

ENVIRONMENTAL JUSTICE ANALYSIS

**IN SUPPORT OF THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMITS**

FOR

**OIL AND GAS EXPLORATION FACILITIES
ON THE OUTER CONTINENTAL SHELF
AND CONTIGUOUS STATE WATERS IN THE BEAUFORT SEA, ALASKA
Permit Number: AKG-28-2100**

AND

**OIL AND GAS EXPLORATION FACILITIES
ON THE OUTER CONTINENTAL SHELF IN THE
CHUKCHI SEA, ALASKA
Permit Number: AKG-28-8100**

OCTOBER 2012

Prepared by:

U.S. Environmental Protection Agency
Region 10
Office of Water and Watersheds
Office of Ecosystems, Tribal, and Public Affairs
Alaska Operations Office

Table of Contents

I.	Description of the Action.....	4
II.	Scope of the Environmental Justice (EJ) Analysis.....	6
III.	Summary of OTHER FEDERAL AGENCY EJ Analyses	7
IV.	Description of the Minority and Low-Income Populations	9
V.	Description of Discharges and Estimated Volumes.....	27
VI.	Summary EPA's Tribal and Public Involvement Activities	31
VII.	Summary of Input/Concerns Heard from Communities.....	33
VIII.	Potential Impacts of EPA's NPDES Permitting Actions	37
IX.	Cumulative Impacts.....	42
X.	Determination of Potential Disproportionate or Adverse Effects.....	43
XI.	Permit Requirements and Conditions	45
XII.	Conclusions	48
XIII.	References.....	49

List of Figures

Figure 1 Pt. Hope Subsistence Use Areas for Marine Resources	19
Figure 2 Pt. Lay Subsistence Use Areas for Marine Resources.....	20
Figure 3 Wainwright Subsistence Use Areas for Marine Resources	21
Figure 4 Barrow Subsistence Use Areas for Marine Resources.....	22
Figure 5 Barrow Subsistence Use Areas for Marine Resources with Lease Areas	23
Figure 6 Nuiqsut Subsistence Use Areas for Marine Resources	24
Figure 7 Kaktovik Subsistence Use Areas for Marine Resources	25
Figure 8 Map Depicting Approximate to Communities.....	26

List of Tables

Table 1 – Population, Age and Race	9
Table 2 – Social Characteristics	9
Table 3 – Health Overview.....	11
Table 4 - Food and Nutrition in the NSB Coastal Communities	13
Table 5 – Beaufort Estimated Discharge Quantities.....	27
Table 6 – Chukchi Estimated Discharge Quantities	28
Table 7 – Summary of Tribal and Public Outreach Activities	30

I. DESCRIPTION OF THE ACTION

The Clean Water Act Section 301(a), 33 USC § 1311(a), prohibits the discharge of pollutants unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. In accordance with 40 CFR § 122.28(c), EPA must consider issuing NPDES general permits for discharges from offshore oil and gas exploration facilities. General permits are appropriate mechanisms for authorizing discharges from multiple sources that involve the same or substantially similar types of operation, and where discharges from those operations are of the same type and to the same geographic area. A general NPDES permit ensures regulatory consistency for similar facilities and activities within the same industrial category.

The previous NPDES general permit, the Arctic General Permit (AKG-28-0000), which authorized waste water discharges from oil and gas exploration activities in the Beaufort Sea, Chukchi Sea, Hope Basin, and northern Norton Basin, expired on June 26, 2011. EPA is reissuing this general permit as two separate general permits: one for oil and gas exploration discharges to the outer continental shelf (OCS) and contiguous state waters of the Beaufort Sea; and one for oil and gas exploration discharges to the OCS in the Chukchi Sea. EPA's decision to split the Arctic GP into two permits was made in part, based on input received from the local communities that the Seas are different and a single permit covering such a large geographic area is too complex.

Prior to initiating the permits reissuance process, during development of the permits, and before taking final action, EPA met with community leaders, consulted with tribal governments, and held public meeting and hearings with several Northwest Arctic and North Slope communities. EPA considered all comments and input received prior to making its final decisions.

The Beaufort and Chukchi Exploration NPDES General Permits cover thirteen types of discharges from facilities engaged in field exploration and drilling activities under the Offshore Subcategory of the Oil and Gas Extraction Point Source Category (40 CFR Part 435, Subpart A). Discharges from these activities must meet the numeric limits and requirements in 40 CFR Part 435, Subpart A, and if available and applicable, more stringent limits to control pollutants to meet the water quality standards of the receiving waters. For the Beaufort and Chukchi general permits, EPA also used the results of the Ocean Discharge Criteria Evaluations (ODCEs) and Traditional Knowledge (TK) data to establish additional monitoring requirements and restrictions.

After the general permits are reissued and in effect, individual operators seeking coverage under the permits must demonstrate to EPA that they can meet the permit limits, requirements, and conditions through submittal of a Notice of Intent (NOI). The following oil and gas exploration discharges and waste streams are proposed to be re-authorized by the Beaufort and Chukchi general permits:

- Discharge 001 – water-based drilling fluids and drill cuttings
- Discharge 002 – deck drainage
- Discharge 003 – sanitary wastes
- Discharge 004 – domestic wastes
- Discharge 005 – desalination unit wastes

- Discharge 006 – blowout preventer fluid
- Discharge 007 – boiler blowdown
- Discharge 008 – fire control system test water
- Discharge 009 – non-contact cooling water
- Discharge 010 – uncontaminated ballast water
- Discharge 011 – bilge water
- Discharge 012 – excess cement slurry
- Discharge 013 – muds, cuttings, and cement at the seafloor

Section 403 of the CWA requires development of an ODCE to assess the potential impacts of discharges to the territorial sea, contiguous zone, and oceans to ensure they do not cause an unreasonable degradation of the marine environment. Unreasonable degradation is defined in 40 CFR 125.121 as:

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

The ODCE is based on ten criteria (40 CFR 125.122):

- Quantities, composition, and potential for bioaccumulation or persistence of the pollutants to be discharged;
- Potential transport of such pollutants by biological, physical, or chemical processes;
- Composition and vulnerability of the biological communities which may be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species identified as endangered or threatened pursuant to the Endangered Species Act, or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain;
- Importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism;
- Existence of special aquatic sites including, but not limited to, marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas, and coral reefs;
- Potential impacts on human health through direct and indirect pathways;
- Existing or potential recreational and commercial fishing, including finfishing and shellfishing;
- Any applicable requirements of an approved Coastal Zone Management Plan;
- Other factors relating to the effects of the discharge as may be appropriate; and
- Marine water quality criteria developed pursuant to Section 304(a)(1).

EPA may issue an NPDES permit if the ODCE finds that the discharges will not cause unreasonable degradation of the marine environment (40 CFR Part 125 subpart M).

II. SCOPE OF THE ENVIRONMENTAL JUSTICE (EJ) ANALYSIS

Environmental Justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and the accompanying Presidential memorandum, directs each Federal Agency to consider EJ as part of its mission and to develop strategies to achieve environmental protection for all communities to the greatest extent practicable and permitted by law.

Fair treatment means that no group of people, including racial, ethnic or socioeconomic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal and commercial operations or the execution of federal, state, local, and tribal programs and policies. Meaningful involvement means that (1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public's contribution can influence regulatory agency's decisions; (3) the concerns of all participants involved will be considered in the decision making process; and (4) the decision makers seek out and facilitate the involvement of those potentially affected.

This document evaluates whether the discharges authorized under the Beaufort and Chukchi general permits for oil and gas exploration may cause EJ impacts. The evaluation also discusses how EPA involved the Arctic communities in a meaningful dialogue regarding their concerns, the potential impacts of EPA's action on those communities, and how EPA intends to address the communities' concerns and mitigate the potential impacts, as permitted by law under the CWA.

EPA's tribal trust responsibilities and government-to-government consultation requirements are covered under a separate Executive Order and agency policies. However, the issues and concerns shared with EPA by tribal governments during consultation meetings are also considered in this EJ analysis because of related issues and concerns among all Arctic communities regarding safety of subsistence foods and cultural impacts, including the continuation of the subsistence way of life.

III. SUMMARY OF OTHER FEDERAL AGENCY EJ ANALYSES

Numerous EJ analyses pertinent to federal actions within the Beaufort and Chukchi Seas have been completed by the Department of Interior Bureau of Ocean Energy Management (BOEM, formerly Minerals Management Service) and the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS). A summary of the EJ conclusions made by these agencies are summarized below.

- A. U.S. Department of the Interior, Minerals Management Service, Draft Environmental Impact Statement (EIS), Beaufort and Chukchi Sea Planning Area, Oil and Gas Leases 209, 212, 217, and 221, OCS EIS/EA, MMS 2008-055, at www.mms.gov/alaska/ref/EIS%20EA/ArcticMultiSale_209/2008_0055_deis/vol1.pdf
- Proposed Action, Effects in Beaufort Sea. EJ – Effects of 3D seismic surveys, exploration, and possible development should not exceed a moderate level of effect if appropriately mitigated.
 - Incremental contributions of the Proposed Action to cumulative effects – Accompanying changes to subsistence harvest patterns would be expected to disrupt community activities, but not to displace sociocultural institutions. (ES-20)
 - Similar EJ effects were reported in the Chukchi Sea for the Proposed Action. (ES-30)
- B. U.S. Department of the Interior, Minerals Management Service, Final EIS, Oil and Gas Lease Sale 193 and Seismic Surveying Activities in Chukchi Sea, OCS EIS/EA 2007-026, May 2007, at www.mms.gov/alaska/ref/EIS%20EA/Chukchi_FEIS_193/LS%20193%20FEIS%20Vol%20I.pdf.
- Short term, local disturbance could affect subsistence harvest resources, but no resource or harvest area likely would become unavailable. No disproportionately high adverse effects are expected to occur from planned and permitted activities associated with lease sale evaluated by this EIS. (p. ES-4)
- C. U.S. Department of the Interior, Minerals Management Service, Beaufort Sea Planning Area, Oil and Gas Lease Sales 186, 195, and 202, Final Environmental Impact Statement, OCS EIS/EA, MMS 2003-001, at www.mms.gov/alaska/ref/EIS%20EA/BeaufortMultiSaleFEIS186_195_202/2003_01vol1.pdf.
- Chronic disruptions to sociocultural systems likely would occur, but these disruptions are not likely to cause permanent displacement of ongoing traditional activities of harvesting, sharing, and processing subsistence

resources. No disproportionately high adverse effects would likely occur from planned and permitted activities associated with any of the three proposed OCS lease sales evaluated in this EIS. (ExSum-3)

- D. U.S. Department of Commerce, NOAA, NMFS, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement, December 2011, at <http://www.nmfs.noaa.gov/pr/permits/eis/arctic.htm>.
- Alternative 1 – No Action: No effect.
 - Alternative 2 – Authorization for Level 1 Exploration Activity: Minor adverse impacts from disruption of subsistence activities and potential contamination of subsistence food. Minor beneficial impacts from local employment opportunities.
 - Alternative 3 – Authorization for Level 2 Exploration Activity: Minor adverse impacts from disruption of subsistence activities and contamination of subsistence food. Minor beneficial impacts from local employment opportunities.
 - Alternative 4 – Authorization for Level 2 Exploration Activity with Additional Required Time/Area Closures: Minor impacts. With the time/area closures, the impacts to subsistence activities could be further minimized but would remain minor.
 - Alternative 5 – Authorization for Level 2 Exploration Activity with Use of Alternative Technologies: Minor impacts. With the alternative technologies, the impacts to subsistence foods and human health could be further minimized but would remain minor.
 - Very Large Oil Spill – Moderate to major impacts from disproportionate adverse effect on minority populations from impacts to subsistence foods and human health. (ES-20)

IV. DESCRIPTION OF THE MINORITY AND LOW-INCOME POPULATIONS

The North Slope communities are predominantly Alaska Native, specifically Inupiaq. In this EJ analysis, EPA is taking the approach that if the Beaufort and Chukchi general permits actions are protective of Inupiaq subsistence resources, then they will be protective of all residents on the North Slope and Northwest Arctic communities as they rely on the same marine resources.

The Western Arctic bowhead whales (*Balaena mysticetus*) migrate annually from wintering areas in the northern Bering Sea, through the Chukchi Sea in the spring, and into the Canadian Beaufort Sea where they spend the summer. In the autumn they return to the Bering Sea to overwinter. Eleven Alaskan coastal communities along this migratory route participate in traditional subsistence hunts of these whales: Gambell, Savoonga, Little Diomed, and Wales (on the Bering Sea coast); Kivalina, Point Lay, Point Hope, Wainwright, and Barrow (on the coast of the Chukchi Sea); and Nuiqsut and Kaktovik (on the coast of the Beaufort Sea). The bowhead whale hunt constitutes an important subsistence activity for these communities, providing substantial quantities of food, as well as reinforcing the traditional skills and social structure of Iñupiat culture.

The Northwest Arctic coastal communities that participate in the bowhead whale hunt share many common features with the North Slope Borough coastal communities. These include many lifestyle, environmental, social, economic, and cultural conditions that determine health outcomes, such as reliance on subsistence resources, remote location, small population comprised mainly of Iñupiat people, limited infrastructure, housing type, and limited economic opportunities. Seventy-two percent of adults in the Northwest Arctic Borough reported participating in hunting, fishing, and harvesting for subsistence (Poppel et al. 2007, NMFS 2011). Although there are other Arctic and Northwest Arctic communities that are concerned with potential impacts to the marine environment and consequently their way of life, for this EJ analysis, EPA focused on the North Slope coastal communities who practice subsistence within or close to the general permits' Areas of Coverage.

Thus, for the Chukchi general permit, EPA assessed EJ concerns for the North Slope coastal communities of Point Hope, Point Lay, Wainwright, and Barrow. For the Beaufort general permit, EPA assessed EJ concerns for the North Slope communities of Barrow, Nuiqsut, and Kaktovik. While the Northwest Arctic coastal communities are not specifically included in this EJ analysis, EPA included in the analysis the concerns and issues expressed by the communities who are members of the Alaska Eskimo Whaling Commission (AEWC) that are shared with EPA through public information meetings via teleconference as well as government-to-government consultations. These communities include Kivalina, Kotzebue, Gambell, Wales, Little Diomed, and Savoonga. The information shared and discussed with EPA were included in the analysis. The potential impacts from the permitting actions have shown to be similar through comments and concerns expressed through EPA's discussions with the stakeholders.

EPA used and will continue to use available means to identify particular natural resources that, if affected by the permitting actions, could have a disproportionately high and adverse effect on minority and/or low income communities, in particular natural resources that support a

subsistence way of life. EPA required an extensive Environmental Monitoring Program in the permits to ensure the exploration discharges will not cause an unreasonable degradation to the marine environment on a continuing basis. EPA will continue to evaluate information relative to local concerns and ensure meaningful involvement and fair treatment of North Slope communities.

