2. EXPLANATION. This is a corrective practice. Abandoned mined lands are frequently erosive, bare of vegetation, or are exuding toxic substances and/or sediment into nearby streams. Some sites may pose a threat to public health or safety. Reclamation plans for reducing impacts to soil and water resources are needed for each abandoned mine. Specific practices may vary from site to site, ranging from simple revegetation or reshaping with earth-moving equipment, to restoration to pre-disturbance conditions.

It is important that the site be revegetated with plant species that accomplish the purposes of reclamation. Species may be native or introduced and may be both live plants or seed. Fertility of soil and spoil materials and climate will affect species selection and survival, and soil amendment recommendations.

18 - FISH AND WILDLIFE HABITAT MANAGEMENT

The Forest Service in Region 10 has been actively involved in implementing habitat improvement projects for both fish and wildlife.

1. Fisheries. Fish habitat improvement projects in the Region can be split into two major categories:

a. Development of Groundwater-fed Spawning and Rearing Habitat Areas. These projects are focused on specific salmon species, and generally involve excavation of permeable gravels in shallow groundwater areas, resulting in new groundwater-fed streams and ponds. The projects are often coordinated with gravel extraction for other purposes such as road construction.

b. Projects to improve existing spawning and rearing habitat, or to improve accessibility to unavailable habitat. These projects generally focus on salmon, but some are directed to resident salmonids. The projects cover a wide spectrum of activities including, but not limited to: instream placement of fish ladders; physically removing stream barriers such as small waterfalls; placement of steps in steep stream segments to improve access; placement of large woody debris or boulders into streams to improve habitat characteristics; alteration of channel configuration to improve habitat; construction of small dams to increase depth in shallow ponds used for rearing; channel bank reinforcement on streams with eroding banks; and fertilization of lakes with very low nutrient values.

Although all the project types listed above have the potential to benefit fish habitat (and therefore quantities of fish available), the projects should be accomplished in a way that will minimize erosion and degradation of water quality.

2. Wildlife. Wildlife habitat improvement projects will be accomplished in a manner that maintains or improves water quality. The majority of wildlife habitat improvement projects in Region 10 are focused on either big game species (such as moose, Sitka black-tailed deer, Dall sheep, and mountain goats) or waterfowl. Examples of projects are as follows:

a. Projects for improvement of big game habitat include: prescribed burns, plantings or seeding of appropriate browse species, type conversions, thinning, range improvement, and fertilization.

b. Projects for improvement of waterfowl habitat include: creation of waterfowl ponds through excavation, blasting, damming, or flooding of dewatered areas; development of outflow regulation on ponds to adjust pond depth; and development of nesting islands and nesting boxes.

18.1 – PRACTICE: Fish and Wildlife Habitat Improvement Planning

1. OBJECTIVE. To incorporate soil and water resource considerations into planning for fish and wildlife improvement projects.

2. EXPLANATION. This is an administrative practice. Fish and wildlife habitat improvement projects are developed through an interdisciplinary process. The environmental analysis evaluates the potential for impacts and cumulative effects on soil and water resources, as needed. The environmental analysis: (1) considers how to minimize potential erosion and/or water quality effects during and following construction or implementation of the project; (2) includes mitigation of effects for project sites where impacts are unavoidable; and (3) identifies environmentally sensitive areas where impacts from proposed changes cannot be mitigated to conform to standards.

3. IMPLEMENTATION. During the NEPA process, an interdisciplinary team will evaluate watershed and streamflow characteristics and estimate the response of soil and water resources to proposed fish and wildlife improvement projects. Many instream projects require detailed hydrologic evaluation, including peak flow and low flow estimates. The NEPA process identifies mitigating measures needed to protect soil and water resources. Project work will include provisions to meet water quality, soils, and other resource protection requirements as directed by the environmental analysis.

4. REFERENCES. FSM 2620 and 2630; individual Forest Plans; Federal Clean Water Act, Federal Water Pollution Control Act (Section 404), Coastal Zone Management Act (Public Law 92-583), Alaska Coastal Management Program (6 AAC 50.010).

18.2 – PRACTICE: Development of Groundwater-fed Spawning and Rearing Habitat from Gravel Extraction and Other Sites

1. OBJECTIVE. To minimize sediment production from gravel extraction and/or ground reshaping during and following construction of groundwater-fed spawning and rearing streams and ponds.

