any harm to the environment or any change in water quality in the vicinity of the Pebble site. [Stelljes at Tr. 1481, 1486.]

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1. Allegations of Acid Rock Drainage from Drill Holes.

Plaintiffs allege Pebble's drilling activity is generating acid rock drainage and harming concurrent users. Acid rock drainage ("ARD") is a chemical reaction that can occur when mineralized rock containing sulfides interacts with air (or another oxidant), water and in some cases bacteria to create an acid solution.[36] [Moran at Tr. 692, 738.] According to Plaintiffs' expert Dr. Moran, the risk with ARD is that it has the potential to dissolve and mobilize the chemical constituents that are naturally occurring in the localized rock formation, possibly leading to contamination, including heavy metals leaching. [Moran at Tr. 692-93.]

Plaintiffs' expert witnesses, Drs. Moran, Chambers and Zamzow, each testified about the *potential* for the drill holes at the Pebble study area to generate ARD. Each of the experts admitted that they were retained to render an opinion only on the potential for drill holes at Pebble to cause ARD reactions, not whether the drill holes are in fact generating or will in fact generate ARD. Dr. Moran testified:

> Q: What opinion were you asked – retained to reach, in what subject matters?
>
> A: I was asked to evaluate the, predominately the connections, hydraulic connections between surface water and groundwater, and the potential impacts from drilling and abandonment activities, chemical impacts. [Moran at Tr. 680.]

[36] The pH scale goes from 0 to 14, with 0 being acidic and 14 being alkaline. [Zamzow at Tr. 1084-85.] Neutral water for aquatic life is between 6 and 8.5. [Zamzow at Tr. 1085-86.]

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Dr. Moran also testified from his deposition transcript that "I would like to point out that the whole issue of acid rock drainage is beyond the scope of what I was tasked to do for this particular effort" and that "I largely was staying out of the geochemistry details." [Moran at Tr. 724.]

Dr. Chambers testified that he "was asked to make some judgments on the potential for acid drainage and metals leaching at the Pebble site." [Chambers at Tr. 833.] Dr. Chambers made it clear numerous times that he was only testifying as to potential impacts:

> Q: [Y]ou were asked to identify potential impacts for exploration, correct?
> A: That's correct. [Chambers at Tr. 937.]
> . . .
> Q: And so is it correct, Dr. Chambers, that your opinion is only that there is the potential for contamination in the Pebble project area, but you're not saying it's there?
> A: Yes, that's correct, and that we don't have the information to decide whether it's occurring.
> Q: [Y]ou have only stated your concerns about potential contamination; is that correct?
> A: That's correct. [Chambers at Tr. 942.]

Likewise, Dr. Zamzow testified: "I was retained to characterize the water quality at the Pebble site and examine potential sources that could change that water quality." [Zamzow at Tr. 1003.] Plaintiffs' experts' opinions, therefore, only relate to the potential for acid rock generation and its potential cause, not whether it is in fact occurring at the Pebble site.

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Given the limited scope of Dr. Moran's evaluation, he testified to his general opinion that drilling through sulfide mineralized rock has the potential to generate ARD if the appropriate conditions are present. [*See* Moran at Tr. 694.] He did not, however, express any opinion about whether ARD is currently occurring at the Pebble site as a result of exploration activities and agreed that the issue of ARD is beyond the scope of his expert report. [Moran at Tr. 724; Ex. 3128.] Although Dr. Moran testified generally as to data and reports that show elevated concentrations of dissolved metals, and that these numbers may indicate ARD, he did not testify that those elevated levels are in fact caused by ARD, and even if they are, that the ARD was in fact caused by Pebble's exploration activities. Instead, he stated that analyzing the USGS and Pebble data is difficult because there is no baseline data by which to compare the current water chemistry data to the natural conditions existing prior to drilling. [Moran at Tr. 706.] Notably, Dr. Moran also admitted that it is not unusual to find naturally occurring high metal concentrations when drilling into an ore body. [Moran at Tr. 706 (stating "[o]ne would be foolish to say that you don't expect high metal concentrations if you drill into an ore body").]

Thus, Dr. Moran's opinions do not establish that Pebble's drilling program has caused or will cause any environmental harm. Significantly, Dr. Moran fails to rule out the possibility that the elevated concentrations of dissolved metals are naturally occurring due to the mineralized nature of the bedrock or that ARD is naturally occurring, both of which he admitted occur at the Pebble site. [Moran at Tr. 693, 706, 742-743.] Indeed, due to the nature of the ore body and presence of sulfide mineralization, there are in fact

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naturally occurring ARD reactions beneath the surface which are evidenced by water chemistry data from springs and seeps in the Pebble area. [Zamzow at Tr. 1113-1114 (admitting that there are natural mineralized seeps—i.e., seeps with higher acidity and higher metals concentrations); Ex. 3120 at PLP 4271-4476 (seep SP 26, for example, routinely displayed a pH lower than 4 during field sampling (PLP 4281) and laboratory results show high dissolved metals, including copper (PLP 4379)); Field data shows that seep SRK 12 displayed a pH as low as 2.28 (PLP 4287).]

Dr. Moran's conclusory opinions about ARD do not demonstrate that Pebble's drilling activities have any deleterious environmental impact. This Court finds that although Dr. Moran is a trustworthy witness, his testimony on ARD is not reliable and is only of limited help because his conclusory opinions are based on speculation and arise from an admitted lack of scientific data.[37] [Moran at Tr. 706.] At best, his testimony frames the question, but does little if anything to provide an answer.

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[37] *See Thomas v. FAG Bearings Corp.,* 846 F. Supp. 1382, 1394 (W.D. Mo. 1994) (stating that evidentiary reliability is not present when the "scientific" opinion is premised on fundamentally unsound bases or a fatally deficient amount of data and that "[i]t is central to the concept of expert testimony that such testimony is only admissible if it speaks in terms of probabilities instead of possibilities"); *Kalamazoo River Study Group v. Rockwell Int'l Corp.,* 171 F.3d 1065, 1072-73 (6th Cir.1999) (expert's testimony is unreliable when based on "speculation, conjecture, and possibility" and an "inadequate factual basis"); *Norfolk S. Corp. v. Chevron U.S.A., Inc.*, 279 F. Supp. 2d 1250, 1278 (M.D. Fla. 2003) *rev'd on other grounds sub nom. Norfolk S. Corp. v. Chevron, U.S.A., Inc.*, 371 F.3d 1285 (11th Cir. 2004) (experts' testimony was unreliable where there was a lack of evidence and the experts were forced to fill in too many blanks with speculation and conjecture, and because the experts did not subject their theories to the rigors of scientific analysis); *Pomella v. Regency Coach Lines, Ltd.,* 899 F. Supp. 335, 342 (E.D. Mich. 1995) (quoting *Daubert v. Merrell Dow Pharms., Inc.,* 509 U.S. 579, 590 (1993)) ("[A]n expert's opinion must be supported by 'more than subjective belief and unsupported speculation' and should be supported by 'good grounds,' based on what is known."); *McLean v. 988011 Ontario,*

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Similar to Dr. Moran, Dr. Chambers rendered a general and conclusory opinion that there is a potential for contamination at the Pebble Project area. [Chambers at Tr. 942.] Dr. Chambers did not provide any opinion on whether the exploration drill holes are in fact causing contamination. Rather, Dr. Chambers admitted that he was retained to render an opinion only on the "potential" impacts of exploration at the Pebble site, including ARD and metals leaching. [Chambers at Tr. 833, 937.] He was not retained to render any opinion on whether such events are actually occurring, nor did he attempt to make that determination at trial. [Chambers at Tr. 937, 942.] Indeed, Dr. Chambers admitted that there is not sufficient information to determine whether or not it was occurring. [Chambers at Tr. 942.] Accordingly, and for the same reasons set forth above regarding Dr. Moran, this Court finds that Dr. Chambers' opinions are not persuasive and only of limited help.[38]

Plaintiffs attempted to demonstrate that Pebble's exploration activities contaminated groundwater by presenting Dr. Zamzow's testimony about data from three groundwater monitoring wells. The water quality data related to each of the three wells comes from Report Series F, which is publicly released data from Pebble's water quality

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Ltd., 224 F.3d 797, 800-01 (6th Cir. 2000) ("The expert's conclusions . . . must have a basis in established fact and cannot be premised on mere suppositions."); *Rosen v. Ciba-Geigy Corp.*, 78 F.3d 316, 318 (7th Cir.1996) (stating that a judge "asked to admit scientific evidence must determine whether the evidence is genuinely scientific, as distinct from being unscientific speculation offered by a genuine scientist"); *In re Agent Orange Product Liability Litigation*, 611 F. Supp. 1223, 1249-50 (D.C. N.Y. 1985) (stating that testimony about "scientific knowledge" must be based on "verifiable propositions of fact").

[38] *See* cases cited *supra* note 37.

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monitoring program. [Ex. 3120 at PLP 4045, 4477 *et seq.*] From 2004 to 2007, the Pebble Partnership worked with a number of Alaska-based consultants to manage an ongoing program of surface water and groundwater quality data collection at key locations within the Pebble Project deposit area. [Ex. 3120 at PLP 4045.] For the timeframe of 2004 to 2007, Report Series F contains approximately 72,000 data points for surface water, 29,000 data points for groundwater and another 30,000 data points for seeps in the Pebble area. [Stelljes at Tr. 1500, 1502-04; Ex. 3120.] Out of over 100,000 data points, Dr. Zamzow located and testified about anomalous water quality conditions in only three groundwater monitoring wells: PQ4, SRK5M and MW5D. [Zamzow at Tr. 1013-21.] Further, none of the anomalous data points can be considered reliable and therefore cannot demonstrate that exploration drilling has caused any contamination.

a. *Well PQ4.*

Monitoring well PQ4 is located inside the mineralized Pebble deposit area near the discovery outcrop. [Stelljes at Tr. 1504; Zamzow at Tr. 1013; Ex. 3120 at PLP 4478.] The well is set into mineralized bedrock and reflects the quality of water flowing through that rock layer. [Zamzow at Tr. 1013.] From November 2005 to March 2007, the field data for PQ4 show that pH levels declined from 6.31 to 4.39 and then from March 2007 to November 2007 pH increased to 4.87.[39] [Ex. 3120 at PLP 4484; Zamzow at Tr. 1013.] Dr. Zamzow testified that during that timeframe ferrous iron was released, there was an

[39] The pH scale goes from 0 to 14, with 0 being acidic and 14 being alkaline. [Zamzow at Tr. 1084-85.] Neutral water for aquatic life is between 6 and 8.5. [Zamzow at Tr. 1085-86.]

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oxic environment and the lab results showed an increase in dissolved copper. [Zamzow at Tr. 1015; Ex. 3120 at PLP 4484, 4548.]

Based on her analysis of the groundwater quality data at PQ4, Dr. Zamzow testified that "[i]n this case, it seems, **I'm guessing**, that **possibly** what you're seeing is an influence from opening up fresh rock to water and oxygen. . . . I'm open to discussion on that, but that would be my interpretation." [Zamzow at Tr. 1014-15 (emphasis added).] Dr. Zamzow further qualified her answer on cross-examination:

> Q: So, on Friday when you said you guessed that possibly it is due to drilling the well, was that an understatement on your part on Friday?
>
> A: It could be due to drilling the well. It could be due to receiving material in the aquifer from other wells around it. It could be due to receiving water that has not intersected other holes. Those are all options.
>
> Q: And it could be due to natural variability in the groundwater?
>
> A: That is the third one that I mentioned.
>
> **Q: And are you comfortable quantifying the likelihood of the various options based on this data set?**
>
> **A: No.** [Zamzow at Tr. 1097-98 (emphasis added).]

Dr. Zamzow also testified that an ARD reaction is only "one way" to see increases in ferrous iron; she admitted that "[t]here are other ways also." [Zamzow at Tr. 1088.] While there appears to have been some water quality fluctuations in well PQ4, Dr. Zamzow's opinion about the cause of those fluctuations is speculative and she admits that it could be due to natural variability. Accordingly, her opinion is not persuasive.[40]

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[40] *See* cases cited *supra* note 37.

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Additionally, there is outlier data in the sample results that Dr. Zamzow analyzed, which further calls her opinion into question. Outliers are data points that do not conform to the distribution of the data set and are determined to be not representative in the sample so the value is discarded and not used quantitatively. [Stelljes at Tr. 1541; Zamzow at Tr. 1090-91.] In general, scientists follow a quality assurance process that eliminates unreliable outlier values. [Zamzow at Tr. 1090-91.] Report Series F has undergone two out of the three steps for data validation and quality control. [Stelljes at Tr. 1539-40.] The data has been screened and validated by the laboratory and by an independent firm. [Stelljes at Tr. 1539-40.] However, the data set has not undergone a statistical review for unreliable outlier data points.[41] [Stelljes at Tr. 1540.] The preliminary nature of the data is confirmed by the notice on the top of the lab results which states: "*Preliminary data. Do not cite or quote.*"[42] [Ex. 3120 at PLP 4548 (emphasis in original).]

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[41] Report Series F contains a one-page "Quality Control Overview" which states:

> The quality assurance program is documented for each year of the environmental baseline sampling program by the annual Quality Assurance Program Plan (QAPP). Further details of the analytical method requirements and detection limit criteria utilized for each year of the environmental baseline sampling program can be found in the QAPP. [Ex. 3120 at PLP 4638.]

The one-page quality control overview is not the QAPP and there is no evidence that the one-page summary fully describes the quality assurance/quality control process that has been applied to the data in Report Series F.

[42] With regard to this language, Plaintiffs' fisheries expert, Dr. Carol Ann Woody, admitted: "It appears that the Pebble Limited Partnership has further QA/QC to do on some of the information, which is cited do not cite, or you're not allowed to cite or quote any of it." [Woody at Tr. 1319.]

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The lab results for dissolved copper for well PQ4 shows an outlier data entry for May 12, 2007. [Ex. 3120 at PLP 4548; Zamzow at Tr. 1090.] On that date, dissolved copper decreased by orders of magnitude from the prior sample date, and then increased by orders of magnitude for the very next sample date. [Ex. 3120 at PLP 4548.] Dr. Zamzow apparently relied on this outlier data for her opinion that the lab results show an increase in dissolved copper. Although Dr. Zamzow admitted that she does not know whether the low dissolved copper value on May 12, 2007 is reliable or not, she attempted to explain the event as potentially being caused by "a very strong flush of fresh water."[43] [Zamzow at Tr. 1093.] When asked whether she had ever seen sample values rebound to their former levels as quickly as the dissolved copper did at PQ4, Dr. Zamzow admitted: "Studying groundwater is fairly new to me." [Zamzow at Tr. 1094.]

Dr. Stelljes has been interpreting groundwater quality data for his entire 20-year career, much of which involved water quality analysis for Alaska-based projects. [Stelljes at Tr. 1469, 1476-77.] He testified that Dr. Zamzow's opinions are based on unreliable outlier data from well PQ4. [Stelljes at Tr. 1541-42.]

> Q: Having looked at what she relied on for her opinions regarding PQ4, do you agree with Dr. Zamzow?
> A: No, I do not.
> Q: Can you explain why?
> A: PQ4 is one of the four – the specific date of sampling that Dr. Zamzow discussed in her testimony is one of four samples out of all of the groundwater samples that were

[43] Dr. Zamzow admitted that the dissolved manganese levels for "May 2007 does not look reliable," but she does not explain why the anomalous copper data for the same date is reliable. [Zamzow at Tr. 1097.]

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> collected over this four-year period that were outside of these control limits, and the whole sample was tossed out as not being representative. In other words, it was probably just incorrectly reported.
>
> Q: So it's an error?
>
> A: So it's basically a not applicable sample to be looking at, because it would not be included in any quantitative data evaluation that would be conducted.
>
> Q: And based on your experience as a toxicologist in this field, trained to look at this kind of data, is that result at PQ4 something that should have been a red flag to you?
>
> A: Certainly. Most of the concentrations were orders of magnitude different from any of the other concentrations in the rest of the 35 samples collected at that location.
>
> Q: So even without a separate statistical review of that, what would your conclusion have been about that sample looking at that data that was available?
>
> A: That there was probably something wrong with the sample, because almost none of the numbers conform with any of the other numbers. [Stelljes at Tr. 1541-42.]

This Court finds that in forming her opinions about the cause of the water quality fluctuations at well PQ4, Dr. Zamzow relied on unreliable outlier data that should not be included in a quantitative data analysis. Accordingly, there is insufficient evidence for this Court to find that Pebble's drilling operations in fact caused a change in water quality at well PQ4.[44] Even if exploration operations did cause a chemical change in well PQ4, there is no evidence to suggest such a change caused any harm to organisms or other users.

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[44] *See* cases cited *supra* note 36. *See also Renaud*, 749 F. Supp. at 1552-53 (declining to admit plaintiff's expert's opinion based on the use of a single data point to extrapolate a continuous release of contaminants over an 11-year time period when the court-appointed expert stated in her report that "it is unsound scientific practice to select one concentration measured at a single location and point in time and apply it to describe continuous releases of contaminants over an 11-year time period").

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b. *Well SRK5M.*

Dr. Zamzow testified that field analysis for monitoring well SRK5M shows that it typically displays a stable water chemistry with a pH slightly below neutral. [Zamzow at Tr. 1017; Ex. 3120 at PLP 4485.] However, on August 18, 2007, the field data shows that there was a dip in the pH from around 6.5 to 3.47. [Zamzow at Tr. 1017; Ex. 3120 at PLP 4485.] Out of 14 field data entries for pH, all of them are fairly consistent except for the August 18, 2007 entry, which is substantially lower. [Zamzow at Tr. 1017; Ex. 3120 at PLP 4485.] The lab chemistry also shows that from 2004 until November 2007, there are low concentrations of total and dissolved metals. [Zamzow at Tr. 1018; Ex. 3120 at PLP 4555.] But on one date, May 12, 2007, the total and dissolved metals increase by two orders of magnitude. [Zamzow at Tr. 1018; Ex. 3120 at PLP 4555.]

Dr. Zamzow's opinion is that this lab chemistry indicates that an acid moved through the monitoring location in May 2007. [Zamzow at Tr. 1019.] But the field data shows that acid conditions did not exist at the well until three months later in August 2007. The pH in May 2007 was within the normal range of variability for the well. [Ex. 3120 at PLP 4485.] Dr. Zamzow believes that the only explanation for why the dissolved metals increased in May and the pH drops three months later in August is because the field data or lab data was attributed to the wrong date since it would be consistent to have the pH drop and the metals rise at the same time. [Zamzow at Tr. 1018-1019.]

Dr. Zamzow testified that she has never seen the metals go up three months before the pH goes down, because increased acidity is what drives increased metal

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concentrations. [Zamzow at Tr. 1099-1100.] Thus, the lower pH is supposed to be the cause of leaching the metals out and increasing the dissolved metals concentrations. [Zamzow at Tr. 1100.] Dr. Zamzow's analysis is that someone must have made a mistake on the dates when entering the data for monitoring well SRK5M. [Zamzow at Tr. 1099-1100.] Her opinion is that the well received dissolved metals and acid from outside the well that moved through the aquifer. [Zamzow at Tr. 1101-02.] She suspects that the May 2007 date is correct because that is when there is snow melt and the water table rises, making it more likely that something moved through the aquifer that well SRK5M picked up. [Zamzow at Tr. 1101-02.]

Dr. Zamzow's opinion that a data entry mistake was made is unconvincing. Monitoring wells SRK5M and PQ4 are located within one-half to three quarters of a mile of one another and PQ4 also shows some anomalous data on May 12, 2007. [Zamzow at Tr. 1100-01.] Whatever produced the anomalies, however, caused opposite water quality affects in the wells—PQ4 shows *decreased* dissolved metals in May 2007 and SRK5M shows *increased* dissolved metals for the same date. [Ex. 3120 at PLP 4548, 4555.] There was no credible evidence presented at trial explaining how a flush of water in May 2007 could produce significantly different dissolved metals concentrations in two monitoring wells located within less than one mile of the other. A more likely explanation is that the data points that Dr. Zamzow relied on are outliers which have not yet been eliminated through statistical review.

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Dr. Zamzow even admitted that the pH value of 3.37 on August 18, 2007 may be an outlier, stating "[i]t could be bad data." [Zamzow at Tr. 1108.] Dr. Stelljes testified that the August 18, 2007 pH reading from SRK5M is in fact an outlier. [Stelljes at Tr. 1544.]

> Q: Does that refresh your recollection about the data sampling at SRK5M?
>
> A: Yes, it does. Thank you. There is one data point from August 18th of 2007 that has a very low pH of 3.37. All of the other pHs measured at SRK5M are between 5.85 and 6.89. And, again, the same outlier analysis when applied to this 3.37 shows that that's outside of control limits and would be not quantitatively addressed in any kind of a data analysis.
>
> Q: Is it acceptable practice or standard practice to rely on a single isolated data point to offer a conclusion about water chemistry in your field, sir?
>
> A: Not unless there has only been one sample collected. You tend to look at – the more samples you collect, the better able you are to understand the system. And at this site, there has been more samples collected on water quality than any site I have worked on in my 20 years. The water is some of the cleanest water I have seen in both groundwater and surface water anywhere I have worked. [Stelljes at Tr. 1543-44; Ex. 3120 at PLP 4485.]

Even if SRK5M's low pH value for August was actually the pH value for May 2007, as Dr. Zamzow suggests, and assuming that the May 2007 lab data is in fact reliable, Dr. Zamzow admitted that these anomalies may not be caused by exploration activity. Indeed, Dr. Zamzow admitted that the low pH and increase in dissolved metals concentrations could be caused from a "natural fracture" in the bedrock. [Zamzow at Tr. 1019, 1109.] Notably, Dr. Zamzow admitted that she does not think it is possible to tell in

a lot of cases whether the variability in water chemistry is caused by natural variations or from exploration drilling. [Zamzow at Tr. 1109-10.]