A. Demographics¹

EPA considered available demographic information for the North Slope Borough with respect to two reference populations, the state of Alaska, and where available, the United States of America.

Table 1 – Population, Age and Race

Location	Total Population	Under 5	Over 65	American Indian or Alaska Native	Asian	White	African American	Hispanic or Latino
<i>North Slope Borough</i>	9,503	7.8%	4.2%	53.4%	4.8%	34.1%	1.2%	3.0%
<i>State of Alaska</i>	722,718	7.5%	8.1%	14.9%	5.6%	67.9%	3.60%	5.80%
<i>United States</i>	311M	6.5%	13.3%	1.2%	5.0%	78.10%	13.1%	16.7%

(US Census Quickfacts - 2011 estimates²)

As Table 1 illustrates, in total, all eight villages within the North Slope Borough comprise of 9,503 people. The North Slope coastal village populations range in size from approximately 241 to 4,257 residents³. In comparison to the rest of the Alaska, the North Slope Borough villages have a slightly higher percentage of children under five years of age, yet a slightly lower percentage of people 65 and older. Fifty three percent of all people identify themselves as Alaskan Natives, making them the majority population in the North Slope Borough. This number is significantly higher than the Alaskan Native/Native American population in both the State of Alaska and the United States as a whole. Asians comprise the second largest minority group in this area making up nearly 4.8 % of the total populace.

¹ Data was gathered from the 2000 US Census via American Fact Finder at http://factfinder.census.gov/home/saff/main.html?_lang=en

² Census Data – 2011 estimates – accessed at <http://quickfacts.census.gov/qfd/states/00000.html> and <http://quickfacts.census.gov/qfd/states/02/02185.html> on October 1, 2012.

³ Census Data – 2011 estimates – accessed at <http://quickfacts.census.gov/qfd/states/02000lk.html> on October 1, 2012.

Table 2 – Social Characteristics

Location	Total Population	High School Graduate (Percent of persons age 25 & over)	Bachelor’s Degree or Higher (percent of persons age 25 or over)	Speak a language other than English at home	Individuals Below Poverty
<i>North Slope Borough</i>	9,503	73.8%	13.5%	48.6%	11.8%
<i>State of Alaska</i>	722,718	90.7%	27.0%	16.50%	9.5%
<i>United States</i>	311M	85.0%	27.9%	20.1%	13.8%

(US Census²)

Within the age group of persons 25 and older, 73.80% of residents report earning at least a high school diploma. This number is slightly lower than both reference populations. Limited formal education is a barrier to employment, health care and social resources, and can increase the risk of poverty, stress, and impacts from environmental stressors. Almost fourteen percent of people over 25 have earned at least a Bachelor’s degree or Higher. Nearly half the people who reside in the North Slope Borough speak a language other than English at home, which is significantly higher than those in the State of Alaska and the United States. Less than 12% of all North Slope residents live below poverty levels, i.e., the total family income is less than the threshold appropriate for that family. This number is somewhat greater than the rest of Alaska, but slightly less than the percentage living below the poverty line in the rest of the United States.

B. Health⁴

The 2009 Alaska Native Health Status Report, issued by the Alaska Native Tribal Health Consortium, provides an overview of health conditions in this region. Between 2004 and 2007, the leading causes of death in Alaskan Natives living on the North Slope were cancer, heart disease, suicide, unintentional injury and chronic obstructive pulmonary disease (COPD), respectively. This is fairly consistent with the death rates of Alaskan Natives across the state. Cancer is the leading cause of death for Alaska Native people, accounting for 1 out of every 5 deaths. The Alaska

⁴Alaska Native Tribal Health Consortium: Alaska Native Epidemiology Center. Alaska Native Health Status Report 2009 http://www.anthc.org/chs/epicenter/upload/01_HSRintro.pdf

The Arctic Slope Service area as defined by Alaska Native Tribal Health Consortium covers the North Slope Borough with the exception of Point Hope, which falls under the Northwest Arctic service area. Point Hope is located the furthest distance from the activities proposed for authorization under the permits. The health statistics for the Northwest Arctic Service Area do not differ significantly in most respects from the statistics presented here for villages that are located much closer to the proposed activities. Please visit the Alaska Native Health Status Report for more details.

Native cancer death rate was 30% greater than for U.S. Whites. Heart disease is the second leading cause of death for Alaska Native people.⁵

Furthermore, over the 2 year period between 2005 and 2007, more than 30% of adults in the North Slope Borough were classified as obese. Additionally, from 1990 to 2007, there has been a large increase in the prevalence of diabetes for Alaskan Natives statewide. The percent of rate increase has jumped to 117% over the 17 year time frame. This increase is present in the North Slope Borough, with a 158% increase. Finally, there are nearly three times (58% vs. 20%) as many Alaska Native people in this area who are smokers, compared to Alaska non-Natives.

Only 30% of pregnant Alaskan Native women in the North Slope area had access to adequate prenatal care between 2006 and 2007. These numbers are lower than the state average of 46%. In the North Slope region, 6% of children were born with a low birth weight compared to a statewide average of 5%.

The percent of housing units with water and sewer service varies by major rural regional health corporation within the state, ranging from 58% to 98%. In 2008 it was reported that 94% of the Alaskan Natives in the North Slope region had access to water and sewer service. This is well above the percentages of Alaskan Natives statewide.

Table 3 – Health Overview

Health Indicators	North Slope	Alaskan Natives Statewide	Year
Obese (BMI 30+)	37%	31%	2005-2007
Diabetes: % Rate of Increase since 1990	158%	117%	2007

Overweight, obesity, and diabetes present significant health burdens to the North Slope Borough (Parnell et al. 2008). This constellation of disorders is linked with increased risk of developing a number of other chronic health problems, including high blood pressure, heart disease, arthritis, certain cancers, and some types of respiratory problems. As shown in Table 3, from 2005 to 2007 the NSB had substantially higher estimated adult obesity rates than the Alaska average.

C. Diet and Nutrition

Diet and nutrition play an important part in health. Healthy diets prevent disease and are important to maintain at community and individual levels. Native populations in Alaska and elsewhere have experienced marked changes in disease patterns stemming from the rapid transition from a healthy subsistence diet to a more Western diet and lifestyle, resulting in drastic increases in obesity, diabetes, and other chronic diseases (Kuhnlein and Receveur 1996, NMFS 2011).

⁵ Id.

Importance of Subsistence

The Inupiat consider subsistence to be more than just a “way of life,” and for the people who live along the Beaufort Sea and Chukchi Sea coasts, subsistence is their life (Maclean 1998). Subsistence defines the essence of who they are, and it provides a connection between their history, culture, and spiritual beliefs. An essential component of Inupiat values is the sharing of subsistence resources among families, friends, elders, and those in need. “[V]irtually all Inupiat households depend on subsistence resources to some degree” (NSB 2004, NMFS 2011).

Subsistence activities are assigned the highest cultural value by the Inupiat and provide a sense of identity in addition to the substantial economic and nutritional contributions. Many species are important for the role they play in the annual cycle of subsistence resource harvests, and each subsistence food resource plays an important role. Loss of access to any subsistence food resource could have serious effects. When a subsistence resource is unavailable for any reason, families will adapt and redirect harvest effort towards other species, but the contribution of some resources to the annual food budget would be very difficult to replace. Besides their dietary benefits, subsistence resources provide materials for family use and for the sharing patterns that help maintain traditional Inupiat family organization. Relationships between generations, among families, and within and between communities are honored and renewed through sharing, trading, and bartering subsistence foods. The bonds of reciprocity extend widely beyond the permit areas of coverage and help to maintain ties with family members elsewhere in Alaska. Subsistence resources provide special foods for religious and ceremonial occasions; the most important ceremony, Nalukataq, celebrates the bowhead whale harvest (NMFS 2008b, NMFS 2011).

The use of traditional food in the subsistence way of life provides important benefits to users. Subsistence foods are often preferable as they are rich in many nutrients, lower in fat, and healthier than purchased foods. Subsistence foods consist of a wide range of fish and wildlife and vegetable products that have substantial nutritional benefits. According to the state Division of Subsistence, about 38.3 million pounds of wild foods are taken annually by residents of rural Alaska, or about 316 pounds per person per year. This compares to 23 pounds per year harvested by Alaska's urban residents. Fish comprise 55 percent of subsistence foods taken annually. Ninety-two to one-hundred percent of rural households consume subsistence-caught fish, according to the state (ADF&G 2010).

Subsistence harvesting of traditional foods, including preparation, eating, and sharing of resources contributes to the social, cultural, and spiritual well-being of users and their communities (NMFS 2011). Communities express and reproduce their unique identities based on the enduring connections between current residents, those who used harvest areas in the past, and the wild resources of the land. Elders’ conferences, spirit camps, and other information exchange and gathering events serve to solidify these cultural connections between generations and between the people and the land and its resources (NMFS 2011).

Participation in the harvesting and sharing of subsistence foods goes beyond the family and the community. There is an extensive network of exchange that occurs between communities of the Beaufort and Chukchi Seas and further to relatives residing in larger towns such as Anchorage and

Fairbanks. For instance, the shares of bowhead whale that each crew member receives after whaling are involved in secondary redistribution among local relatives and those in other communities. Social and cultural identity is strengthened by serving subsistence foods at home and at feasts and sharing subsistence foods, particularly with elders. The foods that are exchanged strengthen family and regional ties (NMFS 2011).

Subsistence Participation and Diet

Diets in the NSB include both traditional, or subsistence foods, and non-traditional, or store foods. Traditional diets are associated with numerous health benefits and reduced risk of many chronic diseases including diabetes, high blood pressure, high cholesterol, heart disease, stroke, arthritis, depression, and some cancers (Reynolds et al. 2006; Murphy et al. 1995; Adler et al. 1994, 1996; Ebbesson et al. 1999, Bjerregaard et al. 2004).

While evidence of dietary habits in the NSB is limited, subsistence resources are an important food source to North Slope Borough residents. Subsistence foods include fish, seal, walrus, beluga and bowhead whale from the Beaufort and Chukchi Seas, as well as land-based animals and certain migratory birds and eggs. As Table 4 shows, in the 2010 North Slope Borough census, 54 percent of households indicated that they get at least half of their meals from subsistence sources. Data from the 2003 North Slope Borough census show that virtually all Iñupiat households report relying on subsistence resources to some extent, and that subsistence foods make up a large proportion of healthy meals (Circumpolar Research Associates 2010, NMFS 2011). The North Slope Borough also has among the highest per capita harvests of subsistence food in Alaska (McAninch 2010).

Table 4 - Food and Nutrition in the NSB Coastal Communities

	Barrow	Kaktovik	Nuiqsut	Point Hope	Point Lay	Wainwright	ALL NSB
Times last year when households found it difficult to get the foods they needed to eat healthy meals ¹	28%	40%	38%	36%	51%	46%	35%
If yes, because not able to get enough subsistence foods	34%	44%	53%	59%	48%	36%	43%
If yes, because not able to get enough store foods	90%	88%	87%	86%	96%	95%	90%
Households that get at least half of their meals from subsistence sources	44%	67%	67%	64%	61%	67%	54%

Notes: ¹Includes all head of households (survey respondents)
 Source: Circumpolar Research Associates 2010

While a wide variety of species are harvested, marine mammals represent an essential part of the diet providing micronutrients, omega-3 fatty acids, and anti-inflammatory substances (MMS, 2008). Rates of obesity, diabetes and heart disease – all outcomes associated with dietary changes towards less-healthy foods – have been rising rapidly in the North Slope Borough over the last several decades. This combination of a high reliance on subsistence foods and metabolic changes in the population means that changes to the availability or quality of subsistence resources could have detrimental impacts on nutritional health outcomes and food insecurity for the local population (NMFS, 2011).

Food insecurity and a change away from subsistence food sources may contribute to the risk for obesity and the associated chronic illness for residents in the North Slope Borough. Food insecurity refers to an inability to secure sufficient healthy food for a family. Those facing food insecurity tend to consume cheaper, high-calorie food with low nutrient value (ADPH 2005, Bersamin et al. 2006, Bersamin and Luick 2007, Bersamin et al. 2008). This is often because processed or packaged foods are cheaper and more readily available in rural/remote areas than fruits and vegetables, often because of their longer shelf life. Rates of food insecurity are high in the North Slope Borough with 19 to 40 percent of households reporting not having enough food to eat at times (Circumpolar Associates 2010, NMFS 2011).

Residents of the North Slope Borough are quite concerned about environmental contamination, particularly as it relates to contamination of subsistence food sources. In a recent survey, 44 percent of Inupiat village residents reported concern that fish and animals may be unsafe to eat (Poppel et al. 2007, NMFS 2011).

Environmental contaminants have the potential to affect human health in a number of ways. First exposure to contaminants via inhalation, ingestion, or absorption may induce adverse health effects, depending on a number of factors, including the nature of the contaminant, the amount of exposure, and the sensitivity of the person who comes in contact with the contaminant.

Aside from actual exposure to environmental contamination, the perception of exposure to contamination is also linked to known health consequences. Perception of contamination may result in stress and anxiety about the safety of subsistence foods and avoidance of subsistence food sources (CEAA 2010, Joyce 2008, Loring et al. 2010), with potential changes in nutrition-related diseases as a result. It is important to note that these health results arise regardless of whether or not there is any “real” contamination at a level that could induce toxicological effects in humans; the effects are linked to the perception of contamination, rather than to measured levels (NMFS 2011).

Rural Arctic communities are particularly vulnerable to the health effects of climate change, and global warming is increasingly becoming recognized as a determinant of health in the Arctic (NMFS 2011). Changing weather and ice patterns have the potential to affect a wide range of health-related outcomes. Climate change may affect both subsistence food availability and storage and may increase risks associated with subsistence activities, which in turn may lead to dietary and cultural change. Climate change can also affect water, sanitation, housing, transportation infrastructure, cultural continuity, community stress levels, the spread of infection, and even the

types of diseases and infections to which the population is susceptible (ACIA 2004, Brubaker et al. 2010, Brubaker et al. 2011).

Communities in the North Slope Borough are already experiencing some effects of climate change: erosion problems; thawing ice cellars; less reliable ice conditions; and subsequent higher risk to hunters and spring whalers (NMFS 2011).

Changes in diet and nutrition may occur as a result of oil and gas activities where the local populations rely on subsistence resources. As previously discussed, these changes can lead to a number of important public health outcomes. The traditional diet in Alaska is associated with reduced risk of chronic diseases such as diabetes, high blood pressure, high cholesterol, heart disease, stroke, depression and arthritis (NMFS, 2011). A vital, productive subsistence way of life is strongly correlated with measures of overall well-being and psychosocial health in Arctic communities (Poppel et al., 2007; Hicks and Bjerregaard, 2006; Shepard and Rode, 1996). Impacts to subsistence harvest, if they were severe enough, would also impact food security and nutritional status, thus increasing the risk of nutritionally-based chronic medical problems such as high blood pressure, obesity, diabetes, and cardiovascular disease. Individuals dependent on subsistence resources could experience these effects in varying degrees; however, the effects could be most prominent in Inupiaq residents of the region, in whom current data suggest that subsistence is a foundation to general well-being and physical health (MMS, 2008).

