

**DRAFT ENVIRONMENTAL BASELINE STUDIES
2005 STUDY PLANS**

CHAPTER 13. SUBSISTENCE

JUNE 2005

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ACRONYMS

AASHTO	American Association of State and Highway Transportation Officials
ABA	acid base accounting
ACHP	Advisory Council on Historic Preservation
ACLS	alternative cleanup levels
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
agl	above ground level
AHRS	Alaska Heritage Resource Survey
APE	area of potential effect
ARD/ML	acid rock drainage/metal leaching
ASCI	Alaska Stream Condition Index
BEESC	Bristol Environmental & Engineering Services Corporation
BMR	baseline monitoring report
CAD	computer-aided drafting
CC	comprehensive stations with continuous stage monitoring
CH2M	CH2M HILL, Inc.
CIR	color infrared
CWOC	comprehensive stations without continuous stage monitoring
DECD	Alaska Department of Economic and Community Development
DEM	digital elevation model
DNR	State of Alaska Department of Natural Resources
DO	dissolved oxygen
DOT&PF	State of Alaska Department of Transportation & Public Facilities
DQOs	data quality objectives
EC	environmental consequences
EIS	environmental impact statement
EPA	Environmental Protection Agency
EBD	environmental baseline document
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FSP	field sampling plan
GIS	geographic information system
GPS	global positioning system
HGM	hydrogeomorphic

IM	initial monitoring station
LDN	Land Design North
LDNPP	Lake Clark National Park and Preserve
mg/L	milligrams per liter
mm	millimeters
MRLs	method reporting limits
NDM	Northern Dynasty Mines Inc.
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic & Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
ORP	oxidation reduction potential
PJD	preliminary jurisdictional determination
PSD	prevention of significant deterioration
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
SHPO	State Historic Preservation Officer
SOPs	standard operating procedures
SRB&A	Stephen R. Braund & Associates
SWANCC	Solid Waste Agency of Northern Cook County v. U.S. Army Corp of Engineers
SWE	snow-water equivalent
TIN	triangulated irregular network
TPH	total petroleum hydrocarbons
USACE	United States Army Corp of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WMP	water monitoring plan

13. SUBSISTENCE

The objectives, methods/approach, and deliverables for the mine site, transportation and utility corridor, and port options are the same throughout this discussion. Stephen R. Braund & Associates (SRB&A) will lead the subsistence work for these areas. The Alaska Department of Fish and Game (ADF&G), Division of Subsistence, will collaborate with SRB&A and will provide the results from systematic household surveys conducted in five communities, updating baseline information about subsistence hunting, fishing, and gathering that is compatible with information collected in previous rounds of ADF&G household interviews.

13.1 Objectives of Study

The objectives of the subsistence study are to characterize the baseline conditions and current use of the land for subsistence living, to provide the data required to assess the potential effects of the Pebble Project near Iliamna, Alaska, and its related transportation and utility, and port infrastructure, and to provide the necessary information for project permitting. The following specific objectives form the basis for the major activities included in this portion of the study plan:

- Characterize the existing subsistence activities in the project area and contributing areas.
- Provide environmental input to the analysis of project-design options (e.g., waste storage, transportation and utility corridor/port, etc.) and their potential effects on subsistence uses.
- Compile data to assess the environmental effects on subsistence activities related to the project facilities and activities during construction, operation, and closure.
- Identify alternative design or impact-mitigation measures.
- Perform the appropriate quantity and quality of studies/analyses necessary to expeditiously achieve all state and federal project permitting requirements.
- Recommend ongoing monitoring studies needed to ensure compliance with all state and federal permitting requirements.

13.2 Proposed Study Plan

13.2.1 Study Area/Scope

The study area includes those communities whose residents use the mine site, transportation and utility corridor, and port areas for the harvest of subsistence resources or who harvest resources that migrate through or use this area. This includes the communities in the Lake Clark and Lake Iliamna areas; communities down river from the mine in the drainages for the Kaktuli, Mulchatna, and Nushagak rivers; communities down river from the mine in the Kvichak River drainage; and communities on the Kenai Peninsula that may use the Iniskin and/or Iliamna bay areas. The proposed study communities are described below and shown in Figure 13-1 and Table 13-1.

