

Chapter 6

Pebble Mine Permitting Process

Before the Pebble Limited Partnership (PLP) can proceed with the Pebble Mine project, it must obtain federal and state permits related to development, including construction of tailings dams; siting and construction of a new power source; development of roads, transmission lines, slurry and waste transmission pipes; and construction of a deep-water port. According to PLP, the Pebble Mine project will be subject to at least 67 different local, state, and federal permits (PLP 2009b). These and other requirements described in this chapter may appear to be adequate safeguards to ensure that Bristol Bay's wild salmon ecosystems are not adversely impacted. However, they may in fact be insufficient due to limitations in Alaska's large mine permitting process and related land use statutes and regional plans. This chapter highlights these and other concerns as they relate to some of the key elements of the permitting process.

6.1 State Process and Regulatory Requirements

Alaska's Large Mine Permitting Process

The Alaska Department of Natural Resources (ADNR) is the lead agency for “all matters relating to the exploration, development, and management of mining” (ALASKA STAT. § 27.05.010(b)). The Agency's Office of Project Management and Permitting coordinates the permitting activities of the Large Mine Project Team, which comprises numerous Alaska state agencies, including the Alaska Department of Fish and Game (ADFG), the Department of Environmental Conservation, the Department of Transportation and Public Facilities, the Department of Commerce, Community and Economic Development, the Department of Law, and the Department of Health and Social Services (ADNR 2008b). The primary goal of the team is to coordinate the timing and completion of required state permits, from pre-permitting to post-closure (ADNR 2008b).

In designating the ADNR as the “lead agency” with respect to mining in Alaska, the Alaska State Legislature failed to mandate a clear standard for the ADNR to meet in coordinating mining activities on state lands. The agency must merely “provide for maximum use of state land consistent with the public interest” (ALASKA STAT. § 38.04.005(a)). Since what constitutes the “public interest” is not clearly defined, and since the ADNR is now statutorily exempted from providing written findings as to how proposed mining-related

The Bristol Bay watershed is essential to the health, environment and economy of Alaska. Gathering data and getting public input now, before development occurs, just makes sense.

—Dennis McLerran, EPA Regional Administrator
Region 10 (EPA 2011c)

activities affect the “public interest,” the agency has very broad discretion in permitting large mine activities (ALASKA STAT. § 38.05.035(e)(6)).

Further, the ADNR is guided by a statute that instructs it to prefer the land use that “will be of the greatest economic benefit to the state and the development of its resources” (ALASKA STAT. § 38.05.850(a)). This has resulted in a large mine permitting process that is likely to favor the rapid economic growth typically resulting from intensive short-term resource extraction over longer-term economic development derived from the sustainable use of natural resources. Though design changes are often required throughout the permitting process, as a result of this statutory direction, a large mine project that has begun the permitting process has never been rejected by the State of Alaska (ADNR 2008b).

In 2006, Northern Dynasty submitted 11 preliminary permit applications to the ADNR, including five to build large earthen-fill dams or embankments to contain waste from the mine and six to obtain appropriations of ground and surface waters from the Koktuli River and Upper Talarik Creek (ADNR 2008c). However, NDM requested that the ADNR delay adjudication of the applications indefinitely, thereby suspending public review (ADNR 2006). PLP now expects to initiate the permitting process in 2012.

Alaska Coastal Management Program

The Alaska Coastal Management Program (ACMP)—authorized by the Coastal Zone Management Act of 1972 and federally approved by the National Oceanic and Atmospheric Administration (NOAA) in 1979—is a voluntary state program created to enable the state and local districts to influence federal development projects within Alaska's coastal zone and obtain federal funds to develop and administer coastal programs (ADNR 2011, LaRoche and Shelton 2011). Until recently, the ADNR's Division of Coastal and Ocean Management was required to conduct a review process to ensure that proposed or federally-permitted coastal development activities are consistent with state standards and the district policies of approved coastal programs (AAC Title 11, § 110; ADNR 2011). Twenty-five of the 28 local districts that elected to participate in the



Frying Pan Lake (photo by Erin McKittrick).

local implementation efforts of the ACMP have state-approved district coastal management plans, including Bristol Bay Borough and Bristol Bay Coastal Resource Service Area (Alaska State Legislature 2010).

Since its inception, the ACMP underwent revisions that significantly altered the original intent of the program. In 2003 in response to an initiative proposed by Governor Frank Murkowski at the urging of mining and other development interests, the Alaska State Legislature transferred the ACMP from the governor's office to the ADNR, eliminating the Coastal Policy Council and centralizing decision-making authority for approving coastal district management plans and reviewing consistency determinations with the ADNR commissioner (Gray 2005, Epler 2011b). The state legislature also revised the applicable ACMP statutes to (1) remove consideration of air and water quality matters from consistency review consideration, (2) eliminate a citizen's right of judicial enforcement, (3) reduce the boundaries of local coastal plans, and (4) require the ADNR to rewrite ACMP regulations affecting the consistency review process, statewide standards, and district plan criteria (ALASKA STAT. §§ 46.39.010–.040, Gray 2005).