In addition to simply providing a food source, subsistence activities support important cultural and social connections. Acculturation is a commonly used concept to describe the psychological and cultural impacts of rapid modernization and loss of tradition. Social and psychological problems, including alcohol and drug problems, unintentional and intentional injury and suicide (a high percentage of which are associated with alcohol use), depression, anxiety, and assault and domestic violence, are now highly prevalent on the North Slope (as they are in many rural Alaska Native and Arctic Inuit villages in Canada and Greenland) and cause a disproportionate burden of suffering and mortality for these communities (MMS 2008, NMFS 2011). These problems rarely occur in isolation, but usually arise in the context of specific sociocultural and physical environments that shape human behavior. Research in circumpolar Inuit societies suggests that social pathology and related health problems, which are common across the Arctic, relate directly to the rapid sociocultural changes that have occurred over the same time period (Bjerregaard et al. 2005, Curtis et al. 2005, Goldsmith et al. 2004, NMFS 2011).

Studies have found rapid cultural changes to be linked to a wide variety of health concerns, ranging from impaired mental health and social pathology (such as substance abuse, violence, and suicide), to cardiovascular disease and diabetes. The specific health implications of acculturation in the Inupiaq are well documented; for example, the shift away from a nutrient-rich traditional diet and towards store-bought and western foods is associated with cardiovascular risk and obesity. However, equally if not more important, is the loss of the sociocultural value of subsistence. Traditional foods are highly valued among circumpolar populations, as they are considered to be healthy and provide strength, warmth and energy in ways that store-bought foods do not (Arctic Climate Impact Assessment, 2004). Subsistence foods contribute to cultural identity, tradition, and social cohesion. The enjoyment of traditional foods is seen to be of equal cultural value to speaking the native language (Kleivan 1996, Searles 2002, NMFS 2011).

The importance of Inupiaq participation in subsistence activities and consumption of subsistence foods extends beyond their nutritional and dietary importance. For example, the hunt and consumption of subsistence foods involve cultural, traditional, and spiritual activities that involve the entire community. Of particular importance among subsistence activities is the bowhead whale hunt. The Inupiaq have hunted the bowhead whale for over 2,000 years (Stoker and Krupnik 1993), and the whale hunt continues as a cornerstone of diet, social organization, and cultural survival (Brower et al. 1998, Michie 1979, NMFS, 2011).

Although acculturative stress is a concern among the Inupiaq, the strength of traditional culture and local institutions, and in particular, the value and stability of the bowhead hunt, provide a strongly protective effect against the health impacts of acculturation (NMFS, 2011).

The following maps (Figures 1-7) illustrate the locations of the existing oil and gas leases in the Beaufort and Chukchi Seas relative to the subsistence use areas within the North Slope Borough. Figure 8 depicts the approximate distances from Shell's proposed lease locations to nearby Chukchi communities. The existing federal leases in the Chukchi Sea are approximately 70 miles or farther from the nearest coastal community.

Concerns have been expressed over animals swimming through domestic or sanitary wastes, as well as the plume containing drilling fluids, cuttings, and other effluent associated with discharges from oil and gas exploration activities in the Beaufort and Chukchi Seas. In addition to the subsistence resources potentially exposed to the contaminants in the discharges, the perception of contamination alone causes stress and anxiety about the safety of subsistence foods and avoidance of subsistence food sources. Avoidance may result in changes in nutrition-related diseases (NMFS, 2011).

Many Inupiaq residents of the North Slope Borough have reported that they are concerned that current and/or future oil and gas activities could increase contaminant loads of subsistence resources to a level that would threaten human health (Poppel et al., 2007). Concerns include accidental oil spills, persistent leaks, and poor waste management practices. Residents have also expressed concerns that the contaminant thresholds established by regulatory agencies do not take into consideration the large amounts of fish or game consumed by the Inupiaq, rather, they were developed based on the consumption levels of the general population (BLM, 2005, cited in NMFS, 2011).

EPA acknowledges the importance of clearly articulating the potential risks associated with the discharges associated with oil and gas exploration activities, and recognizes that even the perception of contamination could produce an adverse effect by causing hunters to avoid harvesting particular species or to avoid particular harvest areas. Reduction of subsistence harvest or reduced consumption of subsistence resources due to lack of confidence in the foods' quality or safety could produce an adverse effect on human health.

Consistent with the Executive Order on Environmental Justice (Section 4 – Consumption of Fish and Wildlife), EPA has considered, through the ODCEs and this EJ analysis, potential risks to

Inupiat subsistence consumption patterns. The approach to this analysis is discussed below and Section VIII.

EPA understands the communities' concerns regarding potential tainting of subsistence resources. Since both discharges have the potential to impact subsistence resources and/or influence subsistence harvest activities, the Beaufort and Chukchi general permits include monitoring requirements and additional conditions to evaluate the potential impact of the discharges on an ongoing basis and to ensure no unreasonable degradation of the marine environment.

EPA will also request the Agency of Toxic Substances and Disease Registry (ATSDR) to review the data from the Environmental Monitoring Plan reports to further evaluate the potential risks associated with exploration discharges on the communities that rely on marine resources for subsistence. EPA will continue to communicate and coordinate with the communities and local and tribal governments regarding any new information that becomes available.