This Court finds that there is insufficient evidence to determine whether the water quality data for monitoring well SRK5M is reliable, and even if it is, there is no evidence that the variations in water chemistry were in fact caused by Pebble's exploration drilling program, or that such variations caused any harm to organisms or other users.

c. Well MW5D.

Monitoring well MW5D is located just south of the mineral deposit. [Stelljes at Tr. 1504; Ex. 3120 at PLP 4478.] The field data for MW5D shows an initial pH of 10 which decreases over approximately one year, at which point it reaches a relatively stable pH ranging from 7.08 to 6.20. [Ex. 3120 at PLP 4481.] Dr. Zamzow testified that the oxidation reduction potential ("ORP") data is unusual for this well in that it goes from a strong negative to a strong positive over a couple years, which she believes shows that there has been an introduction of air and oxygen into the system. [Zamzow at Tr. 1021; Ex. 3120 at PLP 4481.] Dr. Zamzow also notes that the ferrous iron increases, which may indicate acid rock drainage or bacteria. [Zamzow at Tr. 1021.]

The decrease in pH from 10 to a neutral state is not likely from ARD. The most likely explanation for the initial high pH in MW5D is that bentonite contaminated the screened interval and the alkalinity is reflected in the field pH data. Dr. Zamzow admitted that the high pH "could simply be some sort of alkaline contamination and then a dilution to pH 7, and we have now reached equilibrium . . . ." [Zamzow at Tr. 1021.] Drs. Stelljes

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and Moran agree. Dr. Moran analyzed the anomalous pH conditions in MW5D and concluded that it is not necessarily an indicator of ARD. [Moran at Tr. 730 ("Q: But [the last data entry for MW5D] doesn't indicate that there is any evidence of acid rock drainage as of the date of that sample entry, correct? A: That's correct.").] As for the drop in pH from 10 to about 7, Dr. Moran stated that he "can't tell" whether it is evidence of ARD generation because there is not enough data to determine whether the pH continued to drop or if it stabilized at around 7. [Moran at Tr. 749.] He also concluded that the high pH likely resulted from contamination of the screened interval by grout or cement. [Moran at Tr. 729.]

Dr. Stelljes similarly testified that MW5D initially displayed a high pH because there was likely "a small piece of bentonite" in the screened interval left over from installing the well. [Stelljes at Tr. 1527.] The first few measurements taken reflect the alkaline nature of the bentonite, but eventually water in the screened interval came to equilibrium at a neutral pH. [Stelljes at Tr. 1527.] Dr. Stelljes testified that the data for MW5D indicates that ARD is not occurring at the monitoring well:

> Q: Based on the data you have reviewed, the data points for MW5D, does that indicate to you there is acid rock drainage occurring at that monitoring well location?
> A: No, not at all. As a matter of fact, the pH is basic as opposed to acidic. [Stelljes at Tr. 1528.]

Additionally, Dr. Stelljes testified that the initial high pH for MW5D is an outlier data point that does not conform to control limits and would not be considered in a qualitative analysis in any event:

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> Q: Regarding Dr. Zamzow's testimony concerning MW5D, we have already talked about a little bit, did you agree with her testimony that the pH trend there showed possibly acid rock drainage?
>
> A: No, I do not.
>
> Q: And why not?
>
> A: Again, the pH sample, that high one that I talked about at the beginning earlier with the 9.8 whatever was also identified as one of those outliers that doesn't conform with control limits. [Stelljes at Tr. 1542-43.]

Because Dr. Zamzow has relied on outlier data and admitted that the pH fluctuation is most likely caused from bentonite and not ARD, there is insufficient evidence to find that Pebble's drilling operation has impacted groundwater quality at MW5D.

In fact, Dr. Stelljes testified that the water quality data in Report Series F—for both surface water and groundwater—shows that the water at Pebble is stable and pure. Specifically, he testified that "at this site, there has been more samples collected on water quality than any site I have worked in my 20 years. The water is some of the cleanest water I have seen in both groundwater and surface water anywhere I have worked." [Stelljes at Tr. 1544.] Dr. Stelljes recognized that although there is seasonal variability in the water quality data, when that data is viewed over time it demonstrates that the water chemistry is consistent and stable. [Stelljes at Tr. 1522.] Although the concentrations may go up and down, it is remarkably consistent in those patterns. [Stelljes at Tr. 1523.] Based on his review of all the groundwater quality data, Dr. Stelljes determined that there is no indication of ARD or permanent harm to water quality:

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> Q: And did you find any of the data for the groundwater monitoring wells that indicated the chemical fingerprint of acid rock drainage?
>
> A: No. I was not able to find any such signature.
>
> Q: How many groundwater sampling locations did you look at?
>
> A: I looked at all of the 37 sampling locations that had been repeatedly sampled.
>
> Q: How many data points did you look at?
>
> A: Way too many. About 29,000.
>
> Q: Based on this analysis, do you have an opinion about whether the exploration activities have adversely impacted or impaired the water quality at the Pebble site?
>
> A: Yes, I do have an opinion.
>
> Q: What is your opinion, Dr. Stelljes?
>
> A: That there has been no, neither permanent harm nor any harm that we have been able to identity in the water quality.
>
> Q: And does that apply both to the surface – does that opinion hold for surface water quality as well?
>
> A: Yes, it does, surface water quality, seep quality and groundwater quality. [Stelljes at Tr. 1529.]

Since there has been no impairment to water quality, Dr. Stelljes's opinion is that there has been no permanent harm or impact to any living organisms, including the fish resources or habitat at Pebble, as a result of exploration activities. [Stelljes at Tr. 1529.]

Given Plaintiffs' experts' speculative testimony on the water quality data at Pebble, this Court finds that there is insufficient evidence to conclude that the exploration activities have in fact caused any impact to the surface water or groundwater at the Pebble study area.[45] Plaintiffs have failed to discharge their burden of production as to this issue. Moreover, contrary to the Plaintiffs' assertions, the weight of the evidence

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[45] *See* cases cited *supra* note 37.

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tends to show that exploration activities are not changing water quality in the Pebble study area.

d. Effect of Plugging Drill Holes.

Even if Pebble's core holes had the potential to create ARD significantly greater than naturally occurring in the area, Plaintiffs' experts agree that properly plugging a drill hole will either greatly minimize acid rock generation or stop it completely. [Zamzow at Tr. 1117; Moran at Tr. 696, 741.] It is Pebble's stated policy to plug every hole it drills, no matter how deep, from the bottom to the top, unless the hole is going to be used for water monitoring purposes. [Wober at Tr. 245, 247-49, 252; *see, e.g.,* Ex. 2043 at SOA 005275 (stating in MLUP application that "[u]pon completion all bore holes will be plugged with Bentonite or equivalent slurry from top to bottom").] In fact, Pebble's MLUP requires it to plug or cement the drill holes as part of the reclamation process. [Ex. 2043-2045; Wober at Tr. 253, 341; Taylor at Tr. 771.] Consistent with standard industry procedure, Pebble understands this permit condition to require plugging from the bottom of the hole to the top. [Wober at Tr. 253, 341-42.]

To that end, Pebble requires its drilling contractors to plug all holes from top to bottom using grout, which is a mixture of bentonite and cement. [Wober at Tr. 248, 344.] Pebble's plugging methods are consistent with Dr. Moran's recommendations. [Moran at Tr. 731.] Persuasive on this point is the fact that it is also in Pebble's own business interest to plug the holes properly. If there is future development of the Pebble deposit,

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open drill holes could impact blasting patterns or create water control problems for underground mining operations that intersect the drill shaft. [Wober at Tr. 341-42.]

There was some direct testimony on whether core holes were observed to be plugged at the Pebble site. Rick Delkittie, a former reclamation crew employee, and Ronald Benkert, a State employee who performed site inspections at Pebble, testified that they observed drill casings that were open at the top and did not appear to have plug material within plain sight of the open hole. [Delkittie at Tr. 970; Benkert at Tr. 1819-20.] However, Mr. Delkittie admitted that he did not know whether the core holes remained "open" because they contained monitoring instrumentation or whether Pebble came in later and plugged them. [Delkittie at Tr. 977-78.] He also failed to state whether the plug material was simply out of sight because the hole was too dark to see down the casing. The MLUP permit conditions provide that the drill holes must be plugged for a minimum of 10 feet within the top 20 feet of the drill hole. [Exs. 2043-2045.] Mr. Benkert admits that although some of the drill casings did not have plug material all the way to the top, they may have been plugged to within several feet from the top, yet not visible without a flashlight because the hole goes dark after a couple of feet. [Benkert at Tr. 1820.] Testimony about seeing bore holes with open casings, therefore, is inconclusive as to whether or not the hole is actually plugged or if it was plugged at a later time.

There were two other sources of information presented at trial that purport to inform whether or not a particular drill hole has been plugged or not: geology logs and

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driller timesheets. Of the two, driller timesheets are the most reliable. Driller timesheets are created in the field by the drill operators and are kept contemporaneously with the drilling operation. [Wober at Tr. 211.] Driller timesheets may indicate whether a hole has been plugged either by expressly saying so or by reflecting the use of material that drillers utilize to plug the drill holes. [Wober at Tr. 211, 213, 216, 344, 358; *see, e.g.,* Ex. 3121 at PLP 25967 (Boart Longyear driller timesheet indicating Hole 7367 was plugged), Ex. 3122 at PLP 30174 (Foundex driller timesheet indicating that Hole GH-08-110 was plugged), Ex. 3123 (Quest driller timesheet indicating Hole 9458 was plugged), Ex. 525 at PLP 25458 (Boart Longyear noting "Hole finished" and use of 75 bags of Volclay Grout).] The drillers creating the timesheets have personal knowledge of whether a hole has been plugged or not because they are the ones actually doing the plugging. [Wober at Tr. 211, 216-17, 344.] Thus, the driller's timesheets are the most reliable documents for determining what activities have taken place at a particular drill site. [Wober at Tr. 344.]

In contrast, geology logs are forms that are filled in by Pebble geologists that work in the "core shack" in Iliamna, which is 20 miles away from the drilling operations. [Wober at Tr. 209.] The purpose of a geology log is to describe the rock characteristics of the drill core sample as analyzed by a geologist. [Wober at Tr. 208.] The log is a fill-in-the-blank form and, from 2002 to June 2009, it contained a field for entering whether the drill hole from which the core sample was taken has been plugged or cemented.[46] [*See*

[46] The geology log forms from August 2009 forward do not have a field for entering whether the core hole was plugged or cemented. [*See* Ex. 913 at PLP 48086-48177); Wober at Tr. 228.]

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Ex. 913 at PLP 47489-48085.] The geologist completing the form, however, does not work at the drill site and generally does not have personal knowledge of whether the particular drill hole has actually been plugged or not. [Wober at Tr. 209.] For this reason, geology logs do not regularly report one way or another whether a hole has been plugged. [Wober at Tr. 211.] Indeed, the field for "plugged" or "cemented" is left blank in a vast majority of the forms. [*See, e.g.*, Ex. 913.] When filling out the log, the geologist does not consult or transfer information from the driller timesheets. [Wober at Tr. 215, 217-18.] Indeed, there is no connection at all between the driller timesheets and the geology log. [Wober at Tr. 218.]

Nevertheless, some of the geology logs contain affirmative statements of whether a drill hole has been plugged, cemented or neither. [Ex. 913.] But the affirmative entries were shown to be frequently incorrect. [Wober at Tr. 226.] For example, some geology logs contain affirmative statements that a hole is not plugged when, in fact, the hole has been plugged as demonstrated by the driller timesheets. [Wober at Tr. 226-27; *compare, e.g.,* Ex. 913 at PLP 47861 (geology log indicating Hole 7367 is not cemented or plugged), *with* Ex. 3121 at PLP 25967 (driller timesheet indicating Hole 7367 was plugged).] Thus, even where the geology logs contain an affirmative statement of plugged or not plugged, the information is inaccurate and therefore not reliable. In the absence of direct testimony, the driller timesheets are the best evidence on whether a hole has been plugged or not.

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The driller timesheets go back to 2006 and generally demonstrate that the core holes are plugged. [Wober at Tr. 230; Ex. 525.] For the period before 2006, Plaintiffs have not presented any convincing evidence of whether those holes have been plugged or not. Additionally, with regard to the holes that the geology logs have made no affirmative statement about plugging, Plaintiffs have not made any attempt to present evidence that the omission means that the hole was left open. Without that direct evidence, this Court declines to the make the inference that holes prior to 2006 were left open.

This Court finds, based on the driller timesheets, Mr. Wober's testimony, and the economic incentive to plug the holes, that most of the core holes drilled at the Pebble site since 2006 have been plugged. [Ex. 525.] Because the holes have generally been plugged, the likelihood of acid rock generation is substantially reduced or stopped altogether. But even if all of the holes were left unplugged, the evidence and testimony before this Court is insufficient to find that ARD is in fact occurring or likely to occur greater than it naturally occurs as a result of Pebble's exploration drill holes. If the holes were unplugged and this was causing ARD, the Court finds that the water quality data would show signs of ARD. The water quality data, however, does not support a conclusion that ARD is occurring.

2. Alleged Acid Rock Drainage from Drill Cuttings.

Dr. Zamzow testified that drill cuttings that remain in sump pits or that are discharged to the tundra are another potential source of ARD and contamination. [Zamzow at Tr. 1026.] Core hole drilling uses a diamond drill bit which creates a fine

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cutting that needs to be floated to the surface of the drill hole. Once the drill cuttings are floated to the surface, they are carried along the drainage ditch with the return water and deposited into the sumps where the cuttings are allowed to fall out of suspension. The drill cuttings that remain in the reclaimed sumps consist of the same bedrock material that is intersected while drilling.

Dr. Chambers and Dr. Zamzow testified for Plaintiffs about the potential contamination resulting from drill cuttings that remain in the sump pits. Dr. Chambers testified that generation of ARD and metals leaching is a possibility and presents a "potentially significant" risk. [Chambers at Tr. 930.] Dr. Chambers, however, did not testify about any actual ARD or contamination resulting from the sump pits. He only testified that it was theoretically possible and presents a risk.

Dr. Zamzow similarly testified that sump pits are a potential source of ARD contamination. [Zamzow at Tr. 1026.] Dr. Zamzow's opinion is based, at least in part, on a study which used a "column test" to determine that reactive tailings from the Pebble mineral deposit will generate ARD within 1 to 75 years under laboratory conditions. [Zamzow at Tr. 1028-29.] Dr. Zamzow admits that "what happens in reality can often be very different" than what happens in a controlled testing environment. [Zamzow at Tr. 1029.] She admits that the sumps are not under the same laboratory conditions as the column test and that the reactive material is, in reality, mixed with bentonite clay and other drilling additives which may inhibit or stop acid rock generation. [Zamzow at Tr. 1114-15.]

Dr. Zamzow and Dr. Chambers did not present any evidence that the drill cuttings in the sump pits are in fact causing ARD or any other kind of contamination. Dr. Zamzow admits that there is no water quality data for the sumps, and that her testimony about ARD contamination is only informed speculation and hypothesis that is not based on any data or observation from the Pebble site. [Zamzow at Tr. 1134.] Speculative testimony, even from a scientist, is still speculation.[47] Dr. Zamzow indicated that she would like to have seen the sumps sampled. [Zamzow at Tr. 1134.] Without the benefit of any sampling data, however, this Court cannot find that the drill cuttings in the sumps are in fact generating ARD contamination.

Even if the sumps were generating ARD, there is no evidence that the contamination is migrating to areas that may expose living organisms to harm. Dr. Zamzow admitted that she does not have enough data or information to say whether the contaminants would migrate out of the sumps or not, noting that "[i]t's something you would really have to measure. It's something that would be really hypothetical to say it moves or doesn't move." [Zamzow at Tr. 1027.] Dr. Zamzow also admitted that the sumps contain drill muds which can coat the sides of the sumps and slow or prevent infiltration and migration of contaminants. [Zamzow at Tr. 1027.]

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[47] *Rosen,* 78 F.3d at 318 (stating that a judge "asked to admit scientific evidence must determine whether the evidence is genuinely scientific, as distinct from being unscientific speculation offered by a genuine scientist"); *Pomella,* 899 F. Supp. at 342 ("[A]n expert's opinion must be supported by 'more than subjective belief and unsupported speculation' and should be supported by 'good grounds,' based on what is known.").

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The Court finds that the evidence presented is insufficient to conclude that the sump pits are in fact generating ARD contamination. Even if the pits are generating ARD, there is no evidence that such contamination is actually migrating to an area in concentrations that may cause harm to a living organism.

3. Alleged Impacts from Discharge of Drilling Muds and Fluids.

Plaintiffs allege that use and discharge of drilling muds and additives during the exploration process have contaminated the Pebble study area. Pebble's water quality data, however, does not indicate that surface water or groundwater in and around the study area have been contaminated by exploration activities. Plaintiffs' experts concede that the surface waters outside the mineralized area are pure. [Zamzow at Tr. 1006, 1082, 1122-23; Woody at Tr. 1319.] Dr. Stelljes testified that the surface water and groundwater is stable and some of the cleanest he has seen in 20 years of analyzing water quality data. [Stelljes at Tr. 1521, 1544.]

Without relying on any Pebble-specific data, Dr. Moran testified that it is his opinion that the discharge of drilling muds and bore hole residues into unlined sumps contaminates groundwater and surface water at Pebble. [Moran at Tr. 717.] Dr. Moran, however, admitted that his opinion is based on observations from drill sites other than at Pebble and on Gordon De Husson's testimony, whose credibility was impeached at trial.[48] [Moran at Tr. 718.] Dr. Moran admitted that there is no Pebble-specific data

[48] *See infra* discussion pp. 75-79.

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showing that contamination at levels harmful to organisms has ever in fact occurred at the site in an area where an exposure could take place:

> Q: . . . [W]hen you testified that there is a potential for contamination from drilling muds on the surface, you do not have any Pebble-specific data that shows contamination at toxic levels harmful to organisms has occurred, correct?
>
> A: I do not.
>
> Q: And you have no Pebble-specific data that at any drill hole location there is actually a level of contamination in the groundwater that would present a risk of toxicity to organisms?
>
> A: No, I wouldn't say that.
>
> Q: You have data that you are relying on for an opinion here today that there is a level of toxicity in the groundwater that is harmful to organisms?
>
> A: I think in my review of the summary data that I have seen there are several monitoring wells that show levels of metals and other anions that if freshwater fish were exposed to them, those would be toxic. Now, admittedly, they are in the groundwater, they are not in the surface water.
>
> Q: Right. There are no fish in the groundwater, correct, sir?
>
> A: I agree. [Moran at Tr. 734-735.]

Given these admissions, this Court finds that there is no scientific data establishing that the discharge of drilling muds at Pebble has, more likely than not, caused toxic levels of contamination to be present in an area where a living organism could be exposed to it.

Testimony from Dr. Stelljes and Allan Nakanishi demonstrates why it is unlikely that Pebble's prior use of EZ-Mud Plus would cause any contamination or environmental harm to the Pebble study area. EZ-Mud Plus is an emulsion consisting of 25 percent petroleum distillates, which are paraffins, and 75 percent polyacrylamide, a gel-type substance. [Stelljes at Tr. 1534; Nakanishi at Tr. 1200.] The constituents in EZ-Mud Plus

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serve two different purposes. The purpose of the paraffin is to seal the holes and cracks in the core hole walls as the drill bit continues down. [Stelljes at Tr. 1536.] If it is working properly, much of the paraffin will remain in the drill hole sealing the core hole walls and will not enter the subsurface. [Stelljes at Tr. 1536.] The purpose of the polyacrylamide is to float the drill cuttings to the surface. [Stelljes at Tr. 1536.]

Given Pebble's sump system, which settles solids out of suspension, whatever material does come back to the surface will either be entombed in the soil or spread on the tundra surface where it will degrade in one to six months. [Stelljes at Tr. 1536-1537.] When polyacrylamide degrades, it can create ammonia. [Stelljes at Tr. 1537.] But Dr. Stelljes testified: "We looked at the concentrations of ammonia in all 29,000 of these data, or all of the groundwater samples and found no evidence that there is elevated ammonia associated with any of the areas that have been drilled." [Stelljes at Tr. 1537.] He also testified that the likelihood that the EZ-Mud Plus chemical compounds would migrate from the sump pits is "[e]ssentially zero." [Stelljes at Tr. 1537.] Thus, with regard to the toxic effect of EZ-Mud on the surrounding ecological system, Dr. Stelljes testified that if it is buried "the exposure is zero" and therefore "the toxic effects would also be zero." [Stelljes at Tr. 1537.]

Consistent with Dr. Stelljes' opinion, the State conducted a qualitative analysis of EZ-Mud Plus and determined that it would be unlikely for the additive to reach a water body in concentrations that would be toxic to fish. [Nakanishi at Tr. 1197-98.] Allan Nakanishi, a technical engineer with DEC's wastewater discharge program, testified:

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> So, what we determined was that between the bore hole and the water body, you would have to have a dilution of about a little over 200 times dilution factor to occur within 100 feet between the bore hole and the surface water. And we determined that that was highly likely to occur, given the amount of dilution – that would occur between the drill hole and the water body, adsorptive effects of the material, and natural attenuation, natural bacterial breakdown of that material as it was traveling through – through the subsurface in groundwater. So, given those factors, we qualitatively determined that it was unlikely for the drilling additive to reach a water body at a level that would be toxic to fish. [Nakanishi at Tr. 1197-98.]

