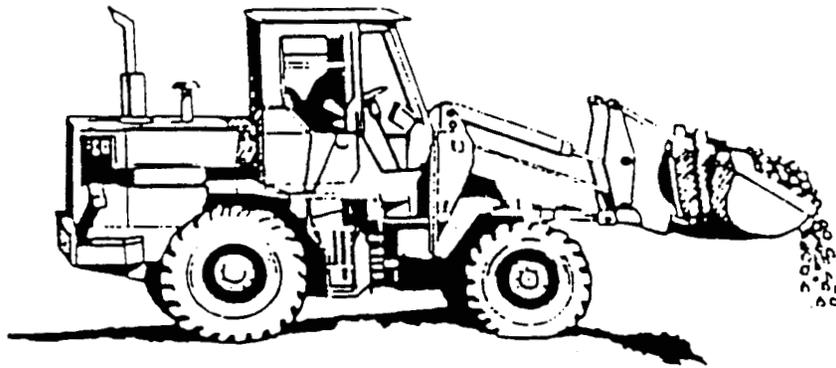


NORTH SLOPE GRAVEL PIT PERFORMANCE GUIDELINES



Technical Report No. 93-9

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NORTH SLOPE GRAVEL PIT PERFORMANCE GUIDELINES

SECTION 309 ENHANCEMENT GRANT PROJECT

Introduction

The Governor's Office, Division of Governmental Coordination (DGC) is pursuing improvements to the Alaska Coastal Management Program (ACMP) in nationally recognized areas of concern for coastal management. This program is funded by the federal Office of Ocean and Coastal Resource Management through the Enhancement Grant Program (Section 309) and addresses:

- ◆ *protection, enhancement or restoration of coastal wetlands;*
- ◆ *assessment and control of cumulative and secondary impacts of coastal growth and development;*
- ◆ *special area management planning in important coastal areas where conflicts exist; and*
- ◆ *energy facilities and activities siting and procedures.*

Alaska's Final Assessment under the Section 309 program identifies as a priority the development of comprehensive guidelines, including gravel mine performance guidelines, for enhancing and restoring Alaska's wetland and other aquatic habitats. Development of specific reclamation guidelines most effectively will assist local districts and agencies in developing appropriate criteria for avoiding or mitigating potential impacts to coastal resources during project review. Federal wetland policy further requires incorporation of mitigation strategies directly in project plans and specifications.

Development of performance guidelines for floodplain and non-floodplain gravel pit siting, operations, and post-mining reclamation in the North Slope Borough (NSB) Coastal District are goals of this project. Due to the current intensity of development activities, emphasis will be placed on the North Slope Coastal Plain within the existing Kuparuk and Prudhoe oilfield units. However, the guidelines are applicable to the entire NSB Coastal District. The project includes the following products:

- ◆ decision matrixes to guide gravel pit siting, operations, and reclamation planning;
- ◆ technical performance guidelines for gravel pit reclamation;
- ◆ conceptual model NSB Coastal District policies; and
- ◆ **proposed** General Concurrence (GC) ACMP approval for gravel mining operations that follow the decision matrixes and technical performance guidelines. (*Note: Applicants may request an individual CZM review based on site-specific circumstances or individual preference. See Application of Guidelines Section.*)

Several federal regulatory programs and policies, state agency policies and coastal district plans require mitigation, which includes requiring provisions to avoid or minimize direct, secondary, or cumulative impacts to fish and wildlife resources and their habitats. While initial studies and guidelines have been developed which address gravel mining,

comprehensive summaries, evaluations, and technical guidelines have not been widely implemented for enhancing and restoring wetlands or other aquatic habitats affected by gravel mining activities. In addition to achieving Alaska's Section 309 Assessment Goals, the performance guidelines are intended to be used by agencies and the NSB Coastal District to assist in interpreting the ACMP Habitat Standard (6 AAC 80.130) and improve implementation of ACMP enforceable coastal district policies and other federal and state mitigation requirements.

Background

Alaska's North Slope was opened to petroleum development after the 1968 oil discovery at Prudhoe Bay. With development came a substantial demand for construction gravel for exploration and development pads, roads, and general infrastructure. In the early 1970s, most gravel needs were met by shallow scrapes within river floodplains. However, growing concerns over the potential impacts of floodplain gravel mining led to development of a state policy in the mid-1970s strongly discouraging both floodplain gravel extraction and winter water withdrawals from natural waterbodies and promoting development of large multi-user pits that could be converted for use as freshwater reservoirs. In 1975, the U.S. Fish and Wildlife Service (FWS) commissioned a five-year study by Woodward Clyde Consultants on the effects of gravel removal from floodplain habitats in arctic and sub-arctic environments (Joyce et al. 1980).

Several of these large gravel mine sites have been depleted as the oil fields have matured. Both depleted and newer operational sites typically are large, deep features with surface areas between 1.5 to 46.8 hectares (3.7 to 117 acres). Base elevations of most sites range between 11.8 and 15.2 m (39 to 50 ft) below the ground surface elevation. Many of these sites were allowed to flood with accumulated snow melt and rain, or intentional connections to adjacent stream or river systems to provide winter and summer water sources. More recently, terrace material pits and shallow, backwater gravel pits have been developed along the Sagavanirktok River. In the case of the later, the backwater pits have been designed to provide summer rearing habitat for fish.

Gravel extraction is a one component of the surface impacts resulting from oil and gas development on the North Slope. Currently over 320 hectares (800 acres) have been excavated as deep pits (Hemming, 1988) and over 2,611 hectares (6528 acres) were disturbed as shallow-scrape floodplain mining during construction of the trans-Alaska pipeline and haul road (Pamplin, 1979). Approximately 80 percent of the material site impacts during construction of the haul road and pipeline were in unvegetated floodplains along the Sagavanirktok River (Pamplin, 1979).

Many of the more recently excavated gravel pit sites have been flooded to provide an ample supply of surface waters for various industrial and domestic uses. Establishing these deep, flooded basins also created unique aquatic habitats with significant potential to support and enhance local freshwater and anadromous fish. Field investigations strongly suggest that fish populations in the mid-Beaufort region of Alaska's North Slope are limited by the availability of suitable over wintering habitat. Most lakes and tundra stream systems are unsuitable as year-round fish habitat because they contain insufficient quantities of under-ice water or because the winter water quality is unsuitable to support fish (Schmidt et al. 1987). North Slope over wintering habitats are confined to a few, scattered, deep lakes, spring areas, and river pools that do not freeze solid (Craig 1987). In the mid-Beaufort coastal plain area (Colville River to the Sagavanirktok River), known fish over wintering habitat is most abundant in the Colville River area, but is limited to several deep, isolated pools in the lower Sagavanirktok and Kuparuk rivers.

Gravel mine sites created to provide construction material for oil and gas development are likely to become deep-lake features at the end of their useful lives as gravel material sources. Unlike the naturally-occurring, shallow tundra ponds and lakes, deep-flooded gravel mine sites maintain significant quantities of under-ice water and are morphologically similar to deep-lake basins formed by glacial processes such as those found in the Foothill Region north of the Brooks Range. These mine sites typically are deeper and larger than many of the known over wintering sites for anadromous and freshwater resident fish.

Recognizing the enhancement potential of flooded gravel mine sites, the ADF&G initiated a multi-year investigation of North Slope oilfield flooded gravel mine sites in 1986. These studies were supported, in part, by ACMP Significant Improvement Grant (SIG) Program funding and private research funding from the Kuparuk River and Prudhoe Bay units. The ADF&G's four-year field study found that flooded gravel mine sites were colonized by two or more fish species. The greatest species diversity and relative abundance occurred in sites located within the floodplains of large river systems. Mine sites associated with small tundra streams draining directly into the Beaufort Sea were colonized by ninespine stickleback (*Pungitius pungitius*) and anadromous fish species such as broad whitefish (*Coregonus nasus*) or least cisco (*Coregonus sardinella*) that occur in the nearshore Beaufort Sea and were affected by time. Older sites tended toward greater species diversity than younger sites. Physical and chemical characteristics, such as volume of water under the ice and winter dissolved oxygen concentrations, in these sites were suitable to support over wintering fish (Hemming 1988). When connected to adjacent riverine systems, the quantity and quality of winter fish habitat increased substantially. Phytoplankton standing crops were found comparable with natural waterbodies. The studies found most of the mine site basins lacked littoral habitat, an important factor for benthic community development and warmer water temperatures preferentially used by rearing fish such as Arctic grayling. Shoreline features such as islands, points, and bays that increase habitat diversity were also lacking in the large, rectangular-shaped material extraction areas.

In 1989, the ADF&G's Habitat and Restoration Division (H&R) prepared preliminary guidelines for fish and wildlife habitat restoration at North Slope gravel sites (Appendix 1). The goal of the guidelines was to promote voluntary measures that enhance fish and wildlife while simultaneously meeting industry's gravel and water needs. The preliminary guidelines were based on the H&R's field investigations, the FWS's comprehensive guidelines (Joyce et al. 1980), and FWS and ADF&G Wildlife Conservation Division recommendations for the establishment of suitable habitat for migratory waterfowl and shorebirds.

ADF&G's investigation of flooded gravel mine sites has continued since the release of the 1979 guidelines. The focus of many of these more recent studies has expanded to include an evaluation of the habitat enhancement potential of appropriately designed and constructed instream, floodplain, and terrace gravel extraction activities. Evaluations completed or in progress to date include:

- ◆ Alyeska Pipeline Service Company (APSC); Sten Creek Ponds; shallow, flooded material site designed to provide rearing habitat for Arctic grayling, round whitefish, and Dolly Varden (Alvin G. Ott, ADF&G, pers. commun.).
- ◆ Alaska Department of Transportation and Public Facilities (DOT&PF); multiple, instream Sagavanirktok River sites; to be connected to the river and designed to provide shallow, backwater rearing habitat for juvenile Arctic grayling and potentially, juvenile Dolly Varden (Alvin G. Ott, ADF&G, pers. commun.).
- ◆ DOT&PF; Deadhorse Airport; pit excavated within intermittent tundra drainage, connected with the Sagavanirktok River, and designed to provide over wintering and

rearing (littoral) habitat for juvenile Arctic grayling and broad whitefish (Carl Hemming, ADF&G, pers. commun.).

- ◆ DOT&PF; Nome River; floodplain material site to be connected via an outlet culvert to the Nome River and designed to provide rearing and potentially over wintering habitat for juvenile Dolly Varden and coho salmon and adult Arctic grayling (R.F. McLean, ADF&G, pers. comm.).
- ◆ DOT&PF; Fox River; floodplain material site to be connected via a natural channel to the Fox River and designed to provide rearing and potentially over wintering habitat for juvenile Dolly Varden and coho salmon and adult Arctic grayling (R.F. McLean, ADF&G, pers. commun.).
- ◆ APSC; Prospect Creek; floodplain material site; connected at the outlet with Prospect Creek to form a shallow pond with an irregular shoreline, extensive aquatic vegetation, and documented use by juvenile Arctic grayling, juvenile chinook salmon, northern pike, and waterfowl (Alvin G. Ott, ADF&G, pers. commun.).
- ◆ Alaska Interstate Construction; Sagavanirktok River; multiple, shallow scrape floodplain terrace sites, not connected to the river, and designed for waterfowl and shorebirds (Alvin G. Ott, ADF&G, pers. commun.).
- ◆ APSC; Sagavanirktok River (Goose Green Gulch); shallow scrap floodplain material site connected at its outlet with the Sagavanirktok River and designed to provide rearing habitat for adult and juvenile Arctic grayling, Dolly Varden, and burbot (Winters, 1990).

Based on the fisheries enhancement potential documented by these investigations, the ADF&G has re-evaluated the mid-1970s state policy restricting instream gravel mining and requiring non-floodplain consolidation of all material sites. The ADF&G also has begun evaluating the relative merits of requiring large, multi-user, long-term non-floodplain material sites rather than small sites that can be reclaimed within the short-term. The ADF&G's preliminary conclusion is that smaller sites that can be reclaimed as part of a single project during a shorter time frame may offer a greater and more immediate enhancement benefit to fish and wildlife than multi-user, long-term sites that may not be reclaimed for 20 to 30 years. More recently, the ADF&G has begun to consider the habitat restoration opportunities associated with using abandoned gravel fill to meet material requirements. Concurrent with other investigators, the ADF&G has concluded that, with proper design, positive impacts that are beneficial to wildlife can be obtained from the reuse of fill material (Jorgenson et. al. 1992; Post 1991).

Application of Guidelines

The North Slope Gravel Pit Performance Guidelines 309 Project builds upon the considerable industry, and state and federal agency experience gained since initial oil field development in 1968. The technical performance guidelines and decision matrixes reflect the current state of knowledge for North Slope gravel pit restoration and are designed to provide for the beneficial extraction of resources within the NSB while promoting concurrent rehabilitation of disturbed sites with an emphasis on long-term habitat gains for selected species of fish and wildlife. The guidelines further are intended to expand government and industry flexibility to test and evaluate new, innovative ideas and approaches, and, where appropriate, incorporate necessary changes back into the permitting process.

Broad use of technical performance guidelines will promote sound decision-making for permitting and facilitate increased planning and coordination between the private sector and federal, state, and local governments. Use of the guidelines will enhance the site-specific protection, management, restoration, and where suitable, enhancement or creation of coastal wetlands and thereby reduce the cumulative impacts and secondary effects of gravel extraction activities associated with North Slope oil and gas development. Optimally, use of the guidelines will avoid or minimize (through facility siting) adverse impacts to high-value habitats, and maximize positive benefits through conversion or enhancement of lower value wetland habitats for waterfowl, shorebirds, fisheries, and other aquatic resources (e.g., fish over wintering or waterfowl nesting habitat). In addition, use of the decision matrixes will assist in evaluating potential material sites on a site-specific basis for creation of desired fish and wildlife habitats for select target species through concurrent reclamation.

Section 309 grant work products include a proposed GC approval under 6 AAC 50.050(c) for gravel mining operations utilizing the decision matrixes and technical performance guidelines. Under this approach, applicants could receive expedited permit approvals and authorizations for selecting to incorporate these guidelines in their project plans and specifications. Applicants choosing not to incorporate these guidelines could continue to submit applications for a coastal consistency determination under existing procedures. The GC proposal will be circulated by the DGC in July 1993 for public review as a possible regulatory revision of the DGC's "A-B-C" List of coastal consistency approvals.

Conceptual model NSB Coastal District policies for gravel mining will also be developed under this grant. These conceptual policies will be submitted to the NSB and the DGC for consideration as future amendments to the approved NSB Coastal District Plan. The conceptual draft district policies do not establish a regulatory regime, but are intended to encourage additional industry, agency and public discussion. Future changes, if any, to the enforceable policies of the NSB Coastal District must be initiated by the North Slope Borough Coastal District and will be subject to full public review under the applicable provisions of 6 AAC 80.020.

Limitations

LIMITATION #1. The guidelines are not intended as absolute regulatory requirements. Rather, they are to be used as a tool to promote rehabilitation strategies that maintain or enhance biologically productive habitats for fish and wildlife, consistent with necessary development within the NSB's industrialized areas.

Establishment of guidelines is intended to provide criteria for use in both the design and review of proposed material sites. However, it must be recognized that the optimum reclamation strategy for a particular project must be determined on a site specific basis and include a full consideration of environmental impacts and enhancement opportunities, logistics, project costs, and other legal requirements.

LIMITATION #2. The guidelines do not consider land management considerations beyond maintenance or enhancement of fish and wildlife habitats.

Alternate, non-habitat, post-mining land uses may be desired by private and state, federal, and local government landowners. In some instances these alternate land uses may be required by law. Complete application of these guidelines may not be possible or desirable in these instances. The guidelines are not intended to establish an absolute requirement that all gravel mine sites be reclaimed for fish and wildlife habitat. Rather, they are intended to provided guidance on how such sites can be reclaimed to maintain or enhance fish and

wildlife if fish and wildlife habitats are the desired post-mining land use. Finally, it must be recognized that the guidelines complement, but do not replace, the State's 1990 Mining Reclamation Act reclamation requirements (AS 27.19 and 11 AAC 97 -- see Appendixes 4 and 5).

LIMITATION #3. The guidelines should not be retro-actively applied to existing material sites.

Cost-effective application of the guidelines generally requires concurrent implementation during site selection and mine plan development. To the extent technically and economically feasible, however, operators are encourage to incorporate as many provisions as possible when reclaiming existing material sites.

PART I

Site Selection and Operations

The site selection and decision matrixes contained in this section and the general performance and reclamation guidelines presented in Part II are intended to provide a framework for the siting, design, operation and reclamation of North Slope gravel pits. The decision matrixes and guidelines are further designed to foster and promote the pro-active inclusion of design features that will result in net positive benefits for selected fish and wildlife resources. The decision matrixes and guidelines are designed specifically for the type of gravel resources and fish and wildlife values found within the NSB. With minor modifications that adapt to varying habitat types that support different fish and wildlife communities, the decision matrixes and guidelines should be equally applicable to other coastal arctic environments. Many of the reclamation concepts have been applied successfully to gravel mining in subarctic and northern temperate climates.

The decision matrixes and general performance and reclamation guidelines presented herein were developed from recommendations, regulatory requirements, and research provided by more than 39 state and provincial fish and wildlife, natural resource, and environmental protection agencies. Recommendations for floodplain and flooded gravel pit mine sites were derived primarily from the ADF&G's multi-year (1986-1993) investigations of North Slope, flooded, gravel mine sites, coupled with the FWS's comprehensive five-year study of arctic and sub-arctic floodplain gravel mine sites (Joyce et. al. 1980). *For floodplain gravel extraction projects, the reader is strongly encouraged to review the critical fluvial dynamics and hydraulic design considerations presented in Joyce, et. al. (1980) in conjunction with the general site selection and specific reclamation guidelines contained in this report.*

Field research on the reclamation of non-floodplain gravel sites and the removal/restoration of abandoned roads and pads within arctic environments is limited. Few of these studies' recommendations have been implemented or evaluated for wide-spread technical or economic feasibility. Accordingly, the guidelines presented herein for non-floodplain and abandoned fill sites are general and are intended to re-establish hydric, wetland conditions that will eventually provide wildlife habitat. Additional research is needed to fine tune these restoration strategies to facilitate reproduction of specific wetland communities, and to influence ecological succession of non-floodplain reclaimed sites. Further research is also needed to evaluate the potential benefits of abandoned fill for wildlife resting, movement, nesting, and insect relief.

Planning

A critical design path for initial site selection, design, construction, and reclamation is presented in Figure 1. Effective use of the critical design chart and site selection matrixes (Figures 4, 5, 6 and 7) requires the reader to first review the reclamation guidelines contained in Part II. Optimal selection of a gravel mine site and mining methods will consider final reclamation objectives for each type of gravel deposit in addition to the technical characteristics, economic criteria, and environmental constraints of the gravel deposits.

In applying the site selection and design guidelines presented in Parts I and II, the following general principles should be considered.

PRINCIPLE #1. *To the extent possible, total gravel requirements and the operational life of the material site should be identified during the initial planning and siting process.*

Selection of a gravel mine site and reclamation plan depends, to a large degree, on the projected life of the operation. Is gravel needed on a continuous basis (e.g., maintenance activities) or is the gravel needed for a discrete project (e.g., road or pad construction)? Will the gravel deposit be mined and reclaimed by a single operator or will multiple operators be using the site? If multiple operators will use the site, can the respective responsibilities of each operator for site development, operation, and reclamation be clearly and legally defined? In many cases, if the gravel requirements are for a discrete project, the benefits of quickly reclaiming one or more smaller material sites may outweigh the relative benefits of establishing a single, larger, gravel mine site that may not be reclaimed for years.

Although total gravel requirements and operational life optimally should be identified at the onset, in many instances, changing economic conditions may significantly affect even the best projections. In these instances, the environmental and economic impact of opening and reclaiming one or more new material sites versus expanding and reclaiming an existing material site at some time in the future should be carefully evaluated. The final assessment will strongly influence project economics and the ultimate benefits for fish and wildlife resources.

While recognizing the importance of economic considerations, in general, development of several small material sites generally is the preferred option for discrete, small construction projects. Such sites can be reclaimed and provide functional habitats within a relatively short period of time. Conversely, if the material site will be developed for on-going operations, maintenance or multiple projects and cannot functionally be reclaimed within a relatively short period of time, the preferred option generally is to develop few, consolidated material sites in low-value habitats. Long-term mining operations (over two years) should be avoided whenever possible within active watercourses, due to unacceptable risks of fish blockage, siltation, fuel spills, and channel changes. Material needs in these instances should be met with either non-floodplain sites or other sites isolated or protected from annual flooding.

PRINCIPLE #2. *Once a need for gravel is identified, all reasonable site alternatives should be identified and evaluated.*

Initial site selection should consider the full range of non-floodplain and floodplain gravel material sources, including reuse of abandoned roads or pads. Final site selection should be based on a comparative assessment of environmental impacts (both positive and negative), material requirements (both immediate and future), project logistics, cost, and reclamation options (including enhancement opportunities). Early consultation with state and federal fish and wildlife agencies, the NSB Wildlife Department, and other industry personnel with experience in fish and wildlife enhancement projects will enhance understanding of specific fish and wildlife requirements. The overall objective of site selection should be to secure necessary material quantities and qualities at reasonable cost while avoiding or minimizing impacts on fish and wildlife resources and their habitats.

PRINCIPLE #3. *Reclamation / enhancement opportunities should be evaluated for each potential mine site.*

Reclamation opportunities that will benefit fish and wildlife resources may not always be readily apparent. Early in the site identification and evaluation process, state and federal fish and wildlife resource agencies and the NSB Wildlife Department should be contacted to determine the importance and quality of existing habitat, the amount of habitat that could be impacted in relation to its total availability, and potential enhancement opportunities associated with gravel mining activities. Proposed post-mining fish and wildlife habitat enhancement concepts may not be feasible if critical habitat factors are not present, cannot be reproduced, or cannot be compensated for by site management. For example, wildlife requiring secluded environments may not tolerate certain land uses on or near the site. Similarly, if adjacent waterbodies do not naturally support fish populations, the potential for establishing functional fish habitat may be limited unless the reclamation plan specifically includes fish stocking. What might appear to be a good idea initially could turn out to be inappropriate, or unworkable, because of the costs involved in trying to duplicate the needed habitat. Final reclamation strategies should not become cast in concrete. Flexibility must be retained to respond to changing technologies and allow incorporation of new or improved techniques as they become available.

PRINCIPLE #4. *The optimum site should meet the project's specific needs (quantity, quality and economics) and be sited and reclaimed to provide the maximum net benefits for fish and wildlife resources.*

Gravel mining operations may be associated with a variety of direct and indirect effects on fish and wildlife resources. Direct detrimental effects generally can be avoided through site selection, mining methods, and timing considerations. With proper site selection, mining methods, and reclamation, a gravel extraction operation may create productive habitat for fish and wildlife (e.g., deep fish overwintering habitat, shallow rearing habitat, waterfowl nesting areas). The calculation of net benefits should consider both adverse impacts of removing habitat and the positive impacts through enhancement of selected fish and wildlife habitats.