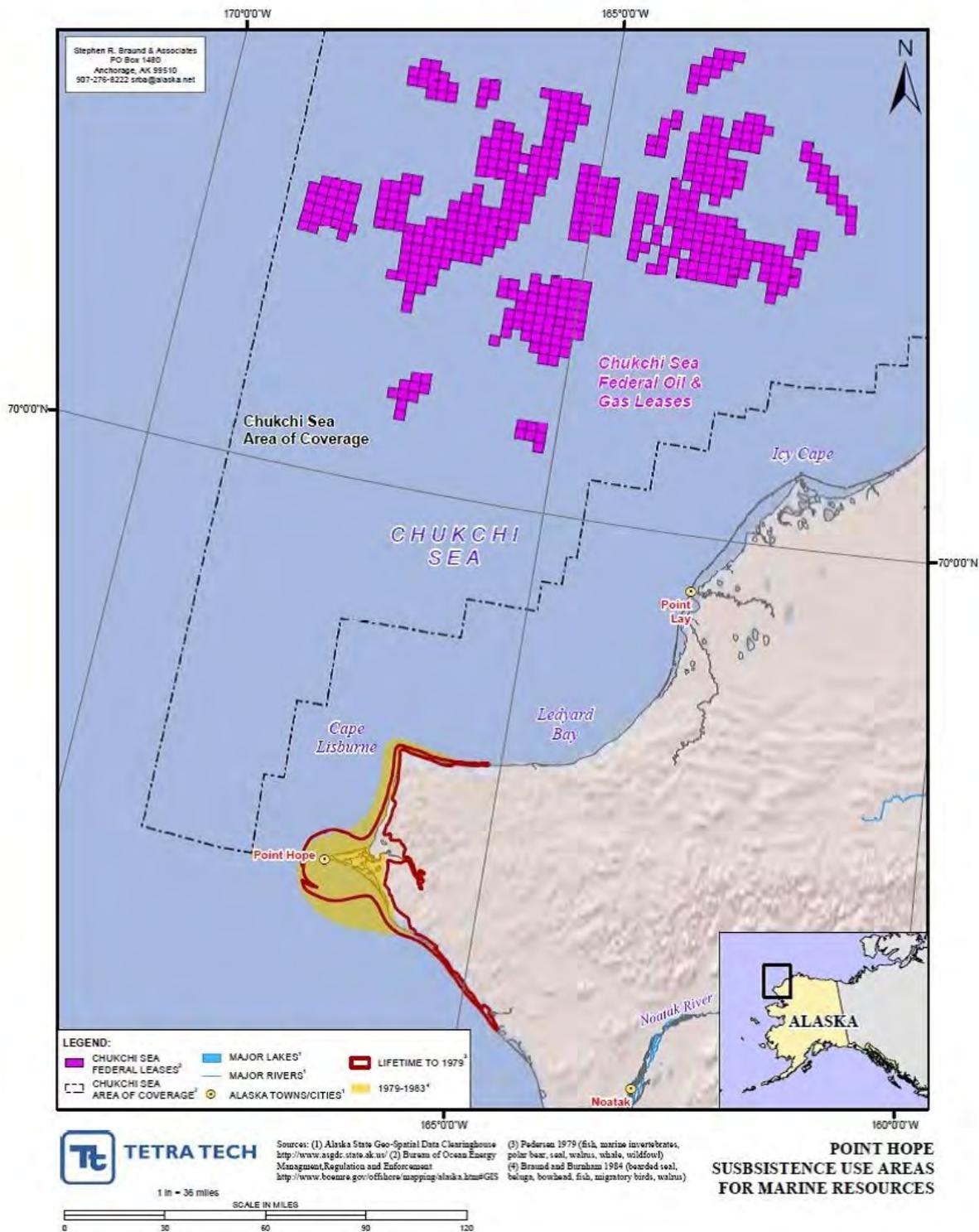


Figure 1

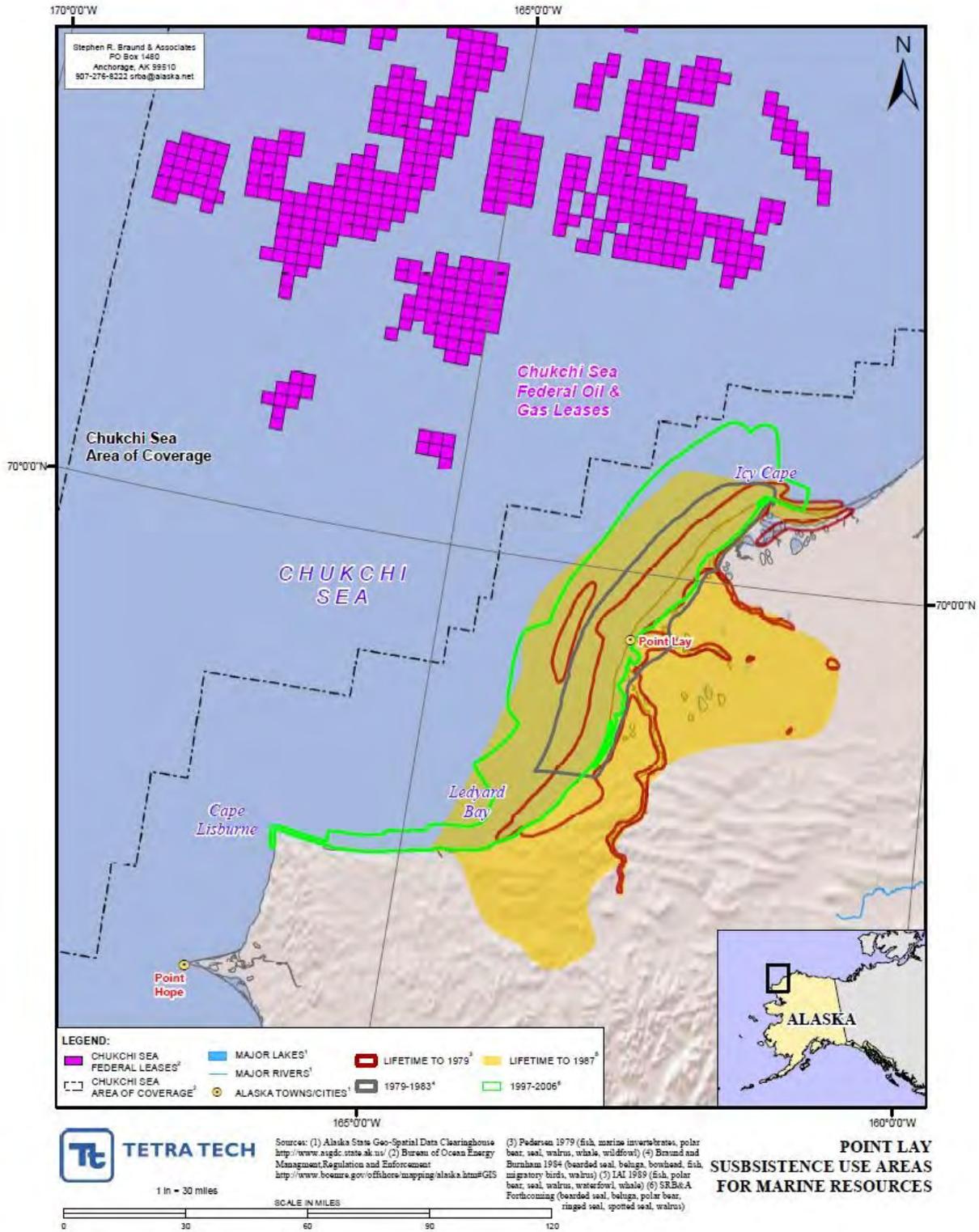


Figure 2

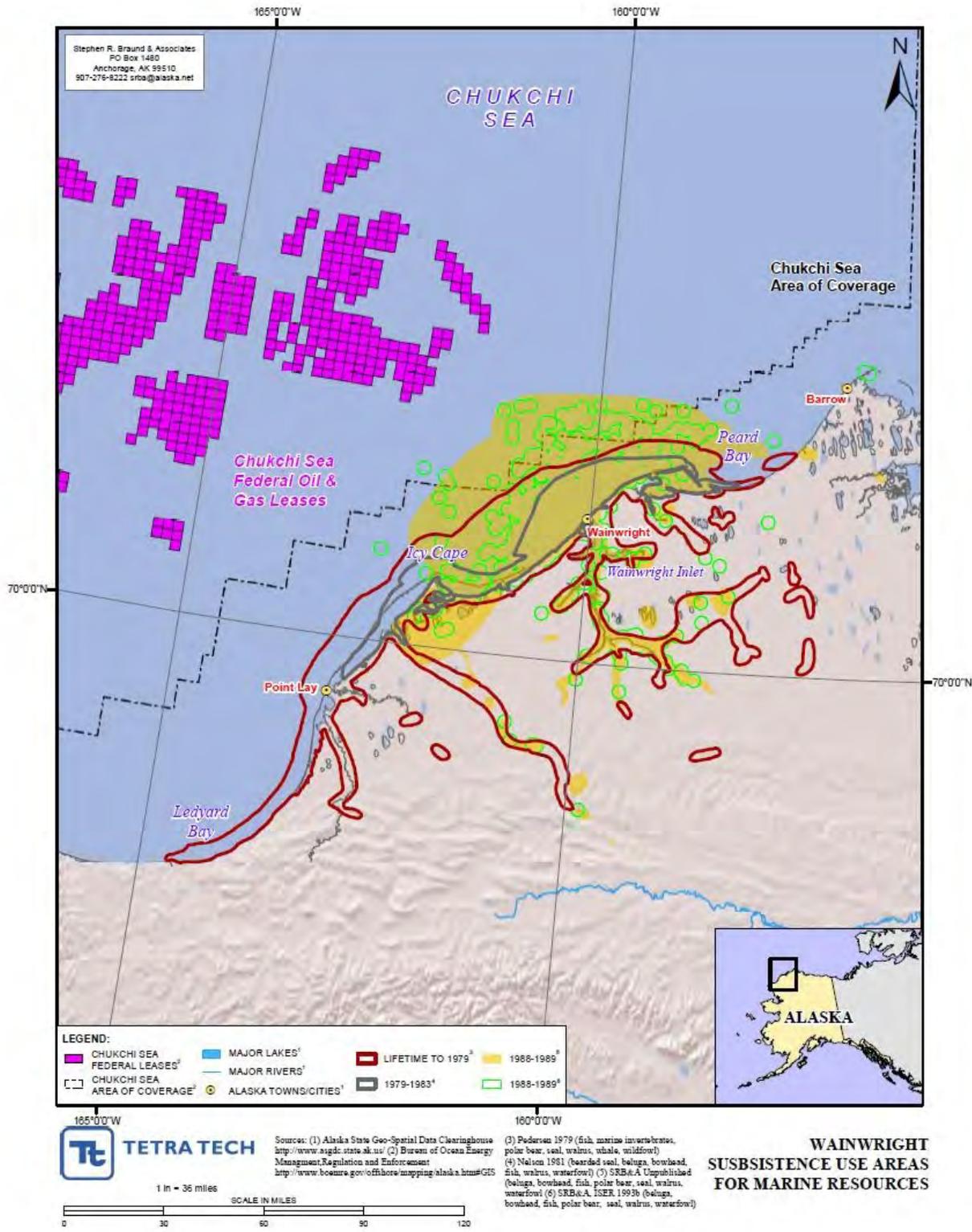


Figure 3

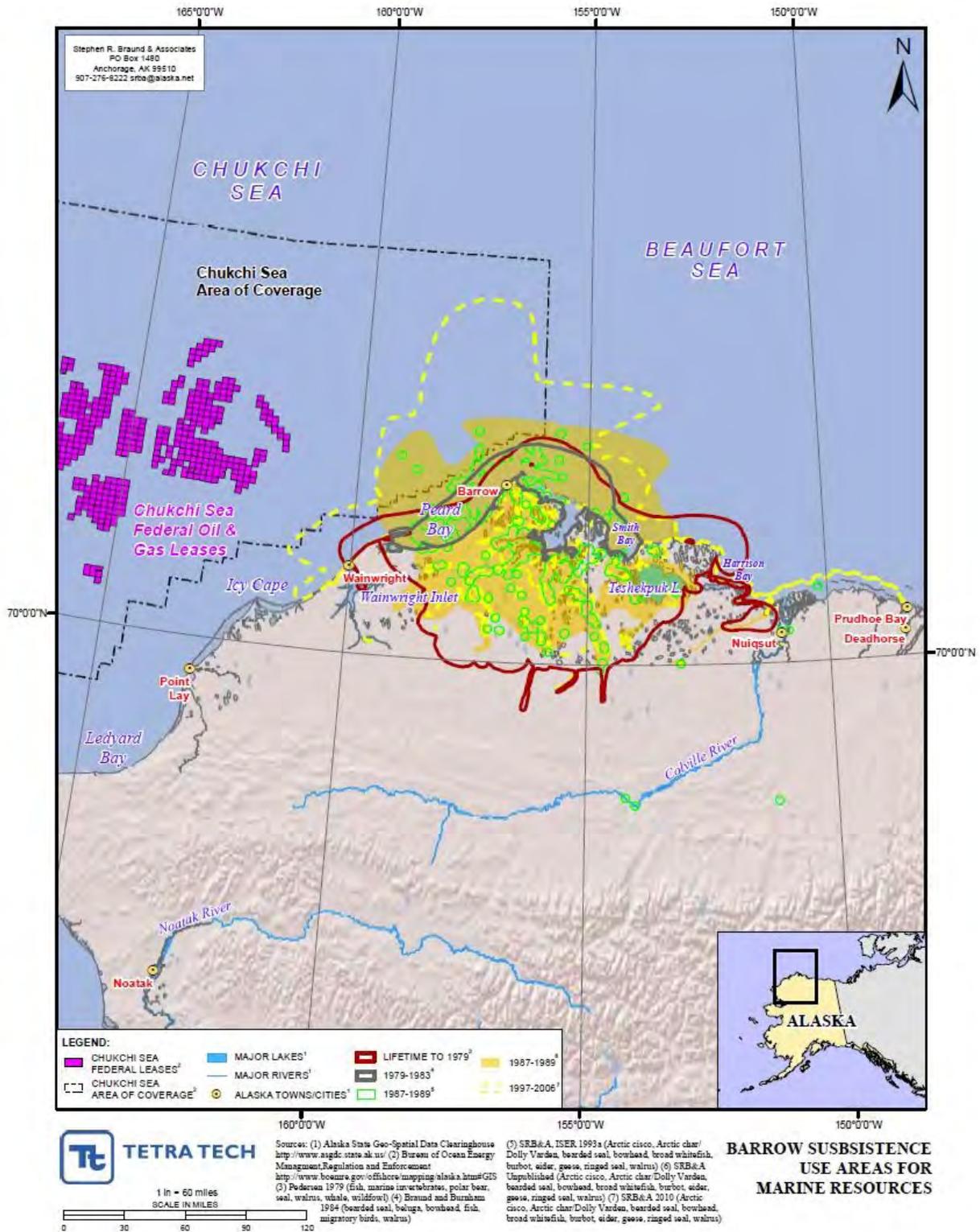


Figure 4

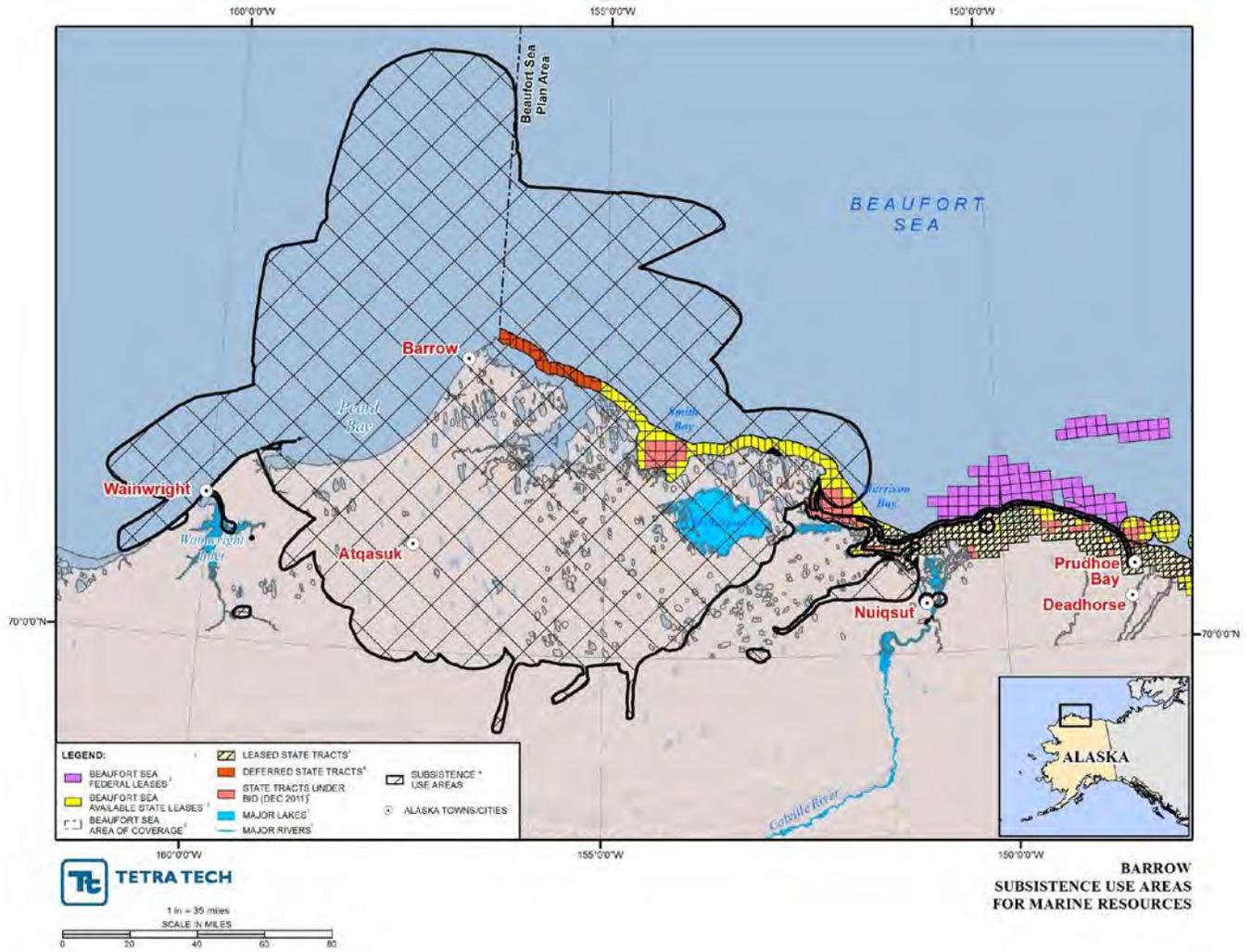


Figure 5

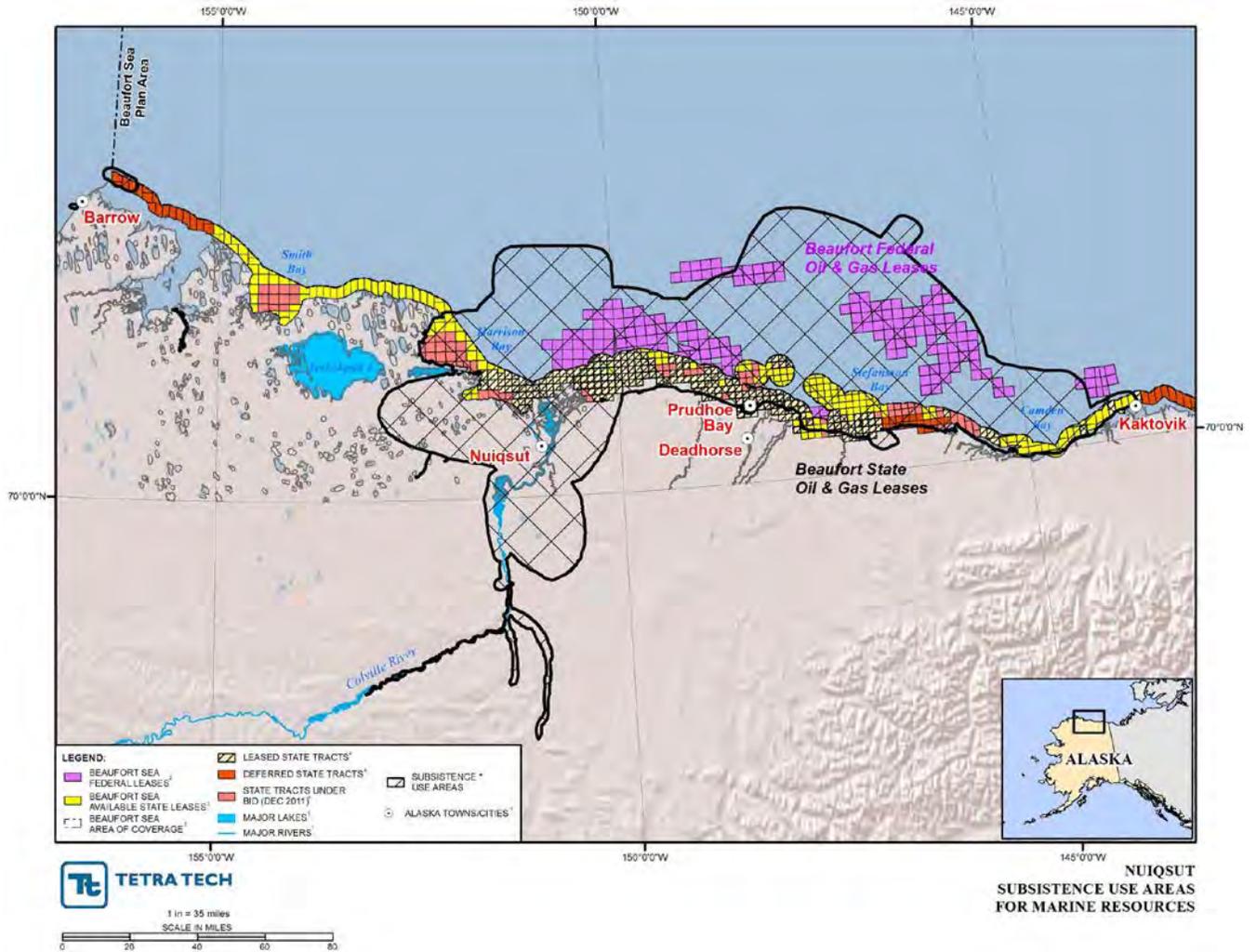


Figure 6

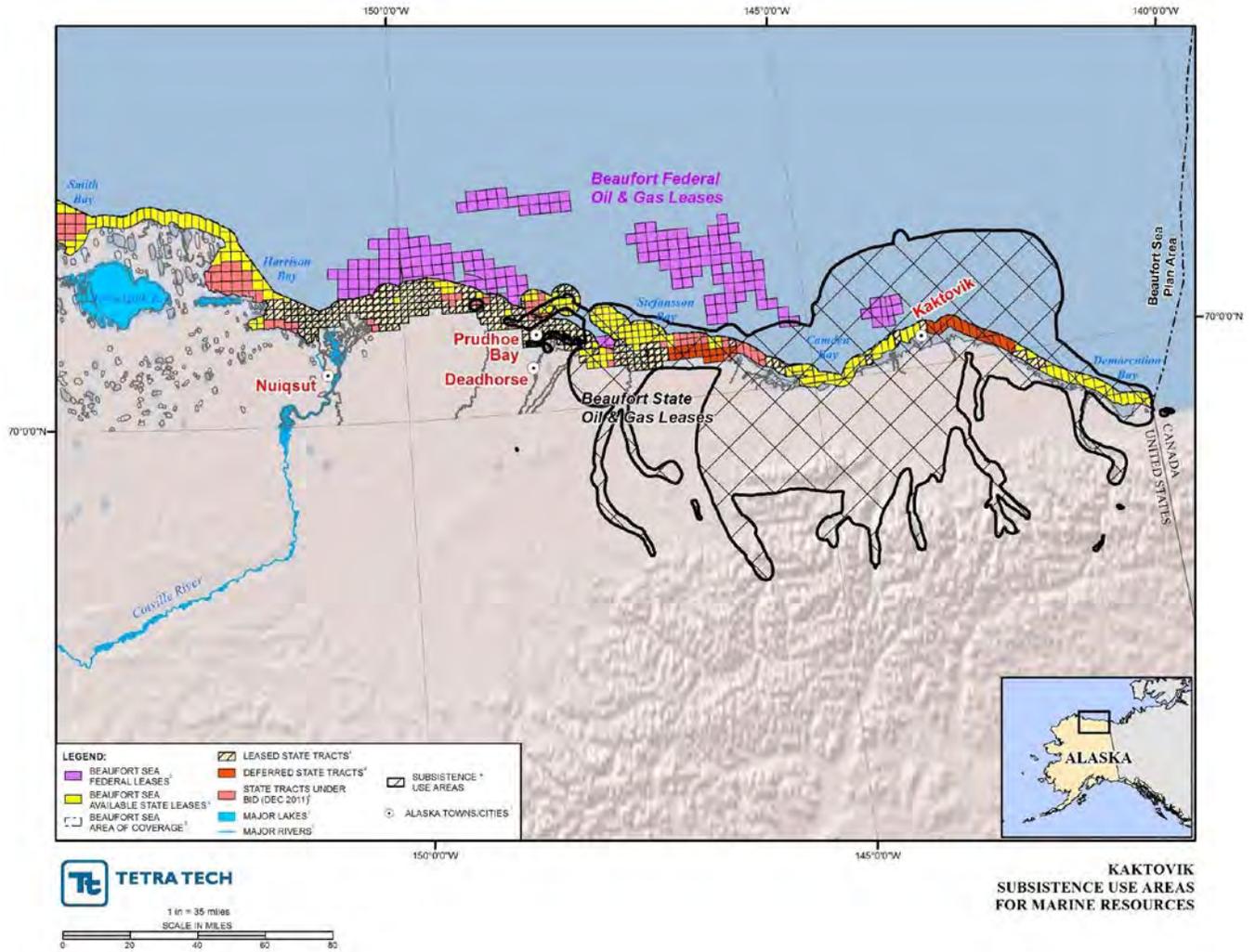
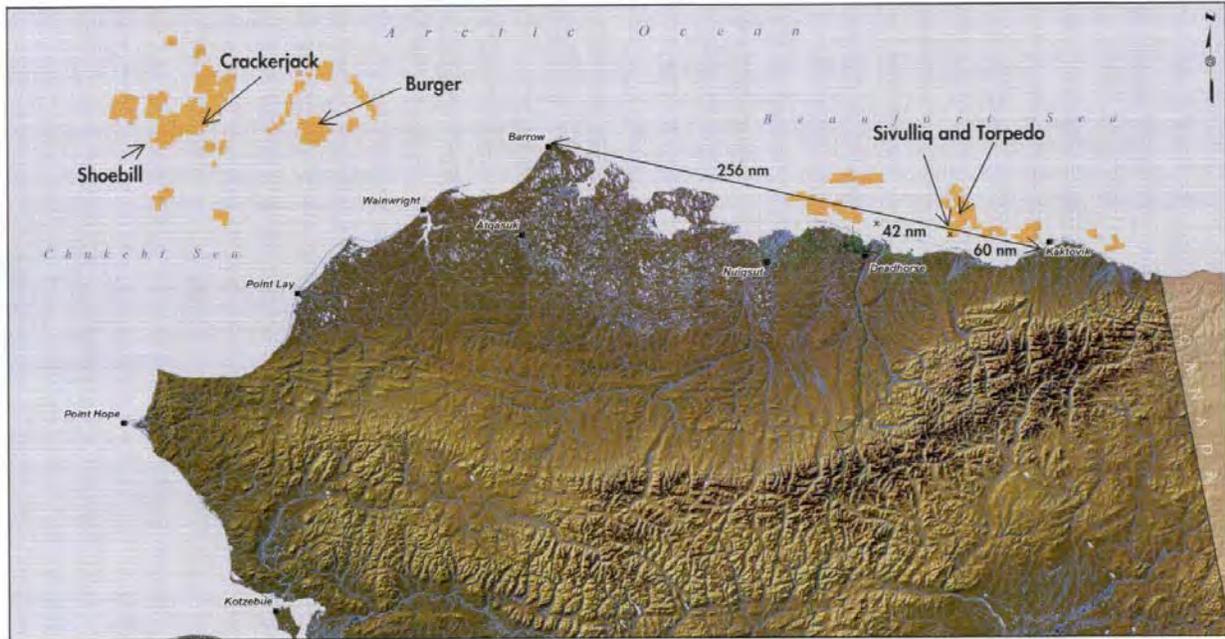


Figure 7

Figure 8



Burger to Barrow	140 miles	Cjack to Barrow	212 miles	Sbill to Barrow	230 miles
Burger to Wainwright	78 miles	Cjack to Wainwright	145 miles	Sbill to Wainwright	162 miles
Burger to Point Lay	92 milts	Cjack to Point Lay	121 milts	Sbill to Point Lay	129 milts
Burger to Point Hope	206 miles	Cjack to Point Hope	192 miles	Sbill to Point Hope	180 miles

V. DESCRIPTION OF DISCHARGES AND ESTIMATED VOLUMES

The following thirteen (13) discharges are authorized under the Beaufort and Chukchi general permits, subject to the permit terms and conditions.

Discharge 001 (Drilling Fluids) – The circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. The Beaufort and Chukchi general permits only authorize the discharge of water-based drilling fluids.

(Drill Cuttings) – The particles generated by drilling into subsurface geologic formations and carried out from the wellbore with the drilling fluid. Examples of drill cuttings include small pieces of rock varying in size and texture from fine silt to gravel. Drill cuttings are also generated from solids control equipment and settle out and accumulate in quiescent areas in the solids control equipment or other equipment processing drilling fluid.

Discharge 002 (Deck Drainage) – Any waste resulting from deck washings, spillage, rainwater, and runoff from gutters and drains, including drip pans and work areas within oil and gas facilities subject to the permits.

Discharge 003 (Sanitary Waste) – Human body waste discharged from toilets and urinals located within oil and gas facilities.

Discharge 004 (Domestic Waste) – Materials discharged from sinks, showers, laundries, eye-wash stations, hand-wash stations, fish cleaning stations, and galleys.

Discharge 005 (Desalination Unit Waste) – Wastewater associated with the process of creating freshwater from seawater.

Discharge 006 (Blowout Preventer Fluid) – Fluid used to actuate hydraulic equipment on the blowout preventer.

Discharge 007 (Boiler Blowdown) – Water and minerals drained from boiler drums to minimize solids build-up in the boiler.

Discharge 008 (Fire Control System Test Water) – Water that is released during the training of personnel in fire protection, and the testing and maintenance of fire protection equipment.

Discharge 009 (Non-contact Cooling Water) – Water that is used for non-contact, once-through cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content.

Discharge 010 (Uncontaminated Ballast Water) – Harbor or seawater added or removed to maintain the proper ballast floater level and ship draft and to conduct jack-up rig related seabed support capability tests (e.g., jack-up rig preload water).

Discharge 011 (Bilge Water) – Water which collects in the lower internal parts of the drilling vessel hull.

Discharge 012 (Excess Cement Slurry) – Excess cement and wastes from equipment washdown after a cementing operation. Excess cement slurry is discharged intermittently while drilling, depending on drilling, casing, and testing program and problems.

Discharge 013 (Muds, Cuttings, Cement at the Seafloor) – Materials discharge at the surface of the ocean floor during construction of the mudline cellar, during the early phases of drilling operations before the riser is installed, and during well abandonment and plugging.

A. Beaufort General Permit Average and Maximum Discharge Volumes

EPA estimates that 18 to 34 exploration wells could be drilled during the five-year term of the Beaufort general permit (2012-2017). Furthermore, EPA estimated the average and maximum discharge volumes on a per well basis using information submitted in the Notices of Intent (NOIs) by Shell Exploration, Inc. (Shell) for potential exploration well locations in the Beaufort Area of Coverage. The NOIs were submitted under the Arctic General Permit. The average and maximum discharge estimates are summarized in Table 5.

Table 5 – Beaufort Average and Maximum Discharge Quantities

Discharge	Average Discharge Quantities^a (bbl/well)	Maximum Discharge Quantities (bb/well)
Water-based drilling fluids and drill cuttings (001)	3,712 ^b	3,709
Deck drainage (002)	214	250
Sanitary wastes (003)	1,275 ^b	1,290
Domestic wastes (004)	14,167 ^b	14,333
Desalination unit wastes (005)	5,350	6,250
Blowout preventer fluid (006)	50	56.4
Boiler blowdown (007)	0 ^c	0
Fire control system test water (008)	477 ^d	572
Non-contact cooling water (009)	1,099,871	1,935,000
Uncontaminated ballast Water (010)	213 ^b	215