2. EXPLANATION. This is an administrative and preventive practice. Development of groundwater-fed streams and ponds involves excavation below the water table and may include connecting the newly developed streams and ponds with an existing anadromous fish stream. During construction, isolating the new groundwater system from the existing stream minimizes

sediment production. The isolated groundwater system then serves as its own sedimentation basin until construction is completed. The last step of construction is to pull the gravel plug between the groundwater system and the existing stream. Sediment production related to construction activities can be further limited by placement of temporary settlement basins, or filters such as hay bales and or filter fabric. Stabilization of pond and channel slopes may include riprap, mulching, seeding, and/or planting (for example: willows, alders). Ponds developed for waterfowl habitat are, in some cases, unconnected to nearby streams. Such ponds generally do not pose water quality problems for adjacent stream systems. If these ponds overspill during heavy rainfall events, then a protected overspill channel should be provided.

Excavation of groundwater-fed channels and ponds should be limited to areas out of the active floodplain. Flooding of these channel and pond projects not only has the potential to divert the adjacent natural stream channel and increase the sediment load, but may also cause physical damage to the channels and ponds themselves. If flooding impacts are expected on a project, flood protection measures, such as berms or dikes, should be provided. These protection measures should be designed and constructed to withstand major flooding events from adjacent streams.

3. IMPLEMENTATION. Project feasibility, location, suitability, and the limits for disturbance and sediment production will be identified through the NEPA process using an interdisciplinary approach. Detailed mitigative measures are developed by the design engineer using criteria from the environmental analysis and through consultation with technical resource staffs when needed. Development of groundwater-fed streams and ponds will be coordinated with appropriate State Agencies.

4. REFERENCES. FSM 2511, 2505.1, and 2630; R-10 FSH 2609.24; Clean Water Act (Public Law 95-217, Section 404), Coastal Zone Management Act (Public Law 92-583), Alaska Coastal Management Program (6 AAC 50.010); Alaska Water Quality Standard Regulations (18 AAC 70).

18.3 – PRACTICE: In-Channel Excavation or Disturbance During Fish and Wildlife Habitat Improvement Projects

1. OBJECTIVE. To minimize stream channel disturbances and related sediment production from fish and wildlife habitat improvement projects through identification of, and compliance with, project specifications.

2. EXPLANATION. During development of instream fish or wildlife habitat improvement projects, it may be necessary for construction equipment to cross, operate in, or operate near stream courses. Close coordination is needed on the projects to minimize damage to the stream and aquatic resources. Instream work should be done during low flow periods whenever possible. Sediment control measures will be provided at construction sites in cases where construction activities would cause increased sedimentation and/or other deterioration of water quality. Settlement basins or filters should be used to remove sediment from excess flows out of the construction area. Equipment use within a live stream channel shall be kept to a

minimum through the utilization of best available technology and techniques. Crossing streams with equipment will be restricted to a time period that will not significantly affect egg and alevin survival, and will be at agreed crossing sites. Where appropriate, other protective measures required of road construction activities shall be applied. These include BMPs 14.6, 14.15, and 14.17.

3. IMPLEMENTATION. The Interdisciplinary Team determines the project location and mitigative measures during the NEPA process. If construction work is contracted, all mitigative measures need to be incorporated within the contract. The Contracting Officer assures compliance with the management requirements, contract specifications, and operating plans. Water quality and channel condition changes are monitored.

4. REFERENCES. FSM 2511, 2505.1, 2630, and R-10 Supp. to 5460.1; R-10 FSH 2609.24; Federal Clean Water Act (Public Law 95-217); Federal Water Pollution Control Act (Section 404); Coastal Zone Management Act (Public Law 92-583); Alaska Coastal Management Program (6 AAC 50.010); and Alaska Water Quality Standard Regulations (18 AAC 70).

18.4 – PRACTICE: Ground Fertilization for Wildlife Habitat Improvement

1. OBJECTIVE. To minimize impacts to water quality in stream systems and lakes within and adjacent to areas being fertilized.

