Subsurface Resources

The North Slope is one of the most subsurface resource rich regions in Alaska, the United States, and North America. The North Slope is the focus of many large- and mid-scale oil and gas interests. Since oil samples were collected by the U.S. Navy in the Colville River area in the late 1800s, to the time that commercial oil and gas exploration began during the 1950s, interest in the oil and gas resources of the North Slope has increased significantly. The discovery of North America's largest conventional oil field in Prudhoe Bay in 1968 and the construction of the Trans-Alaska Pipeline System (TAPS) in 1974 had a significant and continuing impact on the State's growth, development and economy. Since 1959, the oil industry has contributed $157 billion directly to the Alaska economy, averaging roughly $6 billion annually (AOGA 2018).

Oil and Gas Resources

The North Slope is a rich hydrocarbon resource with great exploration and development potential. Oil and gas activities on the North Slope have occurred steadily since commercial exploration began in the 1950s and development began during the 1970s. The Prudhoe Bay oil field was discovered in 1968 and has since been deemed the largest conventional oil field in both the United States and North America. Additionally, Prudhoe Bay is one of the largest single natural gas concentrations in North America; it is probable that this resource may become economically feasible to develop. Oil production in Prudhoe Bay began concurrent with the completion of the Trans-Alaska Pipeline System in 1977. Exploration success in finding super giant and giant oil fields on the North Slope have a history of igniting a flurry of drilling activity to find analogous play types (Gregersen and Brown, 2019a and 2019b). In the year following the discovery of Prudhoe Bay, more exploration wells were drilled than any other year in north Alaska. Some of the largest producing oil fields discovered after Prudhoe Bay were the Kuparuk River field in1969, Endicott field in 1978, Point McIntyre field in 1989, and Alpine field in 1994. Continued exploration and development activities are responsible for numerous other developed and undeveloped oil and gas fields on the North Slope. Forty-five producing oil pools and four gas pools currently exist in north Alaska. As of the date of this area plan, ADNR actively manages thirteen oil and gas units on the North Slope. There are thirty-nine participating areas with these units representing individual hydrocarbon reservoirs. New oil and gas resources are continually being discovered through exploratory endeavors such as most recently announced oil accumulations within the Nanushuk Formation in the National Petroleum Reserve Alaska (NPR-A) and the western portion of the State of Alaska's Oil and Gas North Slope Areawide Lease Sale region. It is likely that the area of development, including infrastructure, will expand significantly in the future.

Coal Resources

Interest in coal resources has occurred since the late 1700s with commercial development in Alaska beginning in 1855. The North Slope is one of the most coal rich areas in Alaska with somewhere between 3.5 and 4 trillion tons of high quality, locatable bituminous and subbituminous coal (Stricker et al. 2011, 4; ASRC 2013). The North Slope coal province

extends 300 miles east from the Chukchi Sea to the Canada border and is composed of coal deposits from the Kekiktuk Formation, the Nanushuk Formation, the Prince Creek Formation, and the Sagavanirktok Formation (Stricker et al. 2011, 4; ASRC 2013). Sparsely distributed coal deposits from the Kekiktuk Formation are found near Cape Lisburne, throughout the eastern Brooks Range, and in NPR-A. Coal deposits from the Nanushuk and Prince Creek Formations are found within the Chukchi Basin and the Brooks Range, as well as the area lying between the Brooks Range and the Barrow Arch called the Colville Basin. Nanushuk Formation deposits are thick within the western portion of the North Slope coal province and gradually thins towards the eastern portion of the province. The remainder of the Colville Basin is made up of coal deposits from the Sagavanirktok Formation (Stricker et al. 2011, 4).

Within the NSAP boundary, high value coal deposits can be found on State owned and/or State selected lands predominantly in the Central Slope and Brooks Foothills regions. These coal beds have high commercial and economic value due to their thermal and coking potential. Although the coal deposits within the NSAP boundary are considered high value, coal is not considered a significant resource in the planning area, and although it is possible that interest may increase in the future, at this time there is little interest in extracting these resources at this time. Coal exploration, development, and extraction are governed by a mix of statutory (AS 38.05.150 and AS 27.21.010-.260) and administrative (11 AAC 85 and 11 AAC 90) requirements, which must be followed for exploration and for subsequent extraction to be authorized.

Locatable Minerals

Although the development of locatable mineral has been an important part of the settlement and economy of Alaska, there has been minimal interest and little exploration for locatable minerals in this area of the state. To date, no major mining or placer mine operations have taken place within the planning area.

Goals

Opportunities for Mineral Exploration and Development. Provide opportunities for mineral exploration and development through state land management.

Job Opportunities and Economic Growth. Contribute to Alaska's economy by making subsurface resources available for development, which will provide job opportunities and stimulate economic growth.

Environmental Quality and Cultural Values. When developing subsurface resources, protect the integrity of the environment and affected cultural features to the extent feasible and prudent.