PRINCIPLE #5. *Develop an operations and reclamation plan on a site-specific basis using the general guidelines contained in Part II.*

The general performance and reclamation guidelines presented in Part II reflect the current state-of-the-art for North Slope gravel mine site reclamation. While the guidelines are not absolutes, they are intended to promote rehabilitation strategies that maintain or enhance biologically productive habitats for fish and wildlife. These guidelines should be fully incorporated into project design unless documented, site-specific physical, hydraulic, technical, economic, or legal constraints dictate otherwise. Future revisions of the guidelines are anticipated based on future research, feedback from monitoring evaluations, and as technology and understanding of arctic ecosystems advance.

The guidelines do not address all fish and wildlife considerations. For example, development of gravel mine sites in proximity to special or sensitive habitats or threatened and endangered species may require timing or other operational or reclamation requirements.

PRINCIPLE #6. *Permit requirements should be outlined for all project personnel and contractors and carefully monitored during actual operations.*

Achievement of reclamation objectives requires close adherence to permit requirements and the approved reclamation plan. Noncompliance with the approved reclamation plan, including "minor," unauthorized field modifications, may limit or eliminate the desired post-mining habitat reclamation objectives.

PRINCIPLE #7. *Gravel mine sites should be monitored following reclamation to evaluate the effectiveness of the various reclamation guidelines.*

Basic monitoring is necessary to evaluate implementation of the approved reclamation plan, assess the effectiveness of approved rehabilitation strategies for various fish and wildlife species, and monitor changes in habitat characteristics over time. Optimally, baseline data should be collected prior to development of the site. While long term monitoring may not be necessary at each site; sufficient data, including reclamation cost data, should be collected at representative sites to fully evaluate the effectiveness and reasonableness of each reclamation strategy. *Subsequent updates of these performance guidelines will incorporate the technical, biological, and economic information obtained through monitoring and assessment activities.*

Site Selection Criteria

As indicated under PRINCIPLES #2 and #4, the selection of the preferred material site should include an evaluation of the relative benefits and disadvantages of alternative sites. Material needs (both quantity and quality), haul distances, site-specific environmental concerns, reclamation opportunities, and project costs all need to be considered. In general, the optimum site should satisfy gravel needs while providing the maximum net benefits for fish and wildlife. In calculating net benefits, both potential detrimental effects as well as positive enhancement opportunities must be considered. The schedule for reclamation of the mine site must also be considered in determining net benefits.

For example, in high value habitats, if there is a choice between mining to a shallow depth over a broad surface area or deeper over a restricted area, the preferred choice generally should be to increase depth before increasing area. This will minimize the area of habitat disturbance while maximizing gravel recovery. However, for facilities located in areas with a high potential for fish and wildlife habitat enhancement, the benefits of quickly reclaiming one or more shallow material sites may outweigh the relative benefits of a smaller, but deeper, site that must remain unreclaimed for many years before the gravel resource is exhausted. Similarly, the potential value of establishing shallow water, littoral habitat in conjunction with a deep gravel pit mine site may warrant expanding the mining operation's footprint and outweigh the relative disadvantage of impacting more surface area.

In general, if a site can be open on a single-use basis and quickly reclaimed (e.g., within 2 years) to establish or enhance a limited fish and wildlife habitat type (e.g., fish overwintering habitat), its net present value may exceed the net value of utilizing an existing material site that may not be scheduled for reclamation for 10 to 30 years. The relative advantages/disadvantages of each potential site must be considered on a site-specific basis.

In conjunction with the calculation of the maximum net benefits and the decision matrixes presented in Figures 4, 5, 6 and 7, the following site selection criteria should be considered for each potential gravel material source.

Existing, Non-floodplain Material Pits

Criteria In general, existing, non-floodplain material sites should be utilized whenever possible unless an alternative site provides a higher net benefit for fish and wildlife resources (see discussion above). When evaluating whether to use an existing site, consider the effect expansion of the site will have on its eventual reclamation. In some instances, the shallow, lateral expansion of an existing,

deep pit may provide much needed littoral habitat for waterfowl and fish and increase the net benefit of the final, reclaimed site.

Abandoned Roads and Pads

Criteria Abandoned roads and pads are a potential gravel source that, in many cases, may be the preferred environmental and economic site choice. Whenever technically and economically feasible, these "material" sites should be used as sources of material for maintenance and new project activities instead of expanding or developing new material sites. Use of these sites often does not require developing new access. Upon removal, the underlying vegetation may be restored as functional wetlands (see Part II Guidelines), thereby providing a degree of on-site mitigation for anticipated project impacts.

In many instances, existing permit requirements may already require removal and rehabilitation of a road or pad upon abandonment. Some have expressed concern that mining and rehabilitation of such sites would constitute double mitigation and would not be authorized by state or federal regulators. It should be recognized, however, that new project developments may include mitigation requirements for both the footprint of the actual project and any material site developed for it. The reuse and reclamation of abandoned gravel fills could satisfy both existing permit requirements for the road or pad and avoid new wetland impacts attributable to material extraction for the new development project. Avoidance of new impacts could negate the need for any new mitigation (with potential cost savings) that might otherwise be required for actual gravel mining activities.

Barrier Islands

Criteria Barrier islands represent a unique, irreplaceable habitat. Gravel mining activities should be completely avoided in these areas.

Coastal Waters and Lagoons

Criteria Coastal waters and lagoons inshore of the barrier islands provide important habitats for a variety of anadromous fish, waterfowl, and shorebird species. Gravel mining activities should only occur within these areas if there are no inland alternatives. The mine site should be located to avoid interruption of fish migration corridors and ensure the free passage of fish and other wildlife.

Coastal Salt Marshes, Intertidal Areas, and Spits

Criteria Coastal wetlands directly influenced by brackish or saline waters are characteristically dominated by *Carex subspathacea* and *Puccinellia phryganodes*. The existence of these vegetation communities, in conjunction with other factors, including traditional use patterns and access to escape habitat, provide high-value brood-rearing and staging habitat for snow geese and brant. Little information is available on restoration techniques for arctic salt marsh habitats. Future research should be directed at providing additional information.

In the absence of proven restoration strategies, gravel mining activities within coastal habitats comprised of *Carex subspathacea* and *Puccinellia phryganodes* should be avoided. Mining activities in adjacent coastal areas should only occur

if there are no inland alternatives. In all instances, the mine site should be located to avoid identified, high value habitats

Non-floodplain Shallow Scrape and Pit Sites

Criteria Gravel mining sites should be sited to avoid or minimize impacts to high value wildlife habitats and to existing drainage patterns. To minimize disturbance to waterfowl habitats, extraction sites should not be located within deep, wetland sites supporting *Arctophila fulva* stands, basin-complex "mosaic" wetlands. Every effort should be made to avoid or minimize actual mining activities from mid-July to mid-August within 1.6 km (1 mile) of identified brant colonies.

Deep *Arctophila* wetland sites provide the highest value nesting, feeding, and brood-rearing habitat for tundra swans, king and spectacled eiders, oldsquaw, white-winged scoters, brant and Pacific loons. "Mosaic" wetlands provide high-value habitat for nesting and feeding waterfowl, especially king eiders, red-throated loons, and shorebirds.

Instream and Floodplain Sites

General Mining of instream and floodplain gravel deposits offer several distinct advantages over non-floodplain or terrace gravel deposits, including a replenishable supply and a virtual absence of extensive overburden. Instream or floodplain material sites developed according to the following criteria and the reclamation guidelines presented in Part II will provide net benefits for selected fish and wildlife species and virtually avoid costly stripping, stockpiling, and rehabilitation of massive quantities of overburden.

Criteria #1 In general, active channels of split, meandering, sinuous and straight rivers should be avoided to reduce detrimental effects on stream hydraulics, water quality, aquatic habitat, and biota. However, if hydraulic changes can be minimized, scraping or pit excavation mining operations within adjacent high-water channels or abandoned channels may present opportunities for creation of backwater rearing or overwintering habitats for fish if adequate fish passage can be maintained. In all cases, changes to channel hydraulics that might lead to avulsion of the river channel or creation of a braided configuration should be avoided.

As an exception to this general criteria, sites within the lower Colville River, Sagavanirktok River, and Kadleroshilik River may be suitable for deep, instream mining within the active stream channel. Due to the low gradient and the protection provided by frozen stream banks during peak, spring discharges, this segment of the river is considered relatively stable. Excavation of deep dredge ponds within this segment of the Sagavanirktok River could provide additional rearing and overwintering habitat for fish. Although eventually these pits will fill from accumulated bedload deposition, due to the low bedload recruitment rates in the Sagavanirktok River, these habitat features will remain productive for a considerable period of time. Other major coastal plain rivers may provide similar opportunities for gravel removal and establishment of deep pool habitat. Further research and evaluation of the fluvial dynamics within these waterbodies is needed.

Criteria #2 Unless suitable flood-flow buffers can be maintained, pit excavations within the inside meander of all stream types generally should be avoided due to a

significant risk of channel avulsion (Note: naturally suitable flood-flow buffers within the NSB coastal plain generally are not available due to the extremely flat topography and both natural and human-induced aufeis formation). Exceptions may occur on a case-by-case basis if the floodplain excavation can be designed to accommodate an avulsion of the stream channel without significant hydraulic risk upstream or downstream of the site. Scrape-mining may occur within the inside meander of most stream types if undisturbed low-flow buffers are maintained.

Criteria #3 Gravel should not be mined from the active channel of known fish overwintering pools. This habitat type is limited within the NSB and should be protected from any hydraulic alteration.

Criteria #4 Mining within the active channels of braided and beaded-tundra streams generally may occur without significant hydraulic risk. These systems are generally devoid of suitable overwintering fish habitat. Excavations of sites (deep) within beaded-tundra streams may provide overwintering habitat and additional summer rearing habitat for fish.

Criteria #5 Where feasible, mining activities within vegetated areas of river floodplains (willow stands and *Dryas* terraces) should be avoided or minimized. These riparian habitats provide high value habitat for nesting birds and important food and cover for musk-oxen, moose, and other mammals.

Site Selection Matrixes

Specific site selection matrixes for each type of river system (braided; split; meandering, sinuous, and straight; and beaded-tundra) are presented in Figures 4, 5, 6, and 7 respectively. The matrixes are specific for river size, mine site location within the floodplain, and the type of gravel deposit. A general description of these river features and the location-of gravel deposits is depicted in Figures 2 and 3.

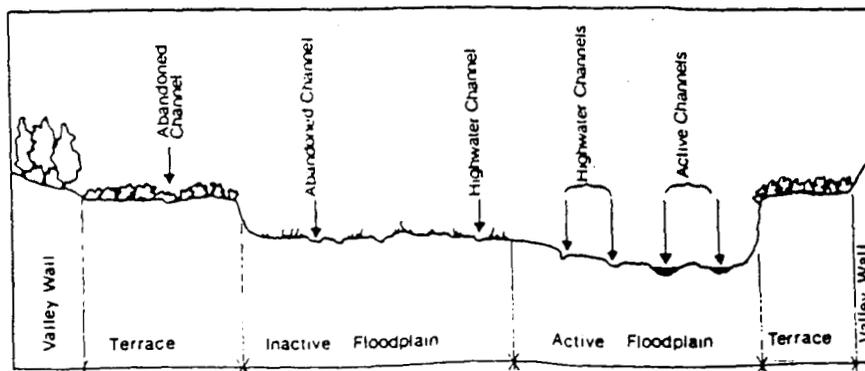
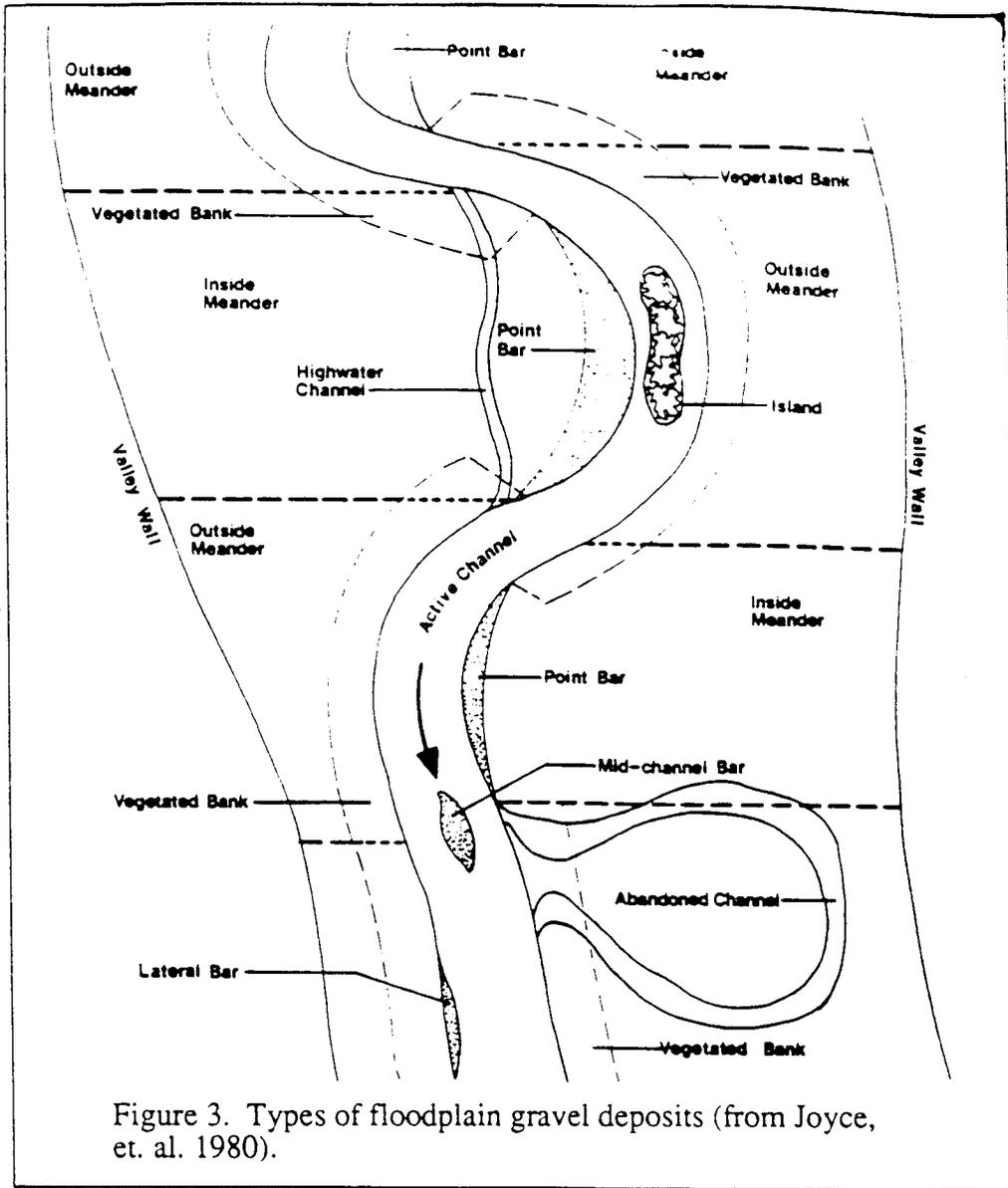


Figure 2. Location of floodplain gravel deposits (from Joyce, et. al. 1980).



Floodplain Siting and Buffer Criteria

From a technical perspective, the gravel removal site should have a sufficient quantity and quality of gravel to meet requirements, receive adequate replenishment of gravels, and be sited or designed to minimize the risk of erosion or avulsion. At initial stages of planning, several sites that meet specific volume and quality requirements should be selected because fish and wildlife habitat or hydraulic concerns may dictate that one or more of the sites are unacceptable. Sites should be selected where gravel removals are unlikely to induce bank erosion, significant upstream or downstream streambed degradation, or avulsion of the main channel across a meander loop or into a secondary channel. A generalized schematic diagram of locations suitable and not suitable for floodplain gravel mining is presented in Figure 8.

Figure 4. Site Selection Matrix for Braided Rivers (from Joyce, et. al. 1980).

River Size			Site Location			Associated Channel			Type of Deposit						Mining Suitability & Comments		
Sm.	Med.	Lrg.	Active	Inactive	Terrace	Channel	Hi-	Aband.	Bed	Point Bar	Lateral Bar	Mid-	Outside	Veg. Island	Veg. Bank		
			Flood Plain	Flood Plain			Water Channel					Channel					Channel
X	X	X	X				X		X								Avoid, see #1.
X	X	X	X				X				X	X					Yes, see #2.
X	X	X	X	X				X	X		X	X					Yes, see #3.
X	X	X	X	X			X	X	X					X			No, see #4.
X	X	X	X	X	X		X	X							X		No, see #5.
X	X	X	X	X				X	X	X							Yes, see #6.
X	X	X	X		X			X			X	X		X			Yes, see #7.
X	X	X	X		X	X			X		X	X		X	X		Yes, see #8.

Expanded Comments:

1. Generally, the bed of an active channel should not be mined. If it is the only available source, gravel should be removed only under strict work plans and stipulations. Side channels are preferred over main channels. If the side channel carries less than approximately one-third of the total flow during the mining period it may be blocked at the upstream end and mined by scraping. Larger side channels and main channels should only be mined by dredging.
2. Available by scraping to an elevation not less than the summer low flow (with suitable buffers) or the water level present during the mining operation.
3. Available by scraping if there is not a high probability of channel diversion through the site. General channel configuration must be maintained.
4. Vegetated islands are often a limited habitat. If alternative deposits are not available, and vegetated islands are abundant in the stream reach, a maximum of 10 to 20 percent of this habitat may be mined within a 5-km reach of the floodplain.
5. Vegetated river banks of both active and high-water channels should not be disturbed because of adverse biological and hydraulic alterations.
6. Available by scraping within the channel. The general configuration of the channel should be maintained.
7. Exposed gravels within the active floodplain should be targeted first. If insufficient exposed gravel within the floodplain is available, these deposits may be scraped. General channel configuration should be maintained.
8. Exposed gravels within the active floodplain should be targeted first. If insufficient exposed gravel within the floodplain is available, these deposits may be scraped or dredge mined. General channel configuration should be maintained.

Figure 5. Site Selection Matrix for Split-Channel Rivers (from Joyce, et. al. 1980).

River Size	Site Location			Associated Channel			Type of Deposit						Mining Suitability & Comments	
	Active Flood Plain	Inactive Flood Plain	Active Channel	Hi-Water Channel	Abandoned Channel	Bed	Point Bar	Lateral Bar	Mid-Channel Bar	Inside Meander	Outside Meander	Veg. Island		Veg. Bank
Sm. Med. Lrg.	X	X	X	X	X	X	X	X	X	X	X	X	X	Avoid, see #1.
	X	X	X	X	X	X	X	X	X	X	X	X	X	Yes, see #2.
	X	X	X	X	X	X	X	X	X	X	X	X	X	Limited, see #3.
X	X	X	X	X	X	X	X	X	X	X	X	X	X	No, see #4.
X	X	X	X	X	X	X	X	X	X	X	X	X	X	No, see #5.
X	X	X	X	X	X	X	X	X	X	X	X	X	X	Yes, see #6.
X	X	X	X	X	X	X	X	X	X	X	X	X	X	No, see #7.
X	X	X	X	X	X	X	X	X	X	X	X	X	X	Avoid, see #8.
X	X	X	X	X	X	X	X	X	X	X	X	X	X	Yes, see #9.
X	X	X	X	X	X	X	X	X	X	X	X	X	X	Yes, see #10.

Expanded Comments:

1. Generally, the bed of an active channel should not be mined. If bed deposits are the only available source, gravel should be removed only under strict, site-specific work plans and stipulations. Side channels are preferred over main channels. If the side channel carries less than approximately one-third of the total flow during the mining period it may be blocked at the upstream end and mined by scraping. Larger side channels and main channels only should be mined by dredging.
2. Available by scraping to an elevation not less than the summer low flow (with suitable buffers) or the water level present during the mining operations.
3. Limited amounts available by scraping or pit excavation. Buffers required to prevent channel diversion (see buffer guidelines).
4. Vegetated islands are often a limited habitat. If alternative deposits are not available and vegetated islands are abundant in the stream reach, a maximum of 10 to 20 percent of this habitat may be mined within a 5-km reach of the floodplain.
5. Vegetated river banks of both active and high-water channels should not be disturbed because of adverse biological and hydraulic alterations.
6. Available by scraping, but specific measures should be utilized to prevent channel diversion.
7. Mining is not recommended in or near the active channel because of low replenishment rates and a high probability of adverse hydraulic alterations.
8. Due to limited gravel availability and replenishment, these deposits generally should be avoided. If only small quantities are required (<10,000 m³), scraping may be possible.
9. Available by scraping or pit excavation; pits should be developed if more than 50,000 m³ are required. Pits may offer potential for developing backwater fish rearing and waterfowl habitat (see Part II - General Performance and Reclamation Guidelines).
10. Limited gravel may be available by scraping. Channel configuration should be maintained.

Figure 6. Site Selection Matrix for Meandering, Sinuous, and Straight Rivers (from Joyce, et. al. 1980).

River Size	Site Location				Associated Channel				Type of Deposit				Mining Suitability & Comments				
	Active Flood Plain	Inactive Flood Plain	Terrace	Channel	Active Channel	Water Channel	Hi-Aband.	Channel	Point Bar	Lateral Bar	Channel Bar	Mid-Meander		Inside Meander	Outside Island	Veg. Bank	Veg. Island
Sm.	X	X			X				X								Avoid, see #1.
Med.	X	X			X				X								Yes, see #2.
Lrg.	X	X	X		X	X							X				Yes, see #3.
	X	X	X		X	X							X				No, see #4.
	X	X	X		X	X									X		No, see #5.
	X	X	X		X	X			X		X						Yes, see #6.
	X	X	X		X	X			X		X		X				Avoid, see #7.
	X	X	X		X	X			X		X		X				Avoid, see #8.
	X	X	X		X	X			X		X		X				Yes, see #9.

Expanded Comments:

1. Generally, the bed of an active channel should not be mined. If bed deposits are the only available source, gravel should be removed by dredging under strict, site-specific work plans and stipulations.
2. Available by scraping to an elevation not less than the summer low flow (with suitable buffers) or the water level present during the mining operations.
3. Gravel is available if suitable buffers can be maintained to prevent channel diversion (see buffer guidelines).
4. Vegetated islands are rare in these river systems and should not be disturbed.
5. Vegetated river banks of both active and high-water channels should not be disturbed because of adverse biological and hydraulic alterations.
6. Available by scraping, but specific measures should be utilized to prevent channel diversion.
7. Mining is not recommended in or near the active high-water channels of these systems due to low replenishment rates and a high probability of adverse hydraulic alterations.
8. Due to low gravel availability and replenishment, these deposits should be avoided. If only small quantities are required (<10,000 m³), scraping may be possible.
9. Available by scraping or pit excavation; pits should be developed if more than 50,000 m³ are required. Pits may offer potential for developing backwater fish rearing and waterfowl habitat (see Part II --- General Performance and Reclamation Guidelines).

Figure 7. Site Selection Matrix for Beaded-Tundra Streams.