2. EXPLANATION. This is an administrative and preventive practice. Fertilization is a technique used to improve the growth rates and viability of certain browse plants and microorganisms. Fertilizers generally increase nitrogen, potassium, and phosphorus within the soil. Calcium carbonate (lime) is sometimes used to reduce soil acidity. Fertilizers for the most part reside in the soil where they are available for plant uptake. However, a small percentage of these nutrients are washed into streams during rainfall or snowmelt events, or become dissolved into the groundwater. Increased concentrations of nitrogen, phosphorus, and potassium within surface waters may increase the growth of aquatic vegetation, particularly within lakes.

Excessive levels of nitrogen and phosphorus in surface and groundwater can be harmful to fish, wildlife, and human users. High nutrient levels within lake waters cause undesirable vegetation growth in the lake and reduce the "life" of the lake through eutrophication. Fertilizers should be applied at manufacturer recommended rates, or less. When areas in excess of 20 acres are being fertilized, a fertilization plan should be developed by an interdisciplinary team. Direct application of fertilizers into streams and lakes shall be avoided unless specifically recommended by the interdisciplinary team. Nutrient concentrations in surface water must not exceed State and Federal water quality standards.

3. IMPLEMENTATION. The Interdisciplinary Team determines the project location, application rates and frequency, and any needed mitigative measures for fertilization projects in excess of 20 acres during the NEPA process. Pre- and post-fertilization water quality monitoring shall be done to evaluate nutrient concentrations in the water. If fertilizer application is

contracted, all mitigative measures should be included in the contract. The Contracting Officer assures compliance with the management requirements, contract specifications, and operating plans.

4. REFERENCES. Federal Clean Water Act (Public Law 95-217), Coastal Zone Management Act (Public Law 92-583), Alaska Coastal Management Program (6 AAC 50.010); Alaska Water Quality Standard Regulations (18 AAC 70); Alaska Drinking Water Regulations (18 AAC 80.050); EPA - Quality Criteria for Water, 1976.

18.5 – PRACTICE: Lake Fertilization for Fish Habitat Improvement

1. OBJECTIVE. Limit eutrophication in Forest lakes.

2. EXPLANATION. This is an administrative practice. Fertilization can be used to improve the growth of aquatic fauna and flora within a lake and in turn increase fish productivity within the lake. Too much fertilization, however, can cause over production of unwanted vegetation within the lake and eventually can limit fish habitat. Lake fertilization shall be carefully evaluated and monitored to assure that excessive nutrient levels do not result.

3. IMPLEMENTATION. Project location, feasibility, suitability, application rates and frequency, and any needed mitigative measures will be identified through the NEPA process using an interdisciplinary approach. Pre-and post-fertilization water quality monitoring shall be done on selected representative lakes to evaluate nutrient concentrations in the water. If fertilizer application is contracted, all mitigative measures should be included in the contract. Chemical materials shall be certified as free of impurities prior to use. The Contracting Officer assures compliance with the management requirements, contract specifications, and operating plans.

4. REFERENCES. Federal Clean Water Act (Public Law 95-217), Coastal Zone Management Act (Public Law 92-583), Alaska Coastal Management Program (6 AAC 50.010); Alaska Water Quality Standards (18 AAC 70); Alaska Drinking Water Regulations (18 AAC 80.050); EPA - Quality Criteria for Water, 1976. "Policy and Guidelines for Lake Fertilization", June 30, 1979, ADF&G prepared by Lake Fertilization Team and F.R.E.D. Technology Series "Limnology Field and Laboratory Manual; Methods for Assessing Aquatic Productivity", Jeff Koenings and Gary Kyle, ADF&G No. 71, Feb. 1987.

19 - FIRE SUPPRESSION AND FUELS MANAGEMENT

Fire suppression activities on National Forest System lands are conducted to protect life and property and natural resources. Suppression activities include hand or mechanical fireline and access road construction, firing operations, and fire retardant drops or use of foaming agents. Water quality and soil erosion and productivity objectives are weighed with the need for rapid suppression during the development of suppression strategies. The suppression strategies CRITICAL (control), FULL (control), MODIFIED (contain) and LIMITED (confine) are outlined in Fire Management Plans. Since some watershed damage will likely result from suppression activities, an objective of the fire suppression program is to rehabilitate suppression-related damage. The fire suppression program covers cost of rehabilitation of damaged areas.