In 2004, the ADNR revised the ACMP regulations, substantially restricting local districts' ability to craft local enforceable standards. The ADNR set statewide standards as the ceiling and eliminated local districts' ability to establish policies for matters "adequately addressed" by state and federal agencies. The ADNR also reduced the effectiveness of statewide standards by weakening criteria for habitat conservation and subsistence, and precluding the applicability of certain standards and district policies to federal lands and waters (Gray 2005).

Changes to the wetlands standard, in particular, could have a major impact on the consistency review determination for the Pebble Mine project. The ADNR significantly narrowed the wetlands standard from the

previous regulations, which required that wetlands be managed "to assure adequate water flow, nutrients, and oxygen levels and avoid adverse effects on natural drainage patterns, the destruction of important habitat, and the discharge of toxic substances," to merely requiring that projects "avoid, minimize, or mitigate significant adverse impacts to water flow and natural drainage patterns" (AAC Title 11, § 80.130(a)(3); AAC Title 11, § 112.300(b)(3); Alaska State Legislature 2010). In its review of the State's plan in 2008, the EPA stated, "While the old standard made achieving consistency extremely difficult, the current standard makes protecting the ecological integrity of the coastal habitats nearly impossible . . . because the functioning of a habitat such as a wetland is not solely dependent on maintaining water flow and natural drainage patterns" (USEPA 2008; Alaska State Legislature 2010). The Alaska Department of Fish and Game expressed similar concerns in its reevaluation of the ACMP (ANDR 2008c, Alaska State Legislature 2010).

The Alaska Coastal Management Program expired on June 30, 2011 and the ADNR's Division of Coastal and Ocean Management was dissolved (ALASKA STAT. § 44.66.020(a), ADNR 2011). During the 2010 and 2011 legislative sessions, there were numerous attempts by the coastal districts, the Parnell administration, and members of the Alaska State Legislature to revamp the coastal management program and extend it (Epler 2011a). Proposals covered a broad spectrum, including (1) a year-long extension that would provide more time to revise the ACMP to increase local enforcement authority, (2) a six-year extension of the program as is, and (3) a compromise bill (H.B. 106) that would give local communities more input in coastal development proposals in their districts without giving them veto authority over projects of "statewide interest" (Epler 2011b). The first two proposals did not gain much traction in the legislature. While H.B. 106 passed the House, the Senate version of the bill failed to pass before the Alaska State Legislature adjourned in May 2011 (SitNews 2011).

Since none of the ACMP bills passed during the June 2011 legislative session, it will likely take two to three years to get the program up and running again (SitNews 2011). During that time, coastal development proposals, including mining projects, will fall under federal purview (Epler 2011d). Whether the Pebble Mine project will be subject to state and local review under the ACMP depends largely on how the large mine permitting process and the ACMP reauthorization timelines coincide.

Bristol Bay Area Plan

Alaska land use plans provide a road map to the ADNR regarding the use of state land, determining

allowable land uses and whether land is open or closed to mineral staking (ADNR 2008b). Generally, all state lands are open to mineral location unless specifically closed (AAC Title 11, § 97). The ADNR commissioner is required to designate land uses, which are classified as general use, primary designated use, or co-designated use (ALASKA STAT. § 38.05.300, ADNR 2005).

The Bristol Bay Area Plan (BBAP) is the primary land use plan for state lands in Bristol Bay, including lands in the proposed Pebble Mine project area. In 1984, the ADNR classified nearly all 12 million acres of uplands and shorelands in the BBAP as “wildlife habitat,” primarily as a co-designated use. However, in its 2005 revision of the BBAP, the ADNR reduced the area designated as habitat for fish and wildlife by 90%—from 12 million acres to less than 800,000 acres. The ADNR also reclassified mining as a blanket “co-designated use” unless the land is closed to mineral entry. Since a significant portion of the plan area has no secondary or co-designated uses listed, including 9.4 million acres classified as “resource management land,” the plan largely favors mining as the preferred use. In effect, the revised BBAP prohibits other uses not specifically listed or designated if they are considered to be in conflict with mining (ADNR 2005; Nondalton et al., No. 3DI-09-46 CI [Alaska Super. Ct. 3rd Jud. Dist. at Dillingham, June 9, 2009]).

Currently, the legality of the 2005 BBAP is being challenged in Alaska state court by six federally recognized tribes, the Alaska Independent Fishermen’s Marketing Association, and Trout Unlimited (Nondalton et al., No. 3DI-09-46 CI [Alaska Super. Ct. 3rd Jud. Dist. at Dillingham, June 9, 2009]; AA 2009a; TU 2010). If the court requires that the 2005 land use plan be rewritten, the development of a new land use plan could significantly extend the timeline for the Pebble permitting process (AA 2009a). If no such revision is required, the ADNR will continue to lead the state permitting process with wide discretion and without clear conservation standards (Nunamta Aulukestai and TU Alaska 2009).

Anadromous Fish Act

The Anadromous Fish Act mandates that the ADFG Commissioner specify the “various . . . streams or parts of them that are important for the spawning, rearing, or migration of anadromous fish” (ALASKA STAT. § 16.05.871(a)). Once a stream is added to the Anadromous Waters Catalog (AWC), the ADFG Commissioner can require a developer whose plans will affect the designated waters to provide complete “specifications for the proper protection of fish . . . in connection with the construction or work, or in connection with the use” (ALASKA STAT. § 16.05.871(c)(2)). If such plans are deemed “insufficient for the protection

Bristol Bay sockeye salmon (photo by Bob Waldrop).