Bilge water (011)	537 ^b	543
Excess cement slurry (012)	50	50
Muds, cuttings, and cement at the seafloor (013)	3,512	5,335

Notes:

bbl = barrel

a. Average estimated quantities based on Shell’s NOIs for exploration activities in the Beaufort Sea.

b. Shell’s NOIs indicated zero discharge in Camden Bay at the Sivulliq and Torpedo prospects.

c. Shell’s NOIs indicated zero discharge.

d. Shell’s NOIs indicated zero discharge in Harrison Bay at the Cornell and Mauya prospects.

B. Chukchi General Permit Average and Maximum Estimated Discharge Volumes

For the Chukchi general permit, EPA estimates that 24-42 exploration wells could be drilled in the five drilling seasons during the five-year permit term (2012-2017).

The estimated average and maximum discharge volumes per well were developed based on NOIs submitted under the Arctic General Permit by Shell, ConocoPhillips Alaska, Inc. (COP) and Statoil USA E&P Inc. (Statoil) for potential exploration well locations in the Chukchi Area of Coverage. The discharge estimates are summarized in Table 6.

Table 6 – Chukchi Average and Maximum Estimated Discharge Quantities

Discharge	Average Discharge Quantities (bbl/well)	Maximum Discharge Quantities (bbl/well)
Water-based drilling fluids and drill cuttings (001)	7,693 ^a	13,500
Deck drainage (002)	647 ^b	1,470
Sanitary wastes (003)	1,190 ^c	1,600
Domestic wastes (004)	8,454 ^d	16,667
Desalination unit wastes (005)	10,300 ^e	20,160
Blowout preventer fluid (006)	28	42
Boiler blowdown (007)	235 ^f	390
Fire control system test water (008)	144 ^g	157
Non-contact cooling water (009)	2,700,769	4,700,000
Uncontaminated ballast Water (010)	28,642 ^h	115,000
Bilge water (011)	622	1,000
Excess cement slurry (012)	377	1,000
Muds, cuttings, and cement at the seafloor (013)	3,747	4,152

Note: bbl = barrel

a Quantities include combined average drilling fluids and drill cuttings quantities from 26 NOIs received from Shell, ConocoPhillips, and Statoil.

b ConocoPhillips' NOIs provided an estimated volume of bbl/season (3,400 bbl/season), with season defined as a 100-day drilling season. 3400 bbl/season was converted to 1,360 bbl/well for computation purposes (assuming a well is drilled within 40 days of operation).

c ConocoPhillips' NOIs provided an estimated volume of 4,000 bbl/season, which was converted to 1,600 bbl/well for computation purposes.

d ConocoPhillips' NOIs provided an estimated volume of 11,800 bbl/season, which was converted to 4,720 bbl/well for computation purposes.

e ConocoPhillips' NOIs provided an estimated volume of 50,000 bbl/season, which was converted to 20,000 bbl/well for computation purposes.

f Based on Statoil and ConocoPhillips' NOIs. ConocoPhillips' NOIs provided an estimate of 200 bbl/season, which was converted to 80 bbl/well for computation purposes. Shell's NOIs indicated zero discharge of this wastestream.

g Based on Statoil and ConocoPhillips' NOIs. Shell's NOIs indicated zero discharge of this wastestream. Statoil and ConocoPhillips NOIs provided estimated volumes in bbl/month which was converted to bbl/well for computation purposes.

h Shell's volumes are associated with drilling vessels, while Statoil and ConocoPhillips' volumes are associated with jackup rigs.

VI. SUMMARY EPA’S TRIBAL AND PUBLIC INVOLVEMENT ACTIVITIES

In May 2009, EPA issued the North Slope Communications Protocol establishing communications guidelines to support meaningful involvement of North Slope communities in EPA decision-making. The goal of the protocol is to improve the agency’s effectiveness in working with North Slope communities.

EPA implemented the protocol during development of the Beaufort and Chukchi general permits by undertaking a comprehensive tribal and public involvement process. Prior to each of the meetings and/or outreach activities, EPA sent numerous letters, and email reminders to the community contacts. EPA’s tribal and public involvement activities include the following and are summarized, by date, in Table 7.

- Early information meetings with Northwest Arctic and North Slope coastal communities (Translation services were provided by EPA in Nuiqsut)
- Quarterly presentations at the Alaska Eskimo Whaling Commission (AEWC) meetings
- Regular coordination with the North Slope Borough (NSB)
- Project updates through email, fax and mailing (Village Corporations, City Councils, Alaska Native Corporations, Tribal Governments, AEWC, Environmental Organizations, NSB, NWAB, and other interested parties)
- Technical Workshops – Early Air/Water outreach, ODCE workshops
- Government-to-government consultation meetings
- Public meetings and hearings
- Traditional Knowledge (TK) workshops in Barrow, Point Lay, Nuiqsut, and Kaktovik. Communities were given multiple opportunities to participate. Point Hope declined involvement and Wainwright did not respond to multiple requests by EPA.