Objectives and Management Guidelines

Objective A. Where deemed appropriate, provide opportunities for mineral exploration and development to the maximum extent practicable without jeopardizing other resources.

- **Guideline A-1.** *Mineral Exploration*. By statute, exploration for locatable minerals is allowed on all state lands. A land use permit is required under most circumstances. Hand prospecting and exploration activities generally do not require a permit. ADNR may determine that some forms of access will not be allowed in specific areas to avoid resource damage.
- **Guideline A-2.** *Open to Mineral Location.* By statute, all state lands are open to mineral entry unless specifically closed. Where an area is open to mineral location, a miner has the right to stake a mining location regardless of the surface use designation or classification. Any adverse effects of mining on surface resources or uses will be managed through compliance with state laws and regulations and the management guidelines in this plan. Except for areas designated Settlement, Public Facilities, or Water Resources, all other state land is considered appropriate for mineral exploration and development consistent with applicable state law, administrative regulation, and management intent and guidelines. Areas designated Settlement, Public Facilities, or Water Resources may be appropriate for mining activity but will likely require the use of stipulations to avoid or mitigate impacts to important public facilities, settlement areas, and large wetland complexes. Reclamation activities are directed by the Mining Reclamation Act (AS 27.19) and regulations (11 AAC 97).
- **Guideline A-3.** *Mineral Closures.* The decision to apply mineral location closures will be made by the Commissioner of ADNR within the standards set by Alaska Statutes. AS 38.05.185(a) requires that the Commissioner determines that mining is incompatible with a significant surface use before an area can be closed to mining. The same section of the statute requires that the Commissioner determine that a potential use conflict exists before imposing leasing requirements for development of locatable minerals. The fact that an area is closed to new mineral location will not be cause for denying access across state land. Mineral closures do not affect valid existing mineral locations.
- **Guideline A-4.** *Lands Closed to Mineral Entry.* State mining law stipulates that mining must be determined to be in conflict with significant surface uses before an area can be closed to mineral entry (AS 38.05.300). Since little potential conflict is expected to exist, this plan does not create any new mineral closing orders, although the current mineral closing orders will be retained since these occur within streams and land disposal areas. The management intent section of parcels designated Settlement should be consulted to determine if a management unit is affected by the leasehold location order recommendation. To determine the location of areas closed to mineral entry in the planning area consult the ADNR Alaska Mapper, available on-line at: http://dnr.alaska.gov/mapper.

- **Guideline A-5.** *Leasable Mineral Development.* State land within the planning area may be leased or opened for mineral or coal exploration and development if the Department determines it is in the best interest of the state to enter into a lease for such resources. Before authorization of a lease, the Department will determine if the surface values are significant enough to warrant restricting surface entry. The surface impacts of proposed underground mining shall be fully considered as part of the permitting process.
- **Guideline A-6.** All coal activities shall be completed in compliance with all applicable provisions provided by 11 AAC 90 and AS 27.2: The Alaska Surface Coal Mining Control and Reclamation Act.
- **Guideline A-7.** The ADNR Mining Section shall be consulted when authorizing any subsurface coal activities.
- **Guideline A-8.** *Oil and Gas Resources*. Significant oil and gas resources are present within the planning area. The planning and decision-making processes for oil, gas and geothermal resource allocation and development follow their own section of the Alaska Statutes (AS 38.05.125 through AS 38.05.184) as well as AS 38.05.035. As noted above, these processes are not included as part of ADNR area plans. State land, with few exceptions, is subject to oil and gas exploration and development, either through areawide leasing under AS 38.05.180 or by exploration licensing under AS 38.05.131. In addition, geothermal exploration and development may occur under AS 38.05.181. For this reason, the Plan does not make any allocation or development decisions regarding these resources. All decisions regarding oil, gas and geothermal resources are subject to ADNR's existing oil, gas and geothermal permitting, licensing and leasing processes.
    1. Oil and gas sales are not subject to the regional planning process; instead they follow the planning process identified under AS 38.05.180. The land use classifications of the Plan are multiple use in character and do not preclude oil and gas development.
    2. It should be noted that mineral closing orders under AS 38.05.185 do not apply to oil and gas exploration and leasing, nor do they preclude reasonable surface access to these resources. However, rights reserved under AS 38.05.125 may not be exercised until provision is made for payment for all damages sustained by the landowner (AS 38.05.130).
    3. Geophysical exploration permits issued under 11 AAC 96 will conform to the maximum extent possible with the management guidelines in the applicable plans.
- **Guideline A-9.** *Offshore Prospecting Permits (OPP).* Under AS 38.05.250, an exclusive right to prospect for deposits of minerals offshore may be granted through authorizations issued by ADNR. ADNR determines what areas will be offered for offshore prospecting. If workable mineral deposits are found offshore, the permittee must apply for a lease in order to develop the mineral deposit. A best interest finding

will be used to determine whether mining can be made a conforming use and, if mitigation is possible, determine the appropriate mitigation measures needed to protect fish and wildlife resources and values.