River Size	Site Location				Associated Channel				Type of Deposit				Mining Suitability & Comments			
	Active Flood	Inactive Flood	Plain	Terrace	Active Channel	Hi-Water Channel	Aband. Channel	Bed	Point Bar	Lateral Bar	Mid-Channel Bar	Inside Meander		Outside Meander	Veg. Island	Veg. Bank
X	X				X	X		X				X			X	Yes, see #1.
X	X	X			X	X	X					X				Avoid, see #2.
X		X				X		X					X			Yes, see #3.
X			X				X	X								Yes, see #4.

Expanded Comments:

1. Low gravel recruitment. Historic gravel accumulations suitable for mining by dredging or pit excavation. Habitat enhancement opportunities include development of deep instream pool habitat for fish.
2. Not suitable for mining by scraping, dredging or pit excavation due to increased potential for channel cutoff or diversion and subsequent hydraulic changes in stream morphology.
3. Suitable for mining by pit excavation or scraping. If fish are present, pit excavations should maintain an outlet connection to the stream at all discharge elevations. Scrapes should avoid creation of isolated depressions that could trap fish. Habitat enhancement opportunities include creation of summer rearing habitat (scrapes) or overwintering habitat (pits) for fish.
4. Suitable for mining by pit excavation. If fish are present, pit excavations should maintain an outlet connection to the stream at all discharge elevations.

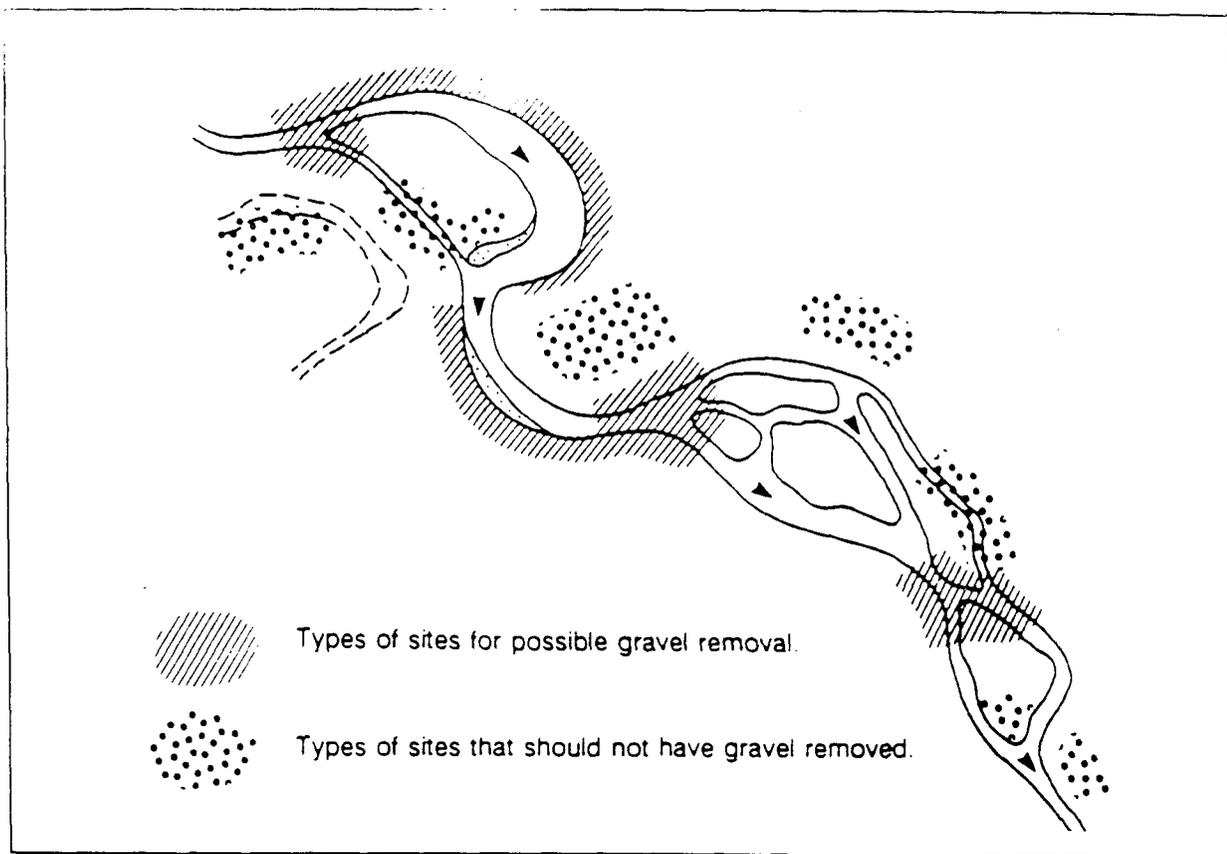


Figure 8. Schematic diagram of general locations suitable and not suitable for floodplain gravel mining (from Stutek Services Ltd., 1989).

To further prevent channel diversions or alterations of channel hydraulics, including any undesired breaching of floodplain gravel pits, adequate low-flow and flood-flow buffers should be established at the time of initial site opening and maintained for the duration of mining activities. Specific criteria for low-flow and flood-flow buffers are presented below.

It explicitly should be recognized that while locating mine sites within the preferred areas depicted in Figure 8 and maintaining or constructing adequate buffers will lessen the probability of adverse erosion, avulsion, or inundation of the mine site during flood discharge events, field observations have demonstrated, that over time, almost all buffers will fail. Appropriate buffers can protect the mine site during actual mining operations and provide an important degree of protection to the site during initial post-mining stabilization and revegetation; however, mine site planning should assume that in the long-term the buffers eventually will fail. Optimally, mine sites should be located where maintenance of long-term buffers (post-mining) is not essential. Alternately, mine sites should be designed with the assumption that post-mining remedial work may be necessary to maintain channel morphology or the design features of the reclaimed site.

Low-flow Buffer Design

A low-flow buffer is a strip of undisturbed ground extending up the channel bank and beneath the water surface from the edge of the low, summer-flow stage (Figure 9). Maintenance of the low-flow buffer is intended to maintain the hydraulic integrity of the channel configuration and to minimize instream changes to aquatic habitat. Establishing

low-flow buffers is required for all scraping-type gravel mining operations within or adjacent to active stream channels. Maintenance of low-flow buffers is recommended for scraping operations within or adjacent to inactive or high-water flood channels to prevent unintended avulsion of the active stream channel into the scraped mine site.

Figure 10 depicts the configuration of low-flow buffers. The upslope boundary of the low-flow buffer is equal to the lesser (smaller) of the following two points:

- the point having an elevation 0.5 m (1.6 feet) above the summer, low-flow water surface elevation; or
- the point having a horizontal distance from the summer, low-flow water's edge that is equal to one-half the width of the channel's top at channel-full (bank-full) discharge.

The lower (below waterline) boundary of the low-flow buffer is a point on the stream bed that has a horizontal distance to the water's edge equal to 10 percent of the width of the channel's top at the summer, low-flow discharge.

Flood-flow Buffer Design

Flood-flow buffers are used to separate a material site from the active channel(s) and to prevent the diversion of flood waters through the material site (Figure 11). Ideally, the flood-flow buffer should comprise an undisturbed portion of the vegetated floodplain. Flood-flow buffers may also be appropriate for gravel pits located in coastal areas with actively eroding shorelines (if the reclamation objective is creation of a fresh-water habitat).

The flood-flow buffer should be of sufficient width to withstand anticipated hydraulic erosion and of sufficient height to withstand the design-flood discharge. Artificial buffers, consisting of river training structures or bank protection devices, may be necessary if an adequate natural buffer does not exist or if the adjacent vegetated floodplain is too low to be effective.

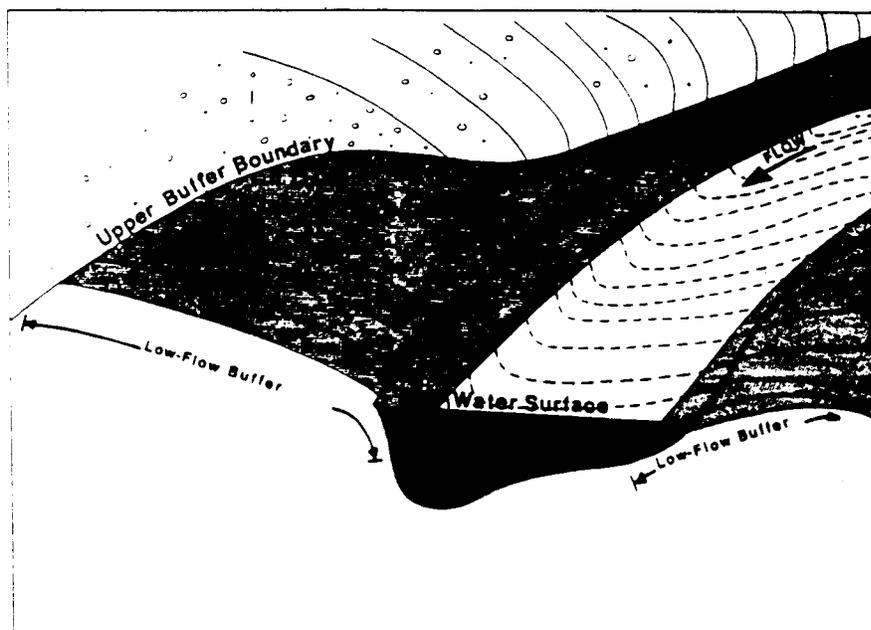


Figure 9. Schematic diagram of the low-flow buffer (from Joyce et. al. 1980).

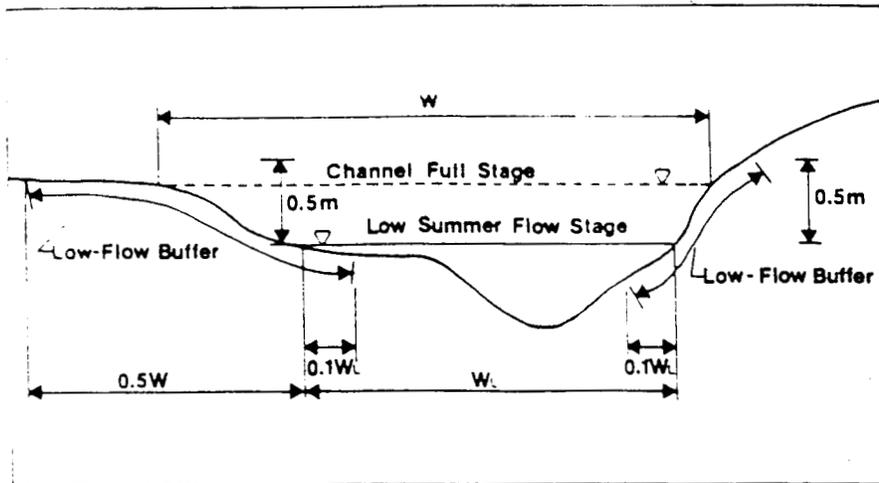


Figure 10. Schematic diagram showing low-flow buffer boundaries and dimensions (from Joyce et. al. 1980).

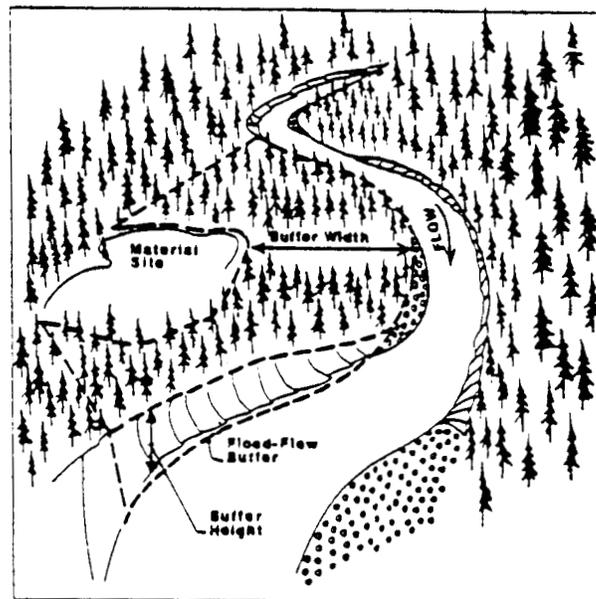


Figure 11. Schematic diagram of a flood-flow buffer (from Joyce et. al. 1980).

The selection of an appropriate flood-flow buffer depends on a number of variables, including:

- channel configuration,
- river size,
- hydrology (duration and intensity of flood events),
- alignment of the active stream channel(s),
- existence of aufeis in the stream adjacent to the material site,
- type and density of floodplain vegetation, and
- soil composition (including ice lenses).

Adequate site data are needed to develop a site-specific buffer design. A hydrology and hydraulic analysis should be performed to evaluate the predicted water surface elevation that will overtop the buffer for the design-flood event. It is also important to consider the erosion potential of the established buffer during the design-flood event. Peak hydrologic discharges within the NSB coastal plain generally occur during spring breakup. Soils are typically frozen solid at this time and may pose little actual risk to erosion of the buffer or possible channel avulsion. In the absence of detailed site information, the minimum flood-flow buffer widths and heights presented in Table 1 are recommended for split channel, meandering, sinuous, and straight rivers.

In all cases, flood-flow buffers adjacent to very large rivers (e.g., Colville River) or locations with extensive afeis should be developed on a site-specific basis using actual field data. Similarly, if insufficient room is available to establish the minimum recommended flood-flow buffer width and height or if the active channel is angled into the bank at an angle greater than 30 degrees, an alternative site should be selected or the buffer should be designed on a site-specific basis using actual field data.

Table 1. General flood-flow buffer guidelines.

Scraping Operations

Minimum design period for protection from flood waters = 5-year-flood event
 Optimum design period for protection from flood waters = 10-year-flood event

<u>River Size</u>	<u>Minimum Buffer Width</u>	<u>Minimum Buffer Height</u>
Small	15 m (50 ft.)	Equal to Water
Medium	35 m (116 ft.)	Surface Elevation @
Large	50 m (165 ft.)	5-Year Flood

Note: The width may be reduced to 50 percent of the recommended minimum at the downstream end of the scraped site.

Pit Excavations

Minimum design period for protection from flood waters = 20-year-flood event
 Optimum design period for protection from flood waters = 50-to-100 year flood event

<u>River Size</u>	<u>Minimum Buffer Width</u>	<u>Minimum Buffer Height</u>
Small	75 m (248 ft.)	Equal to Water
Medium	150 m (495 ft.)	Surface Elevation @
Large	250 m (825 ft.)	10-Year Flood

Note: The width may be reduced to 20 percent of the recommended minimum at the downstream end of the pit. The buffer width should not be reduced if the pit is located adjacent to an actively cutting bank. The buffer width should be increased by a factor of two or more if the pit is located adjacent to a stream with a high rate of historical meandering or channel shifting.

PART II

General Performance and Reclamation Guidelines

A site-specific mining and rehabilitation plan, with a schedule and engineering drawings, should be developed prior to applying for any permits for material source development. Mine site planning and development should follow the siting and operational matrixes and guidelines outlined in Part I. Additional background information and guidance for floodplain gravel removal sites is found in Joyce et. al, 1980.

Mining and reclamation plans should incorporate rehabilitation concurrent with all phases of mining operations (e.g., overburden extraction, gravel stockpiling, gravel washing), such that major reclamation features are in place at the conclusion of gravel removal. Rehabilitation features incorporated during the earliest stages of site planning and development will not only enhance the overall mining operations efficiency, but will also reduce the net costs of reclaiming the site for fish and wildlife benefits.

The reclamation plan should incorporate the following design guidelines for each identified type of material site.

General Guidelines

1. For sites that will be opened during the winter, all work area boundaries should be verified, surveyed, and marked prior to snow-cover and freeze-up to avoid subsequent accidental damage to active channels, buffer locations, and vegetated areas.
2. Actual site preparation and mining operations should be scheduled to avoid conflicts with sensitive biological resources and extreme hydrologic events.
3. Floodplain access design should consider the following factors:
 - a. To minimize disturbance to stream channels, the floodplain mining site should be located on the same side of the river as the location the material will be used.
 - b. Access routing through vegetated habitats should be minimized. If vegetated areas must be traversed during the summer, the organic layer should not be removed but covered with a layer of gravel to protect the underlying organic layer from mechanical ripping, tearing, and compaction. Upon mining completion, the access road gravel should be removed to within 10 cm (3.9 inches) or less of the surrounding topography. If a large amount of thaw subsidence is expected, the excavation depth may be decreased to 25 cm (10 inches) above the surrounding topography. If vegetated areas must be traversed during the winter and the mining operation will be completed within one season, the vegetated area should be left intact and an ice road constructed.
 - c. Floodplain access should occur at the inside of a meander to avoid traversing incised banks at the outside meander. Other incised cut banks should also be avoided.
 - d. Active channels should be crossed with an ice bridge or via temporary bridges, low-water crossings, or properly culverted access roads.
 - e. Unless approved as permanent structures in the reclamation plan, upon site closure, access roads, culverts, and bridges should be removed and the disturbed area restored to approximate the original site contours.

- f. All cut slopes created by gravel removal activities or by construction of access roads should be stabilized to prevent thermal, fluvial, and wind erosion.
4. Overburden, including the surface organic layer, should be stockpiled in a manner that minimizes overall project impacts and allows for use of the overburden for on-site reclamation when the site is no longer needed as a material source.
5. Upon completion of mining, overburden from floodplain and terrestrial storage areas should be removed so that the original site contours and elevations are reestablished (i.e., material is removed to re-expose the buried vegetation/organic layer).
6. Excess overburden should be stabilized and revegetated. Where appropriate [see (a-d) below], organic debris and overburden should be spread over the disturbed site to promote revegetation. Natural revegetation is preferred to the extent practicable. Fertilizing adjacent areas may be necessary to increase natural seed production. Native seed collected from adjacent areas may be sown on overburden as well. Final placement of excess overburden is subject to the following guidelines:
 - a. In braided river systems, excess overburden (if any) should be placed outside the active floodplain.
 - b. In meandering, sinuous, split, and straight channel river systems, excess overburden may be placed within the active floodplain but should be located away from the active channel(s) in areas of minimal hydraulic erosion. Overburden piles should be configured long and narrow with the long axis oriented parallel to the direction of water flow. If hydraulic erosion is expected, the active side of the overburden should be armored to prevent bank erosion.
 - c. In inactive floodplains and river terraces not subject to annual flooding, excess overburden should be spread evenly over the disturbed site to an optimum depth of 10 cm (4 inches).
 - d. In pit-excavated sites (both floodplain and non-floodplain) which will be flooded, excess overburden, vegetated slash and debris should be distributed in the flooded portion of the pit and around the pit perimeter to provide nutrients and cover habitat. Slope contours in both the flooded and non-flooded portions of the pit should blend with surrounding features and follow the guidelines presented later in this section for bank slope, depth, and shoreline configuration in flooded gravel pit material sites. Excess mined material should be used to form islands or vary water depths within the flooded pit.
7. Existing drainage channels in areas affected by the operation should be kept free of overburden.
8. All human-generated debris should be removed from the site.

Specific Guidelines

Abandoned Gravel Fill (Pads and Roads) Material Sites

Objectives: Re-establish wetland habitats through natural thermokarst/thaw lake cycles.

1. For gravel pad fills overlying lightly-compressed organic mats, gravels should be removed to within 10 cm (3.9 in) or less of the underlying organic layer to expose *in situ*

hydric soils and initiate a natural process of thaw subsidence and wetlands creation. Gravel roads should not be removed in their entirety if there is a high probability of subsidence that would lead to establishment of a new drainage channel along the length of the road alignment. Gravel road fills should be removed in an alternating "hop-scotch" pattern to reestablish unrestricted surface flows and create a patch sequence of wetland complexes.

2. For gravel fills overlying highly-compressed or non-existent (bladed) organic mats, gravels should be removed to a depth appropriate to allow natural revegetation of the site. Complete removal of gravel to the natural grade is not always necessary to reestablish wetland habitats. Adequately revegetated surfaces will gradually subside from thaw consolidation of permafrost soils and acquire the wetland hydrology of the surrounding area. Gravel removal below the natural grade will potentially pond waters and accelerate thaw subsidence, providing an inadequate surface for seedling re-establishment.
3. Thaw-subsidence ponds may benefit from fertilization of adjacent wetland vegetation to promote seed generation for more rapid revegetation of disturbed sites. On a case-by-case basis, additional benefits for select species may be obtained by seeding and transplanting "plugs" of indigenous emergent aquatics (e.g., *Carex*, *Arctophila*) into the reclaimed shallow-water, wetland habitats early in the successional process. In general, however, the primary emphasis of reclamation activities should focus on promoting rapid, natural recovery of indigenous vegetation.

Non-floodplain Material Sites (Not Connected to a Waterbody)

Objectives: Reestablish wetland habitat with suitable features for waterfowl and shorebirds, including nesting and loafing habitats.

1. After mining is completed, material sites should be rehabilitated to establish productive wildlife habitat. Sites should be sloped and contoured immediately following completion of each aliquot part or the entire operation, as appropriate.
2. Terrace pit excavations that will not be connected to the active channel should be protected from a 20-year flood event by using an adequate buffer (see Part I - Flood-flow Buffer Criteria). Sites with inadequate natural buffers should be protected from flood waters with suitable diking that will withstand at least a 20-year flood event. Where feasible, the diking should be revegetated to resist erosion and reestablish riparian habitat.
3. Where feasible, shallow scrap material sites should be graded to impound surface waters into one or more shallow basins. Shallow ponds generally thaw prior to deeper ponds - interconnected ponds yet sooner - and may be utilized preferentially by waterfowl and shorebirds.
4. Optimally, 30 to 50 percent of the total excavated area that will be inundated with water should be less than 2 m (6 ft) deep with a gradual shoreline slope between 10:1 and 20:1. To provide suitable conditions for emergent vegetation, at least 30 percent of the area should be less than 1 m (3 ft) deep, with nearshore zones less than 50 cm (20 in). Bank sloping will reduce bank sloughing and potential denning sites for waterfowl predators.
5. Shoreline length and diversity should be maximized to the extent practicable by establishing an irregular shoreline with bays, spits, and islands. Generally, the greater the ratio of shoreline-to-surface area, the more productive the rehabilitated site will be.

for wildlife. Prior planning can incorporate edge sculpting into the mine plan to minimize costs while creating the best possible pond design.

6. Islands suitable for waterfowl and shorebird nesting/loafing should be created to the extent practicable. Optimal island design criteria for waterfowl are as follows:
 - a. Slopes (transition zones from deep water to islands) should be no greater than 10:1 (optimal 20:1);
 - b. Large islands [optimum size 396 m² (0.1 acres) or larger] with dense vegetative cover are preferred by ducks for nesting;
 - c. Small islands [as small as 3 m by 3 m (10 ft by 10 ft) - less for loons] with low vegetation are preferred by geese and loons for nesting;
 - d. The minimum distance from shore to islands should be 9 m (30 ft) to minimize mammalian predation. Water depths in the channel separating the island from the mainland should be deep enough to discourage predator transit at anticipated water levels during the June/July breeding season;
 - e. Maximum elevation of islands should not exceed 1 m (3 ft) [optimum - 0.5 m (1.5 ft)] above mid-summer water levels or 0.3 m (1 ft) above annual high water levels. Regulation of outlet water levels may be desirable to maintain water levels which ensure nesting success. Islands higher than 1 m (3 ft) preferentially may attract predacious glaucous gulls;
 - f. Islands should be located on the upwind end of the pond. Ideally, the islands should be U-shaped with the mouth of the cove facing leeward to the prevailing wind. As a second choice, the islands should be rectangular in shape and oriented with the long axis parallel to prevailing winds;
 - g. Irregularly shaped islands are preferred and should be located in close proximity to open water and areas with emergent vegetation for waterfowl use; and
 - h. Loafing areas (e.g., these could be gravel islands) should have sparse vegetative cover to allow waterfowl to exit the water and have visibility in all directions.
7. Disturbed areas may benefit from fertilization of adjacent wetland vegetation to promote seed generation. On a case-by-case basis, additional benefits for select species may be obtained by seeding and transplanting "plugs" of indigenous emergent aquatic vegetation (e.g., *Carex*, *Arctophila*) into the reclaimed shallow water zones. On land, moist shore zones dominated by wetland grasses are more suitable for waterfowl than barren, dry shore zones.