Plaintiffs' map expert, Dr. Smith, provided testimony that he mapped the locations of all the exploration drill sites and found that some were within the 100-foot buffer. [Smith at Tr. 476-77.] However, there was no direct, eye-witness testimony or documentary evidence of any particular site that was inside the 100-foot buffer zone. Indeed, of all the witnesses who have visited the site and testified at trial, not a single one observed a drill rig within 100 feet of a water source. [*See, e.g.,* Gleitsmann at Tr. 2187; Nakanishi at Tr. 1200; *see also* Exs. 2000-2031 (State inspection reports).] Without some corroborating evidence of a rig within the 100 foot buffer zone, it is difficult for the Court to conclude that, more likely than not, a drill rig was within the 100 foot buffer.

Even if there were drill holes inside the 100-foot buffer zone, there is no evidence that the drilling activity associated with those sites in fact contaminated surface waters at a level toxic to aquatic life. Indeed, there is no evidence that the water sources near the several drill rigs Dr. Smith identified as being within the buffer zone even contained aquatic life. Moreover, even if contamination has in fact occurred, it was temporary in

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nature because the most harmful constituent in EZ-Mud Plus will degrade in one to six months' time, and there was no evidence of any drill site with contaminated water nearby.

Similarly, there is no evidence of any long-term, harmful environmental impact from the use of Quick-Gel during exploration drilling operations. Quick-Gel is a drilling mud comprised of about 95 percent bentonite, which is "essentially clay." [Stelljes at Tr. 1538.] Dr. Stelljes testified that bentonite clay will not contaminate groundwater because it is nearly insoluble, will settle out of suspension when given the chance to do so and because its purpose is to seal the drill hole. [Stelljes at Tr. 1538.] Indeed, one of the properties of bentonite is that the clay particulates will adhere to rock surfaces. [Wober at Tr. 284.] Therefore, it is very unlikely that bentonite left in the reclaimed sumps will migrate or contaminate water quality. [Stelljes at Tr. 1539.]

> Q: And how about the drilling fluids when they are taken out of the hole and put in the pits, what is the risk that bentonite poses to the ecological system if it's in the pits?
>
> A: Well, again, because the pits would end up being covered with soil and backfill, the risk would be essentially zero because, again, you have no exposure, so you have got no toxic effects. [Stelljes at Tr. 1539.]

Although Dr. Zamzow admitted that bentonite is not reactive, she testified that it has the potential to donate sodium ions to the environment. [Zamzow at Tr. 1037.] Dr. Zamzow surmised that this may be why some of the areas were having trouble revegetating, but admitted that she could not be sure until actual measurements were taken:

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> [Bentonite] has the ability to contribute sodium to the environment. I suspect if somebody took a sample of the soil around some of the areas that they have had difficulty revegetating, they would find some high sodium. Again, you can't tell why something is happening until you actually measure, take measurements, soil samples or water samples. [Zamzow at Tr. 1030.]

Nunamta, however, has not presented any evidence of studies establishing that bentonite has in fact killed vegetation at the Pebble site. To the contrary, photographs from a State inspection report depict green grass shoots growing around a clump of bentonite clay. [Ex. 2003 at 15 of 18; Benkert at Tr. 1818-19 (stating no impact from presence of clay).] Even assuming that bentonite has caused damage to vegetation at the Pebble site, there is no evidence that the damage is long-term or permanent. Therefore, this Court finds that Nunamta has failed to produce sufficient evidence demonstrating that the use of drilling muds and additives at the Pebble study area has in fact contaminated the area or caused any long-term environmental harm.

4. Pebble's Water Withdrawals to Support Drilling Operations were Insignificant and Temporary; There is No Persuasive Evidence that the Withdrawals Have Caused Any Actual Harm.

The Pebble study area is approximately 350 to 360 square miles and straddles the watersheds for the Nushagak and Kvichak River systems. The Nushagak watershed consists of approximately 13,000 square miles, which includes the Mulchatna River and two tributary streams flowing from the Pebble area—the North and South Forks of the Koktuli River. The Kvichak watershed is about 9,500 square miles and includes Upper Talarik Creek, which flows from its headwaters near the Pebble deposit to Iliamna Lake.

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[Cathcart at Tr. 1574.] There are currently 29 continuously gaged stations throughout the Pebble study area, three of which are operated by USGS. [Cathcart at Tr. 1571.] Stream flow data has been collected at the Pebble study area since 2004. [Cathcart at Tr. 1563, 1573.] The gages provide flow measurements every 15 minutes. [Cathcart at Tr. 1571.] The quantity of hydrology data at the Pebble study area is unprecedented in Alaska. [Cathcart at Tr. 1572.]

Dr. Jamie Cathcart is a hydrologist and testified to the quantity of water extracted for purposes of Pebble's exploration drilling. Dr. Cathcart's testimony is that the volume of water used by Pebble is insignificant when compared to the available water resources at the site. [Cathcart at Tr. 1591.] For each drill site from 2007 to 2009, Dr. Cathcart calculated the amount of water extracted by the drilling operation and the amount of water available from the permitted water source. He then determined the percentage of water used by dividing the amount withdrawn by the amount available. [Cathcart at Tr. 1590.] To determine how much water was extracted, Dr. Cathcart identified the drill hole and the dates of drilling and multiplied the minutes of operation by the pump rate of 15 gpm (gallons per minute). [Cathcart at Tr. 1580.]

In calculating the extraction volumes, Dr. Cathcart made two reasonable assumptions. First, he assumed a 15 gpm pump rate, which is a reasonable estimate because that is an adequate volume of water to perform the functions necessary to conduct drilling activity at the site. [Cathcart at Tr. 1581.] Additionally, Mr. Wober testified that drill rig crews use the "bucket test" to measure the actual rates of flow at

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their drill rig and they generally calculate to be 15 gpm.[49] [Wober at Tr. 314-15, 319-20; Cathcart at Tr. 1581.] Second, Dr. Cathcart assumed that the drill rig and water pump operated every minute of every hour that it was on site. [Cathcart at Tr. 1582.] Although this is unlikely to have happened in reality since there is a period during which the drill rigs are set up and demobilized where no water is being withdrawn, the assumption leads to a conservative estimate because it overstates the amount of water used. [Cathcart at Tr. 1582.]

Dr. Cathcart explained his methodology using drill hole 7386, which was from Pebble's 2008 drill program. [Cathcart at Tr. 1576.] Drill hole 7386 operated for 33 days and drew water from Lincoln Lake east. [Cathcart at Tr. 1579, 1582-83.] The drill rig extracted an estimated 712,800 gallons of water (15 gpm x 47,520 minutes (i.e., 33 days) = 712,800 gallons) over 33 days of exploration activity. [Cathcart at Tr. 1580.] Dr. Cathcart then calculated the amount of water available for extraction from Lincoln Lake

[49] Pebble uses a method called the "bucket test" to determine the flow rate of the water coming to the drill site. [Wober at Tr. 314.] The bucket test is conducted at the drill site and entails using a stopwatch and a 5-gallon bucket to measure how much water is coming from the pump. [Wober at Tr. 314-15, 319-30.] The driller times how long it takes to fill up a 5-gallon bucket with water and determines the gallons per second. The gallons per second rate is then multiplied by 60 seconds to determine the gallons per minute rate. [*See* Wober at Tr. 319-30.] Using the bucket test, Pebble determined that the water flow from the pumps is approximately 15 gallons per minute. [Wober at Tr. 314-15.] Although Pebble may operate using bore hole pumps rated at 22 gpm or even sump pumps rated at 20 to 60 gpm, that does not mean that volume of water is actually withdrawn from the stream and delivered to the site. [Wober at Tr. 316, 320.] The bucket test is used to calculate how much water is actually coming out of the hose; it is not the pumping capacity of the pump. [Wober at Tr. 320.] Sometimes the drill site is located at a higher elevation than the pump intake at the water source. This requires the pump to lift the water up the elevation difference, which thereby decreases the rate of flow at the outtake. [Wober at Tr. 320.] Core drilling with diamond drill bits typically uses water in the order of 5 to 15 gpm. [Cathcart at Tr. 1581.]

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east by determining the volume of the lake and the amount of water being contributed to the lake by the surrounding drainage area over the 33-day period of drilling operations. [Cathcart at Tr. 1583.] With this drill rig, while water was being extracted from the lake for exploration purposes, there was at the same time water coming into the lake which has to be factored into the percentage of use. [Cathcart at Tr. 1583-84.] Between the lake volume and the 33-day inflow, Dr. Cathcart determined that there was 32.8 million gallons of water available at the water source. [Cathcart at Tr. 1590.] Thus, when the water extracted is compared to the water available, Pebble only used 2.17 percent of the water at the source, which would change the water level by less than one inch. [Cathcart at Tr. 1590.] Dr. Cathcart testified that in his opinion as a hydrologist, Pebble's water withdrawal from Lincoln Lake east was not significant. [Cathcart at Tr. 1591.]

Dr. Cathcart performed the same calculations for Pebble's 2007, 2008 and 2009 drilling programs. [Cathcart Tr. 1591.] He presented several tables summarizing the results of his calculations which show the percentage of water withdrawn at the water source and the percentage of water used relative to the nearest downstream water gage. [Cathcart at Tr. 1592.] The percentage of water used at the source was generally below 10 percent, and the water use relative to the downstream gage was typically under 1 percent. [Cathcart at Tr. 1592.] Thus, this Court finds that most of Pebble's water withdrawals were *de minimis* in relation to the amount of water available.

There were some drill rigs in which larger percentages of water were used. For example, one rig used an estimated 41 percent of the water source over 73 days of

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drilling operations. [Cathcart at Tr. 1594.] Dr. Cathcart testified that the reason for the higher percentage water withdrawal was because the water source was a kettle pond which is not generally connected to surface water streams. [Cathcart at Tr. 1595-96.] Despite the larger water withdrawal, Dr. Cathcart testified that the pond would recharge "back to the way it would have been under natural conditions" after less than one year, and possibly within three months given the hydrology at the Pebble study area.[50] [Cathcart at Tr. 1596.] Dr. Cathcart's analysis regarding the recharge of lakes is consistent with the testimony of Ms. Patricia Bettis, one of the State inspectors. Ms. Bettis personally observed a lake that exhibited low water during summer was recharging by fall and was fully recharged by the next spring. [Bettis at Tr. 1740-42.]

Given the rapid recharge rates at the Pebble study area, Dr. Cathcart testified that the water withdrawals associated with Pebble's exploration activities constitute "a temporary change, but not a permanent change" to the hydrological system. [Cathcart at Tr. 1597.] Even in a kettle pond, which has no surface water connection, where 41 percent of the water is pumped out, it would only take between three months and one year for the pond to return to natural conditions such that there would not be any measurable change in the quantity of water in the pond as a result of the drilling

[50] In general, the Pebble study area has a rainy period in the fall and produces high water flows at that time. During the wintertime, the precipitation falls as snow, so the flows drop because there is little or no additional liquid water entering the system at the time. In the spring, the snow melts and the water flows rise again. [Cathcart at Tr. 1570.] The flows typically recede in the warmer, drier summer months until about August and September when the rains return. [Cathcart at Tr. 1570.] The cycle repeats itself each year.

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operation. [Cathcart at Tr. 1596-97, 1612.] Even in the worst case scenario, where a perched kettle pond was completely drained during the winter, the pond would infill with water during spring snow melt. [Cathcart at Tr. 1615.] Thus, Dr. Cathcart concludes that "the change is quite temporary." [Cathcart at Tr. 1597-98.] In fact, in "[a] lot of instances, most of the changes are very temporary. If you're taking water out of a creek, for instance, very shortly after stopping pumping, you wouldn't be able to tell that you had taken water out of the creek." [Cathcart at Tr. 1598.] Even where the water withdrawals occur in consecutive exploration seasons, Dr. Cathcart testified that the withdrawals are still "a temporary effect" and do not constitute a permanent change to the surrounding hydrology. [Cathcart at Tr. 1598.] Plaintiffs did not offer any evidence that reliably contradicted Cathcart's opinions. Thus, this Court finds that Nunamta has failed to show that Pebble's water withdrawals are causing significant or permanent changes to the hydrological system.

Dr. Cathcart also testified that Pebble's water withdrawals do not constitute a permanent removal or disposal of water from the hydrological system. [Cathcart at Tr. 1613-14.] If water is extracted from a lake and used for drilling and then discharged onto the tundra, that water is not lost to the hydrological system. [Cathcart at Tr. 1614.] Once the water is discharged, it "seeps down into the groundwater and therefore it's then returned to the hydrologic system." [Cathcart at Tr. 1614.] The testimony of other witnesses corroborates the fact that discharged water returns to the watershed by percolating through the overburden and into the groundwater. [Bettis at Tr. 1748;

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Prokosch at Tr. 1774-75.] The Court therefore finds that Pebble's water withdrawals do not permanently remove or dispose of water.

Although Pebble's water use may temporarily reduce the volume of water available near the intake, there was no showing that the reduction of water in fact caused harm. Plaintiffs suggest that water withdrawals from small tributaries and ponds can restrict their volume to a degree that spawning or overwintering fish would be impacted. However, there is no reliable evidence that actually occurred at the Pebble study area. Plaintiffs also suggest that water withdrawals can affect water chemistry of the streams by reducing the amount of water available for dilution. Yet, there is no evidence that contaminants are even reaching surface waters. Moreover, Dr. Cathcart's testimony demonstrates that the reduction in flow is nominal, meaning that the reduction in dilution potential is also nominal. Additionally, as a water course moves downstream in the Pebble area, the amount of water generally increases, which will increase the dilution potential. [Cathcart at Tr. 1592.]

The only direct evidence of any harm resulting from a water withdrawal in the Pebble study area is from Gordon De Husson. But Mr. De Husson's reliability was impeached at trial and much of his testimony was either refuted or shown to be an exaggeration. Mr. De Husson worked as a driller's helper at the Pebble Project in 2006 on a Foundex rig and 2008 on a Quest rig. [De Husson at Tr. 540.] Mr. De Husson testified that while working on a Quest rig in early 2008 his drill team pumped its water source, a kettle pond, dry to the point where the pump intake was no longer taking in

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water. [De Husson at Tr. 566.] Mr. De Husson admitted that within a matter of days the water source had recharged to the point that the intake was again reaching water. [De Husson at Tr. 566, 570.] However, he also testified that when they restarted the pump, he opened a valve to purge air from the water lines and "he noticed a lot of fry, at least a couple hundred shooting off into the snowy tundra." [De Husson at Tr. 568.] Mr. De Husson testified that the fry were "little fish" about a half inch in length. [De Husson at Tr. 569.] This testimony was not contradicted, but it was the only incident reported by Mr. De Husson or any other witness of fry being killed.

His testimony on another matter was specifically contradicted by extrinsic evidence, which calls into question the reliability of all of Mr. De Husson's testimony. Mr. De Husson testified about an artesian flow event his Foundex drilling crew encountered in fall 2006. [De Husson at Tr. 548-53.] He testified that his drill intersected with an artesian waterway that spewed water "60, 90 feet in the air for roughly two and a half, three days." [De Husson at Tr. 550.] He also testified that there was so much water as a result of the artesian flow that when a driller stepped off the drilling platform, "he disappeared" in the water. [De Husson at Tr. 552.] Mr. De Husson testified that there was "a good standing 7, 8 feet of water" on the downhill side of the platform. [De Husson at Tr. 553.]

Mr. De Husson's testimony on this incident is not reliable. On cross, Mr. De Husson admitted that the Foundex drill platform is only a few inches off the ground, resting on 12 by 12 wood supports. [De Husson at Tr. 676.] He then made the

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contradictory claim that the platform was lifting off the ground, floating on the water and, at the same time, it was resting on a mound of drill cuttings. [De Husson at Tr. 678.] Pebble witness Lars Gleitsmann, who is familiar with the setup of Foundex drill rigs contradicted De Husson's testimony:

> Q: And so first, do the tundra mats there, do they sit right on the ground at a Foundex rig that you saw?
> A: Oh, yeah, the tundra mats, the screwed-together two-by-four structures, they are placed right on the ground.
> Q: Did you see any Foundex rigs that are up on stilts 6 or 10 feet off the ground?
> A: No.
> Q: Did you see any Foundex rigs that were sitting on an island of cuttings?
> A: No, absolutely not. They all looked like this with the tundra mat. They are like 8 by 16 feet, two-by-four structures right on the ground, and the drill rig is on a steel frame that sits on the tundra mat on the wooden – right on the ground. [Gleitsmann at Tr. 2139-40.]

Mr. Gleitsmann further testified that the Foundex rigs do not generate much material during their drilling activity—only about one and a half to two cubic meters of cuttings—which is enough to fill up half of the sump hole. [Gleitsmann at Tr. 2140-41.] Thus, Foundex rigs are small and will not produce enough cuttings to create an island that could support the drilling platform and associated machinery as Mr. De Husson says.

Also, in Plaintiffs' rebuttal, Mr. De Husson testified that the area where the driller lost his hat and fell into the tundra over his head was actually a ravine and that water from the artesian flow had filled up the ravine, which was going down to the lower valley. [De Husson at Tr. 2228.] But if the water coming from the artesian event was

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flowing into a ravine which leads to a lower valley, as Mr. De Husson testified, then the ravine would drain the water away from drill platform instead of pooling next to it.

Mr. De Husson's testimony was also specifically impeached with a video of the exact artesian flow event he described on the stand. Ms. Louise Shannon, a geotechnical engineer for Knight Piésold Consulting, took the video while working as a consultant for Pebble. [Shannon at Tr. 2165.] On September 18, 2006, the third day of the artesian event, Ms. Shannon observed and videotaped the artesian flow which occurred at Mr. De Husson's drill rig. [Shannon at Tr. 2166-68, 2170, 2175-76; De Husson at Tr. 2224, 2229.] The video unequivocally shows that the water is not shooting 60 to 90 feet in the air as Mr. De Husson testified. [Ex. 3129 (admitted for impeachment purposes only).] It is equally clear and unequivocal that the drilling platform was resting only a few inches above the tundra surface—it was not floating, there was no island of cuttings and it appears entirely implausible that a driller could step off the platform and "disappear." Indeed, the video depicts one of the drillers standing on the ground and there is no indication he is sinking into the tundra. [Ex. 3129 (admitted for impeachment purposes only); Shannon at Tr. 2202.] Given the video and Ms. Shannon's testimony, Mr. De Husson's testimony was specifically contradicted by extrinsic evidence which calls into question the reliability of all of his testimony.

Mr. De Husson was a pleasant and respectful fellow who appeared very sincere and earnest in his efforts on the stand. But his testimony on several points was shown to be either incorrect or greatly exaggerated. As such, it is difficult for this Court to place

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much weight on any of his testimony. Accordingly, this Court finds that Mr. De Husson was not a sufficiently credible witness such that his testimony about hundreds of fish being expelled from a water pump purge valve, without some corroborating evidence, can be given any weight. Because no credible evidence of actual harm has been presented, this Court finds that Nunamta has failed to show that Pebble's water withdrawals have more likely than not caused any significant or permanent environmental impacts.

5. There is No Persuasive Evidence that Drilling Activities Have Caused Impacts to Fish or Fish Habitat.

The potential impacts to fish and fish habitat fall into three general categories: water quantity, water quality and impacts from fish screens. Plaintiffs did allege that fish may have been impacted by seismic activity and the Court will briefly address that assertion.

a. *Water Quantity.*

A majority of the evidence presented at trial addressed the relationship between fish habitat and water quantity. Specifically, Dr. Dudley Reiser provided expert testimony on the impact of water withdrawals on fish habitat in the Pebble Project area. Dr. Reiser is a published fisheries scientist with over 30 years of experience studying how human water withdrawals affect stream flow and fish habitat. [Reiser at Tr. 1832.] As a highly credentialed scientist, Dr. Reiser has been appointed as a delegate to the independent fisheries science panel by two Washington governors. [Reiser at Tr. 1840.] Based on his experience, training and analysis, Dr. Reiser concluded that the water withdrawals

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associated with mineral exploration at the Pebble study area do not cause any permanent harm to fish habitat during the various life stages of fish that inhabit the area. In fact, Dr. Reiser concluded that there is no harm at all from the withdrawals. [Reiser at Tr. 1904, 1906.]

Dr. Reiser used the physical habitat simulation computer model ("PHABSIM") to generate estimates of fish habitat areas based on various water flow regimes. [Reiser at Tr. 1853-54.] PHABSIM is the most widely-accepted methodology for evaluating fish habitat and is utilized extensively by fisheries scientists around the world and in Alaska. [Reiser at Tr. 1854-55, 1908.] Although Plaintiffs' expert, Dr. Woody, criticized the use of the PHABSIM model to Alaska water bodies [Woody at Tr. 1286], this Court finds that the model was the only reliable and scientific method presented at trial for evaluating the fish habitat impacts of Pebble's water withdrawals.

Both anadromous and resident fish species are present in the watersheds near the Pebble study area. [Reiser at Tr. 1846.] Rather than model each life stage of each species present, Dr. Reiser instead focused his modeling on the sensitive spawning and juvenile life stages of chinook, coho and sockeye salmon. [Reiser at Tr. 1889.] The different life stages and species of salmon have different in-stream flow requirements. The suitability of the habitat for these life stages varies according to the velocity and depth of the stream. [Reiser at Tr. 1848-49.] Thus, fish habitat will change with the stream's water stage, i.e., instream flow. [Reiser at Tr. 1849.] Depending on the species' life stage (spawning, fry, juvenile, etc.), the fish habitat will generally increase as the in-stream flows increase until

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it reaches a peak, after which habitat decreases as in-stream flows continue to increase. [Reiser at Tr. 1849.]

Habitat for spawning chinook salmon, for instance, increases as the water velocity approaches two feet per second, at which point habitat peaks and then decreases as the water velocity exceeds two feet per second. [Reiser at Tr. 1851-52.] If water velocity is plotted along the x-axis and habitat is on the y-axis, the result of the relationship between velocity and spawning habitat for chinook salmon is a bell curve. This bell curve is referred to as a habitat suitability criteria curve. [Reiser at Tr. 1851-52.] There are habitat suitability curves for a variety of habitat factors, including velocity, depth and substrate. [Reiser at Tr. 1852.]