Table 7 – Summary of Tribal and Public Outreach Activities

Type of Outreach Activity	Date(s)	Description
Early NPDES Program Information Sessions	May 28-29, 2009	Kotzebue and Barrow (participants from other North Slope and Northwest Arctic Borough communities also attended)
Project Presentation	March 1, 2010	Barrow – North Slope Borough Assembly
Information Availability	September 2009 and February 2010	Water program information availability sessions along with Air permit hearings and public meetings in Point Hope, Wainwright, and Barrow
Project Information Meetings	March 29, 2010	Kotzebue – Kotzebue IRA
		Kotzebue – Northwest Arctic Borough community
		Point Hope – Point Hope community
	March 31, 2010	Barrow – Native Village of Barrow
		Barrow – North Slope Borough staff
		Barrow – Barrow community

	April 1, 2010	Barrow – AEW Wainwright – Wainwright community
	April 6, 2010	Nuiqsut – Nuiqsut Tribal Council Nuiqsut – Nuiqsut community
	April 7, 2010	Kaktovik – Kaktovik community
	April 8, 2010	Barrow – Inupiat Community of the Arctic Slope
	April 9, 2010	Point Lay – Point Lay community
Project Information Conference Calls	May 25, 2010	City of Gamble
	June 17, 2010	Sivuqaq, Inc.
Project Presentations at AEWC Quarterly Meetings	July 22 – 23, 2010 October 19 – 20, 2010 December 8 – 19, 2010 December 13, 2011	AEWC commissioners
Ongoing Coordination with NSB Staff and Consultants	February 17, 2010 March 31, 2010 May 6, 2010 August 31, 2010 October 20, 2010 October 28, 2010 January 7, 2011	Face-to-face meetings and/or teleconferences with: <ul style="list-style-type: none"> • NSB Law Department • NSB Planning Department • NSB environmental consultants
Project Information Updates	September 2009 March 2010 September 2010 Summer 2011	Transmitted via email to project mailing list and posted on EPA website
Traditional Knowledge Interview Workshops (Stephen R. Braund & Assc.)	September 2010	Point Lay (2 trips; 6 workshops; 8 participants)
	October 2010	Kaktovik (2 trips; 5 workshops; 11 participants)
		Nuiqsut (1 trip; 3 workshops; 32 participants)
December 2010	Barrow (1 trip; 6 workshops; 22 participants)	
ODCE Technical Workshops	June 15, 2011 June 16-17 2011	Anchorage (Environmental Non-Profit Groups) Barrow (NSB, AEW, ICAS, NVB, NS Communities)
Public Meetings & Hearings	March 12-16, 2012	<u>Public and Tribal Government meetings:</u> Point Hope, Barrow, Nuiqsut, Anchorage <u>Public hearings:</u> Barrow, Anchorage
Local and Tribal Government Stakeholder Meetings	September 18 th , 2012	Barrow, AK . Invitees included the North Slope Borough, Inupiat Community of the Arctic Slope, Alaska Eskimo Whaling Commission, Eskimo Walrus Commission, Nanuuq Commission, Native Village of Barrow, Native Village of Point Lay, Native Village of Wainwright, Native Village of Point Hope, Native Village of Kaktovik, Native Village of Nuiqsut, Northwest Arctic Borough, Kotzebue IRA Council, Native Village of Kivalina, Native Village of Gambell, Native Village of Savoonga, Native Village of Wales, and Native Village of Diomede

VII. SUMMARY OF INPUT/CONCERNS HEARD FROM COMMUNITIES

The Traditional Knowledge data collection (SBR&A, 2011) effort for the Beaufort and Chukchi general permits included data that correlated with the concerns that were outlined in the EcoHealth Journal Contribution titled, "Inupiat Health and Proposed Alaskan Oil Development: Results of the First Integrated Health Impact Assessment/Environmental Impact Statement for Proposed Oil Development on Alaska's North Slope" (Aaron Wernham, October 2007). These concerns include:

Subsistence – Food Insecurity/Hunger:

- Displacement of hunters away from productive areas
- Displacement/dispersion of animals
- Reduced populations of subsistence species
- Concern regarding bioaccumulation in subsistence species

Sociocultural

- Loss/degradation of traditional subsistence use areas
- Fear of contaminants
- Fear that development may ultimately engulf the subsistence way of life, with profound implications for health and well-being
- Subsistence impacts lead to breakdown of kinship/community sharing networks
- Subsistence impacts lead to difficulty in transmitting cultural axioms to youth
- Increasing economic disparities within villages

The observations, concerns, and recommendations gathered during the TK workshops for the Beaufort and Chukchi general permits are summarized below.

- A. Knowledge, observations and concerns related to the displacement and availability of whales and other marine mammals:
- Marine species might avoid areas in the vicinity of the discharges which could lead to the deflection of marine mammals and other marine resources resulting in a loss of subsistence resources available. The majority of the concerns focused on the potential effects of drilling fluids and drill cuttings on displacing marine resources.
 - The hunting season is shorter than it used to be and residents have fewer opportunities to harvest what they need. Additionally, the period of time to spend with young men has been shortened because of the change in ice conditions.
 - Even though some areas might be protected (e.g., by particular discharge limits or deferral areas) the marine mammals travel through both the Beaufort and Chukchi Seas, and should be protected with a standardization of discharge practices across all areas.
 - The Sivulliq prospect is located within prime bowhead habitat.

- Unpredictability of currents and their ability to transport chemicals long distances, which could lead to the deflection of marine mammals, particularly the bowhead whale.
- Discharges' disproportionate effect on seals because of their year-round presence.
- Offshore activities cause subsistence resources to move away from the community, resulting in increased risk to hunter safety.

B. Knowledge, observations and concerns related to the effects of contaminants on dietary patterns:

- Toxicity of the discharges, including impacts to newborn animals that might be especially vulnerable and human and wildlife effects from barium and barite in drilling muds.
- Food chain impacts and potential volatile reactions when high temperature drilling mud comes into contact with cold water. Food chain effects of drilling fluids and muds through krill and other small species. Concerns about effects on plankton which could affect larger organisms in the ocean.
- Drilling muds left at shore-based sites inhibiting vegetation growth.
- Boiler blowdown discharges could increase the pH and temperature of the receiving water.
- Effects of chlorine and caustic soda use, resulting in oxygen depletion.
- Observation regarding sick marine wildlife, which is believed to be attributed to oil and gas discharges.
- Potential impacts to sensitive species such as clams, which are important for food resource for walrus.
- Bilge water discharges may introduce invasive species, which will affect resident marine life, such as local krill that are said to have 5 times higher fat content than other parts of Alaska.

C. Knowledge, observations and concerns related to perceived contamination:

- Increased health issues and that contamination already exist in the food chain.
- Contamination of subsistence resources could result from the wastewater discharges. This might cause hunters to change their subsistence use practices; for example, hunting less marine mammals.
- Marine resources will travel through a discharge plume and the health effects from consuming such a marine mammal after it has spent time in the discharge area.
- Contamination in Burbot in the Colville River Delta near Nuiqsut.⁶

⁶ Agency for Toxic Substances and Disease Registry Health Consultation: Review of Burbot Samples determined that the Burbot are safe to eat, for additional information see http://www.atsdr.cdc.gov/HAC/pha/USARmyUSACEUmiatAFS111303-AK/USArmyUSACEUmiat_HC111303.pdf

- D. Knowledge, observations and concerns related to tainted subsistence foods:
- Fish taste changes associated with oil and gas activities.
 - Changes in ability to gather seaweed with fish eggs at Cross Island, which are attributed to the extreme water activity in the area of Prudhoe Bay.
 - Tainted subsistence resources that might travel through a discharge plume.
- E. EPA's ability to enforce the general permits, monitor compliance, and how the communities should be engaged in that process:
- Enforcement and compliance of the permits, including EPA oversight and expressed interest of local involvement in the monitoring of the permitting activities.
 - Use local monitors. Three types of monitoring are needed: (1) local and outside observers; (2) inspections; and (3) testing of all discharges, including random sampling.
 - Share results with communities.
- F. Many concerns were expressed regarding how local communities are being represented in the permitting process. The communities perceive a lack of information about the discharges. Finally, the communities feel they are not being listened to regarding their requests for zero discharge. Recommendations include:
- EPA should communicate every year, be transparent, share information and work with the communities.
 - Respect traditional knowledge.
 - EPA should give more information about these general permits and more time for community to formulate comments and feedback.
 - EPA should travel to the villages to describe the nature of the discharges. Need for educational funds to inform local residents of what is being discharged and how to contain oil spill.
 - Encourage companies to work together to share infrastructure resources (pipelines, ice roads, etc.).
- G. Recommendations for discharge requirements included:
- Restrict discharges in bowhead feeding areas and subsistence use areas.
 - Apply zero-discharge policy. Traditional practice of the Inupiaq is to not discharge anything that is man-made into the ocean. Respondents indicated that technology is available for alternative discharge practices such as injection of discharges into Underground Injection Control wells.
 - Restrict discharges further from shore, up to 25 miles out, although some requested doubling that distance.
 - Restrict discharges to areas the deep ocean (greater than 450 feet) and impose a 20 mile buffer zone from shore (beyond furthest currents that come into Barrow).

- Protect critical habitat areas. Avoid discharges 10-15 miles from shore to avoid feeding areas. Marine mammals, such as seals and walruses, use near-shore as feeding grounds, where there are abundant clam beds. Areas where clams identified should be restricted because of their sensitivity to foreign toxins. Peard Bay and right along Barrow include buffer zone because of currents.
- Icy Cape and Omalik Lagoon should be off limits to discharges.
- Two shoals (Harold and Hannah) located substantial distance from Point Lay should be restricted.
- Open ice conditions – walrus are traveling and feeding when they are moving on the ice. Concerns about walrus and beluga feeding (mid-June to mid-July). Do not allow discharges during open water seasons and along migration routes.
- Consider restricting discharges during subsistence harvesting seasons and in subsistence use areas and around the hunting grounds.
- Seals don't like to swim in muddy water; the distance hunters travel in search of seals depends on turbidity of water offshore from the lagoon. Drilling mud discharges when sea ice is present cause mud to collect on icebergs, infecting the marine environment, and diverting seals from the area.
- There was a mass algae bloom several years ago with brown substance which many residents believed to be associated with oil and gas activities.
- Prohibit discharges during the molting season to protect migratory species.
- Require wastewater treatment on board.
- Analyze what is in mud before discharging. More pre-discharge experiments of discharge pollutants with seawater and dissemination of data to community.
- Ensure bilge water is contaminant free prior to discharge.
- EPA should consider effects of wind and currents on discharges and the timing of discharge in relation to wind patterns and size of of currents. Concerns were also expressed about discharges coming close to shore, the weight of muds, and how far they can be carried.
- Non-biodegradable products, such as plastics, should not be discharged.

H. There were many concerns expressed through the Traditional Knowledge process, particularly concerns regarding cumulative impacts, that are not related to wastewater discharges authorized by the Beaufort and Chukchi general permits. These concerns are outside the scope of EPA's Clean Water Act authority and are not discussed further in this analysis. These concerns include:

- the effects of noise from increased barge and other vessels traffic, helicopters, seismic activities, ice breakers and ice management activities;
- solid wastes disposed by the barges and other vessels in the area;
- oil spill response capabilities and planning;

- infrastructure that will be developed in the event that the exploration activities result in long-term oil production;
- multiple stressors from other industrial activities, particularly on Nuiqsut;
- changes to the environment and how additional impacts may cause important habitat areas to be lost;
- climate change and effects on subsistence;
- significant decreases in sea ice began 10 years ago and persists today;
- any additional impact from discharges would cause further damage to marine resources;
- lack of sea ice has made subsistence activities more expensive and dangerous; and

the difference in restricted areas between the Chukchi and the Beaufort Sea lease sales, including a request for a deferral line in the Beaufort Sea similar to the one that is in place for the Chukchi Sea.

VIII. POTENTIAL IMPACTS OF EPA’S NPDES PERMITTING ACTIONS

A summary of the evaluations conducted in the Beaufort and Chukchi ODCEs as they relate to EJ concerns is provided below.

Criterion 1. The quantities, composition, and potential for bioaccumulation or persistence of the pollutants to be discharged.

The primary discharges of concern for oil and gas exploration (drilling fluids and cuttings) do not cause an unreasonable degradation to marine waters because the pollutants associated with those discharges do not bioaccumulate or persist in the environment. Recent studies show that metals associated with water-based drilling fluids are not readily absorbed by living organisms, but they do carry organic additives that can result in oxygen depletion, which could adversely affect benthic organisms in the immediate area of discharge. Likewise, increased sedimentation by the discharges of water-based drilling fluids and drill cuttings adversely affect benthic organisms in the area of discharge. However, the impacts of oxygen depletion and increased sedimentation are limited to the discharge area encircling each well (100-m radius) and have few long-term impacts. Studies show effects on benthic communities from the discharges of water-based drilling fluids are minor and relatively short-lived. Effects on zooplankton communities are nearly always restricted to the immediate vicinity of the discharge, within about 300 ft (Neff 2010) where the drilling fluids and drill cuttings materials accumulate. Literature reviews indicate some bioaccumulation of barium and chromium can occur in benthic organisms, but pollutant concentrations have been shown to decrease once the organism is removed from the contaminate source; tissue sample concentrations are not significantly different from control organisms.

The Beaufort and Chukchi general permits limit the potential for adverse impacts by: (1) prohibiting the discharge of oil- and synthetic-based drilling fluids, cuttings associated with those fluids; (2) limiting the concentrations of mercury and cadmium in stock barite; (3) requiring suspended particulate phase toxicity testing; and (4) restricting discharges within certain areas and the number of wells drilled within a lease block to no more than five.

All other waste streams that will be authorized by the Beaufort and Chukchi general permits (e.g., sanitary and domestic wastes, deck drainage, blowout preventer fluid) do not contain pollutants that bioaccumulate or persist in the marine environment.

No unreasonable degradation of the marine environment of the Beaufort and Chukchi Seas is expected to occur from bioaccumulation or persistence of pollutant discharges from oil and gas exploration activities. EPA is requiring environmental monitoring programs at each drill site during the 5-year permit term to ensure unreasonable degradation does not occur on a continuing basis, and to use in future agency decision-making.

Criterion 2. The potential transport of such pollutants by biological, physical, or chemical processes.

Pollutant transfer can occur through biological, physical, or chemical processes, and while some degree of transfer is expected from exploratory drilling in the Areas of Coverage, the effects would be limited by the relatively short duration of activity at any individual well and the quantity and composition of discharges.

Physical transport models show that water quality standards will be met within 100 meters from the discharge point with the majority of the larger-grained solids deposited within that distance. Deposition models evaluated for 51 discharge scenarios predicted maximum predicted deposit thickness of approximately 2 cm (0.8 in), and the median for all scenarios was a deposit of approximately 0.2 cm (0.07 in), depending on current speeds of the receiving water. Under most conditions, the majority of the finer-grained solids are deposited within 1,000 m (3,280 ft) of the discharge location. Ice gouging in the Beaufort and Chukchi Areas of Coverage is not well documented, but is not expected to play a substantial role in sediment transport.

Chemical transport of drilling fluids is not well described in the literature. Any occurrence would most likely result from oxidative/reductive reactions in sediments that change the speciation and sorption-desorption processes that change the physical distribution of pollutants.

Overall, discharges from exploration activities are short-lived and intermittent and are unlikely to result in significant accumulation on the seafloor.

Criterion 3. The composition and vulnerability of the biological communities that could be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species identified as endangered or threatened pursuant to the Endangered Species Act, or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain.

Authorized exploration discharges present some potential to produce either acute or chronic effects on a localized basis through exposure in the water column or in the benthic environment. The discharges would result in localized areas where the density and diversity and biomass of benthic organisms would be reduced for some time. Benthic organisms within such areas might also be exposed to sources of contaminants, including trace metals; however, the extent of exposure is not expected to result in long-term changes to the local species composition. Exposure

of bottom feeders such as sea ducks and gray whales to these benthic communities is not anticipated to result in any adverse effects.