Flooded Gravel Pit Material Sites (Interconnected to a Fish-bearing Waterbody)

Objectives: Establish fish overwintering and/or rearing habitats and waterfowl/shorebird nesting and loafing habitats.

1. If feasible, the site should be developed in small aliquots with rehabilitation completed prior to or concurrent with opening additional aliquots;
2. During active mining, the site should be isolated from adjacent waters. Upon completion of mining, all perimeter berms should be removed and the material graded back into the

mined area in a manner that establishes a shallow-water zone less than 0.5 m (1.6 ft) deep around the site perimeter. Berms are not necessary for water control if the mine site will be mined and rehabilitated during a single winter season (i.e., rehabilitation completed prior to spring breakup).

3. Substrate materials in the shallow-water zone should be appropriate to support emergent vegetation and should include plant propagules where practicable. On a case-by-case basis, additional benefits may be obtained by seeding and transplanting "plugs" of indigenous emergent aquatic vegetation (e.g., *Carex*, *Arctophila*) into the reclaimed shallow water zones.
4. Ideally, approximately 20 to 25 percent of the gravel sites total surface area should be maintained as littoral habitat less than 2 m (6 ft) deep. To promote development of emergent vegetation, approximately 20 percent of the total area should be less than 1 m (3 ft) deep.
5. Shoreline length and diversity should be maximized to the extent practicable by establishing an irregular shoreline with bays, spits, and islands. Generally, the greater the ratio of shoreline-to-surface area, the more productive the rehabilitated site will be for fish and wildlife. Prior planning can incorporate edge sculpting into the mine plan to minimize costs while creating the best possible pond design.
6. The final reclamation should incorporate islands suitable for waterfowl and shorebird nesting/loafing to the extent practicable. Aliquots developed within the same general area should be connected upon completion of mining such that islands are created within the resultant lake. Island design criteria for waterfowl are as follows:
 - a. Transition slopes from deep water to islands should be no greater than 10:1 (optimal 20:1);
 - b. Large islands [optimum size 396 m² (0.1 acres) or larger] with dense vegetative cover are preferred by ducks for nesting;
 - c. Small islands [as small as 3 m by 3 m (10 ft by 10 ft) - less for loons] with low vegetation are preferred by geese and loons for nesting;
 - d. The minimum distance from shore to islands should be 9 m (30 ft) to minimize mammalian predation;
 - e. Maximum elevation of islands should not exceed 1 m (3 ft) [optimum - 0.5 m (1.5 ft)] above mid-summer water levels or 0.3 m (1 ft) above annual high water levels. Regulation of outlet water levels may be desirable to maintain water levels which ensure nesting success. Islands higher than 1 m (3 ft) preferentially may attract predacious glaucous gulls;
 - f. Islands should be located on the upwind end of the pond. Ideally, the islands should be U-shaped with the mouth of the cove facing leeward to the prevailing wind. As a second choice, the islands should be rectangular in shape and oriented with the long axis parallel to prevailing winds;
 - g. Irregularly shaped islands are preferred by waterfowl and should be in close proximity to open water and areas with emergent vegetation for waterfowl use; and

- h. Loafing areas (e.g., these could be gravel islands) should have minimal vegetative cover to allow waterfowl to exit the water and have visibility in all directions.
7. If a flooded gravel pit is intended to support overwintering fish, the final pit bathymetry should have a minimum depth of at least 9 m (30 ft) encompassing 25 to 50 percent of the total surface area.
8. The pond bottom should not be graded smooth but should be left irregular with sharp changes in elevation. Bathymetric diversity provides fish with resting and escape cover and creates greater surface area for production of invertebrate forage species.
9. Continuous open-water access between the flooded pit and stream system should be maintained through a permanent outlet connection. The outlet connection should be selected based on site-specific characteristics of the gravel site and waterbody affected but, in general, should conform to the following:
 - a. Existing drainage channels should be incorporated in the site design as outlet channels to the maximum extent possible.
 - b. All outlet channels should be on the pit's downstream side to prevent premature degradation of the stream channel and pit.
 - c. Outlet channels should be deep enough to allow fish passage during low-flow conditions.
 - d. Outlet channels should be connected to a non-depositional area of the active channel and be angled downstream. They should also incorporate specific design measures that minimize long-term sedimentation and maintenance.
 - e. Outlet channels should not be in a straight-line configuration.
 - f. Outlet channels should be constructed to minimize river siltation. If an existing channel is utilized, a "soft plug" should be used during actual gravel extraction activities to isolate the site from the river.

Additional Factors to Consider in the Rehabilitation of Flooded Gravel Pits for Fish

1. Basic requirements of fish in North Slope lakes and ponds include a connection to a stream or river and sufficient primary and benthic production to support fish.
2. Peat/tundra drainage waters tend to be high in iron. Iron binds phosphorous which makes the phosphorus less readily available for primary production.
3. Phytoplankton production is limited by phosphorous levels in arctic waters. Because phytoplankton abundance is generally low, little zooplankton production occurs.
4. Primary production in lakes and ponds is dominated by emergent aquatics. The contribution of plankton to the annual carbon budget is minor by comparison to the contribution from emergent aquatic vegetation.
5. Sediment/detritus food webs are well developed, largely as a result of emergent aquatic vegetation. Given the importance of emergent aquatics to establishing a functioning food web, accelerated benefits may be obtained by seeding or transplanting "plugs" of

indigenous emergent aquatics (e.g., *Carex*, *Arctophila*) within the reclaimed littoral habitat.

Active Stream Channel Material Sites (Scraping Operations)

Objectives: Minimize channel morphology alterations; provide instream cover habitat for fish.

1. If the low-flow buffer was disturbed by equipment, upon completion of mining the buffer should be returned to its natural configuration and height.
2. At side channel sites which have been diked to exclude surface waters, final reclamation should include removing the downstream dike and lowering the upstream dike to an elevation corresponding to the annual flood river stage. This will prevent large quantities of sediment from being washed from the site into the river during low-flow conditions.
3. Unused, oversized gravels or cobbles, root wads, and other site material, when available, should be distributed over the surface of the gravel removal area. This will provide for a more rapid armoring of the disturbed area and provide instream cover habitat for several species of fish.

Active Stream Channel Mine Sites (Dredging Operations)

Objectives: Minimize channel morphology alterations; provide suitable ponded and backwater rearing habitat for fish.

1. Active stream channels scheduled for winter dredging should be evaluated for the presence of flowing water in and downstream of the mine site. If water is found, the site should not be mined. In general, operations are preferable during summer low-flow conditions when working conditions are optimal and active stream channels can be identified and isolated. In addition, summer stream flow conditions may be environmentally preferable to winter when low-flow conditions may be inadequate to carry and flush the additional bedload contributions, and overwintering fish may be impacted if they are unable to relocate.
2. The excavation depth in an active channel should be limited by the width of the summer low-flow channel minus the low-flow buffer. The side slopes should be designed to remain stable during a 5-year flood event.
3. The length of excavation within a pool in the active main channel should not exceed the overall length of the pool. If a riffle is to be dredged, the length of excavation should not exceed the average length of the pools within 5 km (3.1 miles) upstream and downstream from the mine site.
4. To minimize the potential for streambed degradation, the bed slopes of the upstream and downstream ends of the active channel excavation should be designed to remain stable during a 5-year flood event.
5. If the low-flow buffer was disturbed by equipment, the disturbed area should be returned to its natural configuration and height upon completion of mining operations.

PART III

Model NSB Coastal District Policies

Advisory: *The following conceptual amendments of the NSB Coastal District Program, as augmented by the specific requirements of the State's Mining Reclamation Act (AS 27.19 and 11 AAC 97) and other applicable provisions of the NSB Coastal District Plan and statewide ACMP provisions (6 AAC 80), are intended to provide a minimum standard of review for gravel extraction activities within the NSB.*

As indicated in the Application of Guidelines section, the conceptual amendments are presented for discussion purposes only. The proposed amendments do not represent a consolidated state agency position and do not establish a regulatory regime. Inclusion of the conceptual amendments in this publication does not constitute a "public review" of the proposed revisions. Future revisions, if any, of the NSB's approved coastal district plan must be initiated by the NSB and will be subject to full public review under the applicable provisions of 6 AAC 80.020

Conceptual District Plan Amendments

- Policy 2.4.3(j) Gravel extraction activities are prohibited on barrier islands.
- Policy 2.4.5.1(j) Mining of coastal waters and lagoons, beaches, [BARRIER ISLANDS], coastal salt marshes, spits, or offshore shoals. In those circumstances where no feasible and prudent alternatives exist, substantial alteration of shoreline dynamics, coastal processes, and fish migration is prohibited. All adverse impacts on fish and wildlife resources must be fully mitigated.
- Policy 2.4.5.1(l) Whenever technically and economically feasible, abandoned drill pads, roads, airstrips, etc. should be used as a preferred gravel source in lieu of development of a new gravel extraction site.
- Policy 2.4.5.2(a) Mining (including sand and gravel extraction) in the coastal area shall be evaluated with respect to type of extraction operation, location, possible mitigation measures, and season so as to avoid or lessen, to the maximum extent practicable, environmental degradation of coastal lands and waters (e.g., siltation of anadromous rivers and streams). Evaluation of the alternative with the least environmental impacts should consider both adverse and positive (e.g., habitat enhancement) effects of the activity.
- Policy 2.4.5.2(b) Development activities, including associated access roads and material sites, [IS] are required to be located, designed, and maintained in a manner that prevents significant adverse impacts on fish and wildlife and their habitat, including water circulation and drainage patterns and coastal processes. To the extent feasible and consistent with other applicable provisions of this chapter and the expected land use following cessation of the development activity, projects should be

designed, constructed, and reclaimed to enhance fish and wildlife resources, with particular emphasis on species of subsistence and other human-use importance.

Policy 2.4.5.2(d)

To the extent feasible and prudent, gravel extraction activities [WITHIN FLOODPLAINS] must be sited to avoid high value habitats and must include, where appropriate, the following best management practices:

(1) [SHALL] maintain suitable buffers or dikes to segregate [BETWEEN ACTIVE CHANNELS AND THE] the work area and flowing waters,

(2) avoid [INSTREAM] floodplain work that would result in permanent channel shifts, entrapment of fish [AND PONDING OF WATER, CLEARING OF RIPARIAN VEGETATION,] and disturbance of natural banks,

(3) Mine siting should consider the length, location, and other impacts of access roads. Where feasible, mined areas should be located on the same side of a stream as the access road to minimize stream crossings.

(4) Vegetated areas within floodplains should not be disturbed when sufficient quantities of gravel can be obtained in unvegetated areas of floodplains. Where removal must occur in vegetated areas, preference should be given to locations in dominant, homogenous vegetative communities.

(5) All overburden and vegetative slash and debris must be saved for use during site reclamation to facilitate vegetative recovery. This material must be piled or broadcast in a manner so that it will not be washed downstream, and

(6) Where feasible, site configuration should avoid use of long straight lines. Sites should be shaped to blend with physical features and surroundings.

PART IV

Draft General Concurrence (GC) Proposal

Advisory: As indicated in the Application of Guidelines section, the following draft general concurrence proposal is presented for information and discussion purposes only. The general concurrence proposal does not represent a consolidated state agency position and does not establish a new regulatory regime. Inclusion of the draft proposal in this publication does not constitute a "public review" of the proposed general concurrence. A formal public review will be initiated by the Division of Governmental Coordination in late 1993 as a possible regulatory revision under 6 AAC 50.050(e)

General Concurrence GC- _____

The following activity is consistent with the Alaska Coastal Management Program as per 6 AAC 50.050(c) and (e) when conducted according to the standard conditions listed below. This approval does not relieve the applicant from obtaining required permits and approvals from local, State, and federal individual agencies.

DESCRIPTION OF THE ACTIVITY

New material site development or expansion of an existing material site on state, federal, and private lands.

Exploration sampling, equipment movements, instream fords, and culvert installations may be authorized under GC-5, GC-5A, GC-7, GC-18, GC-19, GC-24, and other applicable GC's or Nationwide Permits to define the entire project. Gravel mining operations requiring approvals only under AS 27.19 may be authorized under GC-29. However, applicants proposing fish and wildlife enhancement alternatives as an authorized post-mining land use under AS 27.19.030(b) are encouraged to apply under this GC.

Authority: AS 16.05.840 11 AAC 93
AS 16.05.870 11 AAC 97
AS 27.19 43 CFR 2920
AS 38.05.850 43 CFR 8372
5 AAC 95.010

Permits: Fish Habitat Permit (DF&G)
Mining Reclamation Plan Approvals (DNR)
Land Use Permit (DNR)
Miscellaneous Land Use Permit (DNR)
National Petroleum Reserve-A-Permit (BLM)
FLPMA Land Use Permit (BLM)
COE NWP ??? (To Be Developed)

Region: North Slope Borough Coastal District

PROCEDURE

The provisions of the federal and State Endangered Species Acts and the federal Marine Mammal Protection Act must be adhered to at all times. The Endangered Species Act provides that there will be no activity permitted that jeopardizes the continued existence of an endangered species or results in the destruction or adverse modification of habitat of such species. The applicant is advised to contact the Anchorage U.S. Fish and Wildlife Service, Endangered Species Office (786-3542), for additional information on endangered species.

The Marine Mammal Protection Act provides that there will be no intentional disturbance, harassment, catching, or killing of marine mammals. However, a 1981 amendment to the Marine Mammals Protection Act authorizes the Secretary, U.S. Department of Interior, or the Secretary, U.S. Department of Commerce, under certain conditions, to allow U.S. citizens to take small numbers of marine mammals from non-depleted stocks incidentally, but not intentionally, in specified areas. The applicant is advised to obtain this authorization before conducting any operations in or near coastal areas. For further information, the applicant is urged to contact the Anchorage office of the U.S. Fish and Wildlife Service (786-3542) and National Marine Fisheries Service (271-5006).

DNR will consult with DF&G during review of the required reclamation plan (AS 27.19) to determine compliance with Standard Condition #1.

STANDARD CONDITIONS

1. Gravel mine sites shall be located and reclaimed in accordance with the applicable provisions of the DF&G Technical Report 93-9, "North Slope Gravel Pit Performance Guidelines," dated June 1993.
2. If items of archaeological site or paleontological value are discovered, the permittee must notify the DNR, and may not resume activities under this general concurrence until written approval from DNR is given.

Literature Cited

- Craig, P.C. 1987. Anadromous fishes in the Arctic environment -- precarious or relatively stable existence. Report by LGL Ecological Research Associates, Inc. Anchorage, AK. 56 p.
- Hemming, C.R. 1988. Aquatic habitat evaluation of flooded North Slope gravel mine sites (1986-1987). Alaska Department of Fish and Game, Habitat Division Technical Report No. 88-1. Juneau, AK. 69 p.
- Jorgenson, M. Torre, Timothy C. Cater, and Laura L. Jacobs. 1991. Wetland Creation and Revegetation on an Overburden Stockpile at Mine Site D, Kuparuk Oilfield, Alaska, 1991. First Annual Report. Alaska Biological Research, Inc. Prepared for ARCO Alaska, Inc. and the Kuparuk River Unit. Fairbanks, Alaska. 16 p.
- Joyce, M.R., L.A. Rundquist, and L.L. Moulton. 1980. Gravel removal guidelines manual for arctic and subarctic floodplains. FWS/OBS-80/09. USDI:USFWS. 403 p.
- Pamplin, W. Lewis. 1979. Construction Related Impacts of the Trans-Alaska Pipeline System on Terrestrial Wildlife Habitats. Joint State/Federal Fish and Wildlife Advisory Team, Special Report No. 24.
- Post, Roger A. 1991. Restoring Alaska's Wetlands. National Wetlands Newsletter, July/August 1991 Issue.
- Schmidt, D.R., W.B. Griffiths, and L.R. Martin. 1987. Importance of anadromous fish overwintering habitat in the Sagavanirktok River delta, Alaska. Prepared by LGL Research Associates, Inc. for Standard Alaska Production Co. and the North Slope Borough. Anchorage, AK. 71 p.
- Stutek Services, Ltd. and Kellerhals Engineering Services, Ltd. 1989. Assessing Gravel Supply and Removal in Fisheries Stream. Prepared for the Department of Fisheries and Oceans and the B.C. Ministry of Environment. Vancouver, B.C.
- Winters, Jack F. 1990. Goose Green Gulch: Fish and Wildlife Habitat in a Former Gravel Mine Site. Alaska Department of Fish and Game, Habitat Division Technical Report No. 90-1. Juneau, AK. 31 p.

APPENDIX 1

1989 Preliminary ADF&G Guidelines for Fish and Wildlife Habitat Rehabilitation of North Slope Gravel Sites

1. Site selection should consider both upland and floodplain sources, with the overall objective to minimize loss of existing high value fish and wildlife habitat. At this stage, consideration should be given to such factors as fish and wildlife habitat, including the importance and quality of existing habitat, the amount of habitat to be lost in relation to its total availability, enhancement opportunities, quality and quantity of materials available, future uses of the site, and the economics of site development, operation, and rehabilitation.
2. A site-specific rehabilitation plan, with a schedule and engineering drawings, should be developed and approved prior to issuance of any permits for the development of a material source. Mining plans should incorporate rehabilitation concurrent with all phases of the mining operation (e.g., overburden extraction, gravel stockpiling, gravel washing, etc.) such that major features of the rehabilitated site are in place at the conclusion of gravel removal.
3. The rehabilitation plan for a gravel site that will be flooded following gravel removal should incorporate the following basic concepts:
 - a. The site should be developed in small aliquots with rehabilitation completed prior to or concurrent with opening of additional aliquots;
 - b. During active mining for more than one season, the site should be isolated from adjacent waters with berms of overburden or other materials. Upon completion of mining, all perimeter berms should be removed and the material graded back into the mined area in a manner that establishes a shallow-water zone less than 0.5 m deep around the site perimeter. If the mine site will be mined and rehabilitated during a single winter season, berms are not necessary. Substrate materials in the shallow-water zone should be appropriate to support emergent vegetation and should include plant propagules where practicable.
 - c. Approximately 20 to 25 percent of the total surface area of the gravel site should be maintained as littoral habitat [i.e., water depth less than 2 m (6 ft) deep].
 - d. Shoreline length and diversity should be maximized by establishing an irregular shoreline with bays, spits, and islands. Generally, the greater the ratio of shoreline to surface area, the more productive the rehabilitated site will be for fish and wildlife.
 - e. Criteria for design for waterfowl islands are as follows:
 - (1) Slopes (transition zones from deep water to islands) should be no greater than 10:1 (optimal 20:1);
 - (2) Large islands [optimum size 396 m² (0.1 acres) or larger] with dense vegetative cover are preferred by ducks for nesting;

- (3) Islands as small as 3 m by 3 m (10 ft by 10 ft) with low vegetation are preferred by geese for nesting;
 - (4) The minimum distance from shore to islands should be 9 m (30 ft) to minimize mammalian predation;
 - (5) The maximum elevation of islands above mid-summer water levels should be 1 m (3 ft);
 - (6) Islands should be roughly rectangular, with an irregular shoreline, and oriented with the long axis parallel to prevailing winds;
 - (7) Optimally islands should be sited in proximity to open water and areas with emergent vegetation for waterfowl use; and
 - (8) Loafing areas, which could also be gravel islands, should have minimal vegetative cover, allowing waterfowl to exit the water but have visibility in all directions.
- f. The minimum depth for a flooded gravel pit that will provide fish overwintering habitat should be 30 feet, with that depth encompassing 25 to 50 percent of the total surface area;
 - g. Continuous open-water access between the flooded pit and stream system should be maintained via a permanent connection. Inlet and outlet connections should be selected based on site-specific characteristics of the gravel site and waterbody affected. Existing drainage channels should be incorporated in the site design as inlet or outlet channels to the maximum extent possible. Inlet/outlet connections should be designed to minimize long-term sedimentation and maintenance;
 - h. Overburden, including the surface organic layer, should be stockpiled and disposed of within the limits of the mine area so that the area of impact outside the active mine is minimized. The quantity of overburden to be replaced within the pit will vary with the individual site. Material should be distributed such that it provides a substrate for the establishment of aquatic plants and associated benthic communities;
 - i. Removal of overburden from terrestrial storage should be accomplished so that the original site contours and elevations are reestablished (i.e., material is removed to re-expose the buried vegetation/organic layer);
 - j. Excess overburden should be stabilized, possibly graded to retain moisture (e.g., perched wetlands), and revegetated (e.g., seed bed preparation and fertilization) to accomplish natural revegetation to the extent practicable. Fertilization of adjacent natural wetlands should be conducted, where deemed necessary, to increase natural seed production;
 - k. Aliquots developed within the same general area should be connected upon completion of mining of each aliquot in such a manner that islands are created with an elevation above water surface of less than 1 m (3 ft) at mid-summer water levels;

1. Basic biological monitoring should be conducted to evaluate the effectiveness of rehabilitation for various fish and wildlife species and to monitor changes in habitat characteristics with time. Monitoring should be conducted at each site and should be designed in such a manner that long term (10-plus years) historical data base is obtained.

INFORMATION SOURCES USED IN DEVELOPMENT OF THESE PRELIMINARY GUIDELINES

- Gertler, P.E. 1989. Letter to A.G. Ott (ADF&G) dated July 28, 1989. U.S. Fish and Wildlife Service. Fairbanks.
- Hemming, C.R. 1988. Aquatic Habitat Evaluation of Flooded North Slope Gravel Mine Sites (1986-1987). Habitat Division Technical Report No. 88-1. Alaska Department of Fish and Game. Juneau.
- Hemming, C.R., P.K. Weber, and J.F. Winters. 1989. Limnological and Fisheries Investigations of Flooded North Slope Gravel Mine Sites, 1988. Habitat Division Technical Report No. 89-1. Alaska Department of Fish and Game. Juneau.
- Jorgenson, M.T. 1989. An Overview of Rehabilitation Research in the Kuparuk Oilfield. Final Report. Prepared for ARCO Alaska, Inc., and Kuparuk River Unit by Alaska Biological Research, Inc. Fairbanks.
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- Rosenberg, Dan. 1989. Personal Communication. Wildlife Conservation Division. Alaska Department of Fish and Game. Anchorage.