The end goal of a PHABSIM model is to compute the "weighted usable area" of a stream. [Reiser at Tr. 182.] The weighted usable area is an index of fish habitat that takes into account the stream's hydrology, hydraulics and substrate, along with the fish species' biology in the form of habitat suitability curves. [Reiser at Tr. 1851-54.] The PHABSIM model evaluates each section across a stream transect and weights the value of that area based on the preference of a given fish species and life stage. [Reiser at Tr. 1854.] The end result is an estimate of fish habitat area given various stream flow conditions. [Reiser at Tr. 1854.]

For purposes of this case, Dr. Reiser compared the fish habitat under natural conditions with the fish habitat while Pebble engaged in water withdrawals. [Reiser at Tr. 1885.] The first step in Dr. Reiser's analysis was to establish habitat flow relationships

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(i.e., habitat suitability criteria) and select the stream transects that would be used for developing the habitat flow relationships. [Reiser at Tr. 1885-86.] Dr. Reiser selected 11 stream transects consisting of three from various reaches of the South Fork Koktuli, three from various reaches of the North Fork Koktuli, four from various reaches of Upper Talarik and one from a tributary stream. [Reiser at Tr. 1888.] Dr. Reiser then integrated the habitat suitability criteria for spawning and juvenile life stages of chinook, coho and sockeye salmon. [Reiser at Tr. 1889.] The habitat suitability curves are used to generate the weighted useable area, that is, the estimates of available habitat. [Reiser at Tr. 1853, 1889.]

The second step in Dr. Reiser's analysis was to integrate the hydrology for the particular point in time during which the water withdrawals are made. [Reiser at Tr. 1886, 1890.] Dr. Reiser used the minimum median summer flows because that was one of the lowest flow conditions of the year in all three of the river systems analyzed and would demonstrate the maximum potential for biological impact from water withdrawals occurring at the same time. [Reiser at Tr. 1892-93.] Dr. Reiser chose to use summer for the purpose of his model because summer is a "biologically sensitive period of time[]" for fish and matches the period during which most drilling activity takes place. [Reiser at Tr. 1911.] To that end, Dr. Reiser's study attempted to present the "worst case scenario" for analytical purposes by matching the summer low flow period with the maximum cumulative withdrawal rate from all the drill rigs operating that day to determine the impact on fish habitat, if any. [Reiser at Tr. 1900.]

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The third step was to calculate the amount of water withdrawn and model what that withdrawal does to the available habitat. [Reiser at Tr. 1886, 1893.] The study utilized all water withdrawals occurring at the low flow time frame so as to determine their cumulative impact on the fish habitat. [Reiser at Tr. 1893.] Dr. Reiser assumed that all the water pumps were pumping on the same day at a maximum withdrawal rate and compared that with the minimum summer flow to determine whether there would be any impact to habitat. [Reiser at Tr. 1900.] The cumulative rates of water use on the streams were very small, ranging from 0.065 to 0.19 cubic feet per second. [Reiser at Tr. 1895.]

The final step in Dr. Reiser's analysis was to compare the fish habitat under natural conditions with the fish habitat while Pebble engaged in water withdrawals. [Reiser at Tr. 1886.] In the language of PHABSIM, this comparison is performed by comparing the amount of weighted usable area for the various streamflows. [Reiser at Tr. 1896.] In nearly every case, the water withdrawal was so minimal that the amount of usable habitat was nearly identical to what it would be without pumping. [Reiser at Tr. 1898-1900.] However, in at least one circumstance, the study showed that a reduction in flow actually increased the amount of fish habitat over normal flow conditions. [Reiser at Tr. 1898.]

Thus, Dr. Reiser concluded that there is no detectable difference in the amount of fish habitat between when Pebble is pumping and when it is not. [Reiser at Tr. 1899.] The same conclusion would result using rainbow trout habitat criteria, which enjoy similar habitats as do pacific salmon. [Reiser at Tr. 1920-21.] Thus, the study shows that there

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was no impact to fish habitat from the water withdrawals. [Reiser at Tr. 1900, 1904.] From this analysis, Dr. Reiser concluded that water withdrawals associated with mineral exploration at the Pebble study area did not cause any permanent harm to fish habitat during the various life stages of fish that inhabit the area; in fact, there was no harm at all.[51] [Reiser at 1904, 1906.]

Plaintiffs have not presented any credible evidence that rebuts Dr. Reiser's opinions or that proves Pebble's water withdrawals directly harmed fisheries resources or habitat.[52] Plaintiffs' fisheries expert, Dr. Woody, admitted that she has made no effort to model how water withdrawals under the Pebble TWUPs impact fish habitat. [Woody at Tr. 1310.] Dr. Woody also admitted that she was retained to offer an opinion only on the "*potential* impacts of altered water flows," not the actual impacts. [Woody at Tr. 1256 (emphasis added).] Thus, the evidence Plaintiffs did present only identifies a concern that harm could potentially result from overdrawing water from isolated, fish-bearing kettle ponds during the wintertime. Testimony about possible or potential impacts, however, did little to assist the Court determine if in fact harms have or will occur at the Pebble site.

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[51] Dr. Reiser's conclusion is consistent with the testimony of Mr. Taylor that the amount of water Pebble is withdrawing for exploration activities is so minimal that it would not cause any impact to the fisheries resources in the area. [Taylor at Tr. 1804.]

[52] The only direct evidence of harm to fish is from Mr. De Husson, who testified that when pumping water from a pond during winter the pump sucked up and spewed out a couple hundred one-half inch fish. [De Husson at Tr. 568-69.] Mr. De Husson's credibility was impeached and his testimony is entitled little weight to prove "hundreds of fry" were harmed. Plaintiffs did not present any corroborating evidence of the event.

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Dr. Woody testified that many small, isolated tundra ponds in the Bristol Bay region that are at least three feet in depth have fish in them, including the black fish. [Woody at Tr. 1264.] Lance Trasky, another of Plaintiffs' experts with fisheries experience, similarly testified that he has "some concerns regarding some of [Pebble's] water withdrawals, particularly water withdrawals in the winter from very small streams and ponds . . . ." [Trasky at Tr. 1360.] Mr. Trasky is concerned that some of the water bodies may not have sufficient recharge to replace the withdrawn water and the water levels may fall below that required to support fish and aquatic life. [Trasky at Tr. 1560.]

But even assuming that Pebble withdrew all the water from a tundra pond or small stream, that does not necessarily mean that a permanent harm or impact in fact has occurred. Proof of such harm would require production of convincing evidence that Pebble (1) extracted all the water in a pond, (2) that fish were actually present in the pond, and (3) that the lack of water in fact harmed the fish. No credible evidence was presented at trial that all three of these factual predicates to harm occurred at the Pebble site.

Even if all the water were removed from a tundra pond containing black fish, that does not necessarily mean that the fish will be impacted. Dr. Woody testified that black fish "have a modified esophagus, where they can take advantage of breathing air, so they don't always rely on their gills. They can survive at freezing temperatures for a while, and in some cases, they just need to keep their skin moist to survive at very cold temperatures." [Woody at Tr. 1264.] There is also anecdotal evidence that black fish can

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survive even after being frozen. [Woody at Tr. 1265.] Thus, given Dr. Woody's testimony, black fish may be able to survive in winter conditions with little or no water until the pumping stops and the pond recharges. Therefore, in light of Dr. Reiser's testimony and the lack of any credible rebuttal evidence, this Court finds that Nunamta has failed to show that Pebble's water withdrawals have had any measurable harm or impact on fisheries resources or fish habitat in the Pebble Area or downstream.

b. *Water Quality.*

Plaintiffs claim that Pebble's exploration activities are changing the water chemistry in the streams near the Pebble study area and that such chemical changes are impacting fisheries resources. Plaintiffs have not, however, presented any direct evidence of changed surface water chemistry or adverse impacts to fish as a result of the chemical changes supposedly caused by Pebble's exploration program. In fact, experts for Plaintiffs and Defendants are in agreement that the surface water at Pebble is some of the cleanest, purest and coldest water they have studied.

Plaintiffs' environmental chemist, Dr. Zamzow, testified: "If we're looking at the entire claims area, the surface waters are in general what I would call very pure, very low alkalinity, very low metals, very low electrical conductivity, very cold. And groundwaters are similar." [Zamzow at Tr. 1006, 1082.] Dr. Zamzow also testified that the three main watersheds—the Upper Talarik, the North Fork Koktuli, and the South Fork Koktuli—have pure surface water. [Zamzow at Tr. 1122-23.] Plaintiffs' fisheries scientist, Dr. Woody, similarly testified that "[o]n average, the streams are – the waters

[at the Pebble site] are relatively pure . . . ." [Woody at Tr. 1319.] Pebble's expert toxicologist, Dr. Stelljes, testified that "[t]he water [at the Pebble study area] is some of the cleanest water I have seen in both groundwater and surface water anywhere I have worked." [Stelljes at Tr. 1544.] Indeed, after analyzing all the water quality data for the Pebble site, Dr. Stelljes concluded that Pebble's activities have not permanently harmed any fish communities:

> Q: Do you have an opinion as to whether or not the water quality as a result of the exploration activities has permanently caused any harm to fish habitat or fish ecology?
> A: Yes, I have an opinion.
> Q: What is that opinion?
> A: There has been no permanent harm or impact to the fish communities. [Stelljes at Tr. 1529-30.]

In addition to being pure, the water near the Pebble study area displays a very stable and consistent chemistry. [Stelljes at Tr. 1521.] To demonstrate this fact, Dr. Stelljes testified in detail about two surface water monitoring wells in the South Fork of the Koktuli River watershed: SK100G, which is near the mineralized deposit, and SK100B, which is one of the furthest measuring points downstream from the deposit. [Stelljes at Tr. 1498-1522; Ex. 3120 at PLP 4090.] Looking at all the data points, SK100B displays stable water chemistry over the sampling period from 2004 to 2007. [Stelljes at Tr. 1519; Ex. 3120 at PLP 4133.] The standard deviation is low relative to the mean concentrations for most chemicals, which indicates a tight data distribution and relatively consistent chemical concentrations during the sampling period. [Stelljes at Tr. 1519-20.] SK100G displays stable water chemistry for the same reason—a low standard

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deviation in relation to mean concentrations. [Stelljes at Tr. 1519; Ex. 3120 at PLP 4159.] SK100G, however, has slightly higher mean concentrations than 100B; but this is to be expected because SK100G is closer to the mineralized deposit area. [Stelljes at Tr. 1520.] The concentrations decrease as you move downstream to 100B because the chemical constituents are sticking to sediment in the stream and are being diluted by the influx of tributary waters. [Stelljes at Tr. 1512.] The naturally higher mean concentrations in the surface water near the mineralized deposit does not indicate contamination or that an impact has occurred; it just means that the stream naturally contains higher concentrations because of its proximity to the mineralized area. [Stelljes at Tr. 1520.]

The only evidence of potentially harmful concentrations of constituents in the surface water is from well SK136B in which the copper concentration went from 3 to 20 milligrams per liter. [Ex. 3120 at PLP at 4189.] However, the increase in copper levels at SK136B, which was measured on January 29, 2005, appears to be an outlier. The standard deviation for total copper levels at SK136B is 3.1, which demonstrates that the 20 milligrams per liter measurement in January 2005 is outside the standard control limits. [Ex. 3120 at PLP at 4189.] Moreover, SK136B is located within the mineralized deposit area, which suggests that the spike in copper levels may be from naturally occurring conditions. [Ex. 3120 at PLP 4090.] Even if it could be inferred that the January level is in fact accurate and that fish were exposed to the increased copper

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concentrations, there is no evidence that the fish were actually harmed or that the increased copper levels are in fact the result of Pebble's exploration activity.[53]

Dr. Stelljes, the only toxicologist that testified at trial, explained that in order to have toxicity from a chemical, an animal must first be exposed to the chemical. [Stelljes at Tr. 1487.] If there is no exposure, there can be no toxic effect. [Stelljes at Tr. 1487-88, 1492.] Dr. Stelljes explained that every chemical has toxicity, yet every chemical is safe at some level – the difference between the two is the exposure. [Stelljes at Tr. 1491.] In the field of toxicology, there are two ways to determine whether an organism has been exposed to chemicals: (1) by collecting organisms suspected of exposure and testing them for constituents that ordinarily would not be present; and (2) by estimating the probable exposure level based on detectable concentrations of the contaminant in surface media. [Stelljes at Tr. 1556-57.]

No evidence was presented at trial that any particular animal has been exposed to contamination as a result of Pebble's exploration activities. In fact, Dr. Zamzow admitted that "impacts to aquatic life are theoretical, because we haven't had any studies." [Zamzow at Tr. 1118-19.] In accord with Dr. Stelljes, Dr. Zamzow recognized that to determine the impact of contamination, "you have to have biological organisms to analyze." [Zamzow at Tr. 1122.] Yet, she admitted that "there is no data to review" to

[53] But Dr. Woody's testimony regarding lack of evidence of fish kill is persuasive. In the wild, dead fish aren't likely to be around for very long. They will be eaten. [Woody at Tr. 1308.]

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determine whether or not there has been any impact to aquatic life at the Pebble study area.[54] [Zamzow at Tr. 1122.]

That leaves the second method for determining exposure—i.e., by analyzing the detectable concentrations of the contaminant in the communicating media. Because the experts agree that the surface waters are generally pure, it can be inferred that the probability of exposure to contaminants through surface water is low. That leaves groundwater. Plaintiffs' expert Dr. Moran testified that there are several groundwater monitoring wells that show levels of metals and other anions that would be toxic to freshwater fish. However, he admitted that he is not a toxicologist and that fish do not live in the groundwater. [Moran at Tr. 735.] Dr. Zamzow similarly admitted that fish are not swimming in underground monitoring wells. [Zamzow at Tr. 1123.] Thus, elevated levels of metals in groundwater monitoring wells is not evidence probative of impacts to aquatic organisms.

Plaintiffs, however, suggest that there may be impacts from contaminated groundwater in the hyporheic zone. The hyporheic zone is an area where surface waters and groundwaters mix. [Woody at Tr. 1275.] Dr. Woody testified that the hyporheic zone could "potentially" act as a conduit for contaminants in the aquifer, such as from drilling

[54] Dr. Zamzow also explained the distinction between "contamination" and "impact." Contamination refers to any measurable change in the water chemistry outside the normal pattern. [Zamzow at Tr. 1122.] Contamination is not tied to any toxicity standard for aquatic life or drinking water. [Zamzow at Tr. 1122.] Impact is a toxicity issue. [Zamzow at Tr. 1122.] Dr. Stelljes explains that toxicology is the study of how chemicals interact and affect the environment and living organisms. [Stelljes at Tr. 1470.] Contamination and impact are different concepts. There can be contamination without any impact to a living organism.

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additives, to transfer into upwelling areas in the stream bed which are important for salmon spawning. [Woody at Tr. 1292.] She is also concerned that core holes "could potentially" create ARD reactions that change the groundwater chemistry which may then be introduced to the streambed through the hyporheic zone. [Woody at Tr. 1294-95.] Dr. Woody's concerns, however, are not supported by any evidence that the hyporheic zone is in fact a conduit for contaminants at the Pebble study area or that impacts in that zone have actually occurred. Indeed, Dr. Woody admitted that she was retained to offer an opinion only on the "potential impacts of exploration on aquatic resources," not actual impacts. [Woody at Tr. 1256.]

Given her assigned task, Dr. Woody admitted that she had not tested the toxicity of drill muds on aquatic life, nor had she modeled the potential for drill muds to migrate from the discharge point to areas where there may be aquatic life. [Woody at Tr. 1301-02.] She also admitted that she had not quantified the probability of impacts to aquatic life from Pebble exploration. [Woody at Tr. 1307-08.] Indeed, she stated that there was not sufficient data for the Pebble project area to determine whether the exploration activities impact the fisheries resources or not. [Woody at Tr. 1291.] Most significantly, Dr. Woody admitted that she has not found any causal connection between exploration activities at Pebble and fish resources. [Woody at Tr. 1307-08.] Similarly, Dr. Zamzow admitted that there is no evidence of impacts to fish in the hyporheic zone: "Q: And you haven't identified any impact in that [hyporheic] zone, have you? A: We have not had

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any biological data to review. Q: The answer is no? A: So, the answer is no." [Zamzow at Tr. 1123.]

Based on the evidence presented, there is no water chemistry data showing that Pebble's exploration activities have in fact changed water quality in areas where fish are present. This Court finds that there is no evidence or data showing that it is more likely than not that mineral exploration has in fact impacted or caused harm to any fish at the Pebble site by a change in water chemistry.

c. *Fish Screens.*

Plaintiffs claim that fish have been harmed from the use of inadequate fish screens at the water intake sites at the Pebble study area. The TWUPs and Fish Habitat Permits require Pebble to utilize a screened intake structure for withdrawing water from fish bearing water sources. [Exs. 2072-2084, 2089-2113, 2116-2126; Ex.177 at SOA 54035.] The twin risks associated with extracting water from fish-bearing water sources are impingement and entrainment. Impingement is where the approach velocity of the water at the screen face exceeds the swimming capacity of a fish and the fish is pulled onto the screen and impinged on the mesh. [Reiser at Tr. 1856.] Entrainment occurs where the protective screen mesh size is larger than the resident fish species and the approach velocities at the screen pull the fish through the screen and into the pump intake. [Reiser at Tr. 1856-57.] The "approach velocity" is the velocity along the outside of the screened enclosure at the screen face. [Reiser at Tr. 1856-57.]

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To address the risks of impingement and entrainment, the State permits require Pebble to utilize fish screens of specified screen size and approach velocities. [Exs. 2072-2084, 2089-2113, 2116-2126; Ex. 177 at SOA 54035.] Since 2007, Pebble has utilized two different fish screens designed to protect fisheries resources. [Reiser at Tr. 1868.] In 2007 and 2008, Pebble used a box screen in which an electric sump pump was placed inside of a box frame with screened sides. [Reiser at Tr. 1868.] The box screens have two layers of mesh. The outside layer is one-quarter inch and the inside mesh is one-eighth inch. [Reiser at Tr. 1875.] In 2009, Pebble stopped using the box screens, opting instead to use state of the art cylindrical fish screens. [Reiser at Tr. 1868.] These screens use one millimeter mesh around the entire cylinder. [Reiser at Tr. 1875.]

Dr. Reiser calculated the approach velocities for each drill location in 2007, 2008 and 2009. The approach velocity is calculated by dividing the rate of pumping by the square footage of the area of the screened enclosure. [Reiser at Tr. 1857.] In making his calculations, Dr. Reiser estimated the water pumping rates and used only half of the surface area of the screened enclosure. [Reiser at Tr. 1869.] Dr. Reiser explained his reason for doing this:

> We considered the fact that [the box screens] probably in all cases were not entirely submerged, so you would have the box screen sitting in a stream. It wouldn't have its entire surface area covered, so we calculated what that surface area would be if only it were half submerged, just to be conservative in our estimates of approach velocity . . . ." [Reiser at Tr. 1869.]

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Dr. Reiser's approach velocity calculations did not take into account whether or not the screens are being properly maintained. [Reiser at Tr. 1920.] Based on Dr. Reiser's logic and methodology, the Court accepts Pebble's argument that it can reasonably be inferred that the reduced surface area value in the calculation adequately compensates for any effect caused by an improperly maintained screen.

Dr. Reiser then compared Pebble's approach velocities to the guidelines established by the National Marine Fisheries Service and the Alaska Department of Fish and Game. [Reiser at Tr. 1866.] Based on his calculations, Dr. Reiser concluded that both the box screens and the cylindrical fish screens satisfy the approach velocity requirements. [Reiser at Tr. 1877.] He testified that Pebble's approach velocities "meet[] all the approach velocity criteria for every one by a substantial amount, by a substantial margin. So these are almost undetectable velocities, I would say, unmeasurable velocities that you would have." [Reiser at Tr. 1877.] Dr. Reiser also compared the screen mesh size to the guidelines and concluded that the box screens substantially complied with the guidelines and the cylindrical screens, which have even smaller openings, met all criteria. [Reiser at Tr. 1877.]

Based on his analysis of the screened intake structures, Dr. Reiser concluded that Pebble's water withdrawal methods were sufficient to protect the fishery resources in the Pebble area:

> Q: Based on this analysis, do you have an opinion as to whether the screens used by Pebble during water withdrawal were sufficient to protect fish in all life stages at the Pebble deposit area?

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> A: Yes.
> Q: And what is that opinion?
> A: My opinion is that both the 2007, 2008 and 2009 measures that Pebble used for screening were protective of all the life stages and species of fish. [Reiser at Tr. 1878.]

Consistent with Dr. Reiser's conclusion, Ronald Benkert, an ADFG fisheries biologist, testified that Pebble's water withdrawal methods "are protective of the fisheries resources in the project area." [Benkert at Tr. 1814-15.] Specifically, Mr. Benkert testified: "The fish screens that are being used out there meet all of our criteria for protection of the resources. They are very good fish screens." [Benkert at Tr. 1814.]

Mr. Trasky, however, testified about his "concern" with Pebble's fish screens, including the mesh size and pump velocities. Regarding mesh size, Mr. Trasky speculates that from 1991 to 2007 the fish screens probably had no mesh or one-quarter-inch mesh, which would not be small enough to prevent certain species of juvenile fish from being entrained. [Trasky at Tr. 1362.] Based on his guess that one-quarter inch mesh was used, Mr. Trasky concludes that there was "probably a good chance" that they sucked up fry when withdrawing water. [Trasky at Tr. 1363.] Mr. Trasky's opinions are not probative of harm, however, because there is no evidence that fish were in fact entrained during those years. Mr. Trasky also fails to consider whether the water sources used during that timeframe were known to be fish-bearing streams or ponds. Mr. Trasky's seat of the pants assertions were simply not persuasive to this Court. This similar lack of scientific methodology is seen in Mr. Trasky's testimony regarding caribou.