Table 13-1 lists the 20 communities in the Bristol Bay Region identified as being potentially affected by the Pebble Project. All of these communities will be the subject of both the proposed ADF&G Division of Subsistence household surveys and the SRB&A subsistence mapping interviews. The only difference is in the timing of the interviews (i.e., field work in some communities in 2005 and in other communities in 2006 or later). The ADF&G household surveys and SRB&A subsistence mapping interviews will be conducted in five communities (Nondalton, Newhalen, Iliamna, Pedro Bay, Port Alsworth) in 2005. In addition, SRB&A will conduct subsistence mapping interviews in seven communities (Kokhanok, Igiugig, Levelock, Ekwook, New Stuyahok, Koliganek, and Portage Creek) beginning in 2005.

ADF&G Division of Subsistence will conduct household surveys in these seven communities in the winter (January/February/March) of 2006. The researchers explored conducting this research in the seven communities earlier (October/November 2005), but doing so presented the difficulty of inconsistent study years. For example, conducting the household surveys in January/February allows for an annual recall of the previous calendar year from January through December. Conducting the interviews in October or November creates a problem for defining the 12-month harvest-recall period and makes comparisons of time-series data difficult. To remain consistent with both historic subsistence data collected in Bristol Bay and with the data collected for Northern Dynasty Mines Inc. in the five Iliamna Lake-area communities, ADF&G will conduct the additional surveys in January/February/March 2006 (for the 2005 calendar year).

SRB&A subsistence mapping interviews and additional ADF&G household surveys that would occur in 2006 or possibly later include:

- Dillingham, Clark's Point, Ekuk, Aleknagik and Manokotak. While Clark's Point is relatively small, Dillingham is more a small town than a village and as such would require a separate sampling plan and a significant research effort. Dillingham's population in 2000 was 2,466 people in 888 households. Ekuk has very few permanent residents and will be addressed to the extent people reside there. Both Aleknagik and Manokotak residents use Nushagak Bay and expressed an interest in being included in the environmental baseline study.
- The Bristol Bay Borough communities of Naknek, South Naknek, and King Salmon. There are approximately 489 households in these three communities.

The Kenai Peninsula communities of Ninilchik, Seldovia, and Homer and residents of the west side of Cook Inlet in the vicinity of Chinitna Bay may or may not use the proposed port areas. However, there is evidence of historical links to this area. Telephone interviews are proposed with selected residents in these areas as an exploratory method to gain information on the extent of contemporary subsistence uses, if any, in the vicinity of the proposed port. A preliminary list of names for telephone interviews has been developed.

Harvest Location Information: The subsistence study plan incorporates harvest-location information associated with the harvest-amount data ADF&G will collect in its household survey. SRB&A and ADF&G are working closely to coordinate the collection of this subsistence harvest-location information in the household interviews in the five communities closest to the mine. ADF&G has not historically collected this location information in Bristol Bay during household subsistence-harvest surveys, and doing so will require additional effort. Information related to where harvests occur is especially important when trying to assess potential effects of a project.

TABLE 13-1
Pebble Project — Potentially Affected Communities

Communities Receiving ADF&G HH Surveys and SRB&A Subsistence Mapping Interviews 2005:	
1	Nondalton
2	Newhalen
3	Iliamna
4	Pedro Bay
5	Port Alsworth
Communities Proposed for SRB&A Subsistence Mapping Interviews (2005) and ADF&G HH Surveys (2006, for calendar year 2005)	
6	Kokhanok
7	Igiugig
8	Levelock
9	Ekwok
10	New Stuyahok
11	Koliganek
12	Portage Creek Pile Bay - camp with caretaker
Communities Proposed for SRB&A Subsistence Mapping Interviews and ADF&G HH Surveys (2006 or possibly later)	
13	Dillingham
14	Clark's Point
15	Ekuik
16	Aleknagik
17	Manokotak
18	Naknek
19	South Naknek
20	King Salmon
Kenai Penin. areas proposed for phone interviews in 2005 to determine subsistence use of/links to port area	
21	Ninilchik
22	Homer
23	Seldovia
24	Chinitna Bay