Stream near the Pebble Mine claim (photo by Steve Baird).

of fish,” the commissioner can deny approval. If denied, the applicant may challenge the finding and be granted a hearing (ALASKA STAT. § 16.05.871 (d)(2)).

Only about half of the “waters” in Alaska that are important for anadromous fish are identified in the AWC largely because they have never been surveyed due to their remoteness and because the statutory standards are vague and without statutory definition as to when, how, and under what circumstances the commissioner may make this designation (Parker et al. 2008, ADFG 2011b). As described previously in this report, recent efforts (2008–2010) to catalog salmon-bearing waters in and around the Pebble prospect resulted in the nomination of 103 miles of previously undocumented salmon-bearing streams to the state’s AWC. Further nominations of Bristol Bay water bodies are likely if and when additional surveying occurs, which could require alterations to PLP’s proposal or result in project denial. However, to date no commissioner has denied approval of any project based on these considerations.

Fishway Act

The construction of tailings dams, roads, and other mining infrastructure will create formidable obstacles to fish passage due to significant stream diversion and blockage. The Fishway Act states that if the ADFG Commissioner determines it necessary, for

every “obstruction . . . built across a stream frequented by salmon or other fish . . . a durable and efficient fishway” must be provided and must be kept “open, unobstructed and supplied with enough water to admit freely the passage of fish through it” (ALASKA STAT. § 16.05.841). However, “[i]f a fishway over a dam or obstruction is considered impracticable by the commissioner because of cost, the owner of the dam or obstruction” is merely required to compensate for the loss by (1) paying a fee agreed upon by the commissioner into the state fish and game fund, (2) donating land and funding, as agreed upon by the commissioner, for construction, operation, and maintenance of a fish hatchery and related infrastructure, or (3) entering into an agreement with the commissioner to pay into the state fish and game fund to support the expansion, maintenance, and operation of existing hatcheries within a reasonable distance of the dam or obstruction (ALASKA STAT. § 16.05.851).

6.2 Federal Statutory and Regulatory Requirements

National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires the completion of an environmental impact statement (EIS) for major federal actions that may

significantly affect the environment (NEPA § 4332(C)). NEPA applies to all decisions that have a federal nexus—those that involve the use of federal funds, the need for federal approval in the form of permits, or are located on federal land (40 C.F.R. § 1508.18). The NEPA process will likely be triggered when PLP applies for dredge and fill permits under Section 404 of the Clean Water Act (CWA) (PLP 2009a).

In issuing CWA Section 404 wetland fill permits, the U.S. Army Corps of Engineers (the Corps) is required to evaluate the environmental impacts related to the entirety of the project under NEPA (not just the area affected by the wetland fill permit) if the jurisdictional waters are dispersed throughout the project site, and the project could not go forward without the permits (White Tanks Concerned Citizens, 563 F.3d at 1033, 1039). An EIS evaluating the impacts of the entire Pebble Mine project will be required for two reasons. First, jurisdictional waters are dispersed throughout the Pebble project site such that development of any of the tailings storage facilities or stream diversion channels, wells, and devices proposed to dewater the pit and extract ground and surface waters for mine processes would not be possible without affecting those waters. Second, the Pebble Mine project could not go forward without related CWA Section 404 permits.

Though the requirement to develop an EIS under NEPA was intended to be an action-forcing mechanism to ensure compliance with the substantive goals of the Act, it is considered largely a procedural requirement by the courts. The U.S. Supreme Court has taken a deferential review of final agency decisions under NEPA, giving the agencies broad discretion “to decide how to implement a decision once the required environmental review is complete, even if the chosen course is not the most environmentally sound” (National Environmental Policy 1969; Alfano 2009; Department of Transportation, 541 U.S. 752, 775; Robertson, 490 U.S. at 332, 350). According to the Supreme Court, “[O]nce an agency has made a decision subject to NEPA’s procedural requirements, the only role for a court is to insure that the agency has considered the environmental consequences; it cannot interject itself within the area of discretion of the executive as to the choice of the action to be taken” (Strycker’s Bay Neighborhood Council, Inc., 444 U.S. at 223, 227-228; Kleppe, 427 U.S. at 390, 410 n. 21). Accordingly, NEPA is limited in scope and requires that environmental impacts are taken into consideration and documented, but not necessarily prevented.