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Mr. Trasky also testified that there are State reports that say some of the screens were not fully submerged or were coated with debris. [Trasky at Tr. 1368.] Based on these reports, Mr. Trasky testified that such conditions will cause increased velocities at the screen face and there is a "good chance" that there was some fish entrainment or impingement as a result. [Trasky at Tr. 1369.] But, again, Mr. Trasky does not provide any evidence of fish actually being impinged or entrained by a fish screen that is not all the way submerged or one that is covered in debris. Also, Dr. Reiser's calculations demonstrate that even a partially submerged fish screen will have "almost undetectable velocities" that are protective of fish. [Reiser at Tr. 1877.]

Additionally, Mr. Trasky does not take into account the fact that most of the water sources from which Pebble withdraw water between 2007 and 2009 were not known to be fish-bearing. [Reiser at Tr. 1860-63.] Dr. Reiser testified that most of Pebble's drilling operations from 2007, 2008 and 2009 took place in the headwater portions of the drainages at the Pebble study area. [Reiser at Tr. 1862-63.] He testified that "fish distributions in these systems are largely restricted to the lower portions of these drainages, not in these upper headwater areas." [Reiser at Tr. 1863.] Dr. Reiser reviewed fish distribution data for the water sources, including the anadromous waters catalog, and concluded that "very few of the 58 sites that were being used for water withdrawal were known to contain anadromous fish." [Reiser at Tr. 1865.] Indeed, Dr. Reiser found that only 7 percent of Pebble's water sources were known to contain anadromous fish and only 14 percent were known to contain resident fish species. [Reiser at Tr. 1865.] Thus,

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even if a screen was not fully submerged or not properly maintained, that evidence is not probative of harm unless there is also evidence that the water source is fish-bearing. Because no such evidence was presented at trial, the Court declines to make the inferential leap that Mr. Trasky invites.

Mr. Trasky also testified that if Pebble was using pumps larger than sump pumps, then they could easily exceed velocities at the screen surface that are considered safe for the various species of fish at the Pebble site. [Trasky at Tr. 1363-64.] Mr. Trasky's opinion is based on speculation and the assumption that the large centrifugal sump discharge pumps were used as water intake pumps. [Trasky at Tr. 1403-04.] There was insufficient evidence presented to support this assertion. Accordingly, this Court finds that the Plaintiff has failed to show that Pebble's water withdrawal methods were insufficient to protect the fishery resources in the Pebble area.

The evidence presented at trial demonstrated that the Bristol Bay salmon fishery remains healthy, diverse and robust. Although Bobby Andrew testified that since 2004 he has noticed fewer fish spawning in the Mulchatna River tributaries such as the Koktuli, Swan, Stuyahok and Old Man Rivers [Andrew at Tr. 503-04], a preponderance of the evidence demonstrates that the Bristol Bay salmon runs are healthy and productive. [Hammond at Tr. 999-1000 (commercial set net fishing on the Naknek River during the summer of 2009 was "good"); Woody at Tr. 1314 (even though Pebble has been engaged in exploration activities at the site for at least the last five years, the Bristol Bay salmon fishery has enjoyed highly productive runs for the last few years).] This Court finds that

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there is no evidence that Pebble's exploration activity has had any long-term or permanent adverse impact on the Bristol Bay salmon fishery, or on fish resources in general near the Pebble study area.

d. *Seismic Activity.*

Dr. Zamzow testified that blasting could contribute ammonia, nitrate or sulfate to water, there is no evidence that this has in fact occurred or that it has impacted any fish. [Zamzow at Tr. 1030-31.] Dr. Woody testified that there is a "potential" for seismic exploration to impair future reproduction rates in salmon. [Woody at Tr. 1294.] However, Plaintiffs did not present any evidence that reproduction rates have actually been reduced because of seismic exploration. Mr. Trasky similarly testified that seismic energy may "potentially do some harm" to fish if the charges are set off in a wet area close to fish-bearing waters. [Trasky at Tr. 1358-59.] But no evidence was presented at trial that any fish have actually been impacted or harmed by a seismic event at the Pebble Project site. This Court finds that there is no evidence or data showing that seismic shocks resulting from the use of explosives have in fact impacted or caused harm to any fish at the Pebble site.

6. Plaintiffs' Evidence was Insufficient to show that Drilling Activities Have Caused Impacts to Wildlife or Wildlife Habitat.

The Pebble study area straddles Game Management Units 17B (North and South Fork Koktuli River Drainages) and 9B (Upper Talarik Creek Drainage). [Taylor at Tr. 761; Woolington at Tr. 1621; Ex. 2193.] The surrounding area provides habitat for

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caribou, moose, brown bear, a few black bear, wolves, wolverine and several other furbearers. [Woolington at Tr. 1622.] Most of the testimony at trial involved caribou and addressed whether the mining exploration activity at the Pebble study area has impacted the Mulchatna caribou herd.

a. *Caribou.*

The Court took testimony from three key witnesses regarding caribou in the Pebble study area. The Court heard from State witness James Woolington, who has a master's degree in wildlife science and over 20 years of experience working for the ADFG, Division of Conservation. [Woolington at Tr. 1618.] Mr. Woolington has spent the last 13 years managing the Mulchatna caribou herd as the area management biologist for Unit 17. [Woolington at Tr. 1618.]

The Court heard from Pebble witness Ken Taylor, who has a degree in biological science with an emphasis in wildlife management. [Taylor at Tr. 756.] Mr. Taylor worked as a wildlife biologist in Dillingham from 1979 to 1990 where he managed the Mulchatna caribou herd in Unit 17. [Taylor at Tr. 757.] He has also served in various leadership roles with ADFG, including regional management coordinator for the interior region, deputy director for the wildlife department, director for the habitat and restoration division, and the deputy commissioner of the department. [Taylor at Tr. 758-59.]

The Court took testimony from Mr. Trasky, Plaintiffs' expert, who has a bachelor's degree in fisheries biology and two years of graduate studies. [Trasky at Tr. 1329.] Mr. Trasky's experience in wildlife biology comes from his involvement in land

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use planning with ADFG where he "spent many hours reviewing the literature on the effects of [land use] activities on fish and wildlife, and also talking to the wildlife biologists within the Department of Fish & Game." [Trasky at Tr. 1335.] He also took a couple of general courses on subjects such as ecology and game management in college. [Trasky at Tr. 1336.] Mr. Trasky admits that he does not have an educational degree in wildlife biology and that he has never managed wildlife as part of his job. [Trasky at 1375-76, 1380.]

The Court also heard testimony from several lay witnesses, including: Bobby Andrew, who is a resident of Dillingham and a subsistence user in the Bristol Bay region [Andrew at Tr. 479, 520]; Rick Delkittie, Sr., who is a resident of Nondalton, Alaska and is a subsistence user in the greater Pebble Project study area [Delkittie at Tr. 957, 959-61]; Bella Hammond, who lives at Lake Clark and has flown over the Pebble study area [Hammond at Tr. 985-86]; Rick Halford, who is a pilot who has flown over Unit 17 numerous times over 40 years and guided hunting trips in the high country outside of the Pebble study area [Halford at Tr. 1163]; and Steven Morris, who is a registered hunting guide that operated in the Koktuli and Stuyahok River drainages in Unit 17B [Morris at Tr. 881, 887; Ex. 2193].

Based on the testimony of these witnesses, it is undisputed that—independent of human activity—the Mulchatna caribou herd is naturally migratory, herd populations undergo natural, cyclic variation and the herd's distribution and range frequently and naturally change over time. [Taylor at Tr. 802-03; Woolington at Tr. 1632, 1634, 1637-

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38; Trasky at Tr. 1387, 1391-92; Morris at Tr. 904; Andrew at Tr. 520-21; Delkittie at Tr. 964-65, 974, 979; Halford at Tr. 113-14.] These natural factors are the most likely explanation for the lower caribou density near Pebble.

The Mulchatna caribou herd was discovered in the early 1970's and existed as a relatively small herd generally located in the headwaters of the Mulchatna River. [Woolington at Tr. 1633.] Since that time, its population has fluctuated. In 1974, there was an estimated 14,000 animals; in 1976 the number had fallen to 9,000; and in 1978 it was down to 7,300 animals. In 1981, a radio telemetry survey indicated the herd had rebounded to about 20,000 animals, and by 1990 the herd was 60,000 strong. [Taylor at Tr. 802-03.] As its population grew, the herd began moving into other surrounding areas. [Woolington at Tr. 1633] Mr. Taylor testified:

> What we learned over the course of the 10 or 11 years that I was there, was that the caribou population as it increased, increased its range to the north and to the east. And as it built up to about 60,000 by the time I had left, it was utilizing a lot of area in the upper Nushagak that it hadn't previously utilized. [Taylor at Tr. 802-03.]

By 1996, the herd had grown to about 200,000 caribou, at which point the population began a steep decline. [Woolington at Tr. 1637; Taylor at Tr. 803; Morris at Tr. 903.] The Mulchatna caribou herd was last surveyed in 2008 and consisted of an estimated 30,000 to 40,000 animals. [Woolington at Tr. 1634.]

Mr. Woolington testified about the factors that affect the size of the Mulchatna caribou herd and how those factors impact the herd's range and movements:

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> Q: Over the last 11 years, have you been able to determine what type of factors affect the size of the Mulchatna caribou herd?
>
> A: There would be so many that I don't think I could pull out one that might be the most important. It would be everything from weather and predation, different – weather severity, different factors like that.
>
> Q: Over grazing, is that a factor?
>
> A: It certainly could be, and that was – when the herd was relatively small, that was probably not much of a factor, and they wintered in all areas. It grew to a very large herd. It was about 200,000 caribou during the summer of 1996, photo estimate, and that was still when they were all wintering in kind of one area. Mostly they wintered in the area north of Iliamna Lake and the lower Mulchatna and through that area. So 200,000 caribou in that area, well, they had wintered but then they moved out west. So there were a lot of movements going on. As the herd got larger, then we started seeing, you know, the different movements going on and going to different areas that they hadn't gone to before.
>
> Q: Can you give us some idea of the geographic area that the herd ranges over a given year?
>
> A: Well, there will be, say, starting in May, during the calving, there will be large numbers of caribou as far north as northwest of Lime Village, sort of halfway between Lime Village and Sleetmute in 19-A. They will be all the way east to the Alaska Range, and then again we have some that are the – from the same herd that are out by Cape Newenham, Cape Peirce, far southwest or the very – it would be southwest of Dillingham. And then caribou south of Dillingham and then probably over all the way east to Iliamna Lake. They would be scattered – there would be some main calving concentrations, but there might be caribou scattered all over that. Then throughout the rest of the year, they will move throughout that whole area. In '96, I think they were as far north as McGrath. [Woolington at Tr. 1637-38.]

Even before exploration began at the Pebble study area, the Mulchatna caribou herd distribution and seasonal movements changed frequently. Mr. Taylor testified:

> When I first started working with the herd [in 1979], they were calving up in the Twin Lakes and Turquoise Lake, Telequana Lake area and throughout the Bonanza Hills. By the mid 1980s, they were calving over in the Mosquito Creek part of the Nushagak hills. And by the late 1980s, they were starting to cross the Nushagak River and some calving was occurring over in the Kemuk area. That herd continued to expand through out the 1990s, all the way through the Wood-Tikchik State Park, over into the Togiak drainage and up around the Aniak area. [Taylor at Tr. 764.]

Similarly, Mr. Woolington testified that during his tenure as the area management biologist for Unit 17, he too noticed the distribution and the movement of the herd change often. [Woolington at Tr. 1634.] He explained:

> Well, while I have been there [from 1998 to present], they have used different calving areas. In the spring of – May of 1999, the first time I did the May calving counts it was in a different area than where it had been the year before. And it continued to change. And then starting about 2000, we have documented kind of a split between – calving split between a couple, two areas. One up by Lime Village and Tundra Lake area and another calving area down around Kemuk Mountain and Koliganek area and the middle Nushagak. And since then, that's been where we have seen the calving, although this last May for the first time, we documented a group of – it was 2,000 or 3,000 caribou calving out to the west in unit 18, and these were caribou that previously calved over in game management unit 17, around the middle Nushagak. We're seeing caribou, where formerly caribou wintered in, say, the Nushagak drainage or Mulchatna drainage, now we have, again, kind of a split. About approximately half the herd wintering out west in game management unit 18 in the lower Kuskokwim and kind of between, roughly between Bethel and the mountains to the east of there, and also caribou wintering in – it's between the lower Nushagak and the lower Kvichak River. And then also we see some wintering up in game management unit 19 up by Tundra Lake and Lime Village. [Woolington at Tr. 1634-35.]

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Although the caribou have increased their range and changed their movements, their numbers have been in decline since the mid-1990s. Ken Taylor testified about the causes for the herd's decline after its peak in 1996:

> . . . [D]ue to what was identified in Fish & Game documents as disease, predation and over utilization of range, which I noticed when I was there back in the late eighties, the population began a steep decline.
>
> Q: I understand disease, prey. What's over utilization?
>
> A: There is only so much food per acre in that habitat, and when you have 200,000 caribou in that region, it doesn't take very long for them to eat more than that land is producing. [Taylor at Tr. 803.]

Mr. Taylor further testified that in his opinion Pebble's exploration activity has not had any measurable effect on the Mulchatna caribou population. [Taylor at Tr. 803.]

> Q: What impact has the exploration activity at the Pebble deposit site had on the Mulchatna caribou population?
>
> A: None that I have seen, and none that I believe would be measurable. Typically, human activities that are induced in an area where they hadn't previously occurred will cause some reaction by animal populations in the area. For caribou, we demonstrated on the North Slope and with the TAPS pipeline, that when they are first confronted with a development project or an exploration project, there is some avoidance behavior, but that avoidance behavior over a period of time diminishes to the point where they are comfortable in the vicinity of those developments.
>
> Q: In your opinion, what impacts to other wildlife in that habitat have occurred as a result of exploration activities?
>
> A: I don't believe there is any. [Taylor at Tr. 803-04.]

Despite the decline in animal density since the 1990s and the variability in herd migration behaviors, the Pebble study area is not devoid of caribou. Mr. Taylor testified: "[W]e still see groups of caribou in the Koktuli and Stuyahok hills during post calving

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aggregation, although most of them now are farther north and over in the Kemuk Mountain area." [Taylor at Tr. 763.] Mr. Fredericksen observed caribou on one of his site investigations on August 19, 2009. [Fredericksen at Tr. 1225.] His inspection report indicates observation of "approx. 6 [caribou] one mile NE of Frying Pan Lake." [Ex. 2005.] State inspectors also reported observing "[s]ix caribou . . . near Frying Pan Lake" in August 2010. [Ex. 2001.] An inspection report from September 2008 noted "[a]necdotal reports of small numbers [of caribou] (fewer than 12/group) in general area during past several weeks." [Ex. 2008.] Mr. Halford admitted to seeing at least one caribou in the area in the last two or three years [Halford at Tr. 1160], and Mr. Morris admitted that there are still animals in the area. [Morris at Tr. 908.] Therefore, there are still caribou present in the Pebble study area, though they may not be present in the density the region enjoyed during the herd's population boom in the 1990s.

Although the density of caribou in the Pebble study area has decreased since the peak of the Mulchatna herd's population cycle, there is no evidence that the decrease in population was caused by Pebble's exploration activities. Instead, it is more likely that the lower density is related to a natural reduction in the herd's population associated with over-grazing, disease and predation. Notably, the decline began in the late 1990s, when there was no exploration at Pebble. Additionally, the herd significantly increased its range and distribution in the 1990s and there is testimony that the animals, with their reduced numbers, are now disbursed throughout the entire range rather than congregating in a single location.

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Plaintiffs, nevertheless, claim that the reduced distribution of caribou at Pebble and the surrounding area is caused by mineral exploration activities, especially the use of helicopters. Bobby Andrew testified that the number of caribou in the Pebble area used to be pretty high, but over the years the numbers have decreased, especially after exploratory drilling at the Pebble Project in 2003 or 2004. [Andrew at Tr. 502.] Mr. Andrew testified that on his last hunting trip on the Koktuli and Mulchatna Rivers he did not get any moose or caribou. [Andrew at Tr. 505.]

Mr. Andrew's testimony, however, does not prove a causal link between mineral exploration and caribou populations in the Pebble area. Mr. Andrew agreed that caribou, such as the Mulchatna herd, go through natural population cycles, independent of human activity. [Andrew at Tr. 520-21.] He testified that caribou are migratory animals and part of the reason for observing fewer animals in the Pebble Project vicinity could be due to changes in migration. [Andrew at Tr. 520.] Mr. Andrew admitted that even before there was any exploration activity at the Pebble Project, there were some years where there were fewer caribou to be seen and some years he was not successful at hunting moose or caribou:

> Q: So [the Mulchatna caribou herd] would use the same range, but their population would go through cycles, right?
> A: They will go through cycles.
> Q: Even aside from human activity?
> A: Yes.
> Q: That's the nature of caribou, right?
> A: Yeah.
> Q: Okay. So I take it well before anybody was doing exploration work at the Pebble project, there were years when

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> you went hunting and there were fewer caribou to be seen, right?
>
> A: That is correct.
>
> . . .
>
> Q: . . . I take it there have been other years prior to this past fall when you went hunting and weren't successful, right?
>
> A: That is correct.
>
> Q: You don't get a moose every year?
>
> A: That is correct.
>
> Q: Or a caribou every year?
>
> A: That is correct. [Andrew at Tr. 521, 523.]

Mr. Andrew's testimony generally corroborates Mr. Taylor's and Mr. Woolington's testimony that the herd's population reached a peak in the 1990s, has been in decline ever since, and that the herd has changed its migration patterns. There is no evidence that mineral exploration activity has in fact caused the population decline or change in caribou distribution.

Mr. Morris's testimony also does not establish any causal connection between the caribou population and PLP exploration. Mr. Morris has guided and hunted in the Pebble study area since 1980. [Morris at Tr. 903.] He observed the caribou population grow until it peaked sometime in the late 1980s and into 1995-96, at which point the population began to decline. [Morris at Tr. 903.] Mr. Morris admitted that caribou populations go through cycles and change their migratory range. [Morris at Tr. 903-04.] He testified that the Mulchatna caribou herd population crashed and migrated to a different location due to overgrazing of the area, predation and human activity. [Morris at Tr. 912.] Although Mr. Morris believes that Pebble's activity is a factor relating to the lower numbers of caribou

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in the area, he declined to state whether it was a more significant factor than overgrazing or predation. [Morris at Tr. 912.] Mr. Morris testified that there was helicopter traffic in the Pebble Project vicinity; however, he did not testify about the impact helicopter use actually had on the animals or whether such activity is in fact the reason for the lower caribou density.

Mr. Trasky testified to his opinion that the level of activities that have occurred at Pebble have been of the type and duration that have been shown to displace caribou, moose, and brown bear from essential habitat. [Trasky at Tr. 1370-71.] Mr. Trasky's opinion is largely based on the fact that there has been helicopter usage at the Pebble site. [Trasky at Tr. 1353-54.] Bella Hammond, for instance, testified about helicopters and indicated that she observed on one occasion lots of helicopter activity in the Pebble area—at least one helicopter in the air at all times. [Hammond at Tr. 990.] She also testified that from the ground, helicopters are louder than fixed wing aircraft and you can hear them from a long ways away. [Hammond at Tr. 991.] Mr. Trasky testified that scientific literature states that the movement and acoustical disturbance from helicopters displace caribou, brown bear, and moose from essential habitat, such as salmon streams, calving grounds and wintering areas. [Trasky at Tr. 1356-57.] Based on his readings, Mr. Trasky testified that, in his opinion, it is very likely that Pebble's use of helicopters has displaced wildlife from the Pebble Project area. [Trasky at Tr. 1357.] Mr. Trasky, however, is not a wildlife biologist, nor did he provide any data or scientific analysis establishing that Pebble's mineral exploration activity has in fact displaced caribou.

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Indeed, Mr. Trasky admitted that there are no scientific studies or any direct evidence that that the helicopter activity has actually displaced wildlife in the Pebble area. [Trasky at Tr. 1357.]

There is, however, direct testimony from Mr. Woolington indicating that helicopter noise is unlikely to permanently displace caribou and that any avoidance behavior is temporary. Mr. Woolington has spent a significant amount of his career with ADFG tracking and observing caribou from helicopters flying as low as 30 feet from the ground. [Woolington at Tr. 1625-26.] In his opinion, caribou generally react by running at the initial approach of a low-flying helicopter. [Woolington at Tr. 1626.] However, by the second pass over the animals, caribou will usually stop running and will continue what they were doing prior to encountering the helicopter. [Woolington at Tr. 1626.]

> Q: When you have been doing these helicopter runs, have you had an opportunity to view how the caribou may or may not react to the helicopter?
>
> A: As soon as we're passing over them – and we're going faster than the caribou are traveling, so we're passing over them. As we're going over them, we'll keep going, but we'll turn around and come back to get more. And typically, they don't continue running very much after we're -- after we have passed over them. **And they don't move out of the area**. They go back to their feeding or whatever activity they were in. [Woolington at Tr. 1626 (emphasis added).

Based on Mr. Woolington's testimony, it can be inferred that once caribou are habituated to aircraft activity, they no longer perceive it as a threat and continue about their business as usual. They do not vacate the area where the aircraft is used.