13.2.2 Methods/Approach

With the assistance of the ADF&G Division of Subsistence, literature and field studies will be conducted for collection, analysis, and documentation of a comprehensive database to characterize baseline conditions in the project area, consistent with state/federal agency expectations. Because the primary goal of the subsistence baseline study is to document subsistence uses sufficiently to assess the potential effects of the Pebble Project and its related transportation and utility corridor and port infrastructure on

subsistence uses, it is important to understand how environmental effects will be determined under the National Environmental Policy Act (NEPA). The four primary elements of the NEPA impact assessment are direct effects, indirect effects, cumulative effects, and mitigation. The approach of this study plan is to gather and analyze subsistence information that will be readily usable in a NEPA environmental-consequences analysis.

Direct effects “are caused by the action and occur at the same time and place” (40 CFR 1508.8). Thus, a fundamental data need is spatial subsistence information (i.e., a description of where residents hunt, harvest, fish, and gather subsistence resources) in relation to the proposed development. Existing maps of subsistence-use areas date from the early 1980s (e.g., maps in ADF&G Habitat Management Guide from 1982 and 1983). Beginning in 2005, SRB&A will conduct subsistence/traditional-knowledge interviews in the Bristol Bay communities to identify contemporary (last 10 years) subsistence-use areas that may be affected by the Pebble Project (Table 13-1 and Figure 13-1). In addition, ADF&G will collect specific harvest-location data by resource for its household survey study-year.

SRB&A will focus on two groups for the subsistence/traditional-knowledge interviews: 1) retired hunters/elders who historically used the study area and 2) hunters who currently (last 10 years) go to the study area. SRB&A will not necessarily interview every hunter who has historically gone to or who currently goes to the study area. These subsistence/traditional-knowledge interviews will not be a formal survey using a questionnaire based on a probability sample; rather, a community liaison, working with the community, city, and/or tribal governments, will select key knowledgeable individuals to be interviewed.

The ADF&G Division of Subsistence will provide the results from systematic household surveys conducted in five communities to update baseline information about subsistence hunting, fishing, and gathering that is compatible with information collected in previous rounds of ADF&G household interviews. During the household surveys, ADF&G will gather information on the location of hunting and harvests of resources.

Indirect effects “are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.” For subsistence activities, this includes such things as harvest effort, costs, and travel distance; sharing of subsistence resources; transfer of traditional knowledge; the integrity of culturally significant places; and other culturally significant activities. The research protocols will include subsistence harvest amounts, harvest locations, harvest-use areas, distribution and sharing of resources, and traditional knowledge.

The NEPA process is generally based on the best available information. However, using the best data available at this time for communities in the proposed mine/transportation and utility corridor/port areas likely would not reflect current subsistence uses in the study area because it is dated. For communities closest to the proposed development, the ADF&G Division of Subsistence has subsistence-harvest information for the communities of Nondalton (1973, 1980, 1981, 1983), Newhalen (1983 and 1991), Iliamna (1983 and 1991), Kokhanok (1983 and 1992), Port Alsworth (1983), and Pedro Bay (1982 and 1996 [unpublished]). Most of this information is dated and there is a need for updated baseline information. The residents of these communities rely on subsistence hunting, fishing, and gathering for nutrition and to support their way of life. They use a variety of resources, including salmon and other fish, large land mammals (caribou, moose, bears, sheep), small game and furbearers, birds, and wild plants.

To update the best available information, there are four processes underway. First, SRB&A will be conducting extensive interviews as described above. Second, the ADF&G Division of Subsistence has ongoing subsistence and traditional-knowledge studies in the Lake Clark/Iliamna Lake region. This current research will be incorporated into the subsistence/traditional-knowledge baseline data.