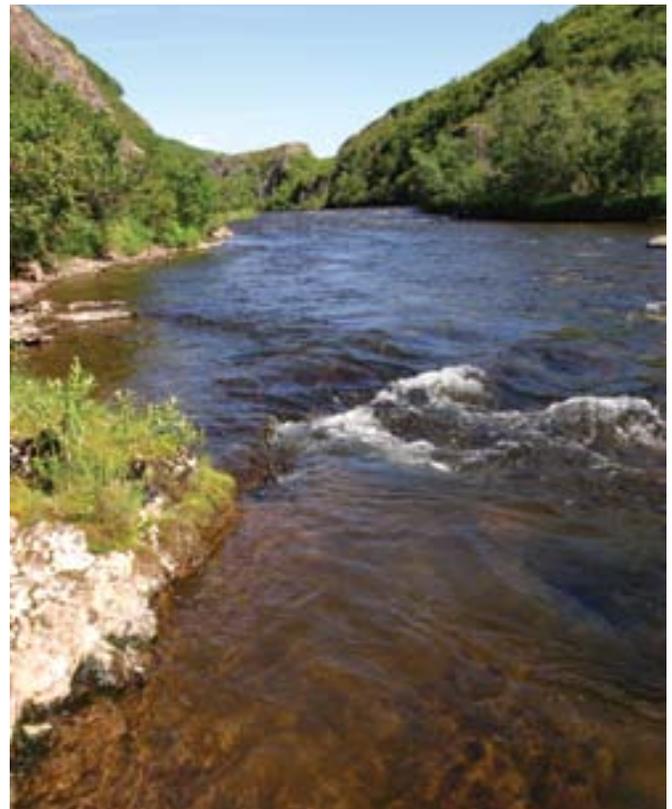
The public comment period for an environmental review under NEPA is limited to 90 days for a draft EIS and 30 days for a final EIS (40 C.F.R. § 1506.10(b)). However, the Corps may extend the comment period

if another federal agency can show compelling reasons of national policy for an extension (40 C.F.R. § 1506.10(d)). Given the massive scope of the proposed Pebble project, which will likely contain volumes of complex scientific data and tens of thousands of pages of documentation, the Corps would be well advised to grant a comment period extension. While an extension will not necessarily enable the public to adequately parse the EIS, it will at least enable a more thorough review.

Although an EIS is meant to serve as a guiding document for federal permitting review, it is also the only real opportunity for the general public to comment on most of the required Alaska state permits. The ADNR participates as a cooperating agency in the NEPA process, using the EIS process to assist in its permit adjudication process and to facilitate public comment (40 C.F.R. § 1506.2, USEPA 2003, ADNR 2010b). Only two Alaska state statutes and regulations require independent public notice and comment periods for permits related to large-scale mining (Parker et al. 2008).

Clean Water Act

According to PLP’s initial proposal, 99% of the materials removed from mining operations will be waste that must be stored in reservoirs contained by one or more massive tailings dams. The solid waste held in these reservoirs will provide significant contamination



This tributary feeds into Talarik Creek, the proposed location of the open pit (photo by Erin McKittrick).



The Clean Water Act applies not only to municipal water supplies, but also to fisheries and wildlife habitat (photo by Ken Morrish, Fly Water Travel).

and control issues that will be scrutinized by the Corps and the Environmental Protection Agency (EPA) under Section 404 of the Clean Water Act (CWA) once the permitting process is initiated.

CWA Section 404(a) authorizes the Corps or an authorized state to issue permits for discharge of dredged or fill material at specified sites in waters of the United States (U.S.) (CWA § 404(a),(h)). Michigan and New Jersey are currently the only states authorized to issue Section 404 permits in nonnavigable waters, so the Corps retains this authority in Alaska, along with jurisdiction over tidal and navigable waters and adjacent wetlands (USEPA 2011d).

According to CWA Section 404(b)(1) guidelines, “[D]redged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern” (40 C.F.R. § 230.1(c)). “The degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts” (40 C.F.R. § 230.1(d)). A discharge is prohibited if it: (1) causes or contributes to

violations of state water quality standards, (2) violates toxic effluent standards or prohibitions under CWA Section 307, (3) jeopardizes the continued existence of species listed under the Endangered Species Act or adversely modifies critical habitat, or (4) violates requirements to protect federally designated marine sanctuaries (40 C.F.R. § 230.10(b)(1-4)). Further, CWA Section 404(b)(1) guidelines require permit denial if the project will cause or contribute to significant degradation of the waters of the U.S. (40 C.F.R. § 230.10(c)). Significant degradation is defined as including, among other things, significant adverse effects “on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes” (40 C.F.R. § 230.10(c)(2)).

CWA Section 404(b)(1) guidelines prohibit discharges of dredged and fill material if there is “a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences” (commonly referred to as a less environmentally damaging practicable alternative, or LEDPA) (40 C.F.R. § 230.10(a)). An alternative is considered “practicable”

if it is available to the applicant and capable of being implemented “after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” This includes areas not currently owned by the project applicant that “could be reasonably obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity” (40 C.F.R. § 230.10(a)(2)).

The “basic project purpose” is the primary reason for the proposed project and is used to determine whether the applicant’s project is water dependent. “Water dependency” means that the proposed project requires access, proximity to, or siting within a special aquatic site (sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes) to fulfill the basic purpose of the project (40 C.F.R. § 230.40–45, 40 C.F.R. § 230.10(a)(3)). If a project is not water dependent, the regulations presume that less damaging practicable alternatives outside of special aquatic sites are available, unless the permit applicant can demonstrate otherwise (40 C.F.R. § 230.10(a)(3)).