In addition, Pebble has an aircraft policy intended to protect wildlife and avoid aircraft/wildlife interactions. In contrast to ADFG's animal counting methods, which involves a helicopter flying directly above animals at 30 feet from the ground, Pebble has a policy requiring its helicopter pilots to fly much higher above the ground and avoid direct overhead flights. Specifically, Pebble's aircraft guidelines to avoid wildlife disturbance requires its pilots to "[f]ly at 500 feet above ground level (agl) or higher whenever possible," and "[w]hen wildlife is observed (especially bears, caribou, moose, wolves, raptor nests, flocks of waterfowl, seabirds, marine mammals), avoid flying directly overhead and maximize your lateral distance as quickly as feasible, remaining at least a half-mile away if possible." [Ex. 3050.] There was no evidence presented that Pebble did not follow these policies in practice.

Mr. Trasky testified that caribou are faithful to their calving grounds and will only abandon them if there is some external force that causes them to do so. [Trasky at Tr. 1370.] The implication is that Pebble's activity in the area forced the caribou to different calving grounds. The Court is unwilling to make that inference because there is no evidence demonstrating a causal link between exploration activity and the Mulchatna caribou herd's migration and calving patterns. Mr. Trasky admitted that there is no evidence or data that actually demonstrates what has caused there to be fewer animals in the area. [Trasky at Tr. 1389.] The only evidence that Mr. Trasky relies on for his conclusion that Pebble's activities displaced wildlife is his knowledge that animals previously used the area and now the State monitoring reports record few wildlife

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sightings. [Trasky at Tr. 1385, 1391.] However, Mr. Trasky admitted that caribou are migratory, that herd populations routinely fluctuate, and that they alter their range over time, each of which is an equally plausible explanation for the low caribou numbers in the Pebble area. [Trasky at Tr. 1388, 1395.] Mr. Trasky read from his deposition transcript at trial:

> Q: Question: Do you have an opinion about whether mineral exploration activities at the Pebble site have actually had an effect on caribou? Your answer?
>
> A: "I think it's had an effect, but since there was no data collected beforehand, no quantity of data and nothing there after, **it's impossible to tell what the level of effect has been**."
>
> Q: Question: Do you know if it's a measurable effect?
>
> A: "There is no data to measure against. Give some data and I will tell you."
>
> Q: Question: Do you have an opinion about whether the exploration activities at the Pebble site have altered the population count of the Mulchatna caribou herd?
>
> A: "I don't know that there is any data. No, **I don't have an opinion**, because there is nothing to base an opinion on. **There is no data**."
>
> Q: Can you keep going, please?
>
> A: "My opinion, based on the kind of activities that have been going on there and the intensity, which is much greater than most exploration sites that we have seen that has had an effect on caribou, but I can't – **I would guess it's probably displaced them from the area**."
>
> Q: . . . Question: Have you looked at the studies about whether the range expanded as the population expanded?
>
> A: "Based on – yes, I have."
>
> Q: Question: What happened?
>
> A: "Caribou have moved to different areas. They have gone further north and migrated back, so **they have expanded their range**. I don't know that they expanded their range. They are just using parts of it that they haven't used for a very long time."

Q: "Including further west, almost all the way to Bethel, right?"

A: "Yes, historically, that's been part of the range."

Q: Question: There are caribou that you found in the western part of the range in the nineties that were not there in the eighties, right?

A: "I do not know whether there were caribou there or not. I know that I have read the long-term studies, and, of course, **that herd has been all over that area in the past and it's declined and expanded and declined. So caribou do that, they cycle a lot**.

Q: "**Is it documented that the Mulchatna caribou herd has cycled historically, right**?"

A: "**Yes**."

Q: "**It's expanded and contracted, right, in population**?"

A: "**Yes**."

Q: "**And it's altered its range over time; is that right**?"

A: "**Yes**."

Q: "And then the population has a measured decline starting in the nineties, right?"

A: "I don't know the exact time, whether it was the nineties or later, but it's my understanding, I have been told, that it has declined." [Trasky at Tr. 1393-95 (emphasis added).]

Given Mr. Trasky's deposition testimony presented at trial, his opinion that Pebble's exploration activities have displaced caribou from the study area is not credible. Mr. Trasky admitted that his opinion is speculative and he fails to take into consideration the Mulchatna caribou herd's natural population cycle and tendency to expand and alter its range over time. He also failed to account for other natural causes for the decline in caribou numbers, such as predation and over-grazing, as explained by Mr. Woolington and Mr. Taylor. Mr. Trasky's testimony is also self-contradictory in places. For instance, he testified that impacts to wildlife at the Pebble study area are "very long-term

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duration." [Trasky at Tr. 1371.] Yet, Mr. Trasky later admitted that impacts to wildlife are temporary because if Pebble shut down its operations, displaced animals would likely return. [Trasky at Tr. 1405.] Mr. Trasky's opinions on caribou are not credible or reliable.[55]

Given the testimony presented, this Court finds that the Mulchatna caribou herd's distribution and movement is subject to frequent change, even in the absence of human activity. The herd has historically changed its calving grounds and wintering locations from one year to the next. The Mulchatna caribou herd's population displays a natural boom-and-bust cycle that is driven by ecological factors like predation, disease, weather and over-grazing. No direct evidence was presented at trial establishing a causal connection between exploration activities and impacts to caribou. Therefore, this Court finds that there is insufficient evidence to establish a causal link between the low caribou distribution in and around Unit 17B and the hardrock mineral exploration activity that has taken place in the Pebble study area.

b. Other Wildlife.

In December 1991, Cominco Alaska, Exploration contracted with ADF&G, Division of Wildlife Conservation, to investigate wildlife use and harvest in the proposed Pebble Copper Mine area, northwest of Iliamna Lake, Alaska. [Ex. 444 at SOA 026208.] The investigation collected information regarding black and brown bears, moose, and

[55] *See* cases cited *supra* note 36.

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furbearing animals including beaver, lynx, land otter, wolf and wolverine in the Pebble Mine area. [*Id.* at SOA 026212.]

The Division of Wildlife collected information from: a) recent moose and bear surveys; b) bear, moose, and furbearer harvest data from 1985/86–1990/91; c) historic aerial survey observations of bears; d) historic trend counts for moose; and e) harvest reports on furbearing animals. [Ex. 444 at SOA 026208.]

The baseline study conducted by the Division of Wildlife Conservation showed: a) low moose density in the vicinity of the ore body; b) brown bears denned around the proposed site; and c) furbearers were trapped extensively in Game Unit 17B and 9B "near the proposed mine area." [Ex. 444 at SOA 026211-026212.]

In February 1993, Cominco requested ADF&G to supplement its caribou management activities by conducting aerial surveys to document use of the Pebble Copper Mine site by caribou and "other large mammals." [Ex. 404, p.1.]

ADF&G generated a report, dated January 14, 1994, that summarized its surveys in 1992 and 1993. [Ex. 404.] The report stated: "The investigation revealed little use of the mine site by large mammals other than caribou. We saw a couple of brown/grizzly bears and no moose, black bears, wolves or wolverines. Red fox (*Vulpes vulpes*), otter (*Lutra Canadensis*), and ptarmigan (*Lagopus* spp) seemed to be common." [*Id.* at p.11.]

In addition to the Mulchatna caribou herd, Mr. Woolington also testified about the populations of other wildlife in Unit 17:

> Q: And what is the stability or lack of stability of the moose population in 17?
>
> A: In 17-A, they are increasing. They are a relatively new addition out there. So that population is doing very well. It's very productive and it's increasing. 17-B, I feel it's probably stable – or excuse me – 17-C is stable. 17-B is probably in a bit of a decline.
>
> Q: What about black bears, brown bears, how would you characterize the stability of those populations?
>
> A: Black bears I don't have much information on them, because they don't occur in very large numbers. There is only about six or eight reported taken in 17 each year. Brown bears we have a lot of brown bears, and according to many local residents in almost all the villages, they feel that brown bear numbers are increasing.
>
> Q: One last species that I'm not sure we mentioned. Do you also report on and study fur-bearing wildlife in unit 17?
>
> A: Some of upon [sic] species, fur-bearer species, have to be sealed or tagged by the department before the trappers sell them. Wolf, lynx, river otter, wolverine, and so I get harvest numbers, but I don't have population estimates for most of them. We are planning on doing a wolf population estimate in parts of 17-B and C this winter. [Woolington at Tr. 1639-40.]

Mr. Taylor similarly testified that although the moose population is relatively low, the Pebble area supports "an abundance of beaver and fairly high populations of brown bear" and a few black bear. [Taylor at Tr. 763.] Mr. Halford testified that he has observed bear on the streams in the Pebble vicinity. [Halford at Tr. 1160.] He also testified that he has not seen many moose around Pebble for awhile, but admitted that it is difficult to see moose in the thick brush. [Halford at Tr. 1160.]

The State inspection reports also indicate a significant amount of wildlife exists in the Pebble study area. The reports state:

Brown Bear

- "Two brown bears observed along Upper Talarik Creek" (August 2010) [Ex. 2001.]
- "One brown bear during fly over between drill holes" (June 2010) [Ex. 2003.]
- "3 brown bears observed ½ mile north of the deposit" (June 2009) [Ex. 2006.]
- "Noted probable [bear] tracks at south end of Frying Pan Lake" (October 2008) [Ex. 2007.]
- "Sow and two cubs approx. 5 miles east of USGS gage on Upper Talarik Creek" (September 2008) [Ex. 2008.]
- "Single set of [bear] tracks observed between Rig 2 and Rig 6" (May 2008) [Ex. 2013.]

Caribou

- "Six caribou . . . near Frying Pan Lake" (August 2010) [Ex. 2001.]
- "[A]pprox. 6 [caribou] one mile NE of Frying Pan Lake" (August 2009) [Ex. 2005.]
- "Anecdotal reports of small numbers [of caribou] (fewer than 12/group) in general area during past several weeks" (September 2008) [Ex. 2008.]

Moose

- "Reports of multiple sightings [of moose] in general area during past several weeks. Bull sited in lake near headwaters of Pete Andrews Creek 9/23" (September 2008) [Ex. 2008.]

Birds & Waterfowl

- "Various birds" (August 2010) [Ex. 2001.]
- "Waterfowl observed" at the larger ponds (June 2010) [Ex. 2003.]
- "Two swans observed on Big Wiggly Lake" (October 2009) [Ex. 2004.]
- "[T]wo swans on the edge of Big Wiggly Lake" (August 2009) [Ex. 2005.]
- "One swan on Frying Pan Lake" and "[o]ne raven near drill rig 2" (June 2009) [Ex. 2006.]
- "[B]ald eagle along Upper Talarik Creek, . . . raven at drill 5" (October 2008) [Ex. 2007.]

- "Pair of swans on Frying Pan Lake, two unidentified flocks on ponds upstream of Frying Pan Lake" and "[o]ne raven near drill rig 5" (September 2008) [Ex. 2008.]
- "[O]ne ptarmigan" (August 2008) [Ex. 2009.]
- "[R]obin" (July 2008) [Ex. 2010.]
- "[B]ald eagle" (June 2008) [Ex. 2011.]
- "[U]nidentified raptor near Rig 6" (May 2008) [Ex. 2013.]
- "Raven" (April 2008) [Ex. 2014.]
- "Raven, numerous unidentifiable birds" (September 2007) [Ex. 2020.]

Furbearers

- "Noted beaver ponds and lodges in upper South Fork Koktuli River drainage, above Frying Pan Lake. Ponds appear to be occupied, as indicated by well maintained lodges and dams" (October 2009) [Ex. 2004.]
- "[G]round squirrels" (August 2009) [Ex. 2005.]
- "Large fox at Big Wiggly . . . foxes at drills 1 & 6 . . . several beaver ponds" (October 2008) [Ex. 2007.]
- "One fox observed between drill rigs 5 and 4" (September 2008) [Ex. 2008.]
- "One ground squirrel" (August 2008) [Ex. 2009.]
- "Marmot, red fox" (July 2008) [Ex. 2010.]
- "Ground squirrel" (June 2008) [Ex. 2011.]
- "Two ground squirrels" (May 2008) [Ex. 2013.]
- "[F]ox tracks downstream of Frying Pan Lake" (May 2008) [Ex. 2013.]
- "Beaver dam, but no beavers observed" (October 2007) [Ex. 2017.]

Despite the exploration activities, these reports demonstrate that there is wildlife present at the Pebble study area.

Given the evidence presented, this Court finds that there is insufficient evidence to conclude that the activities at the Pebble study area have in fact caused permanent impact to the Mulchatna caribou herd or any other wildlife or wildlife habitat in the area.

7. There is No Evidence of Permanent or Long-Term Environmental Harm Resulting from Fuel Spills.

Plaintiffs claim the uncontrolled release of hydraulic oil, diesel fuel and other chemicals has caused contamination at the Pebble site. While there is evidence that spills at the Pebble site have occurred, there is no evidence that any of the releases caused serious environmental impact or harm.

Pebble uses primary and secondary fuel containment and possesses on site all the necessary supplies to handle fuel spills. [Fredericksen at Tr. 1224.] For example, at the Big Wiggly Lake fuel supply area, there are five fuel tanks which are placed in a large welded aluminum containment structure to capture any fuel leakage. [Gleitsmann at Tr. 2125; Ex. 3055.23-.24, 3056.15-.16.] When fuel is off loaded from floatplanes at the lake, a "boom is spread out around the airplane" to contain any spilled fluids.[56] [Gleitsmann at Tr. 2127; Ex. 3056.21.] As an additional precaution, Pebble has placed a fuel spill kit at the outlet of Big Wiggly Lake to contain any fuel spilled into the lake and prevent it from moving downstream. [Gleitsmann at Tr. 2123; Ex. 3055.55.] Pebble places their diesel generators and water pumps away from water sources and stores fuel containment, spill kits and scrubber barrels nearby. [Fredericksen at Tr. 1223; *see, e.g.*, Ex. 2001 at SOA 74910, 74914 and Ex. 2004 at SOA 15781.]

The few spills that have occurred at the Pebble study area have been very routine for the type of drilling operation. [Brown at Tr. 1797.] The State has determined that, at

[56] John Brown testified that "[d]iesel and gasoline and all of the petroleum products float." [Brown at Tr. 1798.]

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the time of trial, none of the spill sites needed any further response or reclamation work. [Brown at Tr. 1801.] Regarding Pebble's responsiveness to the spills, John Brown, the DEC supervisor for spill response, testified:

> Q: And in your opinion, has the responsible party [Pebble] responded appropriately to those spills?
> A: Really, they have been very proactive working with us. There hasn't been a question we haven't [sic] asked that they haven't come up with an answer and been very helpful as far as working with us. [Brown at Tr. 1800.]

Even though there have been some fuel and other spills at the Pebble site, this Court finds Nunamta has failed to show that those spills have created any long-term environmental harm or that Pebble is non-responsive to spills such that harm is likely to occur in the future. Furthermore, the Court finds that the introduction of fuel and oils to the area is not solely from Pebble as the concurrent users of the Pebble Area also access the area using planes or other motorized craft.

8. <u>There is No Evidence that Mineral Exploration Activities Have Caused Significant and Permanent Impacts to Vegetation.</u>

Pebble operates a reclamation program which is designed to remediate disturbed ground and restore vegetation to areas that were previously vegetated. [Taylor at Tr. 771-72; Fredericksen at Tr. 1216, 1221.] Once drilling operations are complete for a particular site, and the drill rig, drill platform and associated structures are demobilized and removed by helicopter, a reclamation crew will come in and remediate the area. [Taylor at Tr. 771-72.] The sumps and trenches are back-filled with the previously excavated soil and recontoured using a "rubber-tracked small backhoe," which is used to protect

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vegetation. [Taylor at Tr. 772; Gleitsmann at Tr. 2141; Fredericksen at Tr. 1215; Ex. 3055.21.] The vegetative mat is replaced on top of the reclaimed sumps and the area is reseeded and revegetated as necessary. [Taylor at Tr. 772; Fredericksen at Tr. 1215.] In general, once a drill site has been reclaimed, the only thing that remains is a drill collar marker in the form of a wood stake. [Wober at Tr. 340; Taylor at 773, 783; Fredericksen at Tr. 1215, 1221 (stating impacts are "Very local. Very small. And very temporary" and after reclamation "it is very difficult to find many of the old drill sites").]

Other than a few exceptions, Pebble's reclamation efforts have been successful. [Taylor at Tr. 773.] Mr. Taylor testified that after one or two growing seasons, it becomes very difficult to distinguish a reclaimed site from the natural landscape:

> Q: Based on your observations and knowledge of what goes on out there, how successful are the reclamation efforts?
> A: They are generally successful. I think we have had a few exceptions, and when we find places where the vegetation hasn't regrown to the satisfaction of our company, we'll send the reclamation crew back out to go through that process again.
> Q: Once reclamation is complete, is the site available for other users?
> A: Yes, it is. It would be very difficult for other users to see the difference between a reclaimed site and a natural site out there after a year or two of vegetation growth. [Taylor at Tr. 772-73.]

Mr. Taylor's opinion on the success of Pebble's reclamation program is shared by State inspectors who have observed the reclaimed drill sites. Notably, Ronald Benkert, one of the State inspectors, testified that "the reclamation has been successful" at a "majority of the sites" for the Pebble Project. [Benkert at Tr. 1821.] Mr. Benkert testified

that out of the 20 or 30 reclaimed sites he has personally observed, there was only one site where the reclamation was not working well. [Benkert at Tr. 1822.] However, with regard to that one area, Mr. Benkert admitted that he did not "know how long it had been since they had reclaimed that site" and the area that had not revegetated was "fairly small," only about 25 feet by 40 feet. [Benkert at Tr. 1824-25.] Other than this one site, Mr. Benkert testified that "most of the sites recovered fairly nicely." [Benkert at Tr. 1824.]

State inspection reports, Pebble's annual reclamation reports and Mr. Gleitsmann's photographs are all consistent with Mr. Taylor's and Mr. Benkert's testimony that reclamation efforts have been successful at the Pebble study area. On two separate occasions, Mr. Gleitsmann visited the Pebble site and photographed "every ground disturbance [he] could find" in the area, including abandoned drill sites. [Gleitsmann at Tr. 2109-10.] Mr. Gleitsmann's photographs of abandoned drill sites depict successful reclamation and little, if any, ground disturbance. [*See, e.g.*, Ex. 3056.7, 3056.22, 3056.31, 3056.37, 3056.46, 3056.55, 3055.29, 3055.35, 3055.37, 3055.40-.42, 3055.48, 3055.52, 3055.54.] Mr. Gleitsmann testified that during his two trips to Pebble he did not observe or photograph "any unsuccessful reclamation." [Gleitsmann at Tr. 2187.]

Pebble's annual reclamation reports demonstrate a successful on-going reclamation program. Of particular note are photographs in the reports which depict drill sites before and after reclamation. For example, Hole 8435 was drilled in 2008 and

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reclaimed in 2009. The pre-reclamation photograph was taken on May 25, 2009 and shows a trench, a sump with water in it and excavated material. The post-reclamation photo, taken less than one month later, shows the same site with almost unnoticeable ground disturbance and new vegetation already beginning to grow back. [Ex. 2032 at SOA 5688.] The reclamation success of Hole 8435 is typical and is similarly demonstrated with other drill sites, test pits and seismic lines throughout the Pebble study area. [*See, e.g.*, Exs. 2032 at SOA 5688-5702, 2033 at SOA 5002-5018, 2034 at SOA 4229-4233, 2035 at SOA 4405-4410, 2036 at SOA 3796-3822, 2037 at SOA 4012-4045.]

The State inspection reports similarly indicate successful reclamation and revegetation of abandoned drill sites at Pebble:

- Holes 10489, 10495: "Good reclamation – hard to identify abandoned DDH site except for the ground post identifying the location." [Ex. 2000.]
- Hole 9463: "Good Reclamation." [Ex. 2000.]
- Hole 8417: "Observed some areas of dead vegetation, but overall, vegetation is doing well." [Ex. 2001 at SOA 74919.]
- Hole 9455: "Site reclaimed and vegetation growing" and "[s]ite generally looked good, vegetation reestablishing." [Ex. 2003.]
- Hole 8427: "[V]egetation is growing and site looks good" and "reclamation efforts appear successful." [Ex. 2003.]
- Holes 9462, 9451, 9448, 9445: "Natural revegetation" [Ex. 2004 at SOA 15788-95.]
- Hole GH-05-59: "Overall the site was in very good condition and can be considered completely reclaimed" and "[s]ite revegetated: yes" [Ex. 2005 at SOA 15812.]
- GH-08-123: "Site clean and no evidence of the drill site remaining" and "[s]ite revegetated: yes" [Ex. 2005 at SOA 15814.]
- Unlisted Holes: "Area drilled in June 2009 – very little evidence of disturbance except for drill collars" [2005 at SOA 15818.]

- Hole 8415: "Site is in good condition with reclamation complete" and "[s]ite revegetated: yes" [Ex. 2006 at SOA 15824, 15827.]
- Hole 8415: "Site revegetated: yes, straw onsite, one inch high blades of grass showing." [Ex. 2008 at SOA 15982.]
- Hole 5316: "[R]eclaimed nicely, dry, no pipe visible." [Ex. 2010 at SOA 15910.]
- Hole 6338: "[N]icely reclaimed" and "[s]ite revegetated: yes, good growth around a very clean site, no sign of disturbance" [Ex. 2010 at SOA 15912.]
- Hole 5324: "[R]eclaimed nicely." [Ex. 2010 at SOA 15913.]
- Hole 7366: "Site re-vegetated: Yes" and "[s]ite looks good . . . and some new grass growth." [Ex. 2019 at SOA 69804.]
- Hole 6355: "Site re-vegetated: Yes" and "re-vegetation was evident" [Ex. 2020 at SOA 15999.]
- Unlisted Holes: Photos showing successful reclamation. [Ex. 2023 at SOA 16033-43.]