APPENDIX 2. Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Alberta	Allan Locke Habitat Biologist Alberta Forestry, Lands and Wildlife 9945 108th Street Edmonton, Alberta T5K 2G6	(403) 427-6734	Fisheries Habitat Protection Guideline #5: Extraction of Sand and Gravel From or Near Watercourses North American Wetlands Conservation Council (Canada): Wetland Evaluation Guide, Issues Paper No. 1992-1 North American Wetlands Conservation Council (Canada): Implementing "No Net Loss" Goals to Conserve Wetlands in Canada, Issues Paper No. 1992-2
Arizona	Eric Swanson Arizona Game and Fish Department Environmental Compliance Program 2221 West Greenway Road Phoenix, Arizona 85023	(602) 789-3607	AGFD Wildlife and Wildlife Habitat Compensation Policy Executive Order No. 91-6: Protection of Riparian Areas Riparian Protection Program Statutes Executive Order No. 89-16: Streams and Riparian Resources Arizona Department of Environmental Quality is preparing "Best Management Practices for Sand and Gravel Operations" (Draft). Final due by the end of 1993. ADEQ Contact: Kris Randau (602) 207-4510
Arkansas	Steve N. Wilson, Director Game and Fish Commission 2 Natural Resource Drive Little Rock, Arkansas 72205		General Information and Copy of COE General Permit 09044-GJ
British Columbia	G.R. Armstrong, Deputy Minister Ministry of Environment, Lands and Parks Parliament Buildings Victoria, British Columbia V8V 1X4		Referred to Ministry of Energy, Mines and Petroleum Resources

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
California	Susan Weber, Chief Counsel Department of Water Resources P.O. Box 942836 Sacramento, California 94236	(916) 653-5791	Referred to Department of Conservation
California	John L. Turner, Acting Chief Environmental Services Division California Department of Fish and Game P.O. Box 944209 Sacramento, California 94244	(916) 653-4875	Surface Mining and Reclamation Act of 1975 Final Proposed Reclamation Standards Regulations (Oct. 22, 1991) "Fluvial Geomorphology and River-Gravel Mining: A Guide for Planners" "Surface and Groundwater Management in Surface Mined-Land Reclamation" "Gravel Mining" (Excerpts from California Department of Fish and Game Environmental Services Field Manual, 1989)
California	Edward A. Heidig, Director Division of Mines and Geology Department of Conservation 801 K Street, MS 24-01 Sacramento, California 95814	(916) 322-1080	California Surface Mining and Reclamation Act "Fluvial Geomorphology and River Gravel Mining: A Guide for Planners" "Surface and Groundwater Management in Surface Mined-Land Reclamation" "Revegetation of Disturbed Land in California: An Element of Mined-Land Reclamation"
Canada (general)	G.E. Swanson, Director Policy and Programs, Habitat Management. Department of Fisheries and Oceans Ottawa, Ontario K1A 0E6	(613) 991-1280	"Assessing Gravel Supply and Removal in Fisheries Streams." (Applicable to British Columbia)" Guidelines for Assessment and Review of River Engineering and Stream Maintenance Works" (Applicable to Nova Scotia)

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Colorado	Donald G. Smith Wildlife Program Specialist Division of Wildlife Department of Natural Resources 6060 Broadway Denver, Colorado 80216	(303) 297-1192	Colorado Wildlife Commission Mitigation Policy and Procedures and Guidelines Colorado Mined Lands Reclamation Division Mineral Permits - Procedures and Guidelines Guidelines for Compliance with Fish and Wildlife Requirements of the Colorado Mined Land Reclamation Board for Coal Mining Technical Review Guidelines for Gravel Mining Activities Within or Adjacent to 100-Year Floodplains (1987) "Development of Aquatic Habitat Potential of Gravel Pits" "Sand and Gravel Pits as Fish and Wildlife Habitat in the Southwest" "Sand and Gravel Mining and Reclamation to Benefit Wildlife" "Wildlife: User Guide for Mining and Reclamation"
Colorado	Steve Norris, Assistant Director Department of Natural Resources 1313 Sherman St., Room 718 Denver, Colorado 80203		Referred to Division of Wildlife and the Mined Land Reclamation Div.
Delaware	William C. Wagner II, Director Division of Fish and Wildlife Department of Natural Resources and Environmental Control P.O. Box 1401 Dover, Delaware 19903		No Provisions Governing Gravel Mining Operations.

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Delaware	Earl Shaver, Envir. Engineer Dept. Natural Resources and Environmental Control Division of Soil and Water Conservation P.O. Box 1401 Dover, Delaware 19903	(302) 739-4411	7 Del. C., Chapter 60, Section 3038 Draft Regulations (Target effective date Fall 1993)
Florida	Joseph Bakker, Chief Bureau of Mine Reclamation 2051 East Dirac Drive Tallahassee, Florida 32310		No Gravel Mining Regulations. Regulations Provided for Phosphate Mine Reclamation.
Florida	Tim King Reclamation Project Biologist Office of Environmental Services Florida Game and Freshwater Fish Commission 3900 Drane Field Road Lakeland, Florida 33811	(813) 648-3203	Guidelines for Compensatory Wetlands Mitigation: Workshop on Wetlands Creation and Mitigation, 1988 "Economic Considerations Affecting Wildlife Habitat Reclamation in Florida's Phosphate Mining Industry" "Landscape System Planning and Permitting for Fish and Wildlife Habitat Reclamation on Florida's Phosphate Mined Lands" "Opportunities for Improving Habitat Reclamation Planning in Florida's Phosphate Mining Industry" "Establishing Wildlife Habitat Features on Phosphate Mined Lands" "Mitigation for Fish and Wildlife Habitats on Mined Lands" "A Systems Planning Approach for Florida Phosphate Mine Reclamation" "Slash and Turn" (A paper describing the use of disturbed and reclaimed native sites as standards for evaluating reclamation success on mined sites) "An Evaluation of Xeric Habitat Reclamation at a Central Florida Phosphate Mine"

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Florida (continued)			"Habitat Reclamation Guidelines: A Series of Recommendations for Fish and Wildlife Habitat Enhancement on Phosphate Mined Lands and Other Disturbed Sites" (Florida Game and Freshwater Fish Commission)
Idaho	John T. Heimer Idaho Fish and Game P.O. 25 Boise, Idaho 83707		No information; referred to Department of Lands
Georgia	William H. McLemore, State Geologist Georgia Department of Natural Resources 205 Butler Street, SE Atlanta, Georgia 30334	(404) 656-3214	Georgia Surface Mining Act of 1968 Surface Mining Regulations
Hawaii	Ron Walker, Acting Administrator Division of Forestry and Wildlife Department of Land and Natural Resources 1511 Punchbowl St. Honolulu, Hawaii 96809		No materials or applicable rules or regulations relating to gravel mining
Iowa	John Beamer, Chief Land Acquisition Department of Natural Resources Wallace State Office Building Des Moines, Iowa 50319	(515) 281-5145	No information - DNR "not involved in mining operations"; contact Department of Soil Conservation

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Kansas	Robert D. Wood, Wildlife Ecologist Environmental Services Section Department of Wildlife and Parks RR2, Box 54A Pratt, Kansas 67124	(316) 672-5911	No Direct Regulatory Authority; gravel mining activities regulated by Division of Water Resources
Kentucky	David E. McChesney, Wildlife Biologist Department of Fish and Wildlife Resources 1 Game Farm Road Frankfort, Kentucky 40601	(502) 564-5448	Kentucky Regulations for the Protection of Fish and Wildlife Resources on Coal Mined Lands "Guide to Developing Wildlife Habitat on Coal Mined Land" "Guide for Protection and Enhancement of Fish and Wildlife Values for Surface Coal Mining and Reclamation Operations"
Kentucky	Dave Rosenbaum, Commissioner Natural Resource and Environmental Protection Cabinet Dept. Surface Mining Reclamation & Enforcement 2 Hudson Hollow Frankfort, Kentucky 40601	(502) 564-2340	Wetland Restoration Guidelines Kentucky Division of Water Regulations Kentucky Division of Field Services Statutes and Regulations "Reclamation and Pollution Control: Planning Guide for Small Sand and Gravel Mines" Kentucky Discharge Elimination System Permit for Non-Coal (Mineral) Mining Operations Non-coal Sample Permit for Surface Mining of Limestone, Sand and Gravel, Fluorspar and Clay
Maine	Mark Stebbins, Mining Coordinator Division of Site Location Department of Environmental Protection State House Station 17 Augusta, Maine 04333	(207) 287-2111	Statutes and Regulations Governing Mine Site Location and Borrow Pit and Topsoil Mining Operations, Restoration and Fish and Wildlife Habitat Enhancement Maine Erosion Control Handbook - Best Management Practices, 1991 Mining Industry Profile - Construction Sand and Gravel Wetland Protection Rules "An Overview of Other State Regulatory Frameworks for Sand and Gravel Mining," February 1993

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Manitoba	Brian D. Bailey Resource/Rehabilitation Planner Manitoba Energy and Mines 555 - 330 Graham Avenue Winnipeg, Manitoba R3C 4E3	(204) 945-6515	Quarry Minerals Regulations, 1992 Mines and Minerals Act Environment Act
Manitoba	S.A. McIvor, Policy Coordination Box 50, 1495 St. James St. Winnipeg, Manitoba R3H 0W9		Referred to Mr. Art Ball, Director, Mines Branch , Manitoba Energy and Mines (204) 945-6505
Minnesota	Cindy Buttleman, Regional Manager Department Natural Resources Division of Minerals 2115 Birchmont Beach Road NE Bemidji, Minnesota 56601	(218) 755-4067	"A Handbook for Reclaiming Sand and Gravel Pits in Minnesota"
Missouri	Jerry J. Presley, Director Department of Conservation P.O. Box 180 Jefferson City, Missouri 65102	(314) 751-4115	Missouri Dept. of Conservation "Stream Gravel Removal Guidelines" Two Talks Summarizing Instream Sand and Gravel Mining Impacts on Water Quality and Stream Morphology, Presented by Conservation Department Personnel at Annual Missouri Forestry, Fisheries, and Wildlife Conferences (1990 and 1992) COE General Permit Special Conditions Department of Conservation: A Landowners Guide to Sand and Gravel Removal and Stream Health
Missouri	Charles A. Stieffermann, Director Land Reclamation Commission Department Natural Resources P.O. Box 176 Jefferson City, Missouri 65102	(314) 751-4041	Missouri Land Reclamation Act and Regulatory Performance Standards for Instream Sand and Gravel Operations

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Montana	John G. Munding Resource Assessment Unit Montana Department Fish, Wildlife and Parks Helena, Montana 59620		Administration of mining activities is the responsibility of the Department of State Lands
Montana	Steve Welch, Chief Opencut Mining Bureau Reclamation Division Department of State Lands 1625 Eleventh Avenue Helena, Montana 59620	(406) 444-2074	Opencut Mining Act, Administrative Regulations, Application Forms Proposed Amendments (1993) Administrative Regulations
New Hampshire	James F. Carter, Admin. Land Mgmt. Dept. Resources and Economic Development P.O. Box 856 Concord, New Hampshire 03302-0856	(603) 271-3456	Local and State Regulatory Performance Standards "BMPs for Erosion Control on Timber Harvesting Operations in New Hampshire"
New Mexico	Joe Klingel New Mexico Game and Fish Department Villagra Building Santa Fe, New Mexico 87503	(505) 827-9912	No gravel mining standards.
Nebraska	Dayle E. Williamson, Director Natural Resources Commission P.O. Box 94876 Lincoln, Nebraska 68509	(402) 471-2081	No state regulations that apply to sand and gravel mining operations other than through NPDES permits where there are discharges to streams.

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Nevada	Thomas J. Fronapfel, Bureau Chief Bureau of Mining Regulation and Reclamation Department of Conservation and Natural Resources 333 W. Nye Lane Carson City, Nevada 89710	(702) 687-4670	General Information: Sand and Gravel Operations Excluded from Reclamation Requirements, regulated under water quality regulations and "Handbook of Best Management Practices".
New Jersey	Susan D. Lockwood Principal Environmental Specialist Department of Environmental Protection and Energy CN 401 Trenton, New Jersey 08625	(609) 633-6755	Rules and Regulations Governing Flood Hazard Area Rules on Coastal Zone Management
New York	Gregory H. Sovas, Director Division of Mineral Resources Department of Environmental Conservation 50 Wolf Road Albany, New York 12233	(518) 457-9337	Mined Land Reclamation Law Regulations governing mining operations "Mined Land Reclamation Program Applicant's Guide"
Newfoundland/ Labrador	Jim Hancock, Director Wildlife Division Department of Tourism and Culture P.O. Box 8700 St. John's, Newfoundland A1B 4J6		Wildlife Division has not developed regulations or guidelines for gravel mining operations, concerns addressed through environmental assessment process
Northwest Territories	J.N. Stein, Chief, Habitat Mgmt. Department of Fisheries and Oceans 501 University Crescent Winnipeg, Manitoba R3T 2N6	(204) 983-5164	"Environmental Guidelines - Pits and Quarries" (Applicable only to Northwest Territories)

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Ohio	Glen G. Kizer, Chief Division of Reclamation Department of Natural Resources 1855 Fountain Square Columbus, Ohio 43224	(614) 265-6675	Ohio Surface Mine Law and Rules
Oklahoma	Melynda A. Hickman Natural Resources Officer Department of Wildlife Conservation P.O. 53465 Oklahoma City, Oklahoma 73105	(405) 521-4616	Follows general guidelines established by USFWS and COE Oklahoma Water Resources Board regulates turbidity and stockpile location
Oregon	James C. Turner Waterways Alteration Coordinator Oregon Fish and Wildlife P.O. Box 59 Portland, Oregon 97207	(503) 229-6967	"Habitat Protection Policies and Standards - Mining and Habitat Protection Guidelines"
Ontario	Gerry Lee, Chief Habitat Conservation Canadian Wildlife Service Ottawa, Ontario K1A 0H3		Not directly involved in gravel mining operations; referred to Department of Indian and Northern Affairs Federal Policy on Wetland Conservation (1992) North American Wetlands Conservation Council (Canada): Wetland Evaluation Guide, Issues Paper No. 1992-1 North American Wetlands Conservation Council (Canada): Implementing "No Net Loss" Goals to Conserve Wetlands in Canada, Issues Paper No. 1992-2

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

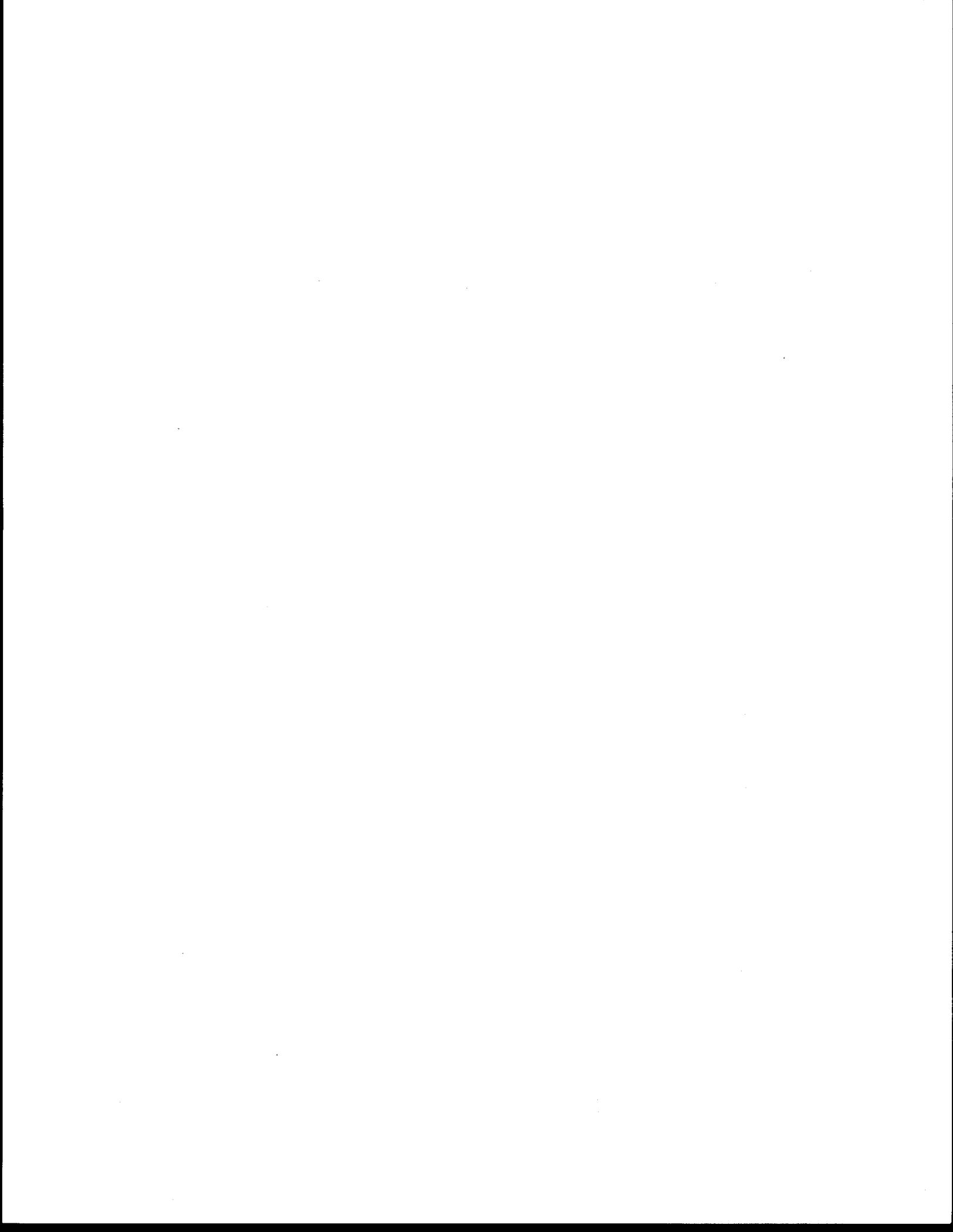
State/Province	Agency / Address	Telephone	Information Provided
Ontario	Lyne Charlebois Secretary to the Director of Programs Wildlife Habitat Canada 1704 Carling Avenue, Suite 301 Ottawa, Ontario K2A 1C7	(613) 722-2090	No information or guidelines available
South Dakota	Doug Hansen, Director Division of Wildlife South Dakota Department of Game, Fish and Parks 523 East Capitol Pierre, South Dakota 57501	(605) 773-3381	"Gravel Pit Reclamation for Fish and Wildlife in South Dakota"
South Dakota	Barbara Regynski Natural Resources Analyst Office of Minerals and Mining Department of Environment and Natural Resources 523 East Capitol Pierre, South Dakota 57501	(605) 773-4201	State Statutes for Sand, Gravel and Construction Aggregate Mining Standard Mining Licensing Application
Vermont	Roderick Wentworth Impact Assessment Specialist Department of Fish and Wildlife Agency of Natural Resources 103 South Main Street Waterbury, Vermont 05676	(802) 244-7331	Vermont Agency of Natural Resources Policy Statement on Stream Gravel Excavation (1990)

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
Vermont	David Gunn, Project Administrator Vermont Geological Survey Agency of Natural Resources 103 South Main Street Waterbury, Vermont 05676	(802) 244-5164	Act 250 Review - General Guidelines
Virginia	Conrad T. Spangler, Director Division of Mineral Mining Department of Mines, Minerals and Energy P.O. Box 4499 Lynchburg, Virginia 24502	(804) 239-0602	Mineral Mining Manual: Sections I and II, Law and Regulations; Section III, Revegetation Guidelines; Section IV, Drainage Handbook
Virginia	Raymond T. Fernald, Manager Environmental Services Section Department of Game and Inland Fisheries P.O. Box 11104 Richmond, Virginia 23230	(804) 367-1000	Department of Game and Inland Fisheries Instream Sandmining Guidelines (12/92)
Washington	Gordon Zillges Regulatory Services Program Manager Washington Department of Wildlife 600 Capitol Way North Olympia, Washington 98501	(206) 753-5700	Instream Gravel Removal Regulations (WAC 220-110-140)
Washington	David K. Norman Chief Reclamation and Mining Geologist Washington Department of Natural Resources Division of Geology and Earth Resources P.O. Box 47007 Olympia, Washington 98504	(206) 902-1439	Draft (1992) Surface Mining Reclamation Guide, includes legal requirements (RCW 78.44 & WAC 332-18)

APPENDIX 2 (Continued). Agency Responses to July 30, 1992, Information Request on State and Provincial Regulation of Gravel Mining Operations.

State/Province	Agency / Address	Telephone	Information Provided
West Virginia	J. Edward Hamrick III, Director Division of Natural Resources Department of Commerce, Labor and Environmental Resources 1900 Kanawha Blvd., East Charleston, West Virginia 25305	(304) 558-2754	General Information "Managing Gas and Oil Well Sites for Wildlife"
Wyoming	Thomas C. Collins Environmental Coordinator Wyoming Game and Fish Department 5400 Bishop Blvd. Cheyenne, Wyoming 82006		Regulation of floodplain and upland mining operations are the responsibility of Department of Environmental Quality
Wyoming	Richard A. Chancellor Engineering Supervisor Land Quality Division Department of Environmental Quality 122 West 25th Street Cheyenne, Wyoming 82002	(307) 777-7756	Non-coal Mining Rules and Regulations
Yukon	Manfred Hoefs, Chief Habitat Management Section Fish and Wildlife Branch Yukon Renewable Resources Box 2703 Whitehorse, Yukon Y1A 2C6	(403) 667-5811	General information; referred to Department of Indian Affairs and Northern Development



APPENDIX 3. Comparative Analysis of State and Provincial Reclamation Requirements for Upland and Floodplain Gravel Mining.

	ALBERTA	ARIZONA	ARKANSAS	BRITISH COLUMBIA	CALIFORNIA
STATE STATUTE OR REGULATION	Public Lands Act; Sand & Gravel Act Fisheries Act; Water Resources Act	ARS Title 27 Executive Order No. 91-6	Act 827 of 1991 as amended & Regulation 15	Mines Act; Fisheries Act 	Surface Mining & Reclamation Act
GOVERNING BODY Administering State Agency	Energy & Natural Resources Forestry, Lands & Wildlife	State Land Commission Arizona State Land Department	Department Pollution Control and Ecology	Ministries of Environment, Lands and Parks and Energy, Mines & Petroleum	CA Dept. Conservation, Div. of Mines & Geology, CA Mining & Geology Board
RECLAMATION REQUIRED	Not mentioned. Additional information requested.	 No.	 Yes.	 	Reclamation plan required Yes.
Federal Lands		No.	Yes.		Yes.
State/Provincial Lands		Yes; reclamation plan required.	Yes.		Yes.
Private Lands		No.	Yes.		Yes.
STATE PERMIT OR NOTICE	Yes.				Reclamation permit required
Federal Lands		No.	Yes.		Yes.
State/Provincial Lands		Permit or lease.	Yes.		Yes.
Private Lands		No.	Yes.		Yes.
EXEMPTIONS		None.	County Judges/Municipal. for pits		None
MEMORADUMS OF UNDERSTANDING					Some by county with USFS & BLM
BONDING		Yes; \$2,000/acre; no exemptions.	Yes. Based on worst case scenario to reclaim land to approved plan.		Financial assurance required, exempt if <1 acre or 1,000 cu. yrd. for small mines
RECLAMATION REQUIREMENTS	Division of Fish & Wildlife Guideline #5 discourages extraction within stream channels of fish-bearing waters; prefers Visual Aesthetics maintenance of 50 m buffer.	Reclamation required; however, no specific regulatory standards, some guidelines applicable.	Reclaim land to approx. original contour; no slopes greater than 3:1. Prohibits mining in extraordinary resource waters.		 Yes Yes Yes Yes, Div. of Mines & Geology Specific, required standards
Monitoring Required? (If so, who is responsible?)					
Technical Performance Standards (Required or Guidelines?)					
MITIGATION (Required/Optional/None)	Not mentioned.	Game & Fish Department Habitat Compensation Policy requires 100%			 Yes Yes Yes
Wetlands		compensation; No Net Loss.			
Fish and Wildlife					
Cumulative/Secondary					
CONSISTENCY WITH LOCAL PLANS	Not mentioned.				 Yes Yes, public notice required
Coastal Zone/County/City Plans		Yes.			
Public Hearing/Notice			Public notice required.		