Four threatened or endangered species occur within the Beaufort and Chukchi Seas: one cetacean species (bowhead whale), one carnivore (polar bear) and two birds (spectacled and Steller's eiders). Two seals, ringed and bearded, are proposed, and the Pacific walrus is a candidate species, for listing and under the Endangered Species Act. These species spend a portion of their lives in the Areas of Coverage. Bowhead whales migrate through the area between summer feeding grounds in the Canadian Beaufort Sea and wintering areas in the Bering Sea. Humpback whales have been identified in the Arctic Ocean; their occurrence is only incidental, and no regular population is known to occur in the area. The occurrences of polar bear and seals are tied closely to the pack ice and would tend to be found further north during the anticipated periods of operations (open water seasons). Spectacled and Steller's eiders nest onshore in the summer and can spend time in the shallow near-shore waters immediately following the breeding period. The potential effects on those species include behavioral changes resulting from the physical presence of exploration rigs, permitted discharges, and drilling support activities. As discussed under Criterion 1, bioaccumulation within prey is not expected to be an exposure pathway to those species. On the basis of the transient use of the area by those species, the limited areal extent of the potential impacts in relation to the total lease area containing prey, and the overall mobility of the species, impacts from oil and gas exploration will have insignificant effects on the ESA listed, proposed, and candidate species. Biological Evaluations of threatened and endangered species has been completed for the Beaufort and Chukchi general permits. The BE concluded that the discharges "may affect, but are not likely to adversely affect" ESA listed, candidate, and proposed species, or their designated critical habitat areas. EPA received concurrence from these determinations from both the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) on March 30, 2012 and April 11, 2012, respectively.

Criterion 4. The importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism.

The Areas of Coverage for the Beaufort and Chukchi general permits provide foraging habitat for a number of species including marine mammals and birds. Bowhead whale migrations occur through the southern portions of area with whales following open water leads generally in the shear zone as they move through the Chukchi Sea to the Beaufort Sea. The spring migration would generally be completed before discharges begin. Fish with demersal eggs might spawn in the Areas of Coverage; however, the spawning habitats of resident fish populations are not well known. A number of other habitats and biological communities exist outside the Areas of Coverage, primarily in the shallow and protected waters near the coast.

Sea ice provides a platform for hunting and feeding, for seeking mates and breeding, for denning, for resting, and for long-distance movement. Ringed seals are polar bear's primary food source, and areas near ice edges, leads, or polynyas where ocean depth is minimal are the most productive hunting grounds (USFWS 2012). Polar bears are unlikely to occur near permitted wells during the open water period, but may occasionally be found swimming in open water. Polar bears are more likely to be encountered during year-round exploration activities anticipated in shallow,

nearshore lease locations in the Beaufort Sea; however, the effects are anticipated to be insignificant because contaminants in the effluent are not expected to bioaccumulate or persist in the environment and would disperse quickly into the receiving waters. The Chukchi leases are located far from shore, a distance of over 50 miles, and exploration drilling activities will only occur during the open water season.

To protect the regional biological communities, the Beaufort and Chukchi general permits contain effluent limits and prohibitions on the discharges of water-based drilling fluids and drill cuttings, including area restrictions, seasonal restrictions, and stable ice restrictions. Both permits also require Environmental Monitoring Programs be conducted at each drill site before, during, and after drilling activities. Furthermore, the Beaufort general permit includes a no discharge during fall bowhead whale hunting activities by the communities of Nuiqsut and Kaktovik.

The intermittent nature and limited extent of the discharges, combined with the effluent limitations, restrictions, and prohibitions established in the Beaufort and Chukchi general permits, will prevent unreasonable degradation of those resources.

Criterion 5. The existence of special aquatic sites including, but not limited to, marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas, and coral reefs.

No marine sanctuaries or other special aquatic sites, as defined by 40 CFR 125.122, are in or adjacent to the Beaufort and Chukchi general permits Areas of Coverage. The nearest special aquatic site—the Alaska Maritime National Wildlife Refuge, is managed by the USFWS as a unit of the National Wildlife Refuge System. Within the Alaska Maritime Refuge system, the Chukchi Sea Unit includes more mainland and barrier island acreage than any of the other units. The Chukchi Sea Unit extends nearly from Barrow to just north of Cape Prince of Wales in the Bering Strait, a distance of more than 360 miles. Both the northern and southern ends of the unit are dominated by several large lagoons and low-lying barrier islands and are relatively shallow with an extensive continental shelf. The Chukchi Unit is located within the Deferral Area established by the Department of Interior Bureau of Ocean Energy Management (BOEM) whereby no lease sales will be held. No other marine sanctuaries or other special aquatic sites are known to be in or adjacent to the Areas of Coverage.

Criterion 6. The potential impacts on human health through direct and indirect pathways.

Human health within the North Slope Borough is directly related to the subsistence activities in and along the Beaufort Sea. In addition to providing a food source, subsistence activities serve important cultural and social functions for Alaska Natives. Individuals in the North Slope and Northwest Arctic Boroughs have expressed concerns related to contaminant exposure through consumption of subsistence foods and other environmental pathways. Concerns have also been expressed over animals swimming through discharge plumes that contain drilling fluids, cuttings, domestic or sanitary wastes, and other waste streams that might contain chemicals.

EPA recognizes that even the perception of contamination could produce an adverse effect by causing hunters to avoid harvesting particular species or to avoid particular harvest areas. Reduction of subsistence harvest or consumption of subsistence resources because of a lack of

confidence in the foods could produce an effect on human health. The discharges of drilling fluids and drill cuttings authorized under the Beaufort and Chukchi general permits could cause a bioaccumulation of metals in benthic communities, and the discharges of non-contact cooling water discharge could cause avoidance behavior in marine mammals because of temperature increases in the immediate area of the discharge. Because both types of discharges could affect subsistence resources or could influence subsistence harvest activities, EPA has included an Environmental Monitoring Program to be conducted before, during, and after drilling activities to monitor and collect operational data at site-specific locations, including collecting sediment data and conduct bioaccumulation studies if drilling fluids and drill cuttings are authorized to be discharged. EPA also required monitoring of the discharge plumes during periods of discharge and observe for potential marine mammal deflection to the maximum extent possible. EPA will also request that the Agency for Toxic Substances and Disease Registry (ATSDR) review the data and reports from the EMP to further evaluate the potential risks associated with exploration discharges at site-specific locations on the communities that rely on marine resources for subsistence.

Criterion 7. Existing or potential recreational and commercial fishing, including finfishing and shellfishing.

Commercial fishing is not authorized within the lease areas within the Areas of Coverage. Subsistence fishing occurs in the nearshore areas of the Beaufort and Chukchi Sea. However, the permits contains effluent limitations that are protective of beneficial uses of the Beaufort Sea, which include aquaculture water supply, seafood processing water supply, industrial water supply, contact and secondary recreation, growth and propagation of fish, shellfish, other aquatic life, and wildlife, and harvesting for consumption of raw mollusks or other raw aquatic life. EPA also applied the same limits in the Chukchi general permit for consistency.

IX. CUMULATIVE IMPACTS

The level of activities in the Arctic, both onshore and offshore, have increased over time. Particularly offshore, activities have increased rapidly and are unlikely to change. Climate change characteristics are also significant factors in potential cumulative impacts. Present and future activities that may have profound implications for cumulative impacts include: oil and gas exploration, development, and production, increased vessel traffic associated with scientific research, recreation and tourism, subsistence activities, large scale community development plans, and climate change.

More information on the cumulative impacts associated with oil and gas activities in the Arctic Ocean can be found in the U.S. Department of Commerce, NOAA, NMFS, Draft Environmental Impact Statement, December 2011, at <http://www.nmfs.noaa.gov/pr/permits/eis/arctic.htm>.

X. DETERMINATION OF POTENTIAL DISPROPORTIONATE OR ADVERSE EFFECTS

Discharges under the proposed Beaufort and Chukchi general permits are not expected to have a disproportionately high and adverse human health or environmental effect on minority or low-income populations living on the North Slope, including coastal communities near the proposed exploratory operations. In making this determination, EPA considered the potential effects of the discharges on the communities, including subsistence areas, based input received by the communities and tribes during early input information gathering, Traditional Knowledge, and through the public process. As discussed above, the ODCEs evaluated ten specific criteria to determine that the Beaufort and Chukchi permits will not cause unreasonable degradation of the marine environment. The definition of “unreasonable degradation” includes significant adverse changes to biological communities and threats to human health, which relate directly to several concerns raised by the Arctic communities. 40 CFR 125.121. As such, several of the ten evaluation criteria for assessing unreasonable degradation are also directly relevant to environmental justice considerations. The ODCEs for the Beaufort and Chukchi general permits offer EPA’s detailed analyses on each of these criteria and overall conclusions regarding impacts to the marine environment.

In particular, the Beaufort and Chukchi ODCEs evaluate the potential for bioaccumulation, pollutant transport, and significant adverse changes in ecosystem diversity, productivity and stability of biological communities in the general permits’ areas of coverage. The ODCEs also evaluate environmentally significant or sensitive areas that are necessary for critical stages of marine organisms, the roles of these areas in the larger biological community and the vulnerability of these areas to potential discharges. The ODCEs further evaluate the potential for loss of esthetic, recreational, scientific and economic values, and impacts to recreational and commercial fishing. Each of these criteria relate directly to concerns raised regarding availability of subsistence resources, potential bioaccumulation and food tainting, human health, and overall species impacts. Overall, based on the analyses in the ODCEs, the exploration discharges authorized by the Beaufort and Chukchi general permits over the five year terms of the permits, will not result in adverse impacts under each of these criteria, as defined by the CWA.

Importantly, the ODCEs also evaluate the threat to human health through the direct physical exposure to discharged pollutants and indirect threats through consumption of aquatic organisms exposed to pollutants discharged under the proposed permits. Human health is directly related to the subsistence practices of native people living in the North Slope. Subsistence areas and related subsistence activities provide food and support cultural and social connections within North Slope communities. EPA solicited and considered the information obtained from residents and participants in the Traditional Knowledge workshops related to these important factors. These factors were a part of the overall evaluation framework of the entire ODCEs and permits development processes. Based on the input received, EPA included provisions, requirements, and restrictions in the permits to ensure impacts would not occur through direct or indirect pathways will not occur.

As a result of this analysis, the Beaufort and Chukchi general permits reflect EPA’s evaluation of threats to subsistence communities on the North Slope. As summarized in Section XI below, several precautionary measures were included in the permits to ensure adverse or disproportionate impacts will not occur as a result of discharges from exploratory drilling

activities. The Beaufort and Chukchi general permits also impose an Environmental Monitoring Plan at each drill site to gather relevant, information about potential effects of the discharges to Alaska's Arctic waters on an ongoing basis, including potential impacts to subsistence resources. The Beaufort and Chukchi general permits also implement existing water pollution prevention and control requirements, including applicable water quality standards, to ensure compliance with applicable CWA requirements including the prevention of unreasonable degradation to the marine environment, as well as the protection of aquatic life. Additionally, under the CWA, EPA has the authority to make modifications or revoke permit coverage if it identifies a basis to conclude that discharges will cause an unreasonable degradation to the marine environment.

Thus, EPA has considered in detail various issues and concerns related to environmental justice and the potential for disproportionate effects on communities and residents engaged in subsistence activities summarized in Section VII, above. Based on EPA's analysis and the permit conditions described above, each described in more detail in the ODCs, EPA has determined that the discharges authorized by the general permits will not cause unreasonable degradation of the marine environment, as defined by the CWA. For similar reasons, EPA concludes that that there will be no disproportionately high and adverse human health or environmental effects on minority or low-income populations residing on the North Slope.

EPA intends to continue communication and coordination with North Slope and Northwest Arctic communities during implementation of the Beaufort and Chukchi general permits. EPA will post all Notice of Intent (NOI) documentation, Environmental Monitoring Program plans of study and reports, environmental studies data, and data from discharge monitoring reports submitted by operators and final EPA general permit decisions, authorizations, and analyses on the Region 10 website. These documents will be available to the public.

XI. PERMIT REQUIREMENTS AND CONDITIONS

EPA evaluated and incorporated the communities' concerns, observations and Traditional Knowledge information in the development of the ODCEs and general permits. The following are examples of the general permits' terms and conditions that address the issues and concerns resulting, in part, from EPA's community outreach efforts:

- Eliminate the authorization to discharge non-aqueous drilling fluids and associated drill cuttings (i.e., only water-based drilling fluids and cuttings are authorized);
- Prohibit the discharges of water-based drilling fluids and drill cuttings under the Beaufort general permit during Nuiqsut and Kaktovik bowhead hunting activities in the Beaufort Sea.
- Require an alternatives analysis before authorization is granted for discharge of water-based drilling fluids and drill cuttings, sanitary, and domestic wastes to stable ice in the Beaufort Sea area of coverage; discharges to stable ice in the Chukchi Sea are prohibited.
- Require an inventory of chemicals added to each wastestream, where in the drilling process they are used, and establish limits on chemical additive concentrations;
- Require an Environmental Monitoring Plan at each drilling site during four phases of the drilling activity, i.e., pre-, during, immediately after, and 15 months after drilling ceases. The EMP must include:
 - completion of an initial drilling site assessment, including a physical sea bottom survey, to ensure the exploratory facility is not located or anchored in a sensitive biological area or habitat;
 - assessment of the benthic community impacts and conduct bioaccumulation studies, if the permittee is authorized to discharge water-based drilling fluids and drill cuttings (Discharge 001), to evaluate potential food chain effects from the discharges; and
 - assessment of the plumes in the vicinity of the discharges and collect observations of potential marine mammal deflection during periods discharge of cooling water and water-based drilling fluids and drill cuttings.
- Screen for effluent toxicity of certain waste streams and conduct whole effluent toxicity (WET) monitoring for those waste streams if: (1) the initial screening indicates the potential for toxicity, or once per well, if the discharges exceed 10,000 gallons in a 24-hour period and if chemicals are used;
- Limit drilling to 5 wells per lease block; and
- Prohibit all discharges in areas with water depths of less than 5 meters.

To protect the regional biological communities, the Beaufort general permit prohibits discharges of water-based drilling fluids and drill cuttings in the following areas:

Area Restrictions:

- in areas where the water depth is less than 5 meters, as measured from mean lower low water (MLLW);
- within 1000 meters of the Stefansson Sound Boulder Patch (near the mouth of the Sagavanirktok River) or between individual Boulder Patches where the distance between those patches is greater than 2000 meters but less than 5000 meters; and
- within State waters unless a zone of deposit (ZOD) has been authorized for the discharge by the State of Alaska.