Though gold, molybdenum, and other precious metals would be recovered, copper extraction is the basic purpose of the Pebble Mine project, based on the above definition. Mining the Pebble deposit is not a water-dependent activity. As such, the analysis of alternatives should include locations outside of special aquatic sites where copper (and/or gold) could be extracted with less potential environmental harm. Further, if it is practicable for the project applicants to “obtain, utilize, expand or manage” other deposits, then those deposits should be considered in identifying the LEDPA (40 C.F.R. § 230.10(a)(2)).

If there is no practicable alternative that meets these requirements, the applicant must take steps to “minimize potential adverse impacts of the discharge on the aquatic ecosystem” (40 C.F.R. § 230.10(d)). Minimizing adverse impacts can be achieved through avoidance of certain habitats or spawning seasons, habitat development and restoration techniques, or compensatory mitigation on- or off-site (40 C.F.R. § 230.75).

Although Congress gave the Corps authority to issue CWA Section 404 permits, it gave the EPA the authority to review and veto Corps decisions. As articulated in CWA Section 404(c), if the EPA Administrator determines that the discharge of mine tailings and other dredge and fill activities will have an “unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas,” the administrator may either preemptively prohibit the specification of a site before a Section 404(b)(1) permit has

been submitted to or approved by the Corps, or veto the Corps’ Section 404(b)(1) permit approval (CWA § 404(c), 40 C.F.R. § 231.1). According to EPA regulations, “Unacceptable adverse effect means impact on an aquatic or wetland ecosystem which is likely to result in significant degradation of municipal water supplies (including surface or groundwater) or significant loss of or damage to fisheries, shellfishing, or wildlife habitat or recreation areas” (40 C.F.R. § 231.2(e)). In the preamble to CWA Section 404(c) regulations, the EPA stated that “where it is possible it is much preferable to exercise this authority before the Corps . . . has issued a permit, and before the permit holder has begun operations” (Denial or Restriction of Disposal Sites, Section 404(c) Procedures, 44 Fed. Reg. at 58,077). The EPA has only exercised its Section 404(c) authority 13 times since 1972 and only once preemptively (USEPA 2009b and 2009c).

The EPA does not need to wait to see the details of an application to determine that unacceptable effects will result from mining operations in the Bristol Bay watershed. In crafting the Section 404(c) regulations, the EPA noted that even in the absence of a permit application identifying specific discharge proposals, “there are instances where a site may be so sensitive and valuable that it is possible to say that any filling of more than X acres will have unacceptable adverse effects” (Denial or Restriction of Disposal Sites, Section 404(c) Procedures, 44 Fed. Reg. at 58,076). Based on the significance of the Bristol Bay watershed for wild salmon populations, as detailed in chapter 4, and the serious and potentially catastrophic impacts that the large-scale mining activities proposed by PLP would have on Bristol Bay’s salmon ecosystems, as described in chapter 5, the use of the Bristol Bay watershed as a disposal site for dredge and fill activities will likely result in unacceptable adverse effects.

While the EPA may need more information to come to its own conclusion, it is important to note that a

Steller’s eider, listed as threatened under the Endangered Species Act (photo by U.S. Fish & Wildlife Service).





Bristol Bay salmonid (photo by Wild Salmon Center).

proposed determination by the EPA does not represent a judgment that any particular dredge and fill activity will result in unacceptable adverse effects. Instead, a proposed determination simply indicates that the administrator believes the issue should be explored. Further, proof of adverse impacts is not required at the time of initiating the 404(c) process; a concern that unacceptable adverse effects may result is sufficient.

In May 2010, six federally recognized Southwest Alaska Tribes requested that the EPA exercise its preemptive veto authority under CWA Section 404(c) to protect the Kvichak and Nushagak watersheds in Bristol Bay from metallic sulfide mining, including the Pebble Mine (Murphy 2010). The EPA Administrator has not yet initiated the 404(c) process by notifying the Corps or PLP of the agency's intention to issue a public notice of a Proposed Determination to withdraw the Kvichak and Nushagak drainages from discharge of dredged or fill material (USEPA 2009c). However, in February 2011, the EPA announced that it will "conduct a scientific assessment of the Bristol Bay watershed to better understand how future large-scale development projects may affect water quality and Bristol Bay's salmon fishery" (USEPA 2011c).

Endangered Species Act Consultation

Section 7 of the Endangered Species Act (ESA) requires that any federal agency proposing to issue a permit for a project that may affect a threatened or endangered species must first consult with the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USFWS) and prepare a biological assessment (ESA § 1536 (a)(3), NOAA 2010). If the biological assessment concludes that there will likely be an adverse effect on the ESA-listed species, the agencies must formally consult and develop a biological opinion to assess the likelihood that the proposed action would "jeopardize the continued existence of" the species or destroy or adversely modify its critical habitat (ESA § 1536 (a)(2), USFWS and NMFS 1998, NOAA 2010).

While no salmon populations are listed as threatened or endangered in Alaska, there are two known ESA-listed species in Bristol Bay: the short-tailed albatross (endangered), and the Steller's eider (threatened) (USFWS 2010a, 2010b). If the biological opinion results in a "jeopardy" finding for either of these two species, the project cannot move forward unless "reasonable and prudent alternatives" can be identified to avoid jeopardy (ESA § 1536 (b)(3)(A)).