Notes:

APPENDIX 3 (Continued). Comparative Analysis of State and Provincial Reclamation Requirements for Upland and Floodplain Gravel Mining.

	COLORADO	DELAWARE	FLORIDA	GEORGIA	HAWAII
STATE STATUTE OR REGULATION	<input type="checkbox"/> Mined Land Reclamation Act <input type="checkbox"/> Mineral Rules & Regulations	<input type="checkbox"/> 17 Del. C. Ch. 60, Section 6038. <input type="checkbox"/> See Note #1.	<input type="checkbox"/> See Note #2. No gravel mining. <input type="checkbox"/> None.	<input type="checkbox"/> Surface Mining Act, OCG 10, Title 12 <input type="checkbox"/> Surface Mining Rules, Ch. 391.33 <input type="checkbox"/> None.	<input type="checkbox"/> See Note #3. No gravel mining. <input type="checkbox"/> None.
GOVERNING BODY	<input type="checkbox"/> Division of Minerals & Geology <input type="checkbox"/> Mined Land Reclamation Board	<input type="checkbox"/> Div. Soil & Water Conservation, Dept. of Nat. Resources & Envir. Control	<input type="checkbox"/> DNR Environmental Protection Div.		
ADMINISTERING STATE AGENCY	<input type="checkbox"/> Reclamation plan required. <input type="checkbox"/> Yes. <input type="checkbox"/> Yes. <input type="checkbox"/> Yes.	<input type="checkbox"/> Yes. <input type="checkbox"/> Yes. <input type="checkbox"/> Yes. <input type="checkbox"/> Yes.	<input type="checkbox"/> Yes, reclamation plan required.		
FEDERAL LANDS	<input type="checkbox"/> Permit 110(2), 111, and 112 <input type="checkbox"/> Yes.	<input type="checkbox"/> Yes.	<input type="checkbox"/> Mining and Land Use Permit required.		
STATE/PROVINCIAL LANDS	<input type="checkbox"/> Yes. <input type="checkbox"/> Yes.	<input type="checkbox"/> Yes. <input type="checkbox"/> Yes.			
PRIVATE LANDS	<input type="checkbox"/> Yes.	<input type="checkbox"/> Yes.			
STATE PERMIT OR NOTICE	<input type="checkbox"/> <2 acres and little disturbance. <input type="checkbox"/> <5 acres if stormwater plan approved.	<input type="checkbox"/> Yes, with USFS, BLM and Dept. of Health. None, but law allows delegation to local govt. or conservation districts.			
FEDERAL LANDS	<input type="checkbox"/> Yes.	<input type="checkbox"/> Yes.			
STATE/PROVINCIAL LANDS	<input type="checkbox"/> Sect. 110 (<1 ac, \$1000; >1 ac, \$1500) <input type="checkbox"/> Sect. 111 (\$2500/acre). Sm. mines <input type="checkbox"/> exempt if <70,000 tons and 10 ac. (see #4)	<input type="checkbox"/> \$3,000 per disturbed acre.	<input type="checkbox"/> Bond Required. Not <\$1000/acre nor >\$2500/acre. Exemptions avail. at Director's discretion with cause.		
PRIVATE LANDS	<input type="checkbox"/> Yes.	<input type="checkbox"/> Yes.			
EXEMPTIONS	<input type="checkbox"/> Yes.	<input type="checkbox"/> Yes.			
MEMORANDUMS OF UNDERSTANDING	<input type="checkbox"/> Yes.	<input type="checkbox"/> Yes.			
BONDING	<input type="checkbox"/> Yes.	<input type="checkbox"/> Yes.			
RECLAMATION REQUIREMENTS	<input type="checkbox"/> Water Quality/Hydrology <input type="checkbox"/> Fish and Wildlife Habitat <input type="checkbox"/> Visual Aesthetics <input type="checkbox"/> Monitoring Required? (If so, who is responsible?) <input type="checkbox"/> Technical Performance Standards (Required or Guideline?)	<input type="checkbox"/> Yes. <input type="checkbox"/> No. <input type="checkbox"/> Buffer areas near property lines. <input type="checkbox"/> Yes, annual inspections. <input type="checkbox"/> Regulatory.	<input type="checkbox"/> Reclamation must be based on "sound" engineering & conservation principles. <input type="checkbox"/> All lands reclaimed must have a "neat, clean appearance and contain a high quality permanent vegetative cover."		
MITIGATION (Required/Optional/None)	<input type="checkbox"/> Wetlands <input type="checkbox"/> Fish and Wildlife <input type="checkbox"/> Cumulative/Secondary	<input type="checkbox"/> None, unless required under CWA <input type="checkbox"/> Section 404 Permit	<input type="checkbox"/> Not specifically identified. Previously mined lands may be reclaimed on an acre for acre basis for lands currently being mined.		
CONSISTENCY WITH LOCAL PLANS	<input type="checkbox"/> Coastal Zone/County/City Plans <input type="checkbox"/> Public Hearing/Notice	<input type="checkbox"/> Yes, required before permit issuance.			

Notes: #1. New legislation July 1990; proposed regulations will be final Fall 1993. #2. Per Florida Dept. Natural Resources. #3. Per Dept. of Land & Natural Resources. #4. Caps to be lifted by 1993 legislation.

APPENDIX 3 (Continued). Comparative Analysis of State and Provincial Reclamation Requirements for Upland and Floodplain Gravel Mining.

STATE STATUTE	GOVERNING BODY	RECLAMATION REQUIRED	STATE PERMIT OR NOTICE	EXEMPTIONS	MEMORANDUMS OF UNDERSTANDING	BONDING	RECLAMATION REQUIREMENTS	MITIGATION (Required/Optional/None)	Wetlands	Fish and Wildlife	Cumulative/Secondary	CONSISTENCY WITH LOCAL PLANS	Coastal Zone/Courtesy Plans	Public Hearing/Notice
IDAHO	Dept. of Lands, Bureau of Minerals	Reclamation Plan required	Federal Lands State/Provincial Lands Private Lands	None	USFS and BLM regarding bonding & lead agency responsibilities.	Yes, \$1,800 / acre maximum.	Water Quality/Hydrology Fish and Wildlife Habitat Visual Aesthetics Monitoring Required? (If so, who is responsible?) Technical Performance Standards (Required or Guidelines?)	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.
IOWA	Board of Ag. Div. Water Resources	Reclamation Plan required if activity will affect stream channel.	Federal Lands State/Provincial Lands Private Lands	Dir. may grant exemptions w/ cause	USFS and BLM regarding bonding & lead agency responsibilities.	Bond required, not <\$100/acre or >\$500/acre.	Water Quality/Hydrology Fish and Wildlife Habitat Visual Aesthetics Monitoring Required? (If so, who is responsible?) Technical Performance Standards (Required or Guidelines?)	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.
KANSAS	Dept. Surface Mining Reclamation & Enforcement	Reclamation plan required	Federal Lands State/Provincial Lands Private Lands	Dir. may grant exemptions w/ cause	USFS and BLM regarding bonding & lead agency responsibilities.	Bond required, not <\$100/acre or >\$500/acre.	Water Quality/Hydrology Fish and Wildlife Habitat Visual Aesthetics Monitoring Required? (If so, who is responsible?) Technical Performance Standards (Required or Guidelines?)	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.
KENTUCKY	Dept. Surface Mining Reclamation & Enforcement	Reclamation plan required	Federal Lands State/Provincial Lands Private Lands	Dir. may grant exemptions w/ cause	USFS and BLM regarding bonding & lead agency responsibilities.	Bond required, not <\$100/acre or >\$500/acre.	Water Quality/Hydrology Fish and Wildlife Habitat Visual Aesthetics Monitoring Required? (If so, who is responsible?) Technical Performance Standards (Required or Guidelines?)	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.
MAINE	Dept. Environmental Protection	Reclamation plan required	Federal Lands State/Provincial Lands Private Lands	Dir. may grant exemptions w/ cause	USFS and BLM regarding bonding & lead agency responsibilities.	Bond required, not <\$100/acre or >\$500/acre.	Water Quality/Hydrology Fish and Wildlife Habitat Visual Aesthetics Monitoring Required? (If so, who is responsible?) Technical Performance Standards (Required or Guidelines?)	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.	Required on federal lands. operations are not of a magnitude to require habitat compensation.

Notes: #1. Response from Fish & Game Dept. #2. Response from DNR. DNR not involved in mining operations. #3. Dept. of Wildlife & Parks has jurisdiction if activity funded w/ public funds, permitted by another agency subject to review of impacts threatened or endangered species.

APPENDIX 3 (Continued), Comparative Analysis of State and Provincial Reclamation Requirements for Upland and Floodplain Gravel Mining.

STATE/STATUTE:	OR REGULATION	GOVERNING BODY	EXEMPTIONS	MEMORANDUMS OF UNDERSTANDING	BONDING	RECLAMATION REQUIREMENTS	MITIGATION (Required/Optional/None)	Wetlands	Fish and Wildlife	Cumulative/Secondary	CONSISTENCY WITH LOCAL PLANS	Public Hearing/Notice
MANTOBA	Mines and Minerals Act (1992) Fisheries Act	Manitoba Dept. Energy & Mines				Local govt. plan approval required. Reclamation plan required. (On all lands, specific guidelines for revegetation, reconouring, visual aesthetics, water quality protection, and maximum slopes. Post mine land uses include most reasonable & obtainable uses, including wildlife habitat and recreation.	Wetlands (Required/Optional/None)	Wetlands	Fish and Wildlife	Cumulative/Secondary	Consistency with Local Plans	Public Hearing/Notice
MINNESOTA	Wetlands Cons. Act; Envir. Policy Act Shorelands & Floodplain Mgmt. Act 10 CSR 40.10	Dept. Natural Resources; local govts; Dept. Natural Resources, Land Board of Water & Soil Resources			Varies, established by local counties. Required, \$8000 for first 8 acres, \$500/acre for each additional acre.	Local govt. plan approval required. Reclamation plan required. (On all lands, specific guidelines for revegetation, reconouring, visual aesthetics, water quality protection, and maximum slopes. Post mine land uses include most reasonable & obtainable uses, including wildlife habitat and recreation.	Wetlands (Required/Optional/None)	Wetlands	Fish and Wildlife	Cumulative/Secondary	Consistency with Local Plans	Public Hearing/Notice
MISSOURI	Land Reclamation Act 10 CSR 40.10 General Mining Act	Dept. Natural Resources, Land Reclamation Commission			Required, \$200 / acre to actual costs.	Local govt. plan approval required. Reclamation plan required. (On all lands, specific guidelines for revegetation, reconouring, visual aesthetics, water quality protection, and maximum slopes. Post mine land uses include most reasonable & obtainable uses, including wildlife habitat and recreation.	Wetlands (Required/Optional/None)	Wetlands	Fish and Wildlife	Cumulative/Secondary	Consistency with Local Plans	Public Hearing/Notice
MONTANA	Title 82, Ch. 4, Part 4, MCA No state statutes or regulations	Board of Land Commissioners Dept. of State Lands	<10,000 cu yds. cumm. since 1973	Yes, with USFS and BLM	Min. \$200 / acre to actual costs.	Local govt. plan approval required. Reclamation plan required. (On all lands, specific guidelines for revegetation, reconouring, visual aesthetics, water quality protection, and maximum slopes. Post mine land uses include most reasonable & obtainable uses, including wildlife habitat and recreation.	Wetlands (Required/Optional/None)	Wetlands	Fish and Wildlife	Cumulative/Secondary	Consistency with Local Plans	Public Hearing/Notice
NEBRASKA	No state statutes or regulations					Local govt. plan approval required. Reclamation plan required. (On all lands, specific guidelines for revegetation, reconouring, visual aesthetics, water quality protection, and maximum slopes. Post mine land uses include most reasonable & obtainable uses, including wildlife habitat and recreation.	Wetlands (Required/Optional/None)	Wetlands	Fish and Wildlife	Cumulative/Secondary	Consistency with Local Plans	Public Hearing/Notice

Notes: #1. Local zoning control; specific requirements vary. General guidelines available in "Handbook for Reclaiming Sand & Gravel Pits in Minnesota."

APPENDIX 3 (Continued). Comparative Analysis of State and Provincial Reclamation Requirements for Upland and Floodplain Gravel Mining.

	NEVADA	NEW HAMPSHIRE	NEW MEXICO	NEW JERSEY	NEW YORK
STATE STATUTE OR REGULATION		RSA 485-A:17 RSA 155-E (local govt. regulations)	Unknown. See Note #1.	Land Use Regulation Program Coastal Zone Mgmt (NJAC 7:7E)	Mined Land Reclamation Program ECL 23 Title 6 & 27, RCL 15 & 24
GOVERNING BODY Administering State Agency		Dept. of Environmental Services Local governments (primary control)		Dept. of Environ. Protection & Energy Land Use Regulation Program	Dept. Environmental Conservation
RECLAMATION REQUIRED Federal Lands State /Provincial Lands Private Lands	(Operations involved solely in sand & gravel are excluded from mining reclamation requirements.	General reclamation standard administered by local governments. State mining law, RSA 12-E, does not apply to sand, gravel & aggregate.		General reclamation policy 	Reclamation plan required (Min Sids) Yes. Yes Yes
STATE PERMIT OR NOTICE Federal Lands State /Provincial Lands Private Lands		Terrain Alteration Permit required. Yes. Yes.		Regulated under CZM and Stream Encroachment permit. 	Envir. Assess Form, Draft EIS, Mined Land Use Plan, Protection of Waters Permit, Mining Permit, Reclamation Schedule, Air Permit, NPDES Permit
EXEMPTIONS		Incidental ag. & highway exemptions.			Some construction & agricultural
MEMORANDUMS OF UNDERSTANDING					
BONDING		Sufficient to assure compliance but not less than \$1000/acre. 			Required, amount determined by Dept. (usually \$2,500 / acre)
RECLAMATION REQUIREMENTS Water Quality/Hydrology Fish and Wildlife Habitat Visual Aesthetics Monitoring Required? (If so, who is responsible?) Technical Performance Standards (Required or Guidelines?)	Water quality concerns addressed under NRS Ch. 445 and NAC Ch. 445. Erosion controlled through "Handbook of Best Management Practices." 	Reclamation plan required. Revegetation and slope requirements. Ponds are allowed if they don't create public health or safety hazard. 	No gravel mining reclamation stds. 	Reclamation plan required. Yes, general policy. Yes, general policy. Yes, general policy. 	Reclamation plan & schedule required Drainage and water control required Waters may be impounded for wildlife. Revegetation, slope, and screening
MITIGATION (Required/Optional/None) Wetlands Fish and Wildlife Cumulative/Secondary				Determined on a case-by-case basis. 	Required. Article 24 wetland permit "Maintain, minimal or no disturbance" to protected wetlands. Required setbacks from protected waterbodies
CONSISTENCY WITH LOCAL PLANS Coastal Zone/County/City Plans Public Hearing/Notice					State law supersedes local zoning Local zoning must permit mining Yes, if >5 acres

Notes: #1. Response from New Mexico Dept. Fish & Game. DF&G has not developed stds.

APPENDIX 3 (Continued). Comparative Analysis of State and Provincial Reclamation Requirements for Upland and Floodplain Gravel Mining.

STATE/STATUTE	OR REGULATION	GOVERNING BODY	ADMINISTERING STATE AGENCY	RECLAMATION REQUIRED	FEDERAL LANDS	STATE/PROVINCIAL LANDS	PRIVATE LANDS	STATE PERMIT OR NOTICE	MINING PERMIT REQUIRED	RECLAMATION REQUIRED	FEDERAL LANDS	STATE/PROVINCIAL LANDS	PRIVATE LANDS	EXEMPTIONS	MEMORANDUMS OF UNDERSTANDING	BONDING	RECLAMATION REQUIREMENTS	FISH AND WILDLIFE HABITAT	MONITORING REQUIRED?	(If so, who is responsible?)	TECHNICAL PERFORMANCE STANDARDS	(Required or Guidelines?)	MITIGATION (Required/Optional/None)	WETLANDS	FISH AND WILDLIFE	CUMULATIVE/SECONDARY	CONSISTENCY WITH LOCAL PLANS	COASTAL ZONE/COUNTY/CITY PLANS	PUBLIC HEARING/NOTICE
ONTARIO	Pits and Quarries Act Reclamation Act; Fisheries Act	Ministry of Natural Resources	Div. of Minerals and Mining	Reclamation required.																									
SOUTH DAKOTA	5 DCL Ch. 45-6 Ch. 8, Title 40	Dept. Environ. & Nat. Resources	Div. of Minerals and Mining	Reclamation required.	Yes	Yes	Yes																						
UTAH	Mined Land Reclamation Act	Dept. Nat. Resources Div. of Oil, Gas & Mining	Mining; Board of Oil, Gas & Mining	Reclamation required.	Yes	Yes	Yes																						
VERMONT	10 VSA 41 Regulation of Stream Flow Act 250	Agency of Nat. Resources Environ. Bd.	Agency of Nat. Resources Vermont Geological Survey	Reclamation required. See Note #1. Applicable to in stream mining	Yes	Yes	Yes																						
VIRGINIA	Ch. 16 Title 45 I Regulations VR 480-03 16	Dept. Mines, Minerals & Energy	Div. of Mineral Mining	Reclamation required.	Yes	Yes	Yes																						

Notes: #1: Gravel may only be removed from watercourses for certain purposes such as flood control or property protection.

APPENDIX 3 (Continued). Comparative Analysis of State and Provincial Reclamation Requirements for Upland and Floodplain Gravel Mining.

	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING	YUKON
STATE STATUTE OR REGULATION	Envir. Policy Act; Surface Mining Act RCW 78.44; WAC 197 & 332.18	WV Ch. 22A, Article 4	NR 340	Non-coal Rules and Regulations Wyoming Envir. Quality Act	Territorial Lands Act & Quarrying Regulations; Fisheries Act
GOVERNING BODY Administering State Agency	Dept. Nat. Resources, Lands & Minerals /Geol. & Earth Divisions. See Note #1.	Div. Environmental Protection	Dept. Natural Resources	Dept. Envir. Quality, Land Quality Division; Envir. Qual. Council	Dept. Indian & Northern Affairs Dept. Fisheries & Oceans
RECLAMATION REQUIRED	Reclamation required.	Reclamation (some) required.	Reclamation required.	Reclamation required.	
Federal Lands	Yes.	Yes.		Yes.	
State /Provincial Lands	Yes.	Yes.		Yes.	
Private Lands	Yes.	Yes.		Yes.	
STATE PERMIT OR NOTICE	Permit required.	State mining permit required.	Permit required.	Mining permit required.	Water license required.
Federal Lands	Yes.			Yes.	
State /Provincial Lands	Yes.	WV Public Land Corp. permit required.		Yes.	
Private Lands	Yes.			Yes.	
EXEMPTIONS				Yes.	
MEMORANDUMS OF UNDERSTANDING	Yes, with USFS & BLM; some Indian tribes.			Yes, with USFS and BLM.	Yes, with Dept. Fisheries & Oceans
BONDING	Required, actual amount for reclamation <3 acre or <30 ft. pit walls exempt	Required, \$500 / acre.	Required, larger of \$2,000 / acre or \$0.25 / cubic yard.	Required, amount variable. Small mines less than 10 acres are \$1,100/acre.	
RECLAMATION REQUIREMENTS	Reclamation plan required.	Disturbed area must be reshaped, seeded and mulched immediately. Extraction	Reclamation plan required.	Reclamation plan required.	Reclamation plan required.
Water Quality/Hydrology	Yes.	below the waterline is prohibited.	Yes, site stabilization required.	Yes, specific requirements.	Yes.
Fish and Wildlife Habitat	Yes, specific pond requirements.	Habitat restoration plan approved	Yes.	Yes, whenever possible. See Note #2.	Yes.
Visual Aesthetics	Yes.	on site-specific basis. Emphasis on	Yes.	Yes, specific requirements.	Yes.
Monitoring Required? (If so, who is responsible?)		establishing functional wetlands and	Bureau Water Regulation & Zoning		
Technical Performance Standards (Required or Guidelines?)	Yes, both guideline and required.	aquatic habitats.	Regulatory Performance Standards.	Required and guidelines.	
MITIGATION (Required/Optional/None)	Required, no net loss goal (not mandatory).	Required.	No.		No net loss policy.
Wetlands					
Fish and Wildlife				Must restore critical or important habitat.	
Cumulative/Secondary					
CONSISTENCY WITH LOCAL PLANS					
Coastal Zone/County/City Plans	Yes.	Yes.	Yes.	No, but notified in case they wish to object.	Local interests are protected.
Public Hearing/Notice	Public hearing may be required.	Public hearing may be required.		Yes.	

Notes: #1. Activities within fish-bearing waterbodies also subject to Dept. of Fisheries and Dept. of Wildlife jurisdiction. #2. Land must be restored to a condition = to or > than highest previous use. Specific impoundment requirements.

APPENDIX 4

Alaska Mining Reclamation Act

Sec. 27.19.010. Administration; applicability. (a) The commissioner of natural resources shall implement this chapter.

(b) This chapter applies to state, federal, municipal, and private land and water subject to mining operations.

(c) Except as provided in AS 27.19.040(b), this chapter does not apply to an activity regulated under AS 27.21 (*Ed. Note: Alaska Surface Coal Mining Control and Reclamation Act*).

(d) This chapter does not alter or diminish the authority of another state agency, a state corporation, the University of Alaska, or a municipality under its laws and regulations.

(e) The owner of private land may establish requirements for reclamation in excess of those established by this chapter.

(f) The commissioner may not require a miner to reclaim under this chapter that portion of a previously mined area that was part of a mining operation activity occurring before October 15, 1991. (E 1 ch 92 SLA 1990)

Sec. 27.19.020. Reclamation standard. A mining operation shall be conducted in a manner that prevents unnecessary and undue degradation of land and water resources and the mining operation shall be reclaimed as contemporaneously as practicable with the mining operation to leave the site in a stable condition. (E 1 ch 92 SLA 1990)

Sec. 27.19.030. Reclamation plan. (a) Except as provided in AS 27.19.050, a miner may not engage in a mining operation until the commissioner has approved a reclamation plan for the mining operation.