Seasonal Restrictions:

- Open-Water, Unstable, or Broken Ice Restrictions.
 - ❖ at depths greater than 1 meter below the surface of the receiving water between the 5 and 20 meters isobaths as measured from the MLLW during open-water conditions;
 - ❖ within 1000 meters of river mouths or deltas; and
 - ❖ shoreward of 20 meter isobath as measured from the MLLW during unstable or broken ice conditions except when the discharge is prediluted to a 9:1 ratio of seawater to drilling fluids and cuttings.
- Stable Ice Restrictions.
 - ❖ below the ice, and must avoid to the maximum extent possible areas of sea ice cracking or major stress fracturing;
 - ❖ below the ice within State waters unless a ZOD has been authorized for the discharge by the State of Alaska and the ZOD authorization is incorporated into the discharge authorization letter; and/or
 - ❖ onto any stable ice surface unless authorized in writing.

The Chukchi general permit contains the following seasonal restrictions on the discharges of drilling fluids and drill cuttings:

- Open-water restrictions. No discharge at depths greater than 1 meter below the surface of the receiving water between 5 and 20 meters isobaths during open water conditions.
- Unstable or broken ice restrictions. No discharge shoreward of 20 meter isobaths as measured from the MLLW during unstable or broken ice conditions

except when the discharge is prediluted to a 9:1 ratio of seawater to drilling fluids and cuttings.

Both the Beaufort and Chukchi general permits contain limitations, sampling, and monitoring requirements specifically for each discharge. Please refer to the permit documents and the ODCs for each permit for additional information. Project documents can be viewed and downloaded at: <http://yosemite.epa.gov/r10/water.nsf/npdes+permits/arctic-gp>.

Finally, throughout the permit development process, EPA maintained regular communication with the North Slope communities and stakeholders through quarterly update newsletters, in-person presentations, workshops, and meetings. During these proceedings, EPA heard concerns about EPA follow-up and continued involvement, including compliance monitoring, once the permits are issued.

EPA acknowledges the communities' concerns that a comprehensive compliance and enforcement program is a critical component of a robust and effective NPDES permitting program. EPA is working to enhance transparency and public accountability regarding compliance and enforcement performance for all regulated facilities, including oil and gas exploration facilities. For example, EPA is implementing electronic reporting of compliance data as a means to improve the ability of communities and the public to monitor compliance with NPDES permits. Interested persons can also find compliance and enforcement information about regulated facilities on EPA's Enforcement and Compliance History Online (ECHO) website at <http://www.epa-echo.gov/echo/>. The ECHO system provides for fast online searches of EPA data for regulated facilities that integrate self-reporting, inspection, violation and enforcement data for the NPDES permit program and other federal environmental laws. In addition to these tools, EPA will continue to look for comprehensive and effective ways to inform the communities about the compliance status of facilities permitted under the Beaufort and Chukchi general permits.

XII. CONCLUSIONS

This EJ analysis is developed by EPA in compliance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and related memoranda and directives. Through the process of developing the proposed Beaufort and Chukchi general permits, EPA afforded persons and communities fair treatment and meaningful involvement. The input and substantial concerns received by EPA were considered and where allowable by law, EPA incorporated as permit terms and conditions to achieve environmental protection for all communities. The Beaufort and Chukchi general permits will ensure that disproportionate impacts to the North Slope and Northwest Arctic communities will not occur. EPA's continued presence will also ensure that communities will remain involved and informed after the general permits take effect.

XIII. REFERENCES

Adler A, Boyko EJ, Shraer CD, Murphy NJ. 1994. Lower prevalence of impaired glucose tolerance and diabetes associated with daily seal oil or salmon consumption among Alaska Natives. *Diabetes Care* 17:1498-1501.

Adler A, Boyko EJ, Shraer CD, Murphy NJ. 1996. Negative Association between traditional physical activities and the prevalence of glucose intolerance in Alaska Natives. *Journal of Diabetic Medicine* 13:555-60.

Alaska Dept. of Fish and Game (ADF&G). 2010. Subsistence in Alaska: A Year 2010 Update. Anchorage, AK: ADF&G. Available from: http://www.adfg.alaska.gov/static/home/library/pdfs/subsistence/subsistence_overview2010.pdf

Alaska Division of Public Health [Internet]. 2005. (ADPH). Food Insecurity in Alaska. *Chronicles* 1(4):1-8. [cited 2011 May 4]. Available from: <http://www.hss.state.ak.us/dph/chronic/pubs/assets/ChroniclesV1-4.pdf>.

Arctic Climate Impact Assessment. [Internet]. (ACIA). 2004. Arctic Climate Impact Assessment: Impacts of a Warming Arctic. Cambridge University Press; 2004 [cited 2011 May 4]. Available from: <http://www.acia.uaf.edu/>

Bash, J., C. Berman, and S. Bolton. 2001. *Effects of Turbidity and Suspended Solids on Salmonids*. University of Washington, Center for Streamside Studies, Seattle.

Battelle Memorial Institute, Exponent, Florida Institute of Technology, and Neff & Associates. 2010. *Environmental studies in the Chukchi Sea 2008: Chemical characterization, Volume 1*. Prepared by Battelle Memorial Institute, Exponent, Florida Institute of Technology and Neff & Associates for Conoco Phillips and Shell Exploration and Production. August 2010.

Bersamin A, Luick BR. 2007. Nutrient intakes are associated with adherence to a traditional diet among Yup'ik Eskimos living in remote Alaska Native Communities: The CNHR Study. *International Journal of Circumpolar Health*. 66(1):62-70.

Bersamin A, Luick BR, Ruppert E, Stern JS, Zidenberg-Cherr S. 2006. Diet quality among Yup'ik Eskimos living in rural communities is low: the Center for Alaska Native Health Research Pilot Study. *J Am Diet Assoc*. 106:1055-63.

Bersamin A, Luick BR, King IB, Stern JS, Zidenberg-Cherr S. 2008. Westernizing diets influence fat intake, red blood cell fatty acid composition, and health in remote Alaskan Native communities in the center for Alaska Native health study. *J Am Diet Assoc*. 108:266-73.

Bjerregaard P, Jorgensen ME, Borch-Johnsen K. 2004. Serum lipids of Greenland Inuit in relation to

Inuit genetic heritage, westernization and migration. *Atherosclerosis* 174:391-398.

Bjerregaard P, Young TK, Dewailly E, Ebbesson SO. 2005. Review Article: Indigenous health in the Arctic: an overview of the circumpolar Inuit population. *Scand J Public Health* 33: 241-242.

Bureau of Land Management. [Internet]. 2005. Northeast National Petroleum Reserve -Alaska Final Amended Integrated Activity Plan/Environmental Impact Statement. Available from: http://www.blm.gov/ak/st/en/prog/planning/npra_general/ne_npra/ne_npra_feis.html

Brower, Jr., W.A., R.G. Baldwin, Jr. C.N. Williams, J.L. Wise, and L.D. Leslie., 1988. *Climatic Atlas of the Outer Continental Shelf Waters and Coastal Regions of Alaska, Vol. I, Gulf of Alaska*. Vol. I, Gulf of Alaska. Document ID: NAVAIR 50-1C-551; MMS 87-0011. Asheville, NC and Anchorage, AK: USDOD, NOCD; USDO, MMS, Alaska OCS Region; and USDOC, NOAA, NOS, 530 pp.

Brubaker M, Berner J, Bell J, Warren J, Rolin A. [Internet]. 2010. Climate Change in Point Hope, Alaska: Strategies for Community Health. ANTHC Center for Climate and Health [cited 2011 May 4]. Available from: <http://www.anthc.org/chs/ces/climate/climateandhealthreports.cfm>.

Brubaker M, Berner J, Bell J, Warren J. [Internet]. 2011. Climate Change in Kivalina, Alaska: Strategies for Community Health. ANTHC Center for Climate and Health [cited 2011 May 4]. Available from: <http://www.anthc.org/chs/ces/climate/climateandhealthreports.cfm>.

Canadian Environmental Assessment Agency. [Internet]. (CEAA). 2010. Report of the Federal Review Panel Established by the Minister of the Environment: Taseko Mines Limited's Prosperity Gold-Copper Mine Project. Ottawa, Ontario [cited 2011 May 4]. Available from: <http://publications.gc.ca/site/eng/371768/publication.html>.

Circumpolar Research Associates. 2010. 2010 North Slope Borough Census and Economic Profile, Health Section. Health data analyzed by McAninch J, Northern Health Impact Resource Group. Provided by NSB Department of Health and Social Services, North Slope Borough, Alaska.

Currie, D.R., L.R. Isaacs. 2005. Impact of exploratory offshore drilling on benthic communities in the Minerva gas fields, Port Campbell, Australia. *Marine Environmental Research* 59 (2005):217-233.

Curtis T, Kvernmo S, Bjerregaard P. 2005. Changing Living Conditions, Lifestyle and Health. *Int J Circumpolar Health* 64:442-450.

Ebbesson SO, Ebbesson L, Go O, Kennish J, Yeh J. 1999. Diabetes is related to fatty acid imbalance in Eskimos. *Int J Circumpolar Health* 58 (2):108-119.

Goldsmith SO, Angvik J, Howe L, Hill A, Leask L. [Internet]. 2004. The Status of Alaska Natives Report 2004 Institute of Social and Economic Research, University of Alaska Anchorage [cited 2011 May 4]. Available from: <http://www.iser.uaa.alaska.edu/Home/ResearchAreas/statusaknatives.htm>.

Hicks, J. and P. Bjerregaard. 2006. The Transition from the Historical Inuit Suicide Pattern to the Present Inuit Suicide Pattern. Accessed online on Nov. 13, 2006, at <http://www.inchr.org/Doc/April2006/Hicks-suicide.pdf>

Institute for Social and Economic Research. [Internet]. (ISER). 2011. Undated. Alaska Traditional Knowledge and Native Foods Database. University of Alaska. Available from: <http://www.nativeknowledge.org/db/files/tp191.htm>

Joyce A. [Internet]. 2008. Risk and Opportunity in British Columbia Shellfisheries: The Role of Limited Property Rights in Aquaculture Development. University of British Columbia, Vancouver, British Columbia [cited 2011 May 4]. Available from: <https://circle.ubc.ca/handle/2429/7569>.

Kuhnlein H, Receveur O. 1996. Dietary Change and Traditional Food Systems of Indigenous Peoples. *Annu Rev Nutr* 16:417-442.

Loring PA, Duffy LK, Murray MS. 2010. A risk-benefit analysis of wild fish consumption for various species in Alaska reveals shortcomings in data and monitoring needs. *Science of the Total Environment* 408:4532-4541.

MacLean E. 1998. In: *Subsistence: An Alaskan Way of Life*. Alaska Federation of Natives, Anchorage, AK.

McAninch J, Northern Health Impact Resource Group. 2010. North Slope Borough Baseline Community Health Analysis. In-progress draft report, NSB Department of Health and Social Services, North Slope Borough, Alaska.

Michie P. 1979. Alaskan Natives: Eskimos and bowhead whales: an inquiry into cultural and environmental values that clash in courts of law. *American Indian Law Review*. Vol 7:79-115.

Mineral Management Service (MMS). 2008. Beaufort Sea and Chukchi Sea Planning Areas, Oil and Gas Lease Sales 209, 212, 217, and 221, Draft Environmental Impact Statement: U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region, MMS 2008-055, November.

Murphy NJ, Schraer CD, Thiele MC, Boyko EJ, Bulkow LR, Doty BJ, Lanier AP. 1995. Dietary change and Obesity Associated with Glucose Intolerance in Alaska Natives. *Journal of the American Dietetic Association* 95:676-682.

Nelson, H.C, R.L. Phillips, J. McRea Jr., J.H. Barber Jr., M.W. McLaughlin, and J.L. Chin. 1994. Gray Whale and Pacific Walrus Benthic Feeding Grounds and Sea Floor Interaction in the Chukchi Sea. Technical Report for Minerals Management Service / IA No, 14157. OCS Study MMS 93-0042.

North Slope Borough (NSB). 2004. North Slope Borough 2003 economic and census report Volume IX. North Slope Borough Department of Planning and Community Services. Barrow.

National Marine Fisheries Service. (NMFS). NMFS. 2008b. Final environmental impact statement for issuing annual quotas to the Alaska Eskimo Whaling Commission for the subsistence hunt on bowhead whales for the years 2008 through 2012. National Marine Fisheries Service, Alaska Region, Juneau, AK and Seattle, WA.

NMFS. December 2011, United States Department of Commerce, National Oceanic and Atmospheric Administration National Marine Fisheries Service, Office of Protected Resources, "Effects of Oil and Gas Activities in the Arctic Ocean" Draft Environmental Impact Statement. Available at: http://www.nmfs.noaa.gov/pr/pdfs/permits/arctic_deis_volume3.pdf (update August 2012)

Parnell S, Hogan B, Hurlburt W. [Internet]. 2008. Health Risks in Alaska Among Adults: Alaska Behavioral Risk Factor Survey 2008 Annual Report. Behavioral Risk Factor Surveillance. State of Alaska, Department of Health and Social Services, Juneau, Alaska [cited 2011 May 4]. Available from: <http://www.hss.state.ak.us/dph/chronic/hsl/brfss/publications.htm>.

Poppel B, Kruse J, Duhaime G, Abryutina L. [Internet]. 2007. Survey of Living Conditions in the Arctic (SLiCA) Results. Anchorage: Institute of Social and Economic Research, University of Alaska Anchorage [cited 2011 May 4]. Available from: <http://www.arcticlivingconditions.org/>

Reynolds JE, Wetzel DL and O'Hara TM. 2006. Human health implications of omega-3 and omega-6 fatty acids in blubber of the bowhead whale. *Arctic* 20(59):155-164.

Shepard, R. and A. Rode. 1996. *The Health Consequences of Modernization: Evidence from Circumpolar Peoples*. Cambridge, UK: Cambridge University Press.

Stoker SW, Krupnik II. 1993. Subsistence whaling. Pp. 579-629 In. Burns JJ, Montague JJ, Cowles CJ (eds.). *The Bowhead Whale*. Soc. Mar. Mammal., Spec. Publ. No. 2.

Stephen R. Braund & Associates. 2011. *Chukchi and Beaufort Seas National Pollutant Discharge Elimination System Exploration General Permits Reissuance. Report of Traditional Knowledge Workshops – Point Lay, Barrow, Nuiqsut and Kaktovik*. Prepared for Tetra Tech and U.S. Environmental Protection Agency, Region 10. March 11, 2011.

Trefry, J.H., and R.P. Trocine. 2009. *Chemical assessment in Camden Bay (Sivulliq Prospect and Hammerhead Drill Site). Beaufort Sea, Alaska*. Prepared for Shell Exploration and Production Company, July 2009.

Wernham, A. (2007). Inupiat Health and Proposed Alaskan Oil Development: Results of the First Integrated Health Impact Assessment/Environmental Impact Statement of Proposed Oil Development on Alaska's North Slope. *EcoHealth* 4:500-513.