Third, the ADF&G Division of Subsistence has a cooperative agreement with the National Park Service to conduct systematic household surveys about subsistence hunting, fishing, and gathering in Nondalton and Port Alsworth. And fourth, the Division, in collaboration with NDM's team and the study communities, will conduct similar studies for the NDM project in the Bristol Bay communities beginning with Newhalen, Iliamna, and Pedro Bay in 2005. The ADF&G team will use identical data-collection methods, and research in all five communities will occur according to an integrated schedule. In association with these systematic household surveys, ADF&G personnel will train local research assistants in each community to administer the household survey. The goal will be to interview a representative of each year-round household in each community. Participation will be voluntary and all individual and household responses will be confidential. ADF&G will provide the study findings for all five communities to the NDM project team to be incorporated in the NDM subsistence baseline report. Beginning in 2006, ADF&G will conduct similar surveys in 15 other Bristol Bay communities (see Table 13-1).

The traditional-knowledge portion of the interviews will address subsistence cabins and campsites, changes in key habitat areas, changes in resource abundance, distribution and abnormalities, and winter trails/transportation routes.

The success, timing, and length of time in the field for the subsistence and traditional-knowledge interviews depend on the availability and willingness of local residents to participate in the interviews. We assume there will be no participation difficulties. To facilitate higher participation by local residents, the subsistence/traditional-knowledge field trips will be planned during periods when subsistence and commercial harvest activities are not intense.

13.2.3 Major Tasks/Activities

Major tasks/activities to document subsistence uses and assess impacts associated with the Pebble Project area include:

- Planning Meetings/Work Plan. This task includes project meetings, review of project description, communication with NDM for additional project information and clarification, formulation of research designs, preparation and revision of work plans.
- Review of published and unpublished literature. A literature review of existing sources of subsistence and traditional knowledge relevant to the study area will be conducted and will identify and review the scope of any ongoing subsistence or traditional-knowledge programs in the study area. These preliminary data will also be used as part of the engineering alternatives assessment.
- Review and compilation of existing harvest data and subsistence-use areas by community.
- Identify data gaps.
- Prepare field protocols.