There are some notations in the State inspection reports indicating that a site has not yet been revegetated. However, State inspectors do not have the reclamation completion dates when they conduct their field inspections. [Ex. 2003 at 11 of 18 ("It would be nice for agency to have reclamation completion dates at time of inspection.").] Thus, the inspection reports do not indicate how long ago the site was reclaimed, whether the reclamation is complete, whether the area has had a growing season to revegetate or whether another reclamation crew performed additional work after the inspection. The comments in the inspection reports reflecting instances of unsuccessful reclamation may have been entered prior to the completion of the reclamation process or shortly thereafter. Indeed, the State recognized this possibility in one of its reports where it "noted that the abandoned holes were reclaimed at different times and some sites may have had longer to recover than others." [Ex. 2003] The photographs and comments in the reports, therefore,

capture the progress of the reclamation effort, complete or not, and must be assessed in that light.

Some of the inspection reports that Plaintiffs rely on to show unsuccessful reclamation specifically state that reclamation is incomplete or in progress. For example:

- Hole 768: "[H]ad a more visible footprint with bare soil observed . . . [h]owever, **there was indication of reclamation work in progress**." [Ex. 2020 at SOA 15998 (emphasis added).]
- Hole 5331: "Footprint still visible with bare patches present. **Pebble staff informed us site reclamation was ongoing**." [Ex. 2011 at SOA 15923 (emphasis added).]
- Hole 8412: "Vegetation is not regrowing at this site," but "**site did not look like reclamation was 100% complete**." [Ex. 2003 (emphasis added).]

Because the reclamation for these sites was not actually complete at the time of the inspection, these reports have limited probative value of the success or lack of success of Pebble's reclamation program. Additionally, the State has recognized that the slower rates of revegetation at some of the sites may be due to site specific conditions. It acknowledged that the "[i]ssues with revegetation appear to be occurring at drill sites on rocky soil with sparse vegetation." [Ex. 2001 at SOA 74905.]

The weight of the evidence demonstrated that Pebble's reclamation efforts have generally been successful. Therefore, this Court finds that the exploration mining activities have not caused any significant or permanent impacts to vegetation at the Pebble study area such that the lands are rendered unusable or unsuitable for other uses. Further, as to those few areas that are proving more difficult, the Court finds that the

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cumulative area disturbed is very small and, considering the general success thus far, it is more likely than not that these areas will be reclaimed.

9. There is No Evidence that Exploration Activities Have Impacted Any Archeological or Cultural Resources.

There is no evidence that exploration activities in the Pebble study area have ever encountered a cultural or archeological resource, let alone impacted or harmed a site. Pebble's exploration permit contains safeguards to archeological and cultural resources in the exploration area. In the event Pebble's operations encounter an archeological or paleontological resource, the MLUP specifically requires Pebble to cease "all activities that may disturb such resources" and to notify the State of the find. [Exs. 2043-2045.] Plaintiffs suggest that cultural resources are present in the exploration area, noting the find of "an arrowhead" and the remains of a "modern camp at Frying Pan Lake." [Ex. 161 at SOA 21783, 21777.] However, the report transmitting the "find" indicates that the arrowhead is actually a replica: "[A] reproduction of an Eastern Woodlands arrowhead made by former archaeologist Don Quillman (pers. comm.) from heat treated Missouri chert." [Ex. 161 at SOA 21742, 21783.] As for the camp, the report states: "On the west side of the lake was evidence of contemporary use, with an array of discarded aluminum cans on the surface and some buried refuse dug out by scavengers." [Ex. 161 at SOA 21741.] Notably, the report states that "[n]o artifacts, archaeological, or historic sites

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were located during the 2004 field season."[57] [Ex. 161 at SOA 21742.] The lack in cultural and archeological resources in the Pebble area is supported by Plaintiffs' witness Rick Delkittie, who testified that he is not aware of any cultural resources in the area other than some old fire pits over at Frying Pan Lake from his parents. [Delkittie at Tr. 965.] Even if these sites and artifacts could be construed as cultural or archeological resources worthy of protecting, Plaintiffs have failed to present any evidence that those resources have been impacted or harmed by exploration activities at the Pebble study area.

E. Conclusion of Law: The Permits Are Not a "Disposal" under Article VIII, Section 10 because They are Actually and Functionally Revocable.

Even if the temporary, non-exclusive MLUPs and TWUPs are "interests in land," issuance of the permits does not constitute a "disposal" because the permits are legally and functionally revocable. On their face, the MLUPs and TWUPs are temporary, revocable permits which, if not revoked, expire by their own terms. [Exs. 2043-2045, 2072-2080.] For example, MLUP A096118 is valid from "February 26, 2009 through December 31, 2010, unless sooner revoked for cause. This permit is also revocable at will." [Exs. 2043-2045.] The longest permits in place are the five-year TWUPs; however,

[57] Plaintiffs also purported to show the presence of cultural and archeological sites with a GIS map presented by Dr. Smith. Dr. Smith's GIS layer, however, included a cultural resource point that consisted of nothing more than modern camp refuse: "The site consists of a cache of metal and plastic materials partially buried in the rocky flats on a plateau to the east of the Upper Talarik Creek and ten miles due west of the Newhalen River. Camp refuse included a wire that appears to be part of a camp stove, a flat sardine-style can and a piece of plastic film imprinted with a Quaker chewy granola bar label. This label was copyrighted 1985." [Smith at Tr. 473-74; Ex. 552 at SOA 22083.]

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the State has authority to revoke or suspend those permits before they expire by their own terms. [*See, e.g.*, Exs. 2072-2080.] The applicable statute and regulations also render the permits revocable by the State.[58] Indeed, the State has in fact revoked MLUPs from other permittees in the past, and has also temporarily revoked Pebble's TWUPs after a violation of the permit terms was reported. [Prokosch at Tr. 1772; Fredericksen at Tr. 1238.] Thus, the permits are *de facto* revocable when the State has in fact revoked MLUPs and TWUPs.

The next question is whether the facially revocable permits are "functionally irrevocable" in a practical, real world sense as applied to the Pebble exploration project. In *Northern Alaska Environmental Center*, the Alaska Supreme Court adopted a test for determining if a permit was "functionally irrevocable" and therefore required a best interest finding under the Alaska Land Act. The two-pronged test "analyzes both (1) the likelihood of revocation and (2) the long-term and harmful character of the environmental impact."[59] In that case, the Court concluded that a right-of-way permit for the Golden Valley intertie project was "functionally irrevocable" because the project involved over $40 million of legislatively-appropriated construction dollars to build a permanent

[58] *See* AS 38.05.850 (authorizing DNR to grant revocable MLUPs); 11 AAC 96.040(a) (stating that an MLUP "is revocable for cause . . . and is revocable at will"); AS 46.15.155(i) (stating that the commissioner may "revoke" a TWUP); 11 AAC 93.210(b) (stating that a TWUP "is subject to . . . revocation by the department").

[59] *Northern Alaska Environmental Center*, 2 P.3d at 638.

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electrical transmission system and required the clearing of approximately 1,319 acres of vegetation along its 97-mile path, including 867 acres of wetlands.[60]

Under the *Northern Alaska Environmental Center* test, a permit is functionally irrevocable if (1) the permit is not likely to be revoked, or (2) if there is long-term and harmful environmental impact.[61] The first prong of the test "'focuses on the likelihood of the revocation as opposed to the mere legal right to revoke.' Under this test, a permit would not be revocable where revocation would result in the destruction of the licensee's sizable investments."[62] The second prong of the test focuses "on whether, upon revocation, the licensee could remove the installed structures, or otherwise vacate the land, without permanently damaging or destroying the property for governmental use."[63]

Applying the first factor, the permits at issue in this case are functionally revocable because revocation would not result in the destruction of Pebble's investment. As demonstrated in *Northern Alaska Environmental Center*, a permit is unlikely to be revoked if it has allowed the licensee to substantially invest in the construction of permanent infrastructure—like a concrete and steel electrical intertie. Similarly, in *Wilderness Society v. Morton*, the D.C. Circuit case from which the *Northern Alaska Environmental Center* test was adopted, the court concluded that a federal permit

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[60] *Id.* at 639.

[61] *Id.* at 638-39.

[62] *Id.*

[63] *Id.*

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granting Alyeska Pipeline Company the right to construct the 789-mile TransAlaska oil pipeline, which would include building a gravel pad to insulate the permafrost, was functionally irrevocable.[64] In that case, the court noted that if the permit were revoked during the pipeline construction period, "construction of the remainder of the pipeline could not continue and the entire investment in already completed segments of the pipeline would be lost."[65] The court noted that "the entire pipeline investment rests on [the] continuing availability of the [permit]."[66]

That is not the case here. Unlike the intertie in *Northern Alaska Environmental Center* and the oil pipeline and gravel pad in *Wilderness Society*, there is no evidence of Pebble investing money in permanent infrastructure or installments on the land. [*See supra* p. 26-30.] Although Pebble has spent a significant amount of money on exploration and environmental studies, its purpose has been solely to collect intellectual property in the form of information about the mineral deposit and the baseline environmental conditions.[67] [*See supra* pp. 2, 24-29.] Pebble has not invested in the types of permanent,

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[64] 479 F.2d 842, 873-75 (D.C. Cir. 1973).

[65] *Id.* at 873.

[66] *Id.*

[67] Pebble's significant monetary commitment in this study did not prevent DNR from recently suspending Pebble's permits, and Pebble's study of the project area certainly does not guarantee future development. *See Beluga Mining Co. v. State, DNR*, 973 P.2d 570 (Alaska 1999). Also, it is worth noting that the size of Pebble's investment is not the dispositive issue under *Northern Alaska Environmental Center*. The important question is whether revocation would *destroy* Pebble's investment, whatever monetary amount that investment might be.

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concrete and steel infrastructure that would render its permits functionally irrevocable. [*See supra* p. 24-29.]

In contrast to the vast land clearing and permanent electrical intertie authorized by Golden Valley's right-of-way permit in the *Northern Alaska Environmental Center* case and Alyeska's permit to build the oil pipeline and gravel pad, the MLUPs and TWUPs here do not authorize permanent structures or disturbances of the land. [Exs. 2043-2045, 2072-2084; *see supra* pp. 16-23.] The permits, by their very terms, allow only for temporary uses of land and water. [*Id.*] The permits have strict reclamation requirements for all land disturbances, and the water permits preclude any permanent appropriation of water rights. [*Id.*] In accordance with these permits, Pebble has not built a mine or any permanent infrastructure. [*See supra* pp. 24-29.] Indeed, Ken Taylor's testimony shows that everything at the site, except for the bore hole drill casings and the material used to plug the holes, can be removed by helicopter within a matter of weeks. [Taylor at Tr. 782-83.] Evacuating the site upon revocation would not damage the scientific information Pebble has gathered through its exploration and baseline studies. [*See supra* pp. 2.] And the evidence showed that any ground disturbances would be unnoticeable within one-year. [*See supra* pp. 27-29, 119-125.] Thus, unlike the concrete and steel electrical intertie in *Northern Alaska Environmental Center* and the metal pipeline and gravel work pad in *Wilderness Society*, there is no permanent infrastructure at the Pebble study area that would make the permits functionally irrevocable. Because the State's revocation of

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the permits would not destroy Pebble's investment, the permits are functionally revocable under the first factor.

Applying the second factor, the permits are functionally revocable because Pebble's exploration activities have not caused irreversible and deleterious ecological changes to the surrounding environment. The *Wilderness Society* court stated that the second test requires consideration of "whether any structures to be erected can in fact be removed and whether the land may be left, after revocation, in suitable condition for Government use."[68] This test is violated when the structures "cannot be removed without producing permanent and deleterious changes in the underlying land."[69]

In *Wilderness Society*, the court concluded that the pipeline and gravel pad could not be removed without causing permanent harm to the environment. Construction of the pipeline would include "areas where hills and mountains are to be graded away, and other areas where the spoil from such grading will be piled."[70] The court recognized that given these changes "it would seem construction of the pipeline involves permanent changes affecting the land that cannot be reversed upon revocation," because "[t]here is, of course, no way to rebuild a mountain."[71] Additionally, the construction pad would be a gravel roadway up to five feet deep and would be built with 34 million cubic yards of

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[68] *Wilderness Society*, 479 F.2d at 874.

[69] *Id.*

[70] *Id.*

[71] *Id.*

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gravel taken from 234 gravel pits located along the pipeline route.[72] The court concluded that its removal would cause harmful effects to vegetation, erosion and irreversible changes to the permafrost.[73] The court in *Northern Alaska Environmental Center* similarly found that the intertie would cause "irreversible ecological changes," including "the clearing of approximately 1,319 acres of vegetation along its 97-mile path, including 867 acres of wetlands . . . [and] permanent thermal degradation of the sensitive Tanana Flats permafrost."[74]

Unlike the intertie and pipeline projects, there is no evidence that Pebble's exploration activities are now causing or will in the future cause permanent and deleterious changes to the environment. Indeed, Plaintiffs have failed to prove by a preponderance of the evidence that any long-term and harmful environmental impacts have actually occurred or necessarily will occur at the project site or surrounding environment. [*See supra* pp. 38-126.] The evidence shows that more than 20 years after minerals were first discovered at Pebble, the site continues to have pristine water and support wildlife and fisheries resources. [*Id.*] The harms that Plaintiffs' witnesses describe are speculative; they are neither harms occurring in fact nor did they show that the harm will necessarily occur. [*See supra* pp. 40-47, 55-56, 61-64, 85-92, 95-98, 99-117.]

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[72] *Id.* at 873.

[73] *Id.* at 874-75.

[74] *Northern Alaska Environmental Center*, 2 P.3d at 639.

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The evidence at trial demonstrated that the permits and Pebble's activities pursuant thereto have preserved unimpaired the State's resources such that the State may, at any time, revoke the permit and use its property without any significant temporary or permanent damage or destruction to the underlying land. Indeed, there was no evidence that Pebble's exploration drill holes or sump pits cause or necessarily will cause acid rock drainage, nor was there any evidence that Pebble's use of drilling muds and additives cause or will cause harmful and permanent contamination. [*See supra* pp. 40-69, 85-91.] Despite the drilling of over 1,200 holes, the surface water and groundwater at Pebble remain pure and stable. [*See supra* pp. 55-57, 64, 85-89] The evidence also shows that Pebble's water withdrawals were temporary and that the streams, lakes and ponds from which it takes water recharge at a rapid rate. [*See supra* pp. 70-75] If its permits were revoked, there would be no permanent or irreparable harm to the water sources in the Pebble study area. [*See supra* pp. 56, 66-68, 69, 73-75, 84, 85-89.]

The evidence also shows that there has been no permanent harm to fisheries or wildlife resources in the Pebble study area. Fisheries resources were sufficiently protected by Pebble's minimal, temporary water withdrawals and use of protective fish screens. [*See supra* pp. 69-75, 79-86, 92-97.] If the permits were revoked, the fisheries resources would continue to thrive unaffected by Pebble's previous exploration activities on site. [*Id.*] Similarly, the evidence demonstrates that wildlife has not been permanently or deleteriously affected by the exploration activities at the study area. [*See supra* pp. 98-117.] If Pebble removed all of its structures from the area, the wildlife habitat would look

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the same as it had before exploration began. [*See supra* pp. 24-25, 28-29, 119-125.] The wildlife habitat at Pebble is intact and would remain intact upon revocation of the permits. [*Id.*] There is also evidence that once Pebble ends its operations, any wildlife that was displaced by noise will return. [*See supra* pp. 109-110.]

In fact, there was testimony that Pebble could completely remove its operations from the site in two weeks and after one year it would be nearly impossible to tell that there had been any exploration at the site. [*See supra* pp. 24-25, 28-29, 121.] The evidence shows that Pebble operates a successful reclamation program which remediates disturbed ground and restores damaged vegetation. [*See supra* pp. 119-125.] The exploration operation has not caused any significant or permanent impacts to vegetation in the project area. [*Id.*]

Given the evidence presented at trial, revocation of the permits would not result in the destruction of Pebble's investment, nor would it result in permanent and deleterious changes to the environment. Therefore, the MLUP and TWUP permits issued to Pebble are functionally revocable, in the practical, real world sense. The permitted activities are routine and *de minimis*. The permits are not an "interest in land," nor do they constitute a "disposal." Accordingly, the permits need not undergo a constitutional best interest finding or prior public notice before the State may issue them.

VI. THE PERMITS AND THE ASSOCIATED EXPLORATION ACTIVITY DO NOT UNCONSTITUTIONALLY IMPINGE ON REASONABLE CONCURRENT USES UNDER ARTICLE VIII (COUNTS I, II, III, & V).

A. Overview.

The reasonable concurrent uses at the Pebble study area include mineral exploration, access to public land, water, fish and wildlife, cultural resources and subsistence resources. [*See, e.g.,* Exs. 2086 at 3-21, 2087 at SOA 14555-14590.] The evidence presented at trial demonstrates that more likely than not the permits did not grant Pebble exclusive use of state land and water and that the exploration activities at the Pebble area have not significantly impacted or impinged any of the reasonable concurrent uses or users of the area.

B. Pebble's Permits Do Not Provide for Exclusive Use of State Land or Waters.

Neither the MLUP nor the TWUPs that authorize Pebble's mineral exploration activities purport to grant Pebble the right to exclusive use of state land or water. In fact, the MLUP specifically conditions Pebble's land use, stating that Pebble "does not have exclusive use of the surface of the location" and "may not restrict public access." [Ex. 2043-2045.] Further explaining this condition, Mr. Mylius, the Director of DNR's Division of Mining, Land and Water, testified:

> Q: . . . Do these kinds of temporary or miscellaneous land use permits, I should say, grant exclusive use rights to state land?
>
> A: No, they do not. And they specifically say that they do not grant exclusive use and that the permittee couldn't exclude other users from the land. [Mylius at Tr. 2008-09.]

Mr. Mylius further testified that if the State were going to grant exclusive rights to State land, it would not use an MLUP. Instead, it would "either use a land lease, . . . which is a property interest that we give to somebody for an exclusive use of a parcel of state land," or it would grant exclusive rights "through regulation, [by] adopt[ing] what's called a special use area." [Mylius at Tr. 2009-10.]

Like the MLUP, temporary water use authorizations do not grant Pebble the exclusive use of State resources. The TWUPs expressly provide: "No water right or priority is established by a temporary water use authorization . . . . Water so used is subject to appropriation by others . . . ." [*See, e.g.*, Ex. 2072.] Patricia Bettis, who processed several Pebble TWUPs, testified that water use authorizations do not grant Pebble the exclusive use of water or the right to access it:

> Q: Going back to Exhibit 2083 [a TWUP], the permits, does this permit authorize an exclusive use to the water?
> A: No, it does not. A temporary water use authorization does not give right to the use of water. That is a water right certificate.
> Q: And under the permit, does it preclude public access to navigable or public waterways.
> A: No, it does not. [Bettis at Tr. 1715.]

Additionally, the water that Pebble uses pursuant to the TWUPs is not removed from the watershed. Several witnesses testified to the fact that Pebble's use of the water is temporary in that it reenters the hydrologic cycle for no net loss of water to the watershed. [Cathcart at Tr. 1613-14; Bettis at Tr. 1758; Prokosch at Tr. 1774-75.] Ms. Bettis summarized:

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> Q: . . . [W]here does the water go [that Pebble uses]?
> A: The water seeps into the soil and it can percolate through the soil until it hits the groundwater. Once it hits the groundwater, it can flow with the groundwater until it seeps into ponds or into tributaries or the streams.
> Q: So is the water returned to the watershed?
> A: Yes, it is. [Bettis at Tr. 1748.]

Thus, this Court finds that the MLUP and TWUPs authorizing Pebble's exploration activities, on their face, do not grant the exclusive use of State land or water. The next question, therefore, is whether Pebble's actual exploration activities are in fact affecting or impinging on reasonable concurrent uses of the area.

C. Pebble's Drilling Operation and Water Withdrawals Do Not Impact Reasonable Concurrent Use of Water by Fisheries Resources.

This Court has already found that there is no evidence that Pebble's exploration activities have actually impacted fish resources or fish habitat at the Pebble study area. [*See supra* pp. 69-75, 80-98.] Pebble's drilling activity and discharges have not affected the quality of the surface water or groundwater to the detriment of aquatic life in any fish-bearing streams, lakes or ponds. [*See supra* pp. 38-68, 85-91.] The evidence also shows that Pebble's water withdrawals are insignificant in comparison to the volume of water available in the local watersheds and that water continues to be available to concurrent users. [*See supra* pp. 16-23, 80-86.] There is no credible evidence that the quantity of water withdrawn has impacted any fish or fish habitat. [*Id.*] Finally, the evidence establishes that the manner in which Pebble withdraws water is protective of all species and life stages of fish that could potentially be living in its permitted water sources. [*See*

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supra pp. 92-97.] Pebble now uses cylindrical fish screens that protect fish resources that concurrently use the streams and ponds in the Pebble exploration area. [*Id.*]

D. Plaintiffs Failed to Show That Pebble's Drilling Operation Impacted Reasonable Concurrent Use of State Lands by Wildlife Resources.

This Court has also found that there is no evidence that Pebble's exploration activities have impacted the reasonable concurrent use of the area by wildlife. [*See supra* pp. 98-117.] While the caribou density in the Pebble area has decreased since the 1990s, there is no evidence that this reduction was caused by mineral exploration. [*See supra* pp. 98-114.] The more likely cause of the decline in caribou density is the herd's natural variations in migratory patterns and its natural population cycle, which is driven by over-grazing, disease, weather and predation. [*Id.*] The evidence shows that the other wildlife populations in the Pebble area, with the exception of moose, are relatively healthy and abundant. [*See supra* pp. 114-117.]