6.3 Additional Requirements for Pebble Mine Infrastructure

Deep Water Port

Shipment of the ore concentrate to market via ocean freighters will require the construction of a deep-water port in Cook Inlet, which will trigger federal marine and species protection statutes. Since this deep-water port would be located in marine waters, it would require statutory investigations by the NMFS to ensure that the port site would be in compliance with Section 7 of the Endangered Species Act, the Marine Mammal Protection Act (MMPA), and the Fish and Wildlife Coordination Act (FWCA), and that no essential fish habitat would be affected (MMPA §§ 2–207, FWCA §§ 661–667e). These activities may also require a coastal zone consistency review by the ADNOR's Division of Coastal and Ocean Management, as discussed in section 6.1 of this report. In addition, under Section 103(a) of the Marine Protection, Research, and Sanctuaries Act (MPRSA), the Corps must determine that this process will not "unreasonably degrade or endanger . . . the marine environment, ecological systems, or economic potentialities" (MPRSA § 2).

Power Source and Transportation

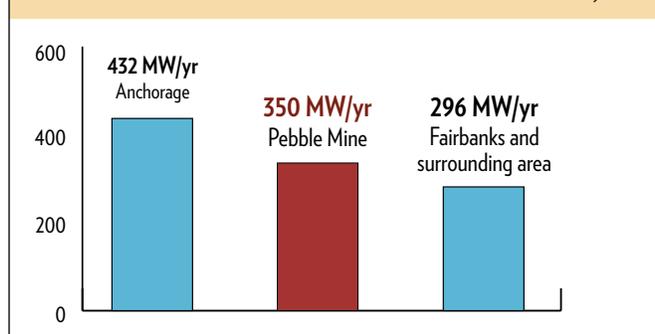
As described previously in this report, the Pebble Mine will require considerable power (Figure 22), which will likely drive construction of new power plants at the mine and port sites (Ghaffari et al. 2011). Because there is not enough natural gas in the region to supply the plants, a new terminal may have to be constructed to import liquefied natural gas (LNG) (AA 2009a). This would require siting and construction permits for the facility and the LNG terminal.

In addition to the transmission of power, the transportation of products, supplies, waste, and people creates regulatory challenges because of the significant distance these resources must travel and the varied ownership of lands over which these activities will occur. Because the mine site is over 100 miles from the projected port site, the ADNOR will need to approve the necessary permits, rights-of-way, and easements on state lands for the 86-mile road, roughly 200



Thirty-six rivers, streams, and small tributaries enter the north shore of Iliamna Lake (pictured above), providing habitat to salmon and resident fish (photo by Erin McKittrick).

Figure 22. Estimated Power Usage of Pebble Mine in megawatts per year compared to cities of Anchorage and Fairbanks (Chugach Electrical Association 2009, Richardson 2011, Ghaffari et al. 2011).



miles of transmission lines (including undersea cables from the power plant that would require tideland leases), and accompanying slurry and waste transmission pipes (Parker et al. 2008). As for the 50 miles of this proposed route that are within Bristol Bay Native Corporation (BBNC) boundaries, the PLP would need to persuade the BBNC to revoke its June 2009 resolution that denied development of the transportation route through their lands. Additionally, for any points at which the road might cross navigable waters, a construction permit would be required from the U.S. Coast Guard (PLP 2009b).

6.4 Other Considerations

When PLP initiates the permitting process, it may submit an initial design for a small mine (relative to the size of the mineral deposit) to ensure permits are secured, and then apply for expansion permits at a later date. The process of acquiring permits for a smaller mine and subsequently requesting expansion permits once the mine is operating, supported by a workforce, and paying taxes is fairly common in the mining industry (Ecology and Environment, Inc. 2010). This practice was demonstrated in 2009 at several mines worldwide, such as the Red Dog Mine in Alaska (doubled the life of the mine from 20 to 40 years), the Keetac Mine in Minnesota (added over 2,000 acres and increased output by 33%), and the Smoky Canyon Mine in Idaho (added 1,100 acres and increased capacity by 38%) (Ecology and Environment, Inc. 2010). In addition, as described in section 2.4, approval of the initial PLP proposal could fuel development of other mining claims in the region. These considerations should be evaluated when assessing the permitting procedures and requirements described in this chapter.

CASE STUDY: FAILURES AT ALASKA'S LARGEST MINE

Red Dog Mine (Alaska)

Red Dog is the second largest zinc mine in the western world. It is owned by the NANA Regional Corporation, an Alaskan Native for-profit corporation, and leased to Teck Cominco Alaska Inc., a subsidiary of Teck Resources Ltd. of Vancouver, British Columbia. Red Dog's sulfide zinc-lead-silver deposits lie in the foothills of the DeLong Mountains (part of the Brooks Range) about 90 miles north of Kotzebue, Alaska, and 52 miles from the Chukchi Sea.

The mine covers the headwaters of Red Dog Creek. The South Fork of Red Dog Creek has been converted into a 585-acre tailings impoundment held by an earth-filled dam. The North Fork enters the main stem below the mine and is still in relatively good condition. Red Dog Creek contains no fish in part due to the area's pre-existing metal concentrations. It flows 5 miles to Ikalukrok Creek, a wintering ground for arctic char. Ikalukrok then meanders for about 27 miles before emptying into the Wulik River, a major spawning stream for char and salmon.