(b) In reviewing a reclamation plan for state, federal, or municipal land under (a) of this section, the commissioner may consider, after consultation with the commissioners of environmental conservation and fish and game and with the concurrence of the miner and landowner, uses to which the land may be put after mining has been completed, including trails, lakes, recreation sites, fish and wildlife enhancement, commercial, and agricultural uses. (E 1 ch 92 SLA 1990)

Sec. 27.19.040. Reclamation bonding. (a) The commissioner shall require an individual performance bond in an amount not to exceed an amount reasonably necessary to ensure faithful performance of the requirements of the approved reclamation plan. The commissioner shall establish the amount of the performance bond to reflect the reasonable and probable costs of reclamation but the bond may not exceed \$750 for each acre of mined area.

(b) The commissioner shall establish a statewide bonding pool for mining operations as an alternative to individual performance bonds. A miner participating in the bonding pool shall contribute an initial deposit not to exceed 15 percent of the reclamation bond plus an additional nonrefundable annual fee not to exceed five percent of the reclamation bond. The commissioner shall refund the 15 percent deposit upon satisfactory completion of the approved reclamation plan. If requested by the miner, the commissioner may apply the deposit to a new reclamation plan. The commissioner may allow the bonding pool to be used to meet the requirements of AS 27.21.160 (*Ed. Note: Alaska Surface Coal Mining Control and Reclamation Act*).

(c) If the commissioner determines that a miner has violated or permitted a violation of the approved reclamation plan and has failed to comply with a lawful order of the commissioner, the commissioner shall forfeit the performance bond and deposit the bond in the statewide bonding pool. The commissioner shall use the reclamation and administrative

costs recovered under AS 27.19.070(a) to supplement the forfeited bond deposited in the statewide bonding pool for reclamation of the site subject to the forfeiture. If the commissioner is unable to recover the full cost of reclamation under AS 27.19.070(a), the commissioner may use the bonding pool to reclaim the site to the standards of this chapter.

(d) A miner not required to post a bond may submit a reclamation plan under AS 27.19.030(a) and participate in the bond pool. (E 1 ch 92 SLA 1990)

Sec. 27.19.050. Exemption for small operations. (a) AS 27.19.030(a) and 27.19.040 do not apply to a mining operation

(1) where less than five acres are mined at one location in any year and there is a cumulative unreclaimed mined area of less than five acres at one location; or

(2) where less than five acres and less than 50,000 cubic yards of gravel or other materials are disturbed or removed at one location in any year and there is a cumulative disturbed area of less than five acres at one location.

(b) To obtain an exemption under (a) of this section, a miner shall file a letter of intent notifying the commissioner of the

(1) total acreage and volume of material to be mined;

(2) total acreage to be reclaimed; and

(3) reclamation measures to be used.

(c) A miner exempt under (a) of this section shall file an annual reclamation statement with the commissioner disclosing the total acreage and volume of material mined by the operation in the current year, the total acreage reclaimed, and the specific reclamation measures used to comply with AS 27.19.020. A miner does not qualify for an exemption under (a) of this section for subsequent operations unless the annual reclamation statement for the previous operation has been filed with the commissioner.

(d) A miner exempted from the requirements of AS 27.19.030(a) and 27.19.040 under (a) of this section that fails to reclaim a mining operation to the standards of AS 27.19.020 is required for two consecutive years to conduct each subsequent mining operation, regardless of size, under an approved reclamation plan and to post a performance bond. (E 1 ch 92 SLA 1990)

Sec. 27.19.060. Cooperative management agreements. The commissioner, on a determination that an agreement is in the best interest of the state, may enter into a cooperative agreement with the federal government or a state agency to implement a requirement of this chapter or a regulation adopted under it. (E 1 ch 92 SLA 1990)

Sec. 27.19.070. Violations. (a) A miner who violates or permits a violation of an approved reclamation plan and fails to comply with a lawful order of the commissioner forfeits the reclamation bond or a portion of the bond and is liable to the state in a civil action for the full amount of reclamation and administrative costs incurred by the state related to the action. A miner exempted under AS 27.19.050(a) is subject to civil action for the full amount of reclamation and administrative costs incurred by the state related to the action if the commissioner determines that reclamation was not conducted under AS 27.19.020.

(b) In addition to other remedies available under this chapter, the commissioner may suspend or revoke permits or approvals of operations not being conducted under the approved reclamation plan and deny future mining permits and approvals under this title and AS 38 related to the mining operation for failure to reclaim the mining operation to the standards of this chapter.

(c) A miner who has forfeited a reclamation bond or has been held liable in a civil action under (a) of this section may conduct future mining operations only after posting a reclamation risk assessment fee equal to five times the bond liability for the proposed mining operation. The reclamation assessment fee shall be refunded after two consecutive years of operation consistent with this chapter. (E 1 ch 92 SLA 1990)

Sec. 27.19.080. Administrative Procedures Act. The Administrative Procedures Act (AS 44.62) applies to this chapter. (E 1 ch 92 SLA 1990)

Sec. 27.19.100. Definitions. In this chapter,

(1) "materials" means sand, gravel, riprap, rock, limestone, slate, peat, and other substances from the ground that are not locatable or leasable under state law;

(2) "mined area"

(A) means an active site of physical extraction, stockpiling, or the disposal of ore, overburden, tailings, or processed materials, stream diversions, bypasses, and settling ponds;

(B) does not include reclaimed areas approved by the commissioner;

(3) "miner" means the owner, operator, or leaseholder of a mining operation;

(4) "mining operation"

(A) means each function, work, facility, and activity in connection with the development, extraction, and processing of

(i) a locatable or leasable mineral deposit except oil, gas, or coal;

(ii) other materials or of a sand and gravel deposit; and

(iii) each use reasonably incident to the development, extraction, and processing of a locatable or leasable mineral deposit or materials;

(B) includes the construction of facilities, roads, transmission lines, pipelines, and other support facilities;

(5) "reclamation plan" means a plan submitted by a miner under regulations adopted by the commissioner for the reclamation of a proposed mining operation;

(6) "stable condition" means the rehabilitation, where feasible, of the physical environment of the site to a condition that allows for the reestablishment of renewable resources on the site within a reasonable period of time by natural processes;

(7) "state land" includes

(A) the land of the University of Alaska;

(B) the land of state corporations;

(8) "unnecessary and undue degradation"

(A) means surface disturbance greater than would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and considering site specific conditions;

(B) includes the failure to initiate and complete reasonable reclamation under the reclamation standard of AS 27.19.020 or an approved reclamation plan under AS 27.19.030(a). (E 1 ch 92 SLA 1990)

APPENDIX 5

Chapter 97. Mining Reclamation Regulations

Article

1. Applicability (11 AAC 97.100)
2. Reclamation Performance Standards (11 AAC 97.200 -- 11 AAC 97.250)
3. Reclamation Plan (11 AAC 97.300 -- 11 AAC 97.350)
4. Reclamation Bonding (11 AAC 97.400 -- 11 AAC 97.450)
5. Exemptions for Small Operations (11 AAC 97.500 -- 11 AAC 97.510)
6. Violations and Penalties (11 AAC 97.600 -- 11 AAC 97.640)
7. Cooperative Management Agreements (11 AAC 97.700)
8. General Provisions (11 AAC 97.900 -- 11 AAC 97.990)

ARTICLE 1. APPLICABILITY

Section

100. Applicability

11 AAC 97.100. APPLICABILITY. (a) This chapter applies to the approval of reclamation plans, reclamation bonding, and enforcement of reclamation requirements under AS 27.19 for locatable mineral, leasable mineral, and material mining operations on state, federal, municipal, and private land. AS 27.19 and this chapter do not apply to a recreational placer mining operation using no mechanized earthmoving equipment other than a dredge with a suction hose six inches or less in diameter, powered by an engine of 18 or fewer horsepower.

(b) AS 27.19.020 sets the minimum standard for conduct of mining operations in Alaska, without regard to land ownership. Although nothing in AS 27.19 requires a miner to file a mining plan before beginning operations, most miners operating on public land are required to do so by other laws. Even where that is not the case, the department recommends that the miner develop a mining plan to help the miner meet the mining standard of AS 27.19.020 and to make the reclamation plan or reclamation letter of intent more effective.

(c) Nothing in AS 27.19 precludes a federal or state agency (including the Department of Natural Resources), a state corporation, the University of Alaska, a municipality, or a private landowner, acting under its own regulatory or proprietary authority, from establishing and enforcing additional requirements or higher standards for reclamation. Compliance with this chapter does not waive or excuse compliance with those additional requirements or higher standards.

(d) This chapter does not apply to:

(1) fuel spills, chemical neutralization, detoxification, or clean-up of hazardous substances used in mineral processing facilities associated with mining operations;

(2) surface coal mining reclamation or related operations regulated under AS 27.21;
or

(3) an area disturbed by a mining operation before October 15, 1991. However, if a mining operation disturbs a previously mined area after October 14, 1991, a miner must reclaim to the standards of AS 27.19 and this chapter; if only a portion of the previously mined area is disturbed after October 14, 1991, this chapter applies only to that disturbed portion. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.010

AS 27.19.020

AS 27.19.100

ARTICLE 2. RECLAMATION PERFORMANCE STANDARDS

Section

- 200. Land reclamation performance standards
- 210. Disposal of buildings, structures, and debris on state land
- 220. Underground mines
- 230. Heap leach operations
- 240. Acid rock drainage
- 250. Material sites

11 AAC 97.200. LAND RECLAMATION PERFORMANCE STANDARDS. (a)

A miner shall reclaim areas disturbed by a mining operation so that any surface that will not have a stream flowing over it is left in a stable condition.

(1) For the purposes of AS 27.19.100(6) and this section, a stable condition that "allows for the reestablishment of renewable resources on the site within a reasonable period of time by natural processes" means a condition that can reasonably be expected to return waterborne soil erosion to pre-mining levels within one year after the reclamation is completed, and that can reasonably be expected to achieve revegetation, where feasible, within five years after the reclamation is completed, without the need for fertilization or reseeding. If rehabilitation of a mined site to this standard is not feasible because the surface materials on the mined site have low natural fertility or the site lacks a natural seed source, the department recommends that the miner fertilize and reseed or replant the site with native vegetation to protect against soil erosion; however, AS 27.19 does not require the miner to do so. Rehabilitation to allow for the reestablishment of renewable resources is not required if that reestablishment would be inconsistent with an alternate post-mining land use approved under AS 27.19.030(b) on state, federal, or municipal land, or with the post-mining land use intended by the landowner on private land.

(2) If topsoil from an area disturbed by a mining operation is not promptly redistributed to an area being reclaimed, a miner shall segregate it, protect it from erosion and from contamination by acidic or toxic materials, and preserve it in a condition suitable for later use.

(3) If the natural composition, texture, or porosity of the surface materials is not conducive to natural revegetation, a miner shall take measures to promote natural revegetation, including redistribution of topsoil, where available. If no topsoil is available, a miner shall apply fines or other suitable growing medium, if available. However, a miner may not redistribute topsoil and fines over surfaces likely to be exposed to annual flooding, unless the action is authorized in an approved reclamation plan and will not result in an unlawful point- or non-point-source discharge of pollutants.

(b) A miner shall reclaim an area disturbed by a mining operation so that the surface contours after reclamation is complete are conducive to natural revegetation or are consistent with an alternate post-mining land use approved under AS 27.19.030(b) on state, federal, or municipal land, or with the post-mining land use intended by the landowner on private land. Measures taken to accomplish this result may include backfilling, contouring, and grading, but a miner need not restore the site's approximate original contours. A miner shall stabilize the reclaimed site to a condition that will retain sufficient moisture for natural revegetation or for an alternate post-mining land use approved under AS 27.19.030(b) on state, federal, or municipal land, or for the post-mining land use intended by the landowner on private land.

(c) A pit wall, subsidence feature, or quarry wall is exempt from the requirements of (a) and (b) of this section if the steepness of the wall makes them impracticable or impossible to accomplish. However, a miner shall leave the wall in a condition such that it will not collapse nor allow loose rock that presents a safety hazard to fall from it.

(d) If a mining operation diverts a stream channel or modifies a flood plain to the extent that the stream channel is no longer stable, a miner shall reestablish the stream channel in a stable location. A miner may not place a settling basin in the way of the reestablished channel location unless the fines will be properly removed or protected from erosion. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.020

AS 27.19.030

AS 27.19.100

11 AAC 97.210. DISPOSAL OF BUILDINGS, STRUCTURES, AND DEBRIS ON STATE LAND. A miner shall remove, dismantle, or otherwise properly dispose of buildings and structures constructed, used, or improved on state land unless the surface owner or manager authorizes that the buildings and structures may stay. A miner shall remove or otherwise properly dispose of all scrap iron, equipment, tools, piping, hardware, chemicals, fuels, waste, and general construction debris on state land. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.020

11 AAC 97.220. UNDERGROUND MINES. A miner shall stabilize and properly seal the openings of all shafts, adits, tunnels, and air vents to underground mine workings after mine closure to ensure protection of the public, wildlife, and the environment. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.020

11 AAC 97.230. HEAP LEACH OPERATIONS. After neutralization of heaps, pads, ponds, and other such facilities has been approved by the appropriate regulatory authority (the Environmental Protection Agency or the Department of Environmental Conservation), a miner shall reclaim the site of a heap leach operation to the standards of AS 27.19 and this chapter. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.020

11 AAC 97.240. ACID ROCK DRAINAGE. A miner shall reclaim a mined area that has potential to generate acid rock drainage (acid mine drainage) in a manner that prevents the generation of acid rock drainage or prevents the offsite discharge of acid rock drainage. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.020

11 AAC 97.250. MATERIAL SITES. (a) Continuous use; intermittent use of a material site. A miner shall reclaim a material site in accordance with AS 27.19.020, 11 AAC 97.200, 11 AAC 97.210, and this section as contemporaneously as practicable with the mining.

(1) If site conditions permit, a miner shall proceed cell by cell so that reclamation can and will occur immediately after each cell is mined. Mining by cell means dividing the material site into separate units and mining them in an orderly sequence so that topsoil removed from a newly opened unit can be placed on a unit already mined.

(2) If site conditions require that the entire material site be mined continuously, with the materials being removed layer by layer, a miner shall reclaim the site as soon as the mining is completed. However, the commissioner will allow the reclamation to be postponed if the commissioner finds that contemporaneous reclamation is impracticable, because the landowner plans to allow future intermittent mining of the material site by one or more miners over a period of more than one year. Before the commissioner allows such a postponement, the miner or landowner must

(A) submit a reclamation plan for the entire material site, including stockpiles;

(B) ensure that reclamation will occur no later than immediately after the material site is ultimately exhausted or to be abandoned; and

(C) provide for a bond for all mined areas at all times until the reclamation is ultimately completed.

(b) Extraction of materials from river beds (gravel bailing operations). If a miner extracts materials from the bed of a watercourse, the miner shall reestablish a stable bed and bank profile as contemporaneously as practicable with the extraction. A stable bed and bank profile is one that will not substantially alter river currents or change erosion and deposition patterns downstream. In reviewing a reclamation plan for such an operation, the commissioner will use hydrologic information available to the department and other information the commissioner considers relevant.

(c) Peat and topsoil mines. A reclamation plan for a mine that produces peat, topsoil, or similar materials must provide that at least two inches of a suitable growing medium will be left or replaced on the mined land.

(d) Materials used for other mines. If the primary use of extracted materials is to assist another mining operation regulated under this chapter (such as gravel to build a road to a mining operation), the miner must include the reclamation plan or letter of intent for the material site operation as part of the reclamation plan or letter of intent for the primary mine.

(e) Exempt excavations. If materials are extracted primarily for a non-mining purpose and not part of a mining operation (such as when preparing a building site or highway cut, dredging a shipping channel, or drilling an access tunnel for a non-mining purpose), the requirements of this chapter do not apply even if the materials are sold commercially or used as fill.

(f) Stockpiles. The requirements of this chapter do not apply to materials stockpiled at a distribution point other than the mined area, nor to materials stockpiled at a mined area where no mining has taken place on or after October 15, 1991. A miner need not reclaim acreage on which materials are stockpiled at an active mine site until the stockpile is used up. However, a miner must locate the stockpile where it will not erode into a waterbody. A stockpile is a storage pile of materials segregated as a commercial product for sale or distribution elsewhere and does not include non-commercial waste rock, overburden, or tailings. A stockpile associated with a mining operation other than for materials is not exempt from this chapter. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.020

AS 27.19.030

AS 27.19.040

AS 27.19.050
AS 27.19.100

ARTICLE 3. RECLAMATION PLAN

Section

- 300. Reclamation plan approval; procedure
- 310. Reclamation plan
- 320. Term; conditional approval; renewal
- 330. Amendment of reclamation plan
- 340. Record keeping and inspection; notice address
- 350. Successor in interest

11 AAC 97.300. RECLAMATION PLAN APPROVAL; PROCEDURE. (a) At least 45 days before the proposed start of mining activities, a miner not exempted under AS 27.19.050 must submit to the department, or to the appropriate agency with which the department has entered into a cooperative management agreement, a proposed reclamation plan for approval.

(b) If a miner entitled to an exemption under AS 27.19.050 mistakenly files a proposed reclamation plan, the commissioner will, within 15 days after receipt,

- (1) return any bond filed,
- (2) notify the miner that no plan approval is necessary,
- (3) accept the plan as a letter of intent under AS 27.19.050(b), and

(4) remind the miner of the subsequent requirement to file an annual reclamation statement under AS 27.19.050(c).

(c) If the commissioner determines that a proposed reclamation plan is complete, the commissioner will begin a review that will take no longer than 30 days. If the commissioner determines that the plan is incomplete, the commissioner will notify the miner that review is suspended pending receipt of the necessary information. The miner may request an extension of time to supply the information. Failure to supply the necessary information within 30 days after notification, or within a longer period allowed by the commissioner, constitutes withdrawal of the proposed plan from consideration.

(d) The commissioner will approve, disapprove, or approve with conditions a proposed reclamation plan within 30 days after determining that the plan is complete. However, the plan approval does not take effect, and the mining operation may not begin, until the miner satisfies the bond requirement under 11 AAC 97.400 -- 11 AAC 97.450.

(e) If the commissioner determines, in his or her discretion, that additional time is needed because of the size or complexity of the operation, the commissioner will, with written notice to the applicant, extend the period described in (c) or (d) of this section and establish an alternative review schedule.

(f) If a state or federal agency or a municipality has entered into a cooperative management agreement with the commissioner to implement all or part of this chapter, the application review schedule will comply with that agency's or municipality's applicable review schedule. If a mining operation requires an individual project review to determine its consistency with the Alaska Coastal Management Program, the application review schedule will comply with 6 AAC 50.

(g) If a miner objects to the plan as approved, the miner may give the commissioner written notice of that objection within 30 days and request reconsideration or propose a modification of the plan for the commissioner's review. If, after that reconsideration or review, the miner continues to object to the plan as approved, the miner may file a statement of issues that meets the standards of AS 44.62.370.

(h) If the approved reclamation plan is for an alternate post-mining land use under AS 27.19.030(b) that was proposed by the commissioner, the Department of Fish and Game, the Department of Environmental Conservation, or the landowner rather than by the miner, the miner shall notify the department within 30 days after approval if he or she does not concur. However, a mining locator or material purchaser on public land may not control or determine how the land will be used after a mining operation is completed. The commissioner will, in his or her discretion, modify an approved reclamation plan for a post-mining land use under AS 27.19.030(b) if the miner shows to the commissioner's satisfaction that reclamation for the proposed use would cost the miner more, in time, equipment, or material, than reclamation to the basic standard required by AS 27.19.020.

(i) The commissioner may not impose an alternate post-mining land use under AS 27.19.030(b) if the land is privately owned and the state or federal government owns only the reserved minerals. If the state owns both the land estate and the mineral estate, the commissioner will not approve an alternate post-mining land use that is inconsistent with a state land use plan adopted under AS 38.04.065. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.030

AS 27.19.060

AS 27.19.080

AS 27.19.100

11 AAC 97.310. RECLAMATION PLAN. (a) Before a miner starts a mining operation subject to AS 27.19.030, or if an exempt miner wishes to operate under the provisions of AS 27.19.040(d), the miner must submit a proposed reclamation plan. The proposed plan must be correct and complete to the best of the miner's knowledge and be signed and dated by the miner or the miner's designee.

(b) A reclamation plan not submitted on a form provided by the commissioner must include the following:

(1) the name, address, and telephone number of the miner or other person who will serve as agent to receive any notice that is required under this chapter, and the names, addresses, and telephone numbers of all other owners, operators, or leaseholders of the mining operation;

(2) a list of all properties, mining locations, or leases on which the mining operation is to be conducted, including the state or federal casefile number, and the legal description of the land on which the mining operation will be conducted, described by legal subdivision, section, quarter-section, township, range, and meridian;

(3) a map (United States Geological Survey topographic map or the equivalent) at a scale no smaller than 1:63,360 (inch to the mile) showing the general vicinity of the mining operation and the specific property to be worked;

(4) a general description and diagram of the mining operation and the mined area that shows and states the number of acres to be mined during each year covered by the plan and that shows the location corners or property boundaries and their relationship to the reclamation work, the tailings or spoil disposal areas, and the areas otherwise affected by the operation; the information furnished must be reasonably appropriate to the scale and complexity of the mine;

(5) the estimated number of yards or tons of overburden or waste and ore or materials to be mined during each year covered by the plan;

(6) a description of the reclamation measures that will be taken to comply with AS 27.19.020 and 11 AAC 97.200 -- 11 AAC 97.250, including the equipment to be used; a time schedule for the reclamation measures; and, if the miner proposes to reclaim the land to an alternate post-mining land use under AS 27.19.030(b) on state, federal, or private land or to an alternate post-mining land intended by the landowner on private land, a statement of that proposed or intended use; the description must include:

(A) measures for topsoil removal, storage, protection, and replacement;

(B) measures for reclamation of tailings impoundments, settling ponds, reservoirs, heaps, open pits and cuts, shafts, adits, tunnels, portals, overburden, waste rock storage areas, and all other affected areas;

(C) measures for stream placement and reclamation at the end of mining; and

(D) a proposal for reclamation or post-mining conversion of access roads leading to the mining operation, airstrips, and other associated facilities;

(7) if on private land, a signed and notarized statement by the landowner that the miner has the landowner's permission to operate throughout the period covered by the proposed reclamation plan; however, this statement is not required if the miner is the landowner, or if the mining operation is on a prior federal mining location and the private landowner received title subject to that location under sec. 22(c) of PL 92-203, the Alaska Native Claims Settlement Act (43 U.S.C. sec. 1621(c)); if the private landowner believes that reclamation to the standard set out in AS 27.19.020 is not feasible because the landowner intends to use the land after mining for a purpose incompatible with natural revegetation, the landowner is encouraged to provide this information as part of the statement; for the purposes of this paragraph, the landowner means the owner of the estate that includes the mineral or material to be mined.