Objective B. When subsurface exploration and development is permitted, the protection, management, and enhancement of the environment, fish and wildlife species and habitat, and cultural values, is to be considered to the maximum extent practicable.

- **Guideline B-1.** To protect environmental and cultural values, ADNR staff shall coordinate applications for subsurface resource exploration and development with appropriate ADF&G, ADEC, and OHA staff.
- **Guideline B-2.** To avoid potential relocation costs due to climate change induced sea-level rise and diminished winter sea ice, minimize placement of infrastructure in coastal areas susceptible to sea-level rise, to the extent practicable.
- **Guideline B-3.** *Reclamation of Mined Land.* Reclamation activities are directed by the Mining Reclamation Act (AS 27.19) and regulations (11 AAC 97). The reclamation of mining operations, including placer mining, must meet the reclamation standards given in AS 27.19. The reclamation law provides a standard that miners must meet during and after mining. The mining operation must be conducted in a manner that prevents unnecessary and undue degradation of land and water resources and requires that reclamation occur "contemporaneously" with the mining operation. 11 AAC 97 (Mining Reclamation) details the specific requirements that must be followed. In designated habitat areas, annual reclamation will be required concurrent with mining, and will be required to restore degraded fish and wildlife habitat and prevent hazards to navigation.
- **Guideline B-4.** *Mining in Fish and Wildlife Habitat.* A permit for mining in or adjacent to designated fish habitat will require as stipulations of the permit any necessary measures that will allow the operation to meet water quality standards, statutes, and regulations governing the protection of fish, such as: levees, berms, seasonal restrictions, and settling ponds. Mining in fish habitat requires permits from ADEC and ADF&G. ADF&G permits are not required in marine waters or estuarine areas outside of the intertidal channel of specified anadromous fish streams. The intertidal channel is that portion of the bed and banks below the mean high-water level. However, a Special Area Permit issued by ADF&G is required if the project is located within a legislatively designated area, including uplands, estuaries, or tidelands. Waterbodies listed within the ADF&G Anadromous Waters Catalog (AWC) represent a fraction of those actually used by anadromous species, and documentation of resident fish streams is not centralized. Therefore, ADNR shall consult with ADF&G prior to the issuance of an authorization where stream channels are present and the likelihood of anadromous or high value resident fish is high, at least seasonally.
- **Guideline B-5.** *Mining in Areas Co-Designated Minerals and Habitat.* If this co-designation is used, it means that either high mineral and habitat values exist within

all or portions of the management unit. Mineral exploration and development are considered appropriate uses within units affected by this co-designation, although there may be sites within a management unit that may not be appropriate for mineral development. Determinations of this type are to be made as part of the regulatory/permitting processes related to the authorization of these uses. Although mineral exploration and development within the planning area are considered appropriate or may be appropriate with stipulations, mining or authorizations granted by ADNR shall carefully consider the effects of a proposed development on the area's fish and wildlife and their associated habitats within the management unit, and the short- and long-term effects on human access to those resources. Those habitats considered significant within a management unit are identified in the Resource Allocation Table in Chapter 3. Some of these habitat areas are used on a seasonal basis and activities that occur at other times of the year than these periods may be appropriate. Consult the Fish and Wildlife Habitat section of this chapter for the specific periods that these seasonal use periods occur. In all instances, consult ADF&G prior to issuing an authorization for mineral or coal exploration or development.

- **Guideline B-6.** Although mining is considered an appropriate use in areas designated Mineral or Mineral/Habitat and in areas designated General Use, there may be sites within a management unit that may not be appropriate for coal development or mining. Determinations of this type are to be made as part of the regulatory review/permitting processes related to the authorizations of these activities. It may also be appropriate in areas with other designations, except for areas designated Settlement. Although mining within the aforementioned areas is considered appropriate or may be appropriate with stipulations, mining authorizations granted by ADNR shall carefully consider the effects of a proposed mining operation on Central Arctic Herd (CAH), Western Arctic Caribou Herd, and Teshekpuk Caribou Herd (TCH) activities. CAH and TCH activities often only affect an area on a seasonal basis. Consult the Resource Allocation Table for the specific periods that such use may occur and the types of use that may be present. ADF&G shall be consulted prior to issuing an authorization for mining exploration or development.

Objective C. *Other Guidelines affecting Subsurface Resources.* Nearly all of the resource guidelines found within Chapter 2 either directly or indirectly affect subsurface resources in the planning area. The most commonly affected resource sections include Public Access, Transportation and Infrastructure, Water Resources, Subsistence and Harvest, Fish and Wildlife Habitat, and Recreation and Tourism; however other resources addressed in this chapter's sections should also be considered.