The initial environmental impact statement stated that the mine would create **no significant impacts to fishery resources** (USEPA 1984). The mine started producing ore in 1989, and reports of concern about water quality and fish populations were issued before the close of the year.



Discharge water (photo by Northern Alaska Environmental Center).

Failures:

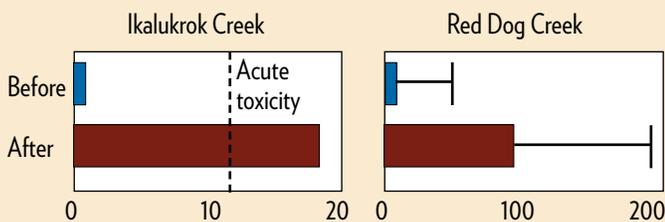
- Heavy metals released into Red Dog Creek
- Air quality violations and soil contamination from heavy metals along the haul road to the Chukchi Sea port
- Ore concentrate spills from haul trucks at the port site

Impact:

- In the early 1990s, zinc levels in streams draining the mine site rose to **between 10 and 200 times the standard**, at one point killing fish in the Wulik River 25 miles downstream (Ott 2004).
- According to the U.S. Environmental Protection Agency's 2004 Toxic Release Inventory, **487 million pounds of toxic compounds were released from Red Dog Mine**, including copper and zinc, making it the highest level of toxic releases anywhere in the nation (Teck Cominco Alaska Inc. 2004, Rothe 2006).
- In the early 1990's, there were also air quality violations and soil contamination at the Red Dog Mine and along the haul road to the port on the Chukchi Sea from various sources of contaminated fugitive dust. Ford and Hasselbach (2001) found that heavy metals from dust along the haul road had contaminated mosses and soil near the road. Brumbaugh and May (2008) reported that particulates dispersed near the road in snow samples during winter in 2005 and 2006 were enriched in metals, and these particulates still contributed considerable metal loadings to the nearby terrain (Teck Cominco Alaska Inc. 2008).

Mitigation: In 1991, Teck Cominco Alaska rerouted Red Dog Creek into a plastic-lined bypass channel to isolate it from zinc contamination. The company also built a separate system to collect the underground seeps of water that travel through the mine's rich mineral deposit as well as the rain water that flows over it. That water is collected behind a dam and run through the mine's water-treatment system. In the years following a 1992 Compliance Order with the Alaska Department of Environmental Conservation, Teck Cominco Alaska covered its ore stockpiles, conveyor system, and haul truck beds to reduce dust contamination.

Approximately 1.4 billion gallons a year of treated water are released into Red Dog Creek. From May to October, water from the tailings impoundment

Rising Zinc Levels

Zinc (ppm) of samples collected: ■ Before mining began ■ After

(Hulen 1990)

Response of mine owners to contamination claims (from Anchorage Daily News excerpts)

October 7, 1989 (Spokeswoman) Parker said the company had nothing to do with the water.

August 16, 1990 DEC and the Department of Fish and Game have been pressuring Cominco Alaska Inc, the mines owner, to stop the seepage . . . Cominco has refused, contending there is no clear connection between the mine and seepage into Red Dog Creek. The previous fall, Cominco officials maintained that similar leeching was caused by unusually rainy weather. This week, a company official said this summer's seepage was due in large part to recent dry weather, which has lowered creek levels and made mineral seepage more obvious.

August 30, 1990 The amount of zinc and other potentially harmful metals flowing into a creek near the Red Dog Mine dropped drastically after the mine's operator moved the stream and made the other changes demanded by state agencies.

is treated with lime to precipitate zinc, lead, and iron and sodium sulfide to precipitate cadmium. This treatment process has the side effect of raising the concentration level of total dissolved solids (TDSs) in the water, primarily through calcium and sulfate ions released by the precipitating agents. The residents of the town of Kivalina, whose drinking water comes from the Wulik River, appealed a permit modification in 2004 that established new, less stringent limits for the mine's discharges of TDSs (USEPA 2004). A subsequent settlement between Tech and Kivalina proposes a pipeline to carry Red Dog's treated wastewater from the mine to the Chukchi Sea.