(c) If a mining operation is a public project for which the successful bidder has not yet been determined, the agency responsible for the project, the landowner, or another third party may submit a proposed reclamation plan on behalf of the successful bidder. The proposed plan must be complete except for the miner's name, address, and telephone number. Before the plan approval takes effect, the miner must provide his or her name, address, and telephone number, sign the plan, and satisfy the bond requirement. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.020

AS 27.19.030

AS 27.19.040

AS 27.19.100

11 AAC 97.320. TERM; CONDITIONAL APPROVAL; RENEWAL. (a) The commissioner will, in his or her discretion, approve a reclamation plan for any term not to exceed 10 years. If the plan is for more than one year, the commissioner will, in his or her discretion, require the miner to file an annual report that includes the total acreage and volume of material mined in that year, the total acreage reclaimed in that year, and a statement as to whether the reclamation plan is on schedule.

(b) If the commissioner is not satisfied that the plan complies with AS 27.19 and this chapter, the commissioner will, in his or her discretion, approve the reclamation plan only after inclusion of reclamation-specific monitoring, reporting, or performance conditions.

(c) The commissioner will, in his or her discretion, renew a plan upon written request and demonstration that the miner has complied with the approved reclamation plan and the requirements of AS 27.19 and this chapter, if the commissioner determines that the plan is adequate to cover the renewal period. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.030

AS 27.19.100

11 AAC 97.330. AMENDMENT OF RECLAMATION PLAN. (a) A miner shall ensure that reclamation work complies with an approved reclamation plan. If changing product prices, economics, financing, unanticipated conditions, or suspension of mining operations necessitates a change in the reclamation plan, the miner shall submit an amended reclamation plan for approval before modifying the approved reclamation work.

(b) If new or changed statutory or regulatory requirements affect reclamation under an approved reclamation plan, the miner must submit an amended reclamation plan for approval to demonstrate that reclamation occurring after the effective date of the new requirements will comply with those new requirements. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.030

AS 27.19.070

AS 27.19.100

11 AAC 97.340. RECORD KEEPING AND INSPECTION; NOTICE ADDRESS. (a) Until completion of the mining operation, a miner shall keep a copy of the approved reclamation plan, including any approved amendments, at the miner's field office for onsite operations, and shall make the plan available upon request by an authorized representative of the commissioner.

(b) A miner shall allow access to the mining operation to an authorized representative of the commissioner at reasonable times for the purpose of inspecting or monitoring compliance with the reclamation plan.

(c) A miner shall keep the department informed of the miner's correct address until the reclamation is approved as complete. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.030

AS 27.19.070

AS 27.19.100

11 AAC 97.350. SUCCESSOR IN INTEREST. If an interest in a mining operation is transferred from one miner to another by sale, assignment, lease, or otherwise before completion of reclamation and approval by the commissioner, the plan must be amended as provided in 11 AAC 97.330 to reflect the transfer. The commissioner will approve the amendment and will release the predecessor in interest from the reclamation obligations, if

(1) the operation is in compliance with the reclamation plan,

(2) the successor assumes full responsibility and liability under the approved reclamation plan, and

(3) the bonding requirements are met. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.030

AS 27.19.100

ARTICLE 4. RECLAMATION BONDING

Section

- 400. Bonding required
- 405. Corporate surety bond
- 410. Personal bond and letter of credit, certificate of deposit, or deposit of cash or gold
- 415. Acreage to be bonded
- 420. Amount of bond
- 425. Bonding pool
- 430. Liability exceeding bond amount; bonding pool deposit
- 435. Release or decrease of bond, and refund of bonding pool deposit
- 440. Interest; use of bonding pool
- 445. Assignment
- 450. Exception to bonding requirement

11 AAC 97.400. BONDING REQUIRED. A miner who is not exempt under AS 27.19.050(a) shall either

(1) participate in the statewide bonding pool under 11 AAC 97.425;

(2) post a performance bond with the commissioner to ensure complete compliance with AS 27.19, this chapter, and the approved reclamation plan, consisting of either

(A) a corporate surety bond under 11 AAC 97.405; or

(B) a personal bond accompanied by a letter of credit, by a certificate of deposit, or by a deposit of cash or gold, under 11 AAC 97.410;

(3) post a bond or financial guarantee with another government agency to satisfy that agency's reclamation-related bond requirements if, in a cooperative management agreement with that agency, the commissioner has determined that the agency's bond requirements are at least as effective as those of AS 27.19 and that requiring another bond would be unnecessary; or

(4) post a general performance bond that

(A) is written in favor of an agency of the State of Alaska;

(B) requires reclamation to standards no less effective than those of AS 27.19 and this chapter;

(C) is in an amount no less than \$750 per acre of mined area or area to be mined;

(D) remains in effect until the mined area is reclaimed to standards no less effective than those of AS 27.19 and this chapter; and

(E) requires that, if the bond is liquidated, proceeds in the amount of \$750 per acre of mined area will be paid or reserved exclusively for the purpose of reclamation until all mined areas are reclaimed to standards no less effective than those of AS 27.19 and this chapter. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040

11 AAC 97.405. CORPORATE SURETY BOND. A corporate surety bond must

(1) be executed by a corporate surety approved and authorized to do business in this state;

(2) be submitted on a form prescribed by the commissioner; and

(3) remain in effect until the reclamation of all land covered by the bond is completed to the standard of AS 27.19 and this chapter, and its release is approved by the commissioner. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040

11 AAC 97.410. PERSONAL BOND AND LETTER OF CREDIT, CERTIFICATE OF DEPOSIT, OR DEPOSIT OF CASH OR GOLD. (a) A personal bond must be submitted on a form prescribed by the commissioner and must be accompanied by

(1) an irrevocable letter of credit issued by a bank or other financial institution authorized to do business in the United States;

(2) a certificate of deposit in the amount of the bond issued in sole favor of the department by a bank or other financial institution authorized to do business in this state;

(3) a cash deposit maintained in a depository account as directed by the commissioner; or

(4) a deposit of gold held in escrow by a bank or other financial institution, payable to the State of Alaska if the bond is forfeited, and with a value of 25 percent more than the bond obligation, to allow for potential decreases in gold prices.

(b) A personal bond and letter of credit, certificate of deposit, or deposit of cash or gold must remain in effect until the reclamation of all land covered by the bond is completed to the standard of AS 27.19 and this chapter, and their release is approved by the commissioner. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040

11 AAC 97.415. ACREAGE TO BE BONDED. (a) Acreage that must be bonded before a mining operation begins in any calendar year is limited to any area to be mined during that calendar year, plus any mined area (as that term is defined in 11 AAC 97.990) mined in a previous year for which reclamation must be completed under this chapter; it is not necessarily the same as the entire acreage of the mining operation. For an underground mine, only the surface acreage disturbed by the operation constitutes "mined area" for purposes of the bond requirement.

(b) After a multi-year reclamation plan goes into effect, the miner shall ensure that the bond amount is sufficient at all times to cover any area to be mined during the current calendar year, plus any area mined in a previous year that has not yet been reclaimed.

(c) Any previously reclaimed area that is to be mined again is subject to the bond requirement in the year that mining resumes and until it is reclaimed.

(d) In calculating the number of acres that must be bonded, a miner must round up to the next whole number. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040

11 AAC 97.420. AMOUNT OF BOND. (a) The amount of the performance bond required by 11 AAC 97.400 is \$750 per acre, or the reduced per-acre amount determined by the commissioner under (b) of this section, multiplied by the acreage total determined under 11 AAC 97.415.

(b) If a miner shows to the commissioner's satisfaction that the reasonable and probable costs of reclamation under an approved reclamation plan are less than \$750 per acre, the commissioner will reduce the bond to those costs. The miner's showing must be submitted along with the proposed reclamation plan and must include an estimate of the labor and equipment costs that would be incurred to hire a third-party contractor to perform the reclamation in accordance with the plan. In evaluating a miner's proposal for reduction of the bond amount, the commissioner will consider the nature of the surface, its uses,

improvements in the vicinity of the land, the degree of risk involved in the mining operation, and all other relevant factors. The commissioner will make a determination on this request of bond reduction in the time schedules set out in 11 AAC 97.300.

(c) A miner may provide a bond for more than the amount required by (a) and (b) of this section. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040

11 AAC 97.425. BONDING POOL. (a) A statewide bonding pool has been established by the department for mining operations subject to AS 27.19. Instead of posting an individual performance bond, a miner may participate in the bonding pool.

(b) To participate in the bonding pool each year, the miner shall pay into the pool a deposit of 15 percent of the miner's total bond amount determined under 11 AAC 97.420(a) for that year, plus an annual nonrefundable fee of five percent of the total bond amount for that year. These percentages are the same for all operations.

(c) Except for an operation whose bond amount is reduced below \$750 per acre under 11 AAC 97.420(b), the percentages set by (b) of this section result in a bonding pool deposit of \$112.50 per acre and an annual nonrefundable fee of \$37.50 per acre.

(d) No reclamation plan approval goes into effect until the bonding pool deposit and annual nonrefundable fee are paid. The annual nonrefundable fee for the first year of a reclamation plan may not be prorated or reduced. Subsequent annual nonrefundable fees for a multi-year plan are due before the mining operation begins in each calendar year. If the amount of acreage requiring reclamation varies from year to year under the plan, the miner is responsible for making the appropriate payment, including an increased deposit when required, each year. If the acreage decreases, the miner may apply, under 11 AAC 97.435, for a refund of the excess deposit. The miner must pay the annual nonrefundable fee, and the increased deposit when required by the reclamation plan, without billing from the department. A late payment automatically suspends approval of the reclamation plan until full payment, including the late-payment fee set out in 11 AAC 05.010, is received, at which time the reclamation plan is automatically reinstated. During such a suspension, the miner may not engage in a mining operation.

(e) If the commissioner, in his or her discretion, allows a miner who is subject to the bonding requirement of AS 27.21.160 to participate in the bonding pool, the bonding pool is not obligated for an amount exceeding \$750 per acre. Any additional bond amount required under AS 27.21.160 must be provided under one of the mechanisms allowed under AS 27.21.160 and 11 AAC 90. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.030

AS 27.19.040

11 AAC 97.430. LIABILITY EXCEEDING BOND AMOUNT; BONDING POOL DEPOSIT. The posting of a performance bond, or participation in the bonding pool, does not limit the department's right to seek further compensation for a violation of AS 27.19, this chapter, or the approved reclamation plan. The miner is liable for the full costs of reclamation to the standards of AS 27.19, this chapter, and the approved reclamation plan, regardless of the amount of the reclamation bond or bonding pool deposit and fees. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.030

AS 27.19.040

AS 27.19.070

11 AAC 97.435. RELEASE OR DECREASE OF BOND, AND REFUND OF BONDING POOL DEPOSIT. (a) An application for release or decrease of the amount of a performance bond, or for refund of a deposit paid into the bonding pool, must include a sworn statement, executed under penalty of perjury, verifying that the miner has examined the requirements of his or her approved reclamation plan, has investigated the nature and extent of reclamation, and certifies as true that all applicable reclamation responsibilities have been completed.

(b) Before authorizing release of or decrease in the amount of the bond, or refund of a deposit paid into the bonding pool, the commissioner will inspect or review actions taken under the approved reclamation plan, and will make a written finding that each applicable requirement of the approved reclamation plan has been completed. The commissioner will, in his or her discretion, require the miner to submit photographs or other information documenting the reclamation, and, if no inspection takes place, the commissioner will base his or her finding and bond release on the miner's documentary evidence and sworn statement. If reclamation was done in accordance with the plan and with the miner's sworn statement, the commissioner's finding constitutes approval of the reclaimed area and releases the miner from liability under AS 27.19. If reclamation was not done in accordance with the plan and with the miner's sworn statement, the miner remains liable under AS 27.19, notwithstanding the commissioner's finding.

(c) If another agency with jurisdiction over the mining operation agrees to accept the miner's posting of a bond or bond pool deposit with the commissioner as satisfying its own bond requirement, and has filed a written request or entered into a cooperative management agreement under AS 27.19.060 to be notified before the commissioner releases or reduces the bond or bond pool deposit, the commissioner will give the other agency reasonable notice.

(d) Upon request by the miner and consent of the affected surety or financial institution, the commissioner will apply the performance bond, or the bonding pool deposit or a portion of it, to new acreage under a new reclamation plan or amendment to a

reclamation plan submitted by the miner. The non-refundable annual fee is not transferable and is due for all new acreage to be mined. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040
AS 27.19.060

11 AAC 97.440. INTEREST; USE OF BONDING POOL. (a) No miner or surety is entitled to receive interest on any sum deposited into the bonding pool.

(b) The bonding pool, including any accrued interest, may be used by the department only to pay the reclamation costs that have not been paid by the miner or the miner's surety despite the department's reasonable efforts to recover the costs from the miner and the miner's surety. Reclamation funded from the bonding pool will be performed to the standard of AS 27.19.020 and 11 AAC 97.200 -- 11 AAC 97.250. The commissioner will, in his or her discretion, use any money in the bonding pool for reclamation in accordance with AS 27.19, except that the commissioner will not use a refundable deposit to fulfill another miner's reclamation obligation. The commissioner has no obligation or authority under AS 27.19 to undertake reclamation expenditures beyond the disbursable balance of the bonding pool. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040
AS 27.19.070

11 AAC 97.445. ASSIGNMENT. If a miner assigns his or her interest in any uncompleted mining operation, and the commissioner has amended the reclamation plan to reflect the transfer and released the assignor in accordance with 11 AAC 97.350, the commissioner will transfer the assignor's bonding pool deposit and annual nonrefundable bonding pool fee to the assignee upon the written request of the assignee and written consent of the assignor. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040

11 AAC 97.450. EXCEPTION TO BONDING REQUIREMENT. No bond is required under AS 27.19.040 and 11 AAC 97.400 if the miner is an agency of the State of Alaska or federal government or is a municipality. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.040

ARTICLE 5. EXEMPTIONS FOR SMALL OPERATIONS

Section

500. Letter of intent

510. Annual reclamation statement

11 AAC 97.500. LETTER OF INTENT. (a) The letter of intent required by AS 27.19.050(b) must be filed annually on a form provided by the department before the mining begins. The following information must be provided:

(1) the name, address, and telephone number of the miner or other person who will serve as agent to receive any notice that is required by this chapter, and the names, addresses, and telephone numbers of all other owners, operators, or leaseholders of the mining operation;

(2) a list of all properties, mining locations, or leases on which the mining operation is to be conducted, including the state or federal casefile number, and the legal description of the land on which the mining operation is to be conducted, described by legal subdivision, section, quarter-section, township, range and meridian;

(3) a map (United States Geological Survey topographic map or the equivalent) at a scale no smaller than 1:63,360 (inch to the mile) showing the general vicinity of the mining operation and the specific property to be worked; for a material mining operation adjacent to an airport or a public road, the commissioner will, in his or her discretion, waive this requirement and allow the location to be specified by the name of the airport or by the road milepost;

(4) a diagram of the mining operation and the mined area that shows and states the number of acres to be mined during the year and that shows the location corners or property boundaries and their relationship to the reclamation work, the tailings or spoil disposal areas, and the areas otherwise to be affected by the operation; the information furnished must be reasonably appropriate to the scale and complexity of the mine;

(5) total acreage and volume of material to be mined, and the existing acreage of mined area;

(6) total acreage to be reclaimed in the year covered by the letter of intent;

(7) a description of the reclamation measures that will be taken to comply with AS 27.19.020 and 11 AAC 97.200 -- 11 AAC 97.250;

(8) if on private land, a signed and notarized statement by the landowner that the miner has the landowner's permission to operate throughout the period covered by the letter of intent; however, this statement is not required if the miner is the landowner, or if the mining operation is on a prior federal mining location and the private landowner received title subject to that location under sec. 22(c) of PL 92-203, the Alaska Native Claims Settlement Act (43 U.S.C. sec. 1621(c)); if the private landowner believes that reclamation

to the standard set out in AS 27.19.020 is not feasible because the landowner intends to use the land after mining for a purpose incompatible with natural revegetation, the landowner is encouraged to provide this information as part of the statement. For the purposes of this paragraph, the landowner is the owner of the estate that includes the mineral or material to be mined.

(b) The miner shall keep the department informed of the miner's correct address until the reclamation is completed. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.050

11 AAC 97.510. ANNUAL RECLAMATION STATEMENT. (a) The annual reclamation statement required by AS 27.19.050(c) must be filed on a form provided by the department and must include photographs or videotapes dated and described as to location, or other information acceptable to the commissioner, documenting that the reclamation was completed. It must also state the cumulative total of unreclaimed acreage.

(b) The annual reclamation statement must be filed or postmarked by December 31 for each calendar year.

(c) A miner who files a letter of intent must file an annual reclamation statement, even if no mining took place during that year. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.050

ARTICLE 6. VIOLATIONS AND PENALTIES

Section

- 600. Failure to file reclamation statement
- 610. Failure to meet requirements or reclaim small operation
- 620. Violation of reclamation plan
- 630. Administrative determination of violation
- 640. Reclamation risk assessment fee

11 AAC 97.600. FAILURE TO FILE RECLAMATION STATEMENT. A miner who fails to file an annual reclamation statement in accordance with 11 AAC 97.510 may not continue or resume that mining operation without an approved reclamation plan and a bond. The miner may restore the exemption by fully complying with 11 AAC 97.510(a) and (c). Until the miner supplies the documentation required by those subsections, a rebuttable presumption is established that the miner has failed to reclaim the mining operation to the standards of AS 27.19 and this chapter. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.050

11 AAC 97.610. FAILURE TO MEET REQUIREMENTS OR RECLAIM SMALL OPERATION. The penalties stated in AS 27.19.050(d) apply if a miner who obtained an exemption under AS 27.19.050(a) exceeds the acreage or cubic yardage limits of that subsection, or if the commissioner determines that the miner has failed to reclaim the mining operation to the standards of AS 27.19 and this chapter. These penalties apply regardless of where the miner's subsequent mining operation occurs. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.050
AS 27.19.070

11 AAC 97.620. VIOLATION OF RECLAMATION PLAN. AS 27.19.040(c) applies to a participant in the statewide bonding pool in the same way as to a miner who has filed an individual performance bond. Under the circumstances set out in AS 27.19.040(c), a statewide bonding pool participant's bonding pool deposit will become nonrefundable. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.030
AS 27.19.040
AS 27.19.070

11 AAC 97.630. ADMINISTRATIVE DETERMINATION OF VIOLATION. If, after the commissioner issues a written order to a miner, the miner fails to correct a violation of AS 27.19 or this chapter within the period set by the commissioner, the commissioner will, in his or her discretion, serve an accusation in accordance with AS 44.62.360 and AS 44.62.380 and will conduct further proceedings in accordance with AS 44.62.330 -- AS 44.62.650. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.070
AS 27.19.080

11 AAC 97.640. RECLAMATION RISK ASSESSMENT FEE. (a) The reclamation risk assessment fee required by AS 27.19.070(c) applies to a miner who has had any portion of his or her bonding pool deposit become nonrefundable, in the same way as it applies to a miner who has forfeited a reclamation bond or has been held liable in a civil action. The requirement applies to any future mining operation by that miner, regardless of location, for the period set out in (d) of this section.

(b) The reclamation risk assessment fee required by AS 27.19.070(c) must be tendered to the department in the form of a performance bond meeting the requirements of 11 AAC 97.405 or 11 AAC 97.410. The miner may not participate in the statewide bonding pool to meet this requirement.

(c) The reclamation risk assessment fee is required in addition to, not instead of, the bonding requirements of this chapter.

(d) The reclamation risk assessment fee will be refunded to the miner after two consecutive years of mining operations in complete compliance with AS 27.19, this chapter, and the approved mining reclamation plan then in effect for that miner.

(e) If a miner who has posted a reclamation risk assessment fee is determined to be in violation of AS 27.19, this chapter, or an approved reclamation plan, the reclamation risk assessment fee will be forfeited to the statewide bonding pool. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.070

ARTICLE 7. COOPERATIVE MANAGEMENT AGREEMENTS

Section

700. Cooperative agreements

11 AAC 97.700. COOPERATIVE AGREEMENTS. (a) Upon a written finding that the state's best interest will be served, the commissioner will, in his or her discretion, enter into a cooperative management agreement with a federal or state agency under AS 27.19.060, or with a municipality under art. X, sec. 13 of the Alaska Constitution, to implement AS 27.19 and this chapter. Except as provided in (b) of this section, the cooperative agreement will, in the commissioner's discretion, provide

(1) that the federal or state agency will implement AS 27.19 and this chapter with respect to the land that it manages, or that the municipality will implement AS 27.19 and this chapter with respect to the land that it owns; or

(2) that the department and the federal or state agency or the municipality will implement both its own and the other's reclamation authority on a reciprocal basis.

(b) A cooperative agreement with another state agency will, in the commissioner's discretion, delegate to the state agency administrative review authority under the Administrative Procedure Act.

(c) For purposes of this section,

(1) "state agency" means any organizational unit of the executive branch of the state, but does not include any agency in the judicial or legislative branches of the state government;

(2) "federal agency" means any organizational unit of the executive branch of the federal government, but does not include an agency in the judicial or legislative branches of the federal government. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.010

AS 27.19.060

AS 27.19.100

AS 38.05.020

AS 44.62.340

AS 44.62.640

Art. X, sec. 13, Alaska Const.

ARTICLE 8. GENERAL PROVISIONS

Section

900. Boundary maintenance

910. Multiple miners; liability

990. Definitions

11 AAC 97.900. BOUNDARY MAINTENANCE. In order to provide an accurate reference for the location of the reclaimed area, a miner must maintain or reestablish all location corners or property boundaries described in the reclamation plan until the commissioner inspects the site or reviews it for reclamation approval or bond release under 11 AAC 97.435. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990

AS 27.19.020

AS 38.05.020

11 AAC 97.910. MULTIPLE MINERS; LIABILITY. (a) If more than one miner is involved in a mining operation, the commissioner will consider the miner or other person identified as the agent in the letter of intent or reclamation plan to be the miners' agent for purposes of any notice under this chapter until the department is otherwise notified. All notices provided by the department to the

miners' agent constitute notice to all miners involved in a mining operation.

(b) All miners involved in a mining operation are jointly and severally liable for any penalty for failure to comply with AS 27.19 and this chapter. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.020
AS 27.19.070
AS 27.19.100

11 AAC 97.990. DEFINITIONS. In this chapter

- (1) "commissioner" means the commissioner of natural resources;
- (2) "mined area" has the same meaning as in AS 27.19.100(2); however, that definition applies only if the mining occurred after October 14, 1991;
- (3) "miner" has the same meaning as in AS 27.19.100(3); however, "miner" does not include a state, federal, or municipal landowner, regardless of whether that landowner retains a royalty interest as lessor, unless it owns or operates the mining operation; nor does "miner" include any other landowner, unless the landowner has a managing interest or working interest in the mining operation;
- (4) "previously mined area" means the land surface, reclaimed or not, that is left by a mining activity. (Eff. 7/30/92, Register 123)

Authority: Sec. 2, ch. 92, SLA 1990
AS 27.19.100

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Memorandums and Discussion Papers

Memorandum from Alvin G. Ott to Jim Haynes, dated October 27, 1992 regarding Draft North Slope Rehabilitation. Guidelines.

June 11, 1992 Discussion Paper for Oil and Gas Lease Closure and Rehabilitation.

Other

AS 27.19. Alaska Mining Reclamation Act.

11 AAC 97. Alaska Mining Reclamation Regulations.