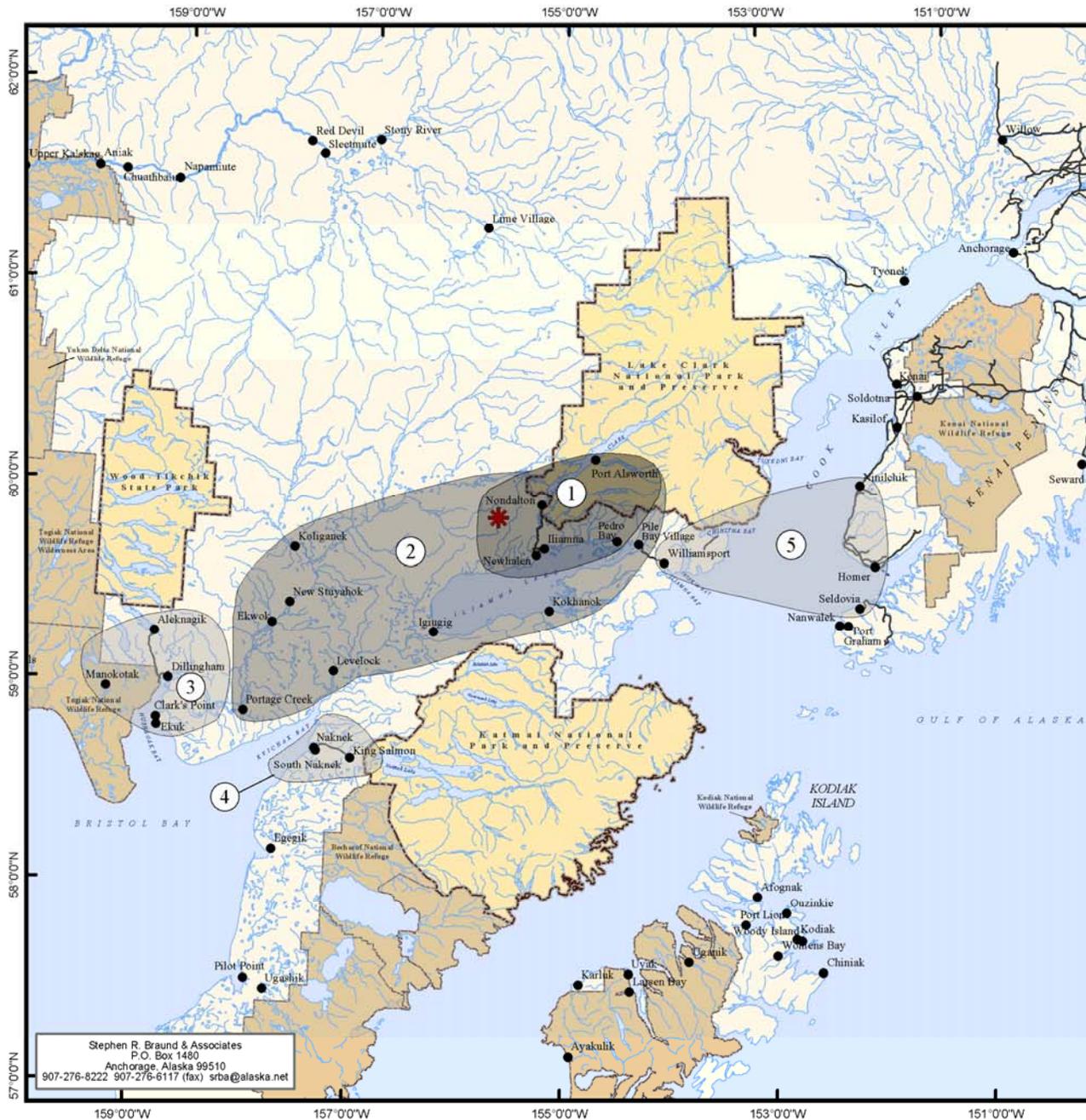
- Contact and coordinate with appropriate community organizations (e.g., traditional councils) for selecting interviewees, finding suitable space to conduct the interviews, determine honoraria amounts, and obtain translation (if necessary). A protocol respectful to each community will be followed that incorporates sensitivity to community schedules, expectations, and desires. Community participation and identification with the project is critical for success.
- Conduct household surveys and subsistence/traditional-knowledge interviews in Bristol Bay communities beginning in 2005.
- Conduct subsistence/traditional-knowledge field work during a period that does not interfere with harvests/commercial fishing. Community interviews are conditioned upon council approval and community schedules.
- Edit and perform quality-control review of field data, and process and compile field data.
- Draft environmental baseline report to accommodate field data.

During this process, the project team will coordinate with ADF&G to avoid duplication and ensure that the highest quality report is prepared.

13.3 2005 Deliverables

- Preliminary subsistence information (e.g., hunting and/or harvest information) as necessary to provide information about the mine, transportation and utility corridor, and port areas.
- 2004 Progress Report.
- 2005 Study Plan
- Initial Environmental Evaluation.

FIGURE



Northern Dynasties Mines Inc.



Pebble Project

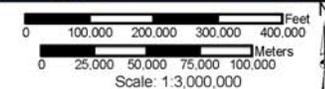
Potentially Affected Communities

Figure 13-1

Legend

- Communities
 - ★ Minesite
 - Roads
 - Rivers
- ① ADF&G HH Survey and SRB&A Subsistence Mapping Interviews 2005 - 5 Communities
 - ② SRB&A Subsistence Mapping Interviews (2005) and ADF&G HH Survey 2006 (except Pile Bay) - 7 Communities
 - ③ ADF&G HH Survey & SRB&A Subsistence Mapping Interviews 2006 or later - 5 Communities
 - ④ ADF&G HH Survey & SRB&A Subsistence Mapping Interviews 2006 or later - 3 Communities
 - ⑤ Telephone Interviews 2005

Privileged and Confidential



Alaska State Plane Zone 5 (units feet)
 1983 North American Datum

File: Fig13-1_2005wrkplan

Date: January 21, 2005

Version: 1

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