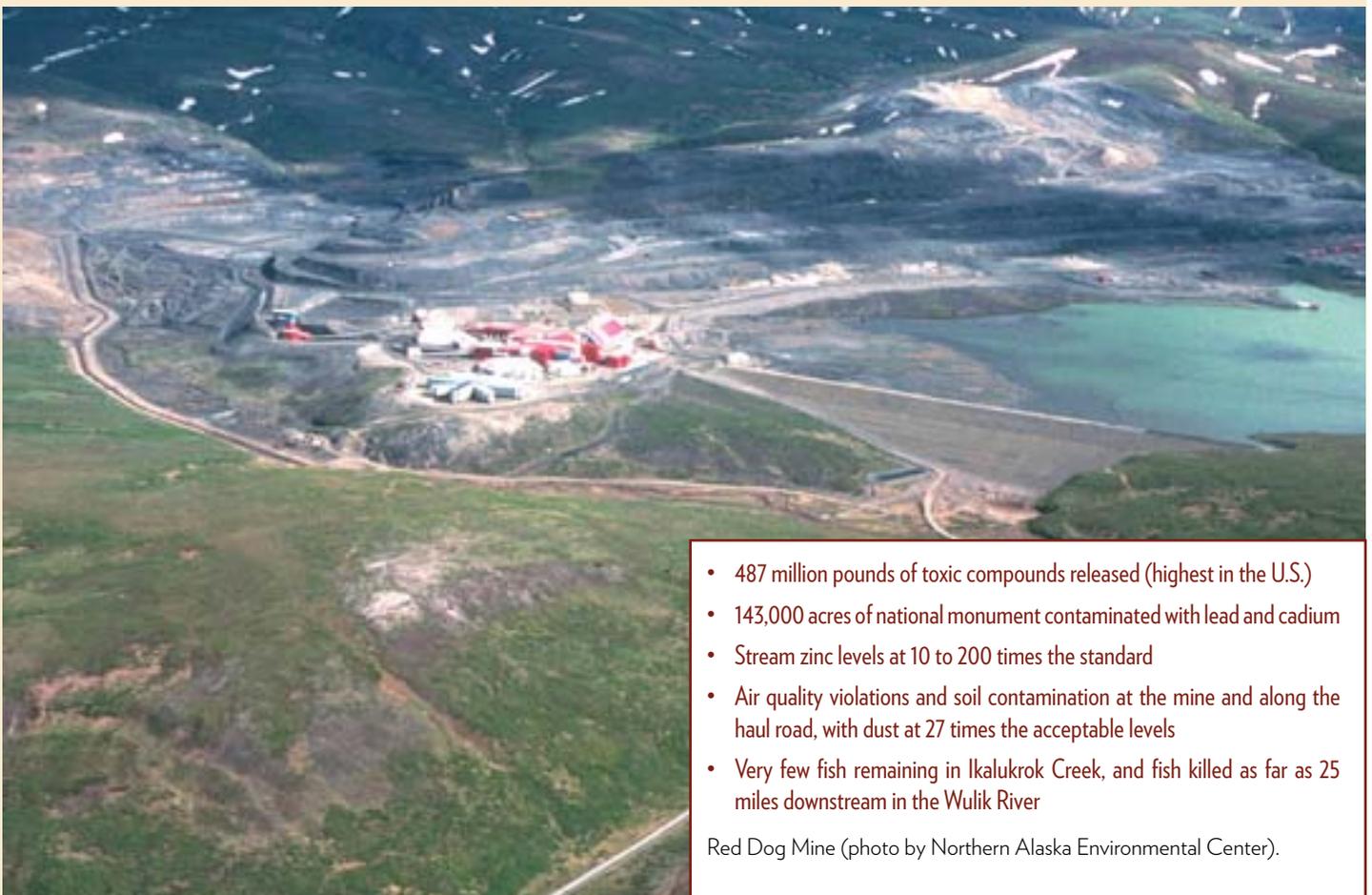
Cost: Toxic discharges will continue after the mine is closed (estimated in the 2030s), requiring perpetual containment, treatment, and monitoring. The State of Alaska currently holds a \$154.6 million financial assurance to ensure reclamation and post-closure activities, including water treatment. The state is proposing to increase the financial assurance amount to \$304.5 million (Tetra Tech 2009).

How does this compare to Pebble? Unlike the Pebble mine site, there is 100 to 600 feet of permafrost beneath the Red Dog Mine site. Because of the permafrost, there is little shallow groundwater flow compared to surface water flow at Red Dog (USEPA 2009d), and the ground water linkages to mine waste and discharge are limited. On the other hand, near the proposed Pebble

Mine area, porous glacial till and little to no permafrost allow a direct connection between ground and surface waters. Therefore, at the Pebble Mine site, there is a high risk of contaminated ground water from the mine carrying contamination to faraway ground and surface waters. The same contamination that is occurring at Red Dog is likely to happen at the Pebble Mine site, but on an even larger scale.

Compare Red Dog Mine's record 487 million pounds of toxic compounds with Pebble's estimated 10.8 billion tons of tailing waste. Currently, the next highest mining discharges in Alaska after Red Dog are 44 million pounds and 6 million pounds at mines near Juneau and Fairbanks. Teck Cominco officials counter that the toxic releases are merely the tons of waste rock collected from the mine and that all discharges are permitted discharges, contained and regulated by state and federal agencies (Dobbyn 2005).

	Red Dog	Pebble
Mine area	0.5 sq mi	28 sq mi
Pit depth	986 ft	1,700 ft
Water used	1.4 billion gal./yr	35 billion gal./yr
Power used		350 MW/yr
Waste produced	243 million tons	10.8 billion tons



- 487 million pounds of toxic compounds released (highest in the U.S.)
- 143,000 acres of national monument contaminated with lead and cadmium
- Stream zinc levels at 10 to 200 times the standard
- Air quality violations and soil contamination at the mine and along the haul road, with dust at 27 times the acceptable levels
- Very few fish remaining in Ikalukrok Creek, and fish killed as far as 25 miles downstream in the Wulik River

Red Dog Mine (photo by Northern Alaska Environmental Center).