E. Pebble's Exploration Activity Has Not Excluded Hunting Guides.

Ken Taylor testified that, in general, there is very little subsistence activity in the Pebble deposit area. [Taylor at Tr. 765.] There is some trapping during winter when the area is accessible by snowmachine, but most of the berry picking and salmon harvesting activity occurs near Newhalen, Iliamna and Nondalton. [Taylor at Tr. 765.] Pebble has company-wide policies in place that are intended to accommodate other concurrent users of the Pebble area, especially the few subsistence users. [Exs. 3050-3052.] For example, Pebble has a hunting, fishing and gathering policy that protects the subsistence resources

of the region by prohibiting Pebble employees from engaging in subsistence activities. [Taylor at Tr. 784, 786; Ex. 3051.] Pebble also has a policy that prohibits Pebble employees and consultants from carrying firearms. [Taylor at Tr. 787; Ex. 3052.] Additionally, Pebble has aircraft guidelines directed toward avoiding wildlife disturbance. [Taylor at Tr. 785; Ex. 3050.] The aircraft policy prohibits harassing or pursuing wildlife, requires pilots to fly 500 feet above the ground or higher whenever possible and, when wildlife is spotted, pilots must avoid flying directly overhead and as quickly as feasible maximize lateral distance and remain at least a half mile away if possible. [Taylor at Tr. 785-86; Ex. 3050.] The policy also requires pilots to avoid landing within a half mile of known caribou aggregation areas. [Taylor at Tr. 786; Ex. 3050.]

The only person to testify at trial that he no longer uses the Pebble area is hunting guide Steve Morris, who guided in the area from 1993 to 2001 and would guide 30 – 40 clients a year to hunt big game. [Morris at Tr. 891.] Mr. Morris is a registered big game hunting guide and possesses a state permit to maintain a permanent hunting camp in Guide Unit 1702, which is in Game Management Unit 17. [Morris at Tr. 881-82, 886-87; Ex. 486.] A portion of Guide Unit 1702 includes the Koktuli River drainage up to its headwaters, a small portion of which overlaps with the Pebble deposit site. [Morris at Tr. 887; *see* Exs. 19 and 3119.] Although Mr. Morris's permanent hunting camp is located in the Stuyahok River area, he testified that the bulk of his spike camps were located in the

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Koktuli River drainage. [Morris at Tr. 887.] Mr. Morris's guiding in the area was focused on caribou. [Morris at Tr. 901.]

Mr. Morris testified that he no longer guides in Unit 1702 because of the lack of caribou and the helicopter activity at the Pebble study area. [Morris at Tr. 891-92.] Mr. Morris claims that activity in the Pebble area is a factor in the low caribou numbers. [Morris at Tr. 912.] However, this Court has already found that there is insufficient evidence linking the low caribou distribution in and around Unit 17B to the mineral exploration activity at Pebble. [*See supra* pp. 98-114.] The more likely explanation for the low caribou density in the area is the herd's natural tendency to vary its range and migration patterns, as well its natural boom-and-bust population cycle which is driven by ecological factors like predation, disease, weather and over-grazing. [*Id.*] Consistent with this finding, Mr. Morris admitted that caribou vary its migratory range and its population go through cycles. [Morris at Tr. 903-04.] He also admitted that the Mulchatna caribou herd population has crashed and migrated to a different location due to over-grazing of the area and predation. [Morris at Tr. 912.] Because there is no evidence that the low caribou numbers are in fact caused by mineral exploration activity, this Court finds that Pebble's activity at the site has not excluded caribou, and thus has not excluded caribou hunters or caribou hunting guides, like Mr. Morris.

Despite the caribou decline, its change in herd migration and Pebble's exploration activity, Mr. Morris admitted that there are still animals in the area:

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> Q: Can you use that area anymore for your hunting guide – I mean, can you use it successfully for your hunting guide business?
>
> A: It's not that there is no animals there anymore, and the whole caribou herd migration thing isn't just because of Pebble's activities, but the animals aren't there like they used to be. And it's more the activity of Pebble that you would not land, put up a camp and have somebody sit there and watch more helicopter activity than wildlife in any given time in that area that I used to use, period. [Morris at Tr. 908.]

Mr. Morris's reason for no longer guiding in the Pebble area, therefore, was not the lack of wildlife or hunting opportunity; rather, it was a personal preference to avoid signs of civilization when taking clients on wilderness hunting trips. Indeed, Mr. Morris admitted that his clients are looking for a true wilderness experience, so he does not want to camp near any signs of civilization or any other hunting parties. [Morris at Tr. 907.] What Mr. Morris desires is exclusivity. Yet, he recognized that registering for a guide unit area does not grant him exclusive hunting rights. [Morris at Tr. 905.] Mr. Morris must share the State resources with other reasonable concurrent users, such as other hunting parties, fishermen and even companies conducting mineral exploration activities in the area.

State hunting regulations are the more likely explanation for why Mr. Morris discontinued his guided caribou hunting trips in the Pebble area. Mr. Morris admitted that the hunting regulations applicable to Unit 17B provide that nonresident hunting for caribou in the area is closed year round. [Morris at Tr. 902-03; Ex. 2193.] Mr. Morris admitted that a bulk of his hunting clients were nonresidents looking to shoot a trophy bull caribou. [Morris at Tr. 902.] It is more likely than not that the State hunting

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regulations caused Mr. Morris to stop taking his clients to the Pebble area, not Pebble's exploration activities.

The evidence also shows that, in general, there are very few resource user conflicts at the Pebble site due to the area's remote location and lack of easy access. Mr. Mylius explained:

> The Mulchatna, there is quite a bit of recreation use on the entire Mulchatna, all the way up to where it comes out of Lake Clark Park. And the Koktuli also has a lot of use in the lower portions of the river, but once you get up near the Pebble project area, we actually did not have any significant issues that that plan had to deal with up there, because there really aren't a lot of conflicts between recreational, subsistence and other users, because there is – compared to the rest of the Bristol Bay area, the Pebble area does not receive the kind of intense recreational – commercial recreational use as we saw down in these lower stretches of the rivers closer to the communities and such. [Mylius at Tr. 2024.]

Indeed, there are only a couple guide camps in the general deposit area because access is so limited. There are only a few lakes that are floatplane accessible and there is only one airstrip along the Koktuli River. [Taylor at Tr. 764-65.] Given the difficulty in accessing the Pebble area, there is unlikely to have been any other conflicts between Pebble and hunters or hunting guides.

F. Plaintiffs Failed to Show That the Exploration Activity at Pebble Has Impacted or Excluded Subsistence Users.

The only witness to testify about impacts to his subsistence use at the Pebble study area is Rick Delkittie. Mr. Delkittie lives in Nondalton, Alaska, which is approximately

nine miles from the Pebble Project site. [Delkittie at Tr. 957, 982.] Mr. Delkittie has engaged in subsistence activities on and around the Pebble site for the last 40 years. [Delkittie at Tr. 959-61.] Mr. Delkittie testified that the area is important for subsistence hunting because there is "easy food to get" and that even in December "[w]e have sockeye salmon right now. We go up there and get fresh sockeye salmon." [Delkittie at Tr. 963.] In the spring, Mr. Delkittie hunts birds by snowmachine and, in fall, he hunts moose, caribou, black bear, porcupine and beaver. [Delkittie at Tr. 960-61.] In the winter, he hunts moose and caribou from his snow machine. [Delkittie at Tr. 961.] Mr. Delkittie testified that he does not use the Pebble site in the summer, presumably because there is no hunting during the summer months and no easy access. [Delkittie at Tr. 959-60.] Summer is when most of Pebble's exploration activity takes place.

Mr. Delkittie runs a trapline in the Pebble Project area during wintertime. [Delkittie at Tr. 974.] From November until March, he checks the sets every three days by snowmachine. [Delkittie at Tr. 975.] Mr. Delkittie admitted that no one has prevented him from running his trapline where he wanted to lay them in the Pebble Project area. [Delkittie at Tr. 976-77.] In fact, he admitted that no one has ever excluded him from going to the Pebble site for any reason all. [Delkittie at Tr. 977.] Mr. Delkittie did not run a trapline in 2009, but that was because of poor snow conditions, not because he was excluded by exploration activity. [Delkittie at Tr. 975.] The only reason he has voluntarily decided not to go to the Pebble site is because it is noisy and he feels that it is already occupied. [Delkittie at Tr. 980.] Plaintiffs have failed to produce any evidence

that Mr. Delkittie has been excluded from engaging in subsistence activities at or around the Pebble site. Further, although Mr. Delkittie may "feel" that the land is occupied, this sentiment implies that he wants to use the land without anyone else present. Granting such a wish would then give Mr. Delkittie sole and exclusive use of the land – something he has no right to claim.

Bobby Andrew also provided testimony about his subsistence activities. Mr. Andrew lives in Dillingham and admitted that he has never actually been on the ground at the Pebble Project site. [Andrew at Tr. 479, 519, 528.] Even though Mr. Andrew has never hunted, camped, or picked berries at Pebble, he testified that he understands the site is public land and that he could go there and conduct subsistence activities if he wanted. [Andrew at Tr. 528-29.] Mr. Andrew admitted, however, that he does not choose to go there because it is difficult to access. [Andrew at Tr. 529.] Indeed, he testified that you cannot get there by boat and the only way to reach it by aircraft is to land at Frying Pan Lake, which is still several miles from the deposit area. [Andrew at Tr. 528.]

Although Mr. Andrew has never engaged in subsistence activity at the Pebble site, he has hunted for moose and caribou on the Koktuli River, 10 to 12 air miles from the deposit. [Andrew at Tr. 505, 520, 528.] Mr. Andrew hunted in that area in the fall of 2010 but was unsuccessful. He blames his failure of getting a caribou or moose on noise from Pebble's exploration activities. [Andrew at Tr. 523.] Yet, Mr. Andrew testified that when he was hunting he was using a loud jet unit on his boat and that he did not hear any noise coming from the Pebble area:

> Q: When you are out there hunting this fall, what noise was going on around you from Pebble?
> A: With the jet unit, I was unable to hear anything else.
> Q: Right. So the sound of the motor on your boat drowned out any other noise?
> A: Yeah. That is correct. And to be honest, while camping there, I had not heard anything from the Pebble project site. [Andrew Tr. 523-24.]

Given this testimony, it is more likely than not that Mr. Andrew's lack of hunting success was due to the fact that game was not always available on any given hunt. There was no evidence that failure to bag game on a particular hunt was attributable to activities at the Pebble site.

In 2004, ADF&G's Division of Subsistence did a survey of subsistence harvests and the uses of wild resources in communities near the site area. [Ex. 447.] Other than the testimony cited above, this survey was the most current and only other evidence regarding subsistence activities and the Pebble Project site. The survey noted that local residents had reported that "subsistence uses and harvests have changed in their lifetimes and over the last 5 years." [Ex. 447, p.8.] Some of the reasons cited by local residents for the changes included: non-local hunters overharvesting moose and caribou, fly-in fishermen overfishing local rivers and streams, increasing wolf and bear predation, climate changes such as warm winters and poor snow conditions and helicopter activity at the project site. [*Id.*] The Division of Subsistence observed "causes of changes in subsistence harvests and uses are complex and require additional research that must involve collaboration with local communities." [*Id.*]

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While this evidence suggests that there have in fact been changes in subsistence patterns and uses over the years, the evidence does not show: a) a comparison between past and current patterns and uses; or b) that if changes in the patterns and uses exist, that those changes are a result of exploration activities at the Pebble project; or c) that if changes exist as a result of Pebble activities that they have been adverse changes.[75]

The Court agrees with the Division of Subsistence's observation that the issues involved in subsistence harvests and uses are complex. Regardless of the difficulty of proving a detrimental change, Nunamta has failed to show that subsistence users, as a whole, have been impacted or excluded by Pebble's exploration activities.

G. Conclusions of Law.

The common theme in Counts I, II, III and V of Plaintiffs' Complaint is that the permits are subject to restrictions on reasonable concurrent uses. The various sections of Article VIII describe the concept of "reasonable concurrent uses" using different but analogous terms: Section 1 – "public interest"; Section 2 – "benefit of the people"; Section 3 – "common use"; Section 4 – "preferences among beneficial uses"; and Section 13 – "common use" and concurrent uses. The testimony and evidence at trial establishes that the exploration activities and permit issuance have not had any significant impact on

[75] As established by Mr. Delkittie, subsistence activities frequently involve the use of snow machines or boats. These items plus the gas to run them cost money. If Pebble activities have produced local income such that subsistence activities have become more affordable, than the "change" may in fact be to increase and improve subsistence success.

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the reasonable concurrent uses or common uses of the land and water as defined by the pertinent sections of Article VIII and as pled by Plaintiffs.

1. Count I – Public Trust Doctrine.

Nunamta contends in its Count I that the "public trust doctrine" requires specific studies, analysis, and a written determination by DNR that the public trust resources impacted by the Pebble Project activities were being managed for the common good. The public trust doctrine, which dates to Roman times, provides that "tidelands conveyed to individuals are subject to the public's right to use the tidelands for navigation, commerce and fishing."[76] Historically, the public trust doctrine prohibits *exclusive* grants of certain public assets to private interests.

The seminal American case dealing with the public trust doctrine is *Illinois Central Railroad Co. v. Illinois*.[77] In that case, the United States Supreme Court held that when a state receives title to tidelands and lands beneath navigable waterways within its borders at the time of its admission to the Union, it receives such land "in trust for the people of the state that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein, freed from the obstruction or interference of private parties."[78] The Court held that an exclusive conveyance of submerged tidal lands in the Chicago harbor violated the public trust doctrine.

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[76] *City of St. Paul v. State, Dept. of Natural Resources*, 137 P.3d 261, 263 n.8 (Alaska 2006).

[77] *Illinois Cent. R. Co. v. State of Illinois*, 146 U.S. 387 (1892).

[78] *Id.* at 452.

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Likewise, the Alaska Supreme Court has "applied the public trust doctrine to cases involving exclusive grants of natural resources by the state."[79] In *CWC Fisheries, Inc. v. Bunker*, the Court held that "[w]hile patent holders are free to make such use of their property as will not unreasonably interfere with these continuing public easements, they are prohibited from any general attempt to exclude the public from the property by virtue of their title."[80]

The public trust doctrine is not a procedural rule. It does not require written "findings," "determinations," "analysis," or any other administrative processes or procedures. Indeed, the Alaska Supreme Court expressly rejected this theory in *Greenpeace v. State*.[81] In that case, Greenpeace asserted that a cumulative impacts analysis requirement can be inferred from various sections of Article VIII of the Alaska Constitution and from the "public trust" responsibility implicit in those provisions. The Court held that "none of these sources directly or indirectly suggests the need for such an analysis."[82]

Given the holdings of the Alaska Supreme Court, the public trust doctrine only applies to exclusive grants of natural resources by the State and it does not mandate any procedural requirements in the form of a best interest finding or any other determination.

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[79] *Brooks v. Wright*, 971 P.2d 1025, 1031 (Alaska 1999).

[80] *CWC Fisheries, Inc. v. Bunker*, 755 P.2d 1115, 1121 (Alaska 1988).

[81] *Greenpeace v. State*, 79 P.3d 591 (Alaska 2003).

[82] *Id.* at 597.

The evidence presented at trial demonstrates that DNR's MLUP and TWUP permits allow only non-exclusive use of State land and water. [*See supra* pp. 135-137.] The MLUP expressly provides that Pebble "does not have exclusive use of the surface of the location" and "may not restrict public access." [Exs. 2043-2045.] The TWUPs specifically state that the water "is subject to appropriation by others" and that Pebble's water use does not establish a "water right or priority." [Exs. 2072-2080.]

The evidence also demonstrates that the exploration activities conducted pursuant to the permits have not rendered Pebble's use functionally exclusive. [*See supra* pp. 137-146.] Indeed, there is no evidence that Pebble's activities have caused any actual harm to any reasonable concurrent user or actually excluded any concurrent user from the area. [*Id.*] There is no permanent infrastructure at the Pebble study area. [*See supra* pp. 24-29.] All disturbed soils are reclaimed so that State lands remain available for other uses. [*See supra* pp. 119-125.] Water withdrawals are limited and regulated. [*See supra* pp. 16-23, 40-69, 79-86; Exs. 2072-2080.] DNR requires protective fish screening devices. [*See supra* pp. 92-97; Exs. 177, 2089-2113, 2116-2126.] State land and water continue to be used concurrently, including by some Plaintiffs. [*See supra* pp. 135-146.] The permits do not grant Pebble the right of exclusive use to State resources and Pebble's activities pursuant to those permits have not rendered its use functionally exclusive. [*Id.*] Therefore, the public trust doctrine does not apply. Plaintiffs are entitled to no relief under Count I.

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2. Count II – Sections 1, 2 & 8 of Article VIII.

Nunamta contends that Sections 1, 2 and 8 require DNR to perform a best interest finding. In *Greenpeace v. State,* the Alaska Supreme Court held that "none of these sources directly or indirectly suggests the need for such an analysis."[83] Section 1 is a general policy statement promoting resource development. Section 2 is a general grant of legislative authority. Section 8 provides, in pertinent part: "The legislature may provide for . . . the issuance of permits for exploration . . . subject to reasonable concurrent uses." The temporary, non-exclusive permits for seasonal exploration at Pebble allow for and protect reasonable concurrent uses. The evidence demonstrates that these permits are non-exclusive and State lands remain open to anyone, including hunters, hunting guides, fishermen and subsistence users. [*See supra* pp. 135-146.] The fisheries of the region are robust. [*See supra* p. 96-97.] The wildlife populations are stable and fluctuations in population are attributable to natural patterns. [*See supra* pp. 98-117.] There is no evidence that Pebble's activities have impaired or impinged on any reasonable concurrent uses or users. [*See supra* pp. 135-146.] Plaintiffs, therefore, are entitled to no relief under Count II.

3. Count III – Sections 3 & 4 of Article VIII.

Section 3 is the "common use clause." The Alaska Supreme Court has held "that the 'common use' clause . . . [is] not implicated unless limits are placed on the admission

[83] *Greenpeace*, 79 P.3d at 597.

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to resource user groups."[84] Since by their terms the MLUP and TWUPs issued to Pebble are non-exclusive, DNR has not placed a limit on any resource user. The evidence demonstrated that there is no actual or "*de facto*" exclusion of other user groups and that any disturbances from mineral exploration are temporary. [*See supra* pp. 38-126, 135-146.] Any perceived exclusion of a user has been unnecessarily self-imposed. [*See supra* pp. 137-146.]

The evidence shows that potential concurrent users are self-limiting themselves from using the site. People like Mr. Delkittie and Mr. Morris testified that they have voluntarily decided not to hunt or go on the site because it appeared occupied or was noisy. [*See supra* pp. 136-146.] There is, however, no evidence that Mr. Delkittie or Mr. Morris were excluded from the site. Indeed, the evidence shows that there are still caribou and other wildlife in the area that are available for hunting and subsistence use. [*See supra* pp. 99-117, 137-146.] Plaintiffs have failed to show that any concurrent user of the land was in fact excluded from using the land.

Section 4 is the "sustained yield clause" and does not provide support to Plaintiffs' theory. Sustained yield is a wildlife management principle for setting bag limits – not a land or water management principle. The environmental stipulations and protections associated with Pebble's exploration permits are expressly designed to protect fish and wildlife populations. The evidence at trial demonstrated that these stipulations have been

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[84] *Tongass Sportfishing Ass'n v. State*, 866 P.2d 1314. 1318 (Alaska 1994).

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successful and that fish and wildlife at the Pebble site has not been permanently or substantially harmed. [*See supra* pp. 38-126.] Thus, Pebble's routine mineral exploration is not affecting the sustained yield of fish or wildlife. Plaintiffs are entitled to no relief under Count III.

4. Count V – Section 13 of Article VIII.

Section 13 of Article VIII governs appropriations of water and adopts the "first in time, first in right" doctrine for water appropriation. The word "appropriation" is a term of art that means a permanent grant of a water right, granted on a priority basis to the first person claiming the right.[85] This section has no application to this case since the TWUPs issued to PLP are not appropriations and do not constitute a grant of water rights.[86] [*See supra* pp. 16-24; Exs. 2072-2080.] The evidence at trial demonstrates that the volume of water used for exploration is *de minimis* and that water withdrawals are conducted in a manner protective of fisheries resources. [*See supra* pp. 16-24, 69-75, 79-85, 92-98.] Therefore, Plaintiffs are entitled to no relief under Count V.

VII. CONCLUSION

This Court finds that Plaintiffs failed to prove their case as has been explained in this decision. The MLUP and TWUP permits at issue in this lawsuit do not amount to a

[85] *Tulkisarmute Native Cmty. Council v. Heinze*, 898 P.2d 935, 940-41 (Alaska 1995) (recognizing that free flowing waters in Alaska are subject to "appropriation" such that water may only be taken, or appropriated, from stream with permission from the State and that first person to apply has first priority to volume of water requested; after successfully appropriating specific amount of water, appropriator is entitled to water right, a full and permanent property right in that quantity of water) (*citing* Alaska Const. art. VIII, § 13). *Compare* AS 46.15.260(1), 46.15.040, 46.15.080 and 46.15.120, *with* AS 46.15.155.
[86] *See* AS 46.15.155(c).

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disposal of an interest in state lands under Article VIII, Section 10 of the Alaska Constitution. Therefore, the permits in question did not trigger any constitutional requirement for prior public notice or that the State conduct a best interest finding before they issued the permits. The evidence at trial also failed to demonstrate that the permits or the associated mining exploration activity impinged on any reasonable concurrent use or user under Article VIII, Section 8. Based on the evidence provided at trial, it is more likely than not that the permits provided for non-exclusive use of State lands and the activities conducted on site did not cause any significant impact or long-term harm to concurrent uses. Given these conclusions, the relief requested by Plaintiffs is DENIED and judgment is entered in favor of Defendant and Intervenor.

DATED at Anchorage, Alaska this 26th day of Sept, 2011.

Eric A. Aarseth
Superior Court Judge

I certify that on 26th *September, 2011, a copy was mailed to:*
Mr. Singer, Hese, Clark
Mulder, Reppow, Johnson
Wainwright,
Leonard
Turkey
Eric Land, Law Clerk

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