ALASKA LEGISLATURE COMMITTEE FILES, 1989-1990 8672
6513 SENATE RESOURCES

9/7

Recommendation 9:
Document Anadromous Fish Habitat

OBJECTIVE

To survey streams for anadromous fish in areas where timber harvests and logging road construction are proposed.

DESCRIPTION

The Anadromous Fish Act is currently one of the most effective means for protecting fish from some nonpoint-source pollutants. The chief limitation of the Anadromous Fish Act is its limited applicability outside of documented anadromous fish habitat. Water quality and fish resources on forest lands could be better protected by funding and implementing a systematic stream survey program in areas slated for logging.

Habitat biologists would survey streams in areas proposed for logging. A helicopter would shuttle teams between potential upstream limits of anadromous fish distribution. The presence of anadromous fish would be documented in the ADF&G's anadromous fish waters catalog. This information could then be used to locate road crossings, identify buffer strips, or other BMPs as appropriate. Water quality samples (e.g., turbidity, suspended sediment concentration, temperature, dissolved oxygen) could also be collected, under the general supervision of ADEC staff. This would assist the ADEC in determining baseline information for comparison with post-logging samples.

AGENCIES OR PARTIES RESPONSIBLE FOR IMPLEMENTATION

The Habitat Division, ADF&G, has the authority and expertise to survey streams to determine anadromous fish distribution.

AUTHORITIES APPLIED TO IMPLEMENT THE RECOMMENDATION

The Anadromous Fish Act (16.05.870) gives the ADF&G the necessary authority to conduct fish stream surveys and document anadromous fish distribution.

POTENTIAL CONSTRAINTS TO IMPLEMENTATION

One potential constraint is limited staff. Existing staff may be required for more extensive surveys. A second constraint is funding. The single greatest expense in conducting stream surveys in remote areas is transportation of staff and equipment. Stream surveys conducted by ADF&G in 1988 cost approximately $3,000 per day for helicopter transport alone. Budget reductions in recent

years have obviated requests for additional funding to conduct stream surveys. A third constraint is the immediate need for stream surveys in many areas. Many native and village corporations in southeast Alaska will probably have harvested their marketable timber by the mid-1990s (Rae 1988). Corporations in southcentral Alaska are not far behind. Large-scale operations are also being planned for state lands in the Susitna Valley and other areas (ADNR 1988). Annual harvests of old-growth timber, including many high-value riparian areas, may peak in the next decade. Stream surveys are needed before the timber is cut.

POTENTIAL FUNDING SOURCES

Funding for ADF&G 1988 stream surveys came from a special legislative appropriation. Special appropriations should continue to be pursued, but they are not a reliable future funding source. A critical component of planning and management of timber harvests is locating and protecting the water quality of anadromous fish streams. The Legislature should designate a specific amount or percentage of its annual appropriation to state agencies for management of the timber industry for conducting stream surveys. Appropriations should be sufficient to survey those watersheds where timber harvests are likely to occur in the following year.

SCHEDULES OR MILESTONES

In light of accelerating timber harvests on private and state lands, funding should be sought for additional staff and contractual services in the upcoming legislative session. Stream surveys should be conducted during late summer and fall 1989.

CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY

02-576(2/77)

years have obviated requests for additional funding to conduct stream surveys. A third constraint is the immediate need for stream surveys in many areas. Many native and village corporations in southeast Alaska will probably have harvested their marketable timber by the mid-1990s (Rae 1988). Corporations in southcentral Alaska are not far behind. Large-scale operations are also being planned for state lands in the Susitna Valley and other areas (ADNR 1988). Annual harvests of old-growth timber, including many high-value riparian areas, may peak in the next decade. Stream surveys are needed before the timber is cut.

POTENTIAL FUNDING SOURCES

Funding for ADF&G 1988 stream surveys came from a special legislative appropriation. Special appropriations should continue to be pursued, but they are not a reliable future funding source. A critical component of planning and management of timber harvests is locating and protecting the water quality of anadromous fish streams. The Legislature should designate a specific amount or percentage of its annual appropriation to state agencies for management of the timber industry for conducting stream surveys. Appropriations should be sufficient to survey those watersheds where timber harvests are likely to occur in the following year.

SCHEDULES OR MILESTONES

In light of accelerating timber harvests on private and state lands, funding should be sought for additional staff and contractual services in the upcoming legislative session. Stream surveys should be conducted during late summer and fall 1989.

Recommendation 10:
Determine Applicability of Existing Research to Alaska

OBJECTIVE

To determine applicability of research and recommendations from other areas to Alaskan conditions.

DESCRIPTION

Extensive research conducted in other states and provinces has determined the effects of logging on nonpoint-source pollution of fish-bearing streams. Results and recommendations of these studies may or may not be applicable to maintaining water quality in Alaskan streams. This project would compare the similarities and dissimilarities between forest lands in Alaska and other areas. For example, the rocks underlying forests erode at different rates, and precipitation and gradient are contributing factors. This project would compare the factors which contribute to erosion rates in Alaska with other areas. The final product would be a detailed, comprehensive, and area-specific report.

AGENCIES OR PARTIES RESPONSIBLE FOR IMPLEMENTATION

The agency or party responsible for a project such as this would have to have a working knowledge of meteorology, geology, soils, hydrology, forestry, fisheries and wildlife ecology, and the sources and effects of nonpoint-source pollution. Thus, it may best be accomplished by a joint effort by the ADNR, ADEC, and ADF&G, or consulting firms or federal agencies with this expertise.

AUTHORITIES APPLIED TO IMPLEMENT THE RECOMMENDATION

The recommendation could be implemented under AS 46 and the Clean Water Act.

POTENTIAL CONSTRAINTS TO IMPLEMENTATION

Difficulty in obtaining funding is a major constraint. Another constraint might be the reluctance of one or more agencies to participate in such a project.

POTENTIAL FUNDING SOURCES

Potential funding sources are federal funding through the EPA Section 319(h) grant program and state funding through a special legislative appropriation.

SCHEDULES OR MILESTONES

A clear understanding of how studies in other areas apply to Alaskan conditions is a key to recognizing real data gaps. This information is essential in designing and prioritizing research projects and in identifying and controlling nonpoint-source pollution in Alaska. Therefore, funding should be sought as soon as possible.

Recommendation 11:
Develop an Effective Sediment Sampling Methodology

OBJECTIVE

To develop and implement field methods which differentiate between natural and elevated concentrations of sediments.

DESCRIPTION

Relatively subtle changes in suspended sediment concentrations, proportion of fine sediments in spawning gravels, and turbidity can adversely affect water quality and productivity of streams. Responses vary between and within streams and through time. Many violations of the AWQS for sediment cannot be detected without a well designed sampling scheme that is conducted before, during, and after logging road construction and timber harvests. Following a review of the literature and development of appropriate field sampling methods, ADEC staff would sample streams before, during, and after timber harvest and road building.

AGENCIES OR PARTIES RESPONSIBLE FOR IMPLEMENTATION

The ADEC has the statutory and regulatory authority and expertise to develop sampling methods and conduct sampling in the field.

AUTHORITIES APPLIED TO IMPLEMENT THE RECOMMENDATION

This recommendation can be implemented under AS 46 and the CWA.

POTENTIAL CONSTRAINTS TO IMPLEMENTATION

Sampling streams before, during, and after timber harvest operations will necessitate a much greater field presence for the ADEC. Thus, staff and funding must be increased.

POTENTIAL FUNDING SOURCES

The most likely sources are federal funding through the EPA Section 319(h) grant program and state funding through a special legislative appropriation.

SCHEDULES OR MILESTONES

This information is essential for identifying and controlling nonpoint-source pollution in Alaska. Therefore, funding should be sought through the Section 319(h) grant program and in the upcoming

DRAFT

legislative session, and the project should be initiated as soon as possible.

DRAFT

LITERATURE CITED

Adams, J. N., and R. L. Beschta. 1980. Gravel bed composition in Oregon coastal streams. Can. J. Fish. Aquat. Sci. 37:1514-1521.

Adams, P. W., R. L. Beschta, and H. A. Froehlich. In press. Mountain logging near streams: opportunities and challenges. In Proc. Internat. Mountain Logging and Pacific Northwest Skyline Symp. College of Forestry, Oregon State Univ., Corvallis. December 1988.

Alaska Department of Natural Resources (ADNR). 1988. Susitna regional forest plan: land status summary. Draft report. Division of Forestry, Anchorage.

Amaranthus, M. P., R. M. Rice, N. R. Barr, and R. R. Ziemer. 1985. Logging and forest roads related to increased debris slides in southwestern Oregon. J. Forestry 83:229-233.

Anderson, G. B., Jr. 1977. Oregon's forest conservation laws: part II. American Forests 83(4):19-21, 41-44.

Ayer, J. D. 1972. Public regulation of private forestry: a survey and a proposal. Harvard J. on Legislation 10:407-429.

Barton, D. R., W. D. Taylor, and R. M. Biette. 1985. Dimensions of riparian buffer strips required to maintain trout habitat in southern Ontario streams. North American J. Fish. Manage. 5:364-378.

Berman, M. D., and T. Hull. 1987. The commercial fishing industry in Alaska's economy. Inst. Social and Economic Res., Univ. Alaska, Anchorage.

Beschta, R. L. 1978. Long-term patterns of sediment production following road construction and logging in the Oregon Coast Range. Water Resources Research 14:1011-1016.

------. 1980. Turbidity and suspended sediment relationships. Pp. 271-282 in Proc. Symp. Watershed Management '80. American Society of Civil Engineers, Boise, Idaho.

------, R. E. Bilby, G. W. Brown, L. B. Holtby, and T. D. Hofstra. 1987. Stream temperature and aquatic habitat: fisheries and forestry interactions. Pp. 191-232 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Bisson, P. A., R. E. Bilby, M. D. Bryant, C. A. Dolloff, G. B. Grette, R. A. House, M. L. Murphy, K V. Koski, and J. R. Sedell. 1987. Large woody debris in forested streams in the

Pacific Northwest: past, present, and future. Pp. 143-190 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Brazier, J. R., and G. W. Brown. 1973. Buffer strips for temperature control. Res. Paper 15. School of Forestry, Oregon State Univ., Corvallis.

Brown, G. W. 1983. Forestry and water quality. O.S.U. Book Stores, Inc. Oregon State Univ., Corvallis. 142 pp.

------, D. Carlson, G. Carter, D. Heckeroth, M. Miller, and B. Thomas. 1978. Meeting water quality objectives on state and private forest lands through the Oregon Forest Practices Act. Report prepared for the Oregon State Department of Forestry. 90 pp.

------, G. W. Swank, and J. Rothacher. 1971. Water temperature in the Steamboat drainage. Res. Paper PNW-119. Pacific Northwest Forest and Range Experiment Station, U. S. Forest Service, Portland, Oregon.

Cederholm, C. J., and L. M. Reid. 1987. Impact of forest management on coho salmon (Oncorhynchus kisutch) populations of the Clearwater River, Washington: a project summary. Pp. 373-398 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Culp, J. M., and R. W. Davies. 1983. An assessment of the effects of streambank clear-cutting on macroinvertebrate communities in a managed watershed. Can. Tech. Rep. Fish. and Aquat. Sci. No. 1208. Department of Fisheries and Oceans, Ministry of Forests, Nanaimo, British Columbia. 116 pp.

Dykstra, D. P., and H. A. Froehlich. 1976. Costs of stream protection during timber harvest. J. Forestry 74:684-687.

Everest, F. H., and R. D. Harr. 1982. Influence of forest and rangeland management on anadromous fish habitat in western North America: 6. Silvicultural treatments. General Tech. Report PNW-134. Pacific Northwest Forest and Range Experiment Station, U. S. Forest Service, Portland, Oregon. 19 pp.

------, R. L. Beschta, J. C. Scrivener, K V. Koski, J. R. Sedell, and C. J. Cederholm. 1987. Fine sediment and salmonid production: a paradox. Pp. 98-142 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Garland, J. J. 1987. Aspects of practical management in the streamside zone. Pp. 277-288 in Salo, E. O., and T. W. Cundy,

streamside zone. Pp. 277-288 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Gibbons, D. R. 1984. A streamside management plan for national forest lands in southeast Alaska. Pp. 175-182 in Meehan, W. R., T. R. Merrell, Jr., and T. A. Hanley, eds. Fish and wildlife relationships in old-growth forests. American Institute of Fishery Research Biologists.

------, W. R. Meehan, K V. Koski, T. R. Merrell, Jr. 1987. History of studies of fisheries and forestry interactions in southeastern Alaska. Pp. 297-329 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Gillick, T., and B. D. Scott. 1975. Buffer strips and the protection of fishery resources: an economic analysis. DNR Rep No. 32. Department of Natural Resources, Olympia, Washington. 30 pp.

Gregory, S. V., G. A. Lamberti, D. C. Erman, K V. Koski, M. L. Murphy, and J. R. Sedell. 1987. Influence of forest practices on aquatic production. Pp. 233-255 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Hall, J. D., G. W. Brown, and R. L. Lantz. 1987. The Alsea watershed study: a retrospective. Pp. 399-416 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Hansmann, E. W., and H. K. Phinney. 1973. Effects of logging on periphyton in coastal streams of Oregon. Ecology 54:194-199.

Harris, A. S., and W. A. Farr. 1974. The forest ecosystem of southeast Alaska: 7. Forest ecology and timber management. Gen. Tech. Rep. PNW-25. Pacific Northwest Forest and Range Experiment Station, U. S. Forest Service, Portland, Oregon. 109 pp.

Hartman, G. F., and L. B. Holtby. 1982. An overview of some biophysical determinants of fish production and fish population responses to logging in Carnation Creek, British Columbia. Pp. 348-374 in Hartman, G., ed. Proc. Carnation Creek workshop, a 10 year review. Malaspina College, Nanaimo, B.C.

------, J. C. Scrivener, L. B. Holtby, and L. Powell. 1987. Some effects of different streamside treatments on physical

DRAFT

conditions and fish population processes in Carnation Creek, a coastal rain forest stream in British Columbia. Pp. 330-372 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Heifetz, J., M. L. Murphy, and K V. Koski. 1986. Effects of logging on winter habitat of juvenile salmonids in Alaskan streams. North American J. Fish. Manage. 6:52-58.

Holtby, L. B. 1988. Effects of logging on stream temperatures in Carnation Creek, British Columbia, and associated impacts on coho salmon (Oncorhynchus kisutch). Can. J. Fish. Aquat. Sci. 45:502-515.

House, R. A., and P. L. Boehne. 1985. Evaluation of instream enhancement structures for salmonid spawning and rearing in a coastal Oregon stream. North American J. Fish. Manage. 5:283-295.

Johnson, S. W., J. Heifetz, and K V. Koski. 1986. Effects of logging on the abundance and seasonal distribution of juvenile steelhead in some southeastern Alaska streams. North American J. Fish. Manage. 6:532-537.

Jones & Stokes Associates, Inc. 1987. Southcentral Alaska sport fishing economic study. Prepared for Alaska Department of Fish and Game, Anchorage.

Koski, K V., and R. Walter. 1981. Forest practices in relation to management of Alaska's coastal zone resources: a review with management and guideline recommendations. Manuscript Rep.--File No. 163. Northwest and Alaska Fisheries Center Auke Bay Laboratory, National Marine Fisheries Service, Juneau, Alaska.

Krag, R. K., E. A. Sauder, and G. V. Wellburn. 1986. A forest engineering analysis of landslides in logged areas on the Queen Charlotte Islands, British Columbia. Land Manage. Rep. No. 43. B.C. Ministry of Forests and Lands, Victoria. 139 pp.

Lloyd, D. S. 1987. Turbidity as a water quality standard for salmonid habitats in Alaska. North American J. Fish. Manage. 7:34-45.

------, J. P. Koenings, and J. D. LaPerriere. 1987. Effects of turbidity in fresh waters of Alaska. North American J. Fish. Manage. 7:18-33.

McCrea, M. E. 1984. Upstream, downstream--why the state forest practices act is not protecting public resources. Unpubl. M.S. thesis. Washington State Univ. 119 pp.

Moore, M. K. 1977. Factors contributing to blowdown in streamside leave strips on Vancouver Island. Land Manage. Rep. No. 3. Ministry of Forests, Victoria, British Columbia. 34 pp.

Moring, J. R. 1982. Decrease in stream gravel permeability after clear-cut logging: an indication of intragravel conditions for developing salmonid eggs and alevins. Hydrobiologia 88:295-298.

Murphy, M. L., J. Heifetz, S. W. Johnson, K V. Koski, and J. F. Thedinga. 1986. Effects of clear-cut logging with and without buffer strips on juvenile salmonids in Alaskan streams. Can. J. Fish. Aquat. Sci. 43:1521-1533.

Newbold, J. D., D. C. Erman, and K. B. Roby. 1980. Effects of logging on macroinvertebrates in streams with and without buffer strips. Can J. Fish. Aquat. Sci. 37:1076-1085.

Norris, L. A., H. W. Lorz, and S. V. Gregory. 1983. Influence of forest and rangeland management on anadromous fish habitat in western North America: 9. Forest chemicals. General Tech. Report PNW-149. Pacific Northwest Forest and Range Experiment Station, U. S. Forest Service, Portland, Oregon. 95 pp.

Olsen, E. D., D. S. Keough, and D. K. LaCourse. 1987. Economic impact of proposed Oregon forest practices rules on industrial forest lands in the Oregon Coast Range: a case study. Res. Bull. 61. Forest Research Lab, College of Forestry, Oregon State Univ., Corvallis. 15 pp.

Piehl, B. T., M. R. Pyles, and R. L. Beschta. 1988. Flow capacity of culverts on Oregon Coast Range forest roads. Water Resources Bull. 24:631-637.

Rae, B. N. 1988. Alaska's timber industry. Alaska Economic Trends 8(10):1-9.

Reed, J. C., Jr., and J. C. Harms. 1956. Rates of tree growth and forest succession in the Anchorage-Matanuska Valley area, Alaska. Arctic 9:239-248.

Rood, K. M. 1984. An aerial photograph inventory of the frequency and yield of mass wasting on the Queen Charlotte Islands, British Columbia. Land Manage. Rep. No. 34. B.C. Ministry of Forests, Victoria. 55 pp.

Sachet, J., S. Keller, A. McCoy, T. Orr, Jr., and N. Wolff. 1980. An assessment of the adequacy of Washington's forest practices regulations in protecting water quality. Tech. Rep. No. DOE 80-7A. Department of Ecology, Olympia, Washington. 102 pp.

Sadler, R. R. 1970. Buffer strips: a possible application of decision theory. Technical Note. Bureau of Land Management, U. S. Department of the Interior, Portland, Oregon. 11 pp.

Sampson, G. R., W. W. S. van Hees, T. S. Setzer, and R. C. Smith. 1988. Potential for forest products in interior Alaska. Res. Bull. PNW-RB-153. Pacific Northwest Research Station, U. S. Forest Service, Portland, Oregon. 28 pp.

Sessions, J., J. C. Balcom, and K. Boston. 1987. Road location and construction practices: effects on landslide frequency and size in the Oregon Coast Range. Western J. Applied Forestry 2:119-124.

Sidle, R. C., and A. J. Campbell. 1985. Patterns of suspended sediment transport in a coastal Alaska stream. Water Resources Bull. 21:909-917.

Sigman, M. J., ed. 1985. Impacts of clearcut logging on the fish and wildlife resources of southeast Alaska. Tech. Report 85-3. Habitat Division, Alaska Department of Fish and Game, Juneau. 95 pp.

Steinblums, I. J. 1978. Streamside buffer strips: survival, effectiveness, and design. Unpubl. M.S. thesis. Oregon State Univ., Corvallis. 181 pp.

------, H. A. Froehlich, and J. K. Lyons. 1984. Designing stable buffer strips for stream protection. J. Forestry 82:19, 50-52.

Swanson, F. J., L. E. Benda, S. H. Duncan, G. E. Grant, W. F. Megahan, L. M. Reid, and R. R. Ziemer. 1987. Mass failures and other processes of sediment production in Pacific Northwest forest landscapes. Pp. 9-38 in Salo, E. O., and T. W. Cundy, eds. Streamside management: forestry and fishery interactions. Contribution No. 57. Univ. Washington, Seattle.

Swanston, D. N. 1969. Mass wasting in coastal Alaska. Res. Paper PNW-83. Pacific Northwest Forest and Range Experiment Station, U. S. Forest Service, Portland, Oregon. 15 pp.

Toews, D. A. A., and M. J. Brownlee. 1981. A handbook for fish habitat on forest lands in British Columbia. Department of Fisheries and Oceans, Vancouver, British Columbia. 164 pp.

------, and M. K. Moore. 1982. The effects of streamside logging on large organic debris in Carnation Creek. Land Manage. Rep. No. 11. Department of Fisheries and Oceans, Ministry of Forests, Vancouver, British Columbia. 29 pp.

Tripp, D. B., and V. A. Poulin. 1986. The effects of mass wasting on juvenile fish habitats in streams on the Queen Charlotte Islands. Land Manage. Report No. 45. Ministry of Forests and Lands, Vancouver, British Columbia. 36 pp.

------, and ------. 1986. The effects of logging and mass wasting on salmonid spawning habitat in streams on the Queen Charlotte Islands. Land Manage. Report No. 50. Ministry of Forests and Lands, Vancouver, British Columbia. 29 pp.

Tschaplinski, P. J., and G. F. Hartman. 1983. Winter distribution of juvenile coho salmon (Oncorhynchus kisutch) before and after logging in Carnation Creek, British Columbia, and some implications for overwinter survival. Can. J. Fish. Aquat. Sci. 40:452-461.

U. S. Forest Service (USFS). 1986. Aquatic habitat management handbook. FSH 2609.24. Juneau, Alaska.

van Hees, W. W. S. 1988. Effects of recent national legislation on ownership of timberland resources in southeast Alaska. Res. Note PNW-RN-469. Pacific Northwest Research Station, U. S. Forest Service, Portland, Oregon. 12 pp.

STATE OF ALASKA

STEVE COWPER, GOVERNOR

DEPARTMENT OF FISH AND GAME

BOX 3-2000
JUNEAU, ALASKA 99802
PHONE: (907) 465-4106

DIVISION OF HABITAT

January 13, 1989

Mr. Robert Loescher
Senior Vice President
Resource Management
SEALASKA Corporation
One Sealaska Plaza
Juneau, AK 99801

Dear Mr. Loescher:

Your January 11 letter requests that, pursuant to the Freedom of Information Act, we provide you a copy of our draft fish habitat regulations.

I have enclosed the requested copy. It is important to understand that this package is a very preliminary draft. It is just now being reviewed by other division of this department, with their comments due to us by January 30. A copy of the draft has not been released for review by other state agencies or the public. These two separate reviews are scheduled to begin later this winter, and ample time will be provided for each.

I hope you will treat our release of this very preliminary draft document to Sealaska accordingly. Incidentally, one item that we plan to provide with the agency and public review drafts is a list of the review comments we received on the 1986 version of the regulations, and our response to each vis-à-vis the 1988 draft. This document is still in preparation.

As we have stated before the Forest Practices Steering Committee, we have always intended to provide our draft regulations to all Steering Committee members as soon as the ADF&G divisions' comments are incorporated and the state "agency review" period begins. We believe this sequence of events will facilitate review and development of our "Title 16" regulations on a path that is parallel with the FPA amendment process. Frankly, we are as anxious as any other party to ensure that our draft regulations receive adequate review by the Steering Committee members and do not duplicate any elements that would be covered under FPA regulations administered by the Alaska Department of Natural Resources.

Please feel free to call me if you would like to discuss this matter further.

Sincerely,

Frank Rue
Director

Enclosure

cc: Steering Committee Members

MEMORANDUM

State of Alaska

DEPARTMENT OF FISH AND GAME

TO: Division Directors

DATE: December 30, 1988

FILE NO.:

TELEPHONE NO.: 465-4105

SUBJECT: Inhouse Review of Proposed Fish Habitat Regulations

FROM: Frank Rue
Director
Habitat Division
Department of Fish and Game

The Habitat Division is seeking inhouse review and comment on the enclosed draft of its proposed fish habitat regulations. A prior draft of these regs went public in January, 1986, but the previous administration decided shortly thereafter to suspend work on them. We believe that fish habitat regulations are needed in order to 1) fully implement the department's authorities under AS 16.05.840 and 16.05.870 (see enclosed fact sheet); and 2) make explicit the standards we use in issuing fish habitat permits. We also want to encourage public discussion of these standards.

No new permit program is being introduced, and the time required to obtain a fish habitat ("Title 16") permit is not being increased. However, the current draft indicates that we propose to require permits for some uses and activities that not all habitat regional offices have required permits for in the past. Basically, these are uses or activities occurring upstream of or adjacent to (but above the high water mark of) cataloged anadromous reaches and that are expected to "affect" (i.e., adversely impact) anadromous fish or their habitat. Although some members of the public will strongly oppose the "affecting" concept, an Attorney General's opinion indicates that it is within the scope of our statute, provided we promulgate regulations.

To assist in your review of the draft regs, we have also enclosed the following: 1) a table of contents listing all sections of the regulations and indicating which statute (AS 16.05.840 or 16.05.870) they are being proposed under; 2) a short but thorough section-by-section analysis of the proposed regulations; and 3) rationale documents giving explanatory narrative and citations for the proposed water intake and blasting standards. A rationale document for our culvert installation standards is being prepared but is not expected to be available for several weeks.

During your review, if you have questions or comments on the water intake, blasting, or culvert installation standards or the pertinent rationale documents, please call the

appropriate person as follows: for blasting, Kim Sundberg (344-2334); for water intakes, Gary Leipitz (344-2281); and for culvert installation, "Mac" McLean (451-6192). Please direct any other questions or comments, as well as your final written review comments, to Ellen Fritts here in Juneau.

In order to continue our forward momentum and get revised draft regs out for interagency review by early to mid-February, we need comments from you no later than January 30, 1989. Incidentally, the fish habitat regulations have been put on the agenda for discussion at the January 16 Director's meeting. We look forward to addressing your concerns at that time if you have not contacted us before then. Thanks very much for your help.

Enclosures

cc: Norman Cohen
Bruce Baker
Habitat Regional Supervisors
Ellen Fritts
Larri Spengler

ALASKA DEPARTMENT OF FISH AND GAME
Fish Habitat Permit
(AS 16.05.840 and AS 16.05.870)

PURPOSE: The fish habitat statutes were enacted to protect and conserve Alaska's fish and game populations and their habitats within anadromous fish streams and to ensure that human activities within all fish streams do not impede the free and efficient passage of fish. An anadromous fish means fish that enter freshwater from the sea for spawning purposes. These include the anadromous forms of char, Dolly Varden, rainbow trout (steelhead), sheefish, smelt, lamprey, whitefish, sturgeon, cutthroat trout, and salmon.

DESCRIPTION: Alaska Statute 16.05.840 (Fishway Act) requires that an individual or governmental agency notify and obtain authorization from the Alaska Department of Fish and Game (ADF&G) for activities within or across a stream used by fish if the department determines that such uses or activities could represent an impediment to the efficient passage of fish. Culvert installation; stream realignment or diversion; dams; low-water crossings; and construction, placement, deposition or removal of any material or structure below ordinary high water all require approval from the ADF&G.

Alaska Statute 16.05.870 (Anadromous Fish Act) requires that an individual or governmental agency provide prior notification and obtain approval from the ADF&G "to construct a hydraulic project or use, divert, obstruct, pollute, or change the natural flow or bed" of a specified anadromous waterbody or "to use wheeled, tracked, or excavating equipment or log-dragging equipment in the bed" of a specified anadromous waterbody (Quoted portions from AS 16.05.870(b)). All activities within or across a specified anadromous waterbody and all instream activities affecting a specified anadromous waterbody require approval from the ADF&G, including construction; road crossings; gravel removal; placer mining; water withdrawals; the use of vehicles or equipment in the waterway; stream realignment or diversion; bank stabilization; blasting; and the placement, excavation, deposition, disposal, or removal of any material. Recreational boating and fishing activities generally do not require a permit.

The description and location of specified anadromous waterbodies is contained in the "Catalog of Waters Important for the Spawning, Rearing and Migration of Anadromous Fishes." Copies of the catalog may be obtained by writing ADF&G at one of the addresses listed below or reviewed in person at the closest ADF&G office.

REQUIREMENTS: Application instructions and specific requirements for fish habitat permits may be obtained from the ADF&G office in your region. No application fee is required. Public notice and hearings are not usually required. Please be advised, however, that certain activities within waterbodies may also require additional authorizations from other state and federal agencies, including the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation, and the Alaska Department of Natural Resources. Information about these other permit requirements may be obtained directly from the individual agencies.

For additional information, please contact the Alaska Department of Fish and Game - Habitat Division Regional Office with geographic responsibility for your project location:

HEADQUARTERS OFFICE
ADF&G - Habitat Division
P.O. Box 3-2000
Juneau, AK 99802
(907) 465-4105

REGION 1 OFFICE
ADF&G - Habitat Division
P.O. Box 20
Douglas, AK 99824
(907) 465-4290

REGION 2 OFFICE
ADF&G - Habitat Division
333 Raspberry Rd.
Anchorage, AK 99502
(907) 344-0541

REGION 3 OFFICE
ADF&G - Habitat Division
1300 College Rd.
Fairbanks, AK 99701
(907) 451-6192

Ver. 5/87

12/30/88

TABLE OF CONTENTS: 1988 VERSION

Section Title	1988 Section No.	Applies to .840?	Applies to .870?[1]
Article 1 - Fish Habitat Permits			
Implementation of Authority	5 AAC 94.100	x	x
Permit to Ensure Efficient Fish Passage	94.110	x	
Permit to Conduct Activities in or Affecting Anadromous Fish Waters	94.120		x
Requirement to Mitigate	94.130	x	x
Article 2 - Fish Habitat Permit Standards			
Application of Standards	94.200	x	x
Waiver Provision	94.210	x	x
Standards for Efficient Passage of Fish	94.220	x	x
Stream, River, and Lake Bed Protection Stds	94.230	p[2]	x
Diversion Channel Standards	94.240	x	x
Winter Activities	94.250	x	x
Culvert Installation Standards	94.260	p[2]	x
Water Intake Standards	94.270		x
Bed and Bank Stabilization Standards for Anadromous Fish Waters	94.280		x
Blasting Standards	94.290		x
Statutory Interpretation	94.300	x	x
Article 3 - Permit Procedures[3]			
Application Procedures	94.400	x	x
Permit Decision	94.410	x	x
Conditions and Assignment	94.420	x	x
Permit Term	94.430	x	x
Amendments to the Permit	94.440	x	x
Permit Retention and Site Inspections	94.450	x	x
Renewal of Permit	94.460	x	x
General Permits	94.470	x	x
Article 4 - General Provisions[3]			
Failure to Adhere to Permit Conditions	94.500	x	x
Appeal Procedures	94.510	x	x
Informal Conference	94.511	x	x
Hearing Procedure	94.512	x	x
Decision	94.513	x	x
Summary Judgement	94.514	x	x
Permit Suspension and Abatement of Activity	94.520	x	x
Emergency and Police Power Actions	94.530	x	x
Bonding or Security	94.540	x	x
Violations	94.550	x	x
Definitions	94.590	x	x

DRAFT

---

[1] AS 16.05.840 and AS 16.05.870

[2] "p" indicates that part, but not all of the section, applies to .840 permits; see 5 AAC 94.200(a)(1) for details.

[3] Articles 3 and 4 are somewhat similar to Articles 8 and 9 which were distributed for public review with the January 1986 version of the habitat regs. In June 1986, the text of Articles 8 and 9 was adopted in the department's special area regulations (5 AAC 95), which pertain to both fish and wildlife. In revising Articles 3 and 4, we have moved mitigation to Article 1, deleted reference to wildlife, corrected typos, improve readability, and expanded the appeals to include procedures for appealing directly to the department on any decision made under 5 AAC 94.

Draft 2: December 30, 1988

TITLE 5. FISH AND GAME
PART 6. PROTECTION OF FISH AND GAME HABITAT.
CHAPTER 94. PROTECTION OF FISH AND GAME HABITAT.

ARTICLE 1. FISH HABITAT PERMITS.

5 AAC 94.100. IMPLEMENTATION OF AUTHORITY. The commissioner will implement the authorities vested in AS 16.05.840 and 16.05.870 according to procedures set out in this chapter.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.110. PERMIT TO ENSURE EFFICIENT FISH PASSAGE. (a) No person including a governmental agency may engage in the following uses or activities in or across a stream frequented by fish without first notifying the commissioner and, if the commissioner finds that the use or activity could present an impediment to efficient passage of fish, without first obtaining a fish habitat permit following the procedures of 5 AAC 94.400--5 AAC 94.460:

(1) construction of a dam or impoundment;

(2) installation of a culvert;

(3) construction, placement, deposition, or removal of any material or structure, including an instream cross-channel structure, below ordinary high water; or

(4) diversion or alteration of the natural water flow or stream bed.

(b) Unless listed in (a) of this section, an activity in or across a stream frequented by fish will not require a fish habitat permit to assure fish passage.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.120. PERMIT TO CONDUCT ACTIVITIES IN OR AFFECTING ANADROMOUS FISH WATERS. (a) No person including a governmental agency may engage in the following uses or activities in, across, or affecting anadromous fish waters without first notifying the commissioner and obtaining a fish habitat permit following the procedures of

5 AAC 94.130. REQUIREMENT TO MITIGATE. (a) Each permittee shall mitigate any adverse effect on fish or their habitat that the commissioner finds may be expected to result from, or which actually results from, the permitted activity.

(b) The commissioner will require one or more of the following mitigation techniques, listed in order of general priority:

(1) avoid an impact altogether by not taking a certain action or parts of an action;

(2) minimize an impact by limiting the degree of magnitude of the action;

(3) rectify the impact by repairing, rehabilitating, or restoring the affected environment;

(4) reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action;

DRAFT

(5) compensate for the impact by replacing or providing substitute resources or environments.

(c) The permittee's responsibility to mitigate in (a) of this section does not apply to unavoidable adverse effects on fish populations or their habitat arising from an overwhelming force of nature with consequences not preventable by due and reasonable precautions.

ARTICLE 2. FISH HABITAT PERMIT STANDARDS.

5 AAC 94.200. APPLICATION OF STANDARDS. (a) If the procedural requirements of 5 AAC 94.400--5 AAC 94.460 are met, the commissioner will use the following standards to decide whether to condition, approve, or deny a permit. All the standards apply to a permitted activity unless they are specifically waived in the permit.

(1) To provide for efficient passage of fish, for a use or activity listed in 5 AAC 94.110(a), in or across a stream frequented by fish, only the standards of 5 AAC 94.220, 5 AAC 94.230(1)-(5), and 5 AAC 94.240--5 AAC 94.260(d) apply.

(2) To provide for proper protection of anadromous fish or their habitat, for a use or activity listed in 5 AAC 94.120(a), in, across, or affecting anadromous fish waters, the standards of 5 AAC 94.220--5 AAC 94.290 apply.

CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY

02–576(2/77)

Draft 2: December 30, 1988

TITLE 5. FISH AND GAME
PART 6. PROTECTION OF FISH AND GAME HABITAT.
CHAPTER 94. PROTECTION OF FISH AND GAME HABITAT.

ARTICLE 1. FISH HABITAT PERMITS.

5 AAC 94.100. IMPLEMENTATION OF AUTHORITY. The commissioner will implement the authorities vested in AS 16.05.840 and 16.05.870 according to procedures set out in this chapter.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.110. PERMIT TO ENSURE EFFICIENT FISH PASSAGE. (a) No person including a governmental agency may engage in the following uses or activities in or across a stream frequented by fish without first notifying the commissioner and, if the commissioner finds that the use or activity could present an impediment to efficient passage of fish, without first obtaining a fish habitat permit following the procedures of 5 AAC 94.400--5 AAC 94.460:

(1) construction of a dam or impoundment;

(2) installation of a culvert;

(3) construction, placement, deposition, or removal of any material or structure, including an instream cross-channel structure, below ordinary high water; or

(4) diversion or alteration of the natural water flow or stream bed.

(b) Unless listed in (a) of this section, an activity in or across a stream frequented by fish will not require a fish habitat permit to assure fish passage.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.120. PERMIT TO CONDUCT ACTIVITIES IN OR AFFECTING ANADROMOUS FISH WATERS. (a) No person including a governmental agency may engage in the following uses or activities in, across, or affecting anadromous fish waters without first notifying the commissioner and obtaining a fish habitat permit following the procedures of

(1) construction, placement, excavation, deposition, disposal, or removal of any material or structure;

(2) use of excavating or log-dragging equipment;

(3) use of any other wheeled or tracked equipment including all-terrain vehicles (ATVs), except where

(A) the use occurs at a location and in a manner authorized by the commissioner on a general permit;

(B) the vehicle has a gross weight of less than 5000 pounds and it is operated over firm ice; or

(C) the vehicle has a gross weight of less than 5000 pounds and the following conditions are all met:

i) the crossing is made from one bank directly to the other bank in a direction perpendicular to the water flow;

DRAFT

ii) no bank alteration occurs that creates conditions which have been found to result in the reduced productivity or loss of fish habitat; and

iii) the crossing is not in or across any area that, in the commissioner's determination, is used for fish spawning.

(4) construction of a permanent or temporary crossing including a bridge, ice bridge, culvert, or constructed low water crossing (ford);

(5) blasting or use of explosives that produces or is likely to produce (A) an instantaneous pressure change greater than 2.5 pounds per square inch (psi) in the swim bladder of an anadromous fish or (B) a peak particle velocity greater than 0.5 inches per second (ips) in a spawning bed during the early stage of egg incubation; or

(6) any action that may result in withdrawal, diversion, pollution, or alteration of anadromous fish waters, including any action which is likely to affect anadromous fish waters.

(b) Unless listed in (a) of this section, an activity in or affecting anadromous fish waters will not require a fish habitat permit.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.870
AS 16.05.890

5 AAC 94.130. REQUIREMENT TO MITIGATE. (a) Each permittee shall mitigate any adverse effect on fish or their habitat that the commissioner finds may be expected to result from, or which actually results from, the permitted activity.

(b) The commissioner will require one or more of the following mitigation techniques, listed in order of general priority:

(1) avoid an impact altogether by not taking a certain action or parts of an action;

(2) minimize an impact by limiting the degree of magnitude of the action;

(3) rectify the impact by repairing, rehabilitating, or restoring the affected environment;

(4) reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action;

DRAFT

(5) compensate for the impact by replacing or providing substitute resources or environments.

(c) The permittee's responsibility to mitigate in (a) of this section does not apply to unavoidable adverse effects on fish populations or their habitat arising from an overwhelming force of nature with consequences not preventable by due and reasonable precautions.

ARTICLE .. FISH HABITAT PERMIT STANDARDS.

5 AAC 94.200. APPLICATION OF STANDARDS. (a) If the procedural requirements of 5 AAC 94.400--5 AAC 94.460 are met, the commissioner will use the following standards to decide whether to condition, approve, or deny a permit. All the standards apply to a permitted activity unless they are specifically waived in the permit.

(1) To provide for efficient passage of fish, for a use c activity listed in 5 AAC 94.110(a), in or across a stream frequented by fish, only the standards of 5 AAC .220, 5 AAC 94.230(1)-(5), and 5 AAC 94.240--5 AAC 94.260(d) apply.

(2) To provide for proper protection of anadromous fish or their habitat, for a use or activity listed in 5 AAC 94.120(a), in, across, or affecting anadromous fish waters, the standards of 5 AAC 94.220--5 AAC 94.290 apply.

(b) In his or her discretion, the commissioner will:

(1) add to a fish habitat permit additional conditions that (A) are needed to ensure efficient passage of fish or the proper protection of anadromous fish or their habitat and (B) relate to aspects of the use or activity not covered by the standards listed in (a)(1) or (a)(2) of this section, respectively; and

(2) include conditions on a permit required by 6 AAC 50 that are needed to make the use or activity consistent with the Alaska Coastal Management Program.

(c) The standards in 5 AAC 94.220--5 AAC 94.290 do not apply to any permittee who obtained, prior to the effective date of these regulations, a permit from the commissioner to conduct a use or activity in fish-bearing waters. However, no use or activity listed in this chapter that was permitted prior to the effective date of these regulations may be significantly changed or expanded without first getting a new permit under 5 AAC 94.400-- 5 AAC 94.460.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.210 WAIVER PROVISION. In his or her discretion, the commissioner will waive or alter the standards in 5 AAC 94.220--5 AAC 94.290 in site-specific instances if he or she finds that there is substantial evidence that granting the waiver or alteration

(1) will not adversely affect fish spawning, rearing, or migration in the affected system; or

(2) will maximize conformance with the standards in this chapter and that all adverse effects on fish or their habitat will be mitigated under 5 AAC 94.500.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.220. STANDARDS FOR EFFICIENT PASSAGE OF FISH. Efficient passage and movement of fish, both upstream and downstream of the permitted use or activity, must be assured. To determine if a use or activity provides for efficient passage of fish, the commissioner will evaluate pertinent site-specific information such as: fish species and life stage present; size of the fish present; water velocity; water temperature; channel profile; substrate composition; or other factors, as appropriate.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.230. STREAM, RIVER, AND LAKE BED PROTECTION STANDARDS. Unless authorized by the commissioner on a permit, no person or governmental agency may:

(1) conduct an activity that creates a potential fish entrapment basin;

(2) construct a stilling basin or settling pond in the portion of the streambed that is covered by ordinary high water;

(3) place, stockpile, discard, or otherwise dispose of material of any type, including excavated material, in waters frequented by fish;

(4) divert or channelize a stream frequented by fish;

(5) remove a human-made inwater structure unless the bed is restored to a stable, approximately original condition; or

(6) excavate material from anadromous fish waters that are used for spawning or, in the commissioner's determination, have significant use for rearing.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.240. DIVERSION CHANNEL STANDARDS. (a) If approved by the commissioner in a permit, a temporary stream diversion channel must be constructed, controlled, and rehabilitated as follows:

(1) the diversion channel must be of sufficient width, depth, length, and gradient to pass a mean annual flood event without overtopping the channel banks unless a channel of different dimensions and slope is authorized by the commissioner upon finding that there is a strong likelihood that the mean annual flood will not occur during the operating period of the temporary diversion;

(2) during excavation or construction, the diversion channel must be isolated, at its upstream and downstream ends and at all expected flows, from the stream to be diverted;

(3) the diversion channel must be constructed so that the bed and banks will not significantly erode at expected flows;

(4) after use, the diversion channel and the natural stream must be stabilized and rehabilitated as may be specified by permit conditions;

(5) fish that become stranded in dewatered channels must be captured and returned to the active stream channel without further harm; and

(6) efficient passage of fish must be maintained at all times in a diversion channel unless the commissioner finds that a temporary impediment is not harmful to fish.

(b) In his or her discretion, the commissioner will allow permanent diversions only where there is no feasible alternative and he or she finds that it is in the public interest.

(c) If approved by the the commissioner on a permit, a permanent diversion will, at a minimum, be constructed to replicate the original unaltered stream characteristics.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.250. WINTER ACTIVITIES. (a) If a person or governmental agency wishes to provide access across a frozen fish-bearing waterbody, the commissioner will, in his or her discretion, require that a snow ramp, ice bridge, or approved cribbing be constructed so as to preclude cutting, eroding, or degrading of river, lake, or stream banks according to the following conditions:

(1) each snow ramp or ice bridge must be made only of snow, ice, or cribbing, or a combination of these materials, and must be largely free of soil and debris; and

(2) if required by the commissioner, each ice bridge must be removed, or breached, and cribbing must be removed before breakup or by the time specified on the permit, whichever is earlier.

(b) Water extraction or removal of snow cover is prohibited from water bodies and locations where the commissioner finds that either activity would impede efficient passage of fish or would be harmful to the survival of overwintering fish.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.260. CULVERT INSTALLATION STANDARDS. (a) Each culvert must be designed, installed, and maintained according to the standards of this section and the terms of a permit issued by the commissioner such that efficient passage of fish, as required in 5 AAC 94.220, is assured. When a culvert battery is proposed, the commissioner will, in his or her discretion, require one or more of the individual culverts to comply with the requirements of (c) of this section.

(b) In his or her discretion, the commissioner will waive or alter the standards of this section or approve an alternative drainage structure under 5 AAC 94.210 if the technical requirements of (c) or (e) of this section cannot be met due to site-specific conditions or if he or she finds that there is substantial evidence that an alternative structure will satisfy the requirements of 5 AAC 94.220 and maximize conformance with the standards of this chapter. An alternative drainage structure may include a bridge, bottomless arch structure, modified or baffled culvert, or downstream tailwater control structure approved by the commissioner on a site-specific basis.

(c) Unless otherwise approved by the commissioner on a permit, each culvert must be designed, installed, and maintained so that the following three conditions are all met.

(1) At least one fifth of the diameter or 18 inches, whichever is less, of each round culvert or at least 12 inches of the height of each elliptical or arch type culvert is buried below the stream thalweg at both the inlet and outlet of the culvert. This requirement does not apply to a bottomless culvert.

(2) The effective slope of the culvert does not exceed 1.0 percent for culverts shorter than or equal to 80 feet or exceed 0.5 percent for culverts longer than 80 feet.

(3) Culvert water velocities and flows, and any resulting drop in the water surface profile at any point within the culvert influence, do not impede the efficient passage of the slowest swimming fish group indigenous to the waterway at a mean annual flood design discharge with a two day duration. Table 1 presents water velocities through different culvert lengths that will ensure the efficient passage of the fish groups listed.

(d) Each bank cut, slope, fill, or exposed earth work arising from culvert installation or maintenance must be

TABLE 1: MAXIMUM ALLOWABLE CULVERT INLET, OUTLET, AND BARREL WATER VELOCITIES IN FEET PER SECOND FOR EFFICIENT FISH PASSAGE. 1/

Velocities in feet/second

Length of Culvert in Feet	Group I Fish 2/ Avg. Inlet & Outlet	Group I Fish 2/ Mean Barrel	Group II Fish 3/ Avg. Inlet & Outlet	Group II Fish 3/ Mean Barrel	Group III Fish 4/ Avg. Inlet & Outlet	Group III Fish 4/ Mean Barrel
30	9.2	4.6	12.0	6.8	12.0	9.9
40	9.0	4.5	11.6	5.8	12.0	8.5
50	8.0	4.0	10.0	5.0	12.0	7.5
60	7.2	3.6	9.2	4.6	12.0	6.6
70	6.6	3.3	8.4	4.2	12.0	6.0
80	6.0	3.0	7.8	3.9	11.0	5.5
90	5.6	2.8	7.4	3.7	10.2	5.1
100	5.0	2.5	6.8	3.4	9.6	4.8
150	3.6	1.8	5.6	2.8	7.4	3.7
200	3.6	1.8	4.8	2.4	6.2	3.1
200+	3.6	1.8	4.8	2.4	6.0	3.0

1/ Average inlet and outlet velocity equals the discharge divided by the cross-sectional area at the inlet and outlet, respectively. Mean barrel velocity is the average, weighted velocity within the entire barrel length, excluding the inlet and outlet zones.

2/ Group I Fish -- Adult and juvenile-low performance swimmers: includes such species as Arctic grayling, longnose sucker, whitefish, burbot, sheefish, Northern pike, Dolly Varden/arctic char, stickleback, smelt, sculpin, and upstream migrant salmon fry.

3/ Group II Fish -- Adult moderate-performance swimmers: includes such species as pink salmon, chum salmon, rainbow trout, and cutthroat trout.

4/ Group III Fish -- Adult high-performance swimmers: includes such species as chinook salmon, coho salmon, sockeye salmon, and steelhead.

stabilized with materials previously approved by the commissioner and properly installed to prevent erosion during and after culvert installation. In his or her discretion, the commissioner will require revegetation or other appropriate measures as a bank stabilization technique and to restore fish habitat.

(e) No person or governmental agency may install a culvert in anadromous fish waters at locations that are used for spawning or, in the commissioner's determination, have significant use for rearing.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

Editor's Note: The Alaska departments of Fish and Game and Transportation and Public Facilities, in conjunction with the University of Alaska-Fairbanks, established an Interagency Fish Passage Task Force in 1985 to address fish passage concerns. The Interagency Task Force is presently under contract to the Federal Highways Administration to evaluate the swimming performance of Arctic grayling (Group I design fish) through culvert structures and to develop design information for providing fish passage through culvert structures. A culvert design manual for Alaska will be jointly prepared and is scheduled to be released in December 1989; subsequent regulatory amendments to this section are anticipated subject to the final conclusions and recommendations of the design manual.

5 AAC 94.270. WATER INTAKE STANDARDS. (a) Any water intake structure, including a screened enclosure, well-point, sump, or infiltration gallery, must be designed, operated, and maintained to prevent fish entrapment, entrainment, or injury.

(b) To prevent entrapment, entrainment, or injury to fish, each water intake having a withdrawal rate of up to 5 cubic feet per second (cfs) and which is directly accessible by fish must be enclosed and centered in a screened structure that complies with this section. The appropriate screen mesh size and through-screen water velocity for each water withdrawal shall be defined by the commissioner on a permit issued under 5 AAC 94.120. The specific screen mesh size and approach velocity specified for a permitted water withdrawal will be based on the fish species occurring in the stream reach where the water will be extracted and will consider age, size, and swimming ability of the fish likely to be present during the intake operation. Table 2 outlines screen mesh/velocity options for withdrawals, up to 5 cfs, that provide adequate fish protection.

(c) Design criteria for water withdrawals greater than 5 cfs that will meet (a) of this section will be set on a project-specific basis by the commissioner.

TABLE 2: MAXIMUM ALLOWABLE SCREEN MESH SIZE AND WATER VELOCITIES THROUGH A SCREENED INTAKE FOR WATER WITHDRAWALS IN ANADROMOUS WATERS

(Up to 5 cubic feet per second)

Criteria	Group A [1/]	Group B [2/]	Group C [3/]	Group D [4/]	Group E [5/]
screen mesh in inches (millimeters)	0.04 (1.0)	0.04 (1.0)	0.1 (2.4)	0.25 (6.4)	0.25 (6.4)
* water velocity in feet per second	0.1	0.5	0.5	2.0	---

1/ Group A - Fry Stage: whitefish

2/ Group B - Juvenile Stage: smelt, whitefish
- Fry or Juvenile Stage: sheefish, pink salmon, chum salmon.

3/ Group C - Juvenile Stage: coho salmon, chinook salmon, sockeye salmon, Arctic char, Dolly Varden.

4/ Group D - Adult Stage: whitefish, Arctic char, Dolly Varden

5/ Group E - Adult Stage: chinook salmon, coho salmon, sockeye salmon, chum salmon, pink salmon. These criteria shall be used to prevent entrapment of Group V fish in off-stream pumping ponds. No velocity criteria apply.

* Water velocity as measured on the downstream side of the enclosure.

(d) For water withdrawals in waters where no fish are present or are likely to be present during the intake operation, no screen mesh or velocity criteria apply.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.870

5 AAC 94.280. BED AND BANK STABILIZATION STANDARDS FOR ANADROMOUS FISH WATERS. (a) For uses or activities listed in 5 AAC 94.120 that are conducted below ordinary high water or that affect or disturb the bed or bank, the commissioner will, in his or her discretion and in accordance with 5 AAC 94.130, require revegetation or other appropriate measures to prevent damage to fish habitat and to stabilize the bed or bank.

(b) Bed or bank stabilization material must be approved by the commissioner. Approved materials must be properly installed to stabilize the bed or bank during and after the project's design life and to help restore fish habitat in disturbed areas without causing more bank erosion or bed scour either upstream or downstream of the project.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.870

5 AAC 94.290. BLASTING STANDARDS. No person or governmental agency may discharge an explosive that produces or is likely to produce 1) an instantaneous pressure change greater than 2.5 pounds per square inch (psi) in the swim bladder of an anadromous fish or 2) a peak particle velocity greater than 0.5 inches per second (ips) in a spawning bed during the early stage of egg incubation.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.870

Editor's Note: A summary of the most recent information concerning setbacks from fish-bearing waters that will ensure that buried explosive charges meet the 2.5 psi standard for various materials and the 0.5 ips standard for distance from a spawning bed is available from department offices.

5 AAC 94.300. STATUTORY INTERPRETATION. (a) As used in AS 16.05.840:

(1) "across" means physically, or physically and by its effects, reaching from one side of a waterbody to the

other, with at least one element of the activity or use affecting or occurring at or below the ordinary high water level;

(2) "built" means to be or cause to be created, constructed, deposited, or placed in a fish-bearing waterbody;

(3) "durable and efficient fishway" means a natural channel or a fish ladder, raceway, culvert, chute, or artificial channel, or other means that provides fish of all age classes, including migrating adults of anadromous species, with unobstructed passage both upstream or downstream.

(4) "obstruction" means a dam, impoundment, thermal plume, pollutant mixing zone, or other object or material that precludes or reduces efficient passage of fish.

(b) As used in AS 16.05.895:

(1) "material damage to the spawning beds" means, in anadromous fish waters, a change in the spawning beds or in the water over the spawning beds that interferes with or prevents the successful reproduction of anadromous fish, as shown by documented

(A) unnatural mortality of anadromous fish that return to spawn;

(B) mortality of eggs, embryos, or alevins within the spawning beds in excess of that naturally occurring in comparable undisturbed spawning beds;

(C) conditions known to interfere with or prevent spawning, or known to cause increased mortality of eggs, embryos, or alevins while they reside in the spawning beds; or

(D) physical disruptions or removal of spawning substrate; and

(2) "prevents or interferes with the migration of anadromous fish" means halting or inhibiting the movement of anadromous fish as shown by documented

(A) unnatural mortality of anadromous fish at any life stage;

(B) conditions known to result in the mortality of anadromous fish at any life stage;

(C) conditions known to reduce or limit the ability of anadromous fish to migrate at any life stage; or

(D) physical blockage of fish passage.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

ARTICLE 3. PERMIT PROCEDURES.

5 AAC 94.400. APPLICATION PROCEDURES. (a) An applicant for a permit shall submit a completed application on a form or in a manner approved by the commissioner. The application must be correct and complete to the best of the applicant's knowledge and be signed and dated by the applicant or the applicant's designee. Submission of a completed application satisfies any related notification required by AS 16 and this chapter. An application form is available from the department's offices.

(b) A permit applicant need not submit an application to the commissioner if the commissioner receives a completed application through:

(1) a forest practices notification submitted under the procedures of AS 41.17.090 for activities conducted in conjunction with timber harvest on private, state, or municipal land;

(2) an Annual Placer Mining Application submitted to the Alaska Department of Natural Resources; or

(3) a Public Notice of Application for Permit submitted to the U.S. Army Corps of Engineers for the discharge of dredged or fill material into waters of the United States under 33 USC 1344 or for the performance of work in or affecting navigable waters of the United States under 33 USC 403.

(c) A completed application, including items submitted under (b), must include: a description of the proposed use or activity, including the expected commencement date and duration; the name of the waterbody or waterbodies that the proposed use or activity will affect and their exact location, including a scaled map; and other information needed for the commissioner to decide if the proposed use or activity will comply with the applicable provisions of this chapter.

(d) Applications for projects in or across a stream frequented by fish or affecting anadromous fish waters,

where the waterbody is located in a legislatively designated state game refuge, game sanctuary, or critical habitat area must follow the procedures and provisions of 5 AAC 95.700--5 AAC 95.770 and 5 AAC 95.900--5 AAC 95.990 and must meet the standards found in 5 AAC 95.430--5 AAC 95.440 in addition to the standards found in this chapter.

(e) A completed application must be submitted to the department's habitat division office managing the region or area in which the proposed activity will occur.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

Editor's Note: Habitat Division office addresses are:

Regional Offices:

Fairbanks: 1300 College Road, Fairbanks, AK 99701-1599 (451-6192)
Anchorage: 333 Raspberry Road, Anchorage, AK 99518-1599 (267-2285)
Juneau: P.O. Box 20, Douglas, AK 99824-0020 (465-4290)

Area Offices:

Ketchikan: 2020 Sea Level Drive, Suite 205, Ketchikan, AK 99901 (225-2027)
Petersburg: P.O. Box 667, Petersburg, AK 99833-0667 (772-3801)
Sitka: 304 Lake Street, Room 103, Sitka, AK 99835-7563 (747-7563)

5 AAC 94.410. PERMIT DECISION. (a) The commissioner will issue a permit if he or she finds that the requirements of this chapter are met.

(b) Permit applications for uses or activities proposed in the coastal zone will be reviewed and permit decisions will be made according to review periods and deadlines listed in 6 AAC 50.

(c) Permit applications for uses or activities proposed outside the coastal zone will be approved or denied, or more information will be requested, within 30 days of the receipt of a completed application.

(d) The commissioner will notify an applicant in writing of the permit decision. If the permit is denied,

this notice will include the reason for denial. An applicant may appeal the permit decision under 5 AAC 94.510 or submit new or additional material and ask for reconsideration under (e) of this section.

(e) In his or her discretion, the commissioner will reconsider an application if the applicant submits within 30 days, to the appropriate Habitat Division office, factual information that is new or additional to materials supplied with the original application. An applicant may submit new or additional information as an amendment to the original application, or the applicant may submit a new application. The procedures of 5 AAC 94.400--5 AAC 94.460 apply to reconsideration.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.420. PERMIT CONDITIONS AND ASSIGNMENT. (a) To provide for proper protection and management of fish and their habitat, the commissioner will consider and will, in his or her discretion, include as conditions of a permit

(1) the duration of the proposed activity including any provision for changing the time period during which the permit is valid;

(2) any other seasonal use restrictions on a specific activity;

(3) limits on an activity's areal extent;

(4) any provision for mitigating damage to fish or their habitat;

(5) any provision to allow periodic monitoring, including inspection and sampling, of the proposed land or water use or activity by an authorized representative of the state;

(6) reporting requirements; and

(7) any other condition needed to comply with 5 AAC 94.220--5 AAC 94.290 or 5 AAC 94.540.

(b) A permit may not be transferred or assigned without prior written consent of the commissioner.

(c) In his or her discretion, the commissioner will require a permit applicant to sign and date the permit before its validation.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.430. PERMIT TERM. (a) Except as provided in (b) of this section, the commissioner will, in his or her discretion, issue a permit subject to the provisions of this chapter for a fixed term not to exceed two years.

(b) In his or her discretion, the commissioner will issue a permit for a fixed term exceeding two years if he or she finds that the activity meets the purposes and requirements of this chapter and that the activity is permanent in nature.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.440. AMENDMENTS TO THE PERMIT. (a) In his or her discretion, the commissioner will amend a permit to change any method the permit authorized or to mitigate for any condition that was reasonably unforeseeable when the permit was approved, and which threatens to cause a substantially adverse effect on fish or their habitat.

(b) Any action a permittee wants to take that increases the project's overall scope or that negates, alters, or minimizes the intent or effectiveness of any condition contained in a permit is a deviation from the approved plan and requires an amendment before beginning the action.

(c) A permittee may request a permit amendment by submitting a written statement to the department's habitat division office where the permit was issued; the statement must explain why the amendment is needed and include an amended plan plus the location, commencement time, duration, and type of activity requiring amendment.

(d) The commissioner will issue a permit amendment if he or she finds that the requirements of this chapter will be met. Review of a request for amendment will not exceed 30 days after receipt of the written statement in the appropriate habitat division office. The procedures of 5 AAC 94.400--5 AAC 94.460 apply to a request for amendment.

(e) An amendment approved by the commissioner becomes effective upon receipt by the permittee, or at a later date

specified by the amendment. An amendment is valid for the duration of the permit or for a shorter specified period.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.450. PERMIT RETENTION AND SITE INSPECTIONS. (a) A permittee shall keep a copy of the permit, including any amendments, at the site of the activity authorized by the permit until completion of the project and shall make the permit available for inspection upon request by an authorized representative of the state.

(b) A permittee shall give an authorized representative of the state free and unobstructed access to the site of the permitted activity for the purpose of inspecting or monitoring compliance with any condition of the permit or the requirements of this chapter. A permittee shall furnish whatever assistance and information the representative reasonably requires for monitoring and inspection purposes. Authorized representatives of the state will make every reasonable effort to give a permittee the opportunity to accompany them during an inspection; however, this does not preclude unannounced inspections.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.460. RENEWAL OF PERMIT. (a) If no action will be taken that increases a project's scope or alters the intent or effectiveness of any action contained in his or her permit, a permittee may request renewal of an existing permit before the current term of the permit expires. Procedures in this chapter apply to renewal, except that the filing of a new application under 5 AAC 94.400 is not required.

(b) If a permittee wants to take any action that increases a project's overall scope or that negates, alters, or minimizes the intent or effectiveness of any condition contained in a permit, amendment of the permit is required before renewal can be requested under this section.

(c) If an existing permit expires or is revoked, a permittee may obtain a new permit only by filing a new completed application according to 5 AAC 94.400.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.470. GENERAL PERMITS. Regardless of whether the requirements of 5 AAC 94.400 and 5 AAC 94.450--5 AAC 94.460 are met, the commissioner may issue a permit to the public at large for a specific activity for an area listed in the permit.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

ARTICLE 4. GENERAL PROVISIONS.

5 AAC 94.500. FAILURE TO ADHERE TO PERMIT CONDITIONS. In his or her discretion, the commissioner will require in writing that a permittee 1) correct a condition; 2) undertake further mitigation specified by the commissioner; or 3) correct a condition and undertake further mitigation specified by the commissioner, in order to minimize or prevent damage to fish populations or their habitat that results from the permittee's failure to comply with a permit condition.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.510. APPEAL PROCEDURES. (a) An applicant or a permittee may appeal in writing directly to the director of the department's Habitat Division (at P.O. Box 3-2000, Juneau, AK 99802) regarding any decision or action made under this chapter. The department will, within 30 days after receiving a written appeal, take one of the following actions:

(1) render a final written decision on the basis of the documents in the case file and any other pertinent documents;

(2) schedule an informal conference with the applicant or permittee at a time convenient to the applicant or permittee;

(3) under 5 AAC 94.512, schedule a hearing before a hearing officer, who may be an employee of the department; or

(4) summarily deny the appeal request.

(b) The department will elect one of the procedures in subsection (a) based on the dispute's complexity, the existence of factual issues, the urgency of the need for a decision, the request of the parties, or other relevant factors, consistent with due process of law.

(c) The department need not hold a hearing under this section when it has denied a permit or given notice of a revocation action on the grounds that the department lacks legal authority to grant the permit or take the action, or when the only arguments or claims an applicant or permittee makes relate to the constitutionality of statutes, the legality of regulations, the correct legal interpretation of statutes or regulations, or if the applicant or permittee does not want a hearing.

(d) In its discretion or at the request of the affected applicant or permittee, the department may extend the time period set under (a) of this section.

(e) Notwithstanding (a) of this section, an applicant or permittee may, under the provisions of AS 44.62.330--44.62.630, initiate an appeal of the issuance or denial of a permit required under 5 AAC 94.120 by requesting a hearing under AS 44.62.370.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.511. INFORMAL CONFERENCE. The department may not make a final and binding decision based on an informal conference unless the decision is reduced to writing. If a party objects to an informal conference at any time before an approved written decision is issued, the department will adjourn the conference and proceed under 5 AAC 94.510(a)(1), (3), or (4).

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.512. HEARING OFFICER. (a) In an oral hearing procedure called under 5 AAC 94.510(a)(3), a party may submit the testimony of witnesses, written factual materials, and arguments in writing. Formal rules of evidence need not apply. The hearing may be held by telephone and, at the request and expense of a party, may be tape recorded. It may also be stenographically transcribed, again at the expense of the requesting party.

(b) The department may elect to conduct a formal hearing under the procedures set forth in the Administrative Procedure Act, AS 44.62.450--44.62.470.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.513. DECISION. Except as set out in 5 AAC 94.514, in a case decided under 5 AAC 94.510(a), the department shall issue and serve by mail or in person a written decision stating:

(1) the requested action;
(2) the chronology of the facts;
(3) the disputed factual issues;
(4) the pertinent statutes and regulations, permits, notices, and plans;
(5) the documents comprising the administrative record;
(6) the reasons for the decision;
(7) the decision; and
(8) any further rights of appeal, including applicable time limits for appeal, a person may have.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.514. SUMMARY JUDGEMENT. In a case summarily dismissed under 5 AAC 94.510(a)(4), the department shall issue and serve by mail or in person a written decision stating the grounds upon which the dismissal is based. A decision summarily dismissed under 5 AAC 94.510(a)(4) may be remanded for reconsideration.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.520. PERMIT SUSPENSION OR ABATEMENT OF ACTIVITY. (a) The commissioner will notify a permittee that the term of the permit is or will be interrupted for a specified period, or that abatement will be required, if the commissioner finds that

(1) an environmental condition exists that was reasonably unforeseeable at the time of permit approval and the permitted activity, if allowed to continue, threatens to cause a substantial adverse impact;

(2) the permittee has failed to implement a required mitigating or preventive measure; or

(3) the permittee has failed to comply with a provision of this chapter or a condition of the permit.

(b) The initial exclusion period set under (a) of this section will not exceed five days. However, the commissioner may extend the exclusion period to a total of 30 days in any calendar year if required for abatement of

the condition, completion of the required mitigating or preventive measure, or compliance with the permit condition or the provisions of this chapter. The exclusion period may be further extended with the consent of the permittee.

(c) By notice to the permittee, the commissioner will terminate an exclusion period after the permittee demonstrates compliance, implementation of the required mitigating measures, or abatement of the activity.

(d) If the commissioner finds, before or during an exclusion period, that corrective action is unlikely to be completed within any available exclusion period, the commissioner will, in his or her discretion, begin a revocation proceeding under AS 44.62.330--44.62.630.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.860
AS 16.05.870
AS 16.05.880

5 AAC 94.530. EXEMPTION FOR EMERGENCY AND POLICE POWER ACTIONS. In an emergency, the commissioner will, in his or her discretion, issue an oral permit for emergency or police power actions before receiving the completed application required in 5 AAC 94.400. A completed application must be submitted within the time specified by the commissioner, whether before or after the emergency or police power action takes place.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.540. BONDING OR SECURITY. (a) In his or her discretion, the commissioner will require a performance bond with a surety company authorized to transact business in Alaska, or other specified security to secure the performance of the terms and conditions of a permit issued under this chapter.

(b) A performance bond or security required under (a) of this section is limited to an amount reasonably necessary to ensure compliance with the provisions of this chapter or the terms and conditions of a permit issued under this chapter.

(c) The commissioner will inspect or review actio- taken under each applicable term or condition of a permit issued under this chapter, and will make a written finding that each applicable term and condition of the permit has been completed, before the permittee's performance bond or security is released.

(d) The posting of a performance bond or the taking of other security under (a) of this section does not limit the department's right, under applicable law, to seek further compensation from the permittee for actual damages to fish or their habitat, or for a violation of the permit.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.550. VIOLATIONS. (a) A violation of this chapter is a violation of AS 16.05.840 or 16.05.870, subject to the penalties set out in AS 16.05.860 and AS 16.05.880--16.05.895.

(b) A violation of the terms and conditions of a fish habitat permit is a violation of this chapter.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

5 AAC 94.590. DEFINITIONS. Besides the definitions set out in AS 01.10.060 and AS 16.05.940, as used in this chapter,

(1) "across" means across as defined in 5 AAC 94.300;

(2) "affecting" means causing the withdrawal, diversion, impoundment, obstruction, pollution, or alteration of the natural flow or bed of anadromous fish waters so as to actually or potentially (A) injure, molest, or otherwise cause conditions known to interfere with or prevent spawning or to cause increased mortality or harmful effects to fish at any life stage; or (B) deter or divert migrating anadromous fish from their natural migration pathways at any life stage;

(3) "anadromous fish" means fish that enter fresh water from the sea for spawning purposes; these include the anadromous forms of char, rainbow trout, sheefish, smelt, lamprey, whitefish, sturgeon, cutthroat trout, and salmon;

(4) "anadromous fish waters" means a river, lake, or stream containing anadromous fish, including its bed, from its mouth to its uppermost reach as listed under 5 AAC 95.010 and includes all distributaries, sloughs, and backwaters and other water courses adjoining the listed waters below the ordinary high water level of the listed waters; in that portion below the mean high tide line, anadromous fish waters means only the waters and bed between the tideland banks exposed at mean lower low water;

(5) "atlas" means The Atlas to the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes;

(6) "authorized representative of the state" means a person who is legally empowered to enforce a statute under which regulations in this chapter are promulgated;

(7) "bank" means that portion of a waterbody's cross section that restricts lateral movement of water at normal water levels, including normal high water levels;

(8) "catalog" means the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes;

(9) "channelize" means to excavate any course, trench, canal, or furrow in or from the bed of a stream or river for the purpose of redirecting the water flow;

(10) "completed application" means the submission of full plans, specifications, and notifications required by AS 16.05.840 and AS 16.05.870 and includes one or more forms, letters, or other documents that provide all of the information needed for the commissioner to issue, condition, or deny a permit;

(11) "early stage of egg incubation" means the period of egg incubation from egg deposition until the eyed stage begins;

(12) "efficient passage of fish" means the upstream and downstream movement of fish or fish populations, or escapement of juvenile fish from their natal spawning bed, in the absence of human-created delays or barriers; the standards and requirements of this chapter, if met, will provide for the efficient passage of fish;

(13) "emergency" means an unforeseeable situation that presents an imminent threat to life or property;

(14) "explosive" means any chemical mixture or compound that decomposes or combusts to generate gas with such rapidity that it can be used for blasting;

(15) "firm ice" means ice of sufficient strength to support crossing vehicles or equipment without breaking or causing the ice to further contact the bottom of the waterbody;

(16) "fish habitat" means the aquatic environment that supports fish and includes the bed, banks, and water column of a freshwater body frequented by fish;

(17) "frequented by fish" means containing fish at any time of the year;

(18) "governmental agency" means a unit of federal, state, or local government created to carry out a governmental function or to implement a statute;

(19) "incubation" means the life phase, during rearing, of a fish from egg deposition through the larval stage;

(20) "mean annual flood" means, for a given site, the mean of all annual floods (annual peak discharge) which has a statistical recurrence interval of 2.33 years;

(21) "migration" means the predictable, purposeful, or seasonal movement of fish, unrestricted by other than natural influences;

(22) "mouth" means a line drawn between the seaward extremes of the exposed tideland banks or beds of any stream channel at mean lower low water; a stream or river may have more than one mouth by virtue of having more than one channel that enters the sea;

(23) "ordinary high water" means the height reached by seasonally high water, including tidally influenced fresh waters, as indicated by the point along the bank or shore up to which the presence and action of water are so common and usual, and so long continued in all ordinary years, as to leave a natural impression on the bank or shore as shown by erosion, shelving, changes in soil characteristics, disturbance of terrestrial vegetation, or other distinctive physical attributes;

(24) "permanent" means with a duration of greater than two years;

(25) "permittee" means a permit holder and includes anyone employed, contracted, or assigned by the person or organization to whom the permit was issued;

(26) "permit" means the approval of plans and specifications required by AS 16.05.840 or AS 16.05.870;

(27) "pollution" means, in making more explicit the definition under 18 AAC 70.110(34), human-induced alteration of the chemical, physical, or biological integrity of fish-bearing waters in a manner that creates a nuisance or makes the waters unclean, noxious, impure, or unfit so as to

A) actually or potentially injure or otherwise cause harmful effects to fish at any life stage; or

B) actually or potentially deter or divert migrating anadromous fish from their natural migration pathways at any life stage;

(28) "rearing" means the developmental life phase of a fish from egg incubation to adult;

(29) "spawning" means egg deposition or fertilization, including preparation for those activities;

(30) "spawning bed" means the portion of a water body where spawning and egg incubation occurs;

(31) "temporary" means with a duration of two or fewer years;

(32) "temporary stream diversion" means a diversion of all or part of the flowing portion of a stream in order to allow a transient instream activity;

(33) "thalweg" means the imaginary line that extends down a stream channel and follows the lowest or deepest points along the bed.

Authority: AS 16.05.020
AS 16.05.050
AS 16.05.840
AS 16.05.870

DRAFT

Revised 12/30/88

Sectional Analysis: Regulations for the Protection of Fish and Their Habitat

ARTICLE 1. FISH HABITAT PERMITS

5 AAC 94.100 IMPLEMENTATION OF AUTHORITY.

This section states that the Commissioner will carry out the requirements of AS 16.05.840 (fish passage) and AS 16.05.870 (anadromous fish waters) according to procedures which can be found in 5 AAC 94.400--5 AAC 94.470, the technical standards found in 5 AAC 94.220--5 AAC 94.290, and with the general provisions found in 5 AAC 94.500--5 AAC 94.590.

5 AAC 94.110 PERMIT TO ENSURE EFFICIENT FISH PASSAGE.

This section clarifies that no person or agency may undertake any of the listed uses or activities in or across a stream frequented by fish if the use or activity could impede fish passage, unless the commissioner has been notified and has issued a permit. Uses or activities not listed in this section do not require a fish habitat permit to assure fish passage. However, if the stream contains anadromous fish, additional permit requirements apply; these are discussed in 5 AAC 94.120.

Permits are currently being required for the uses and activities listed in this section. The major change in this procedure to this section is that a fish habitat permit to assure fish passage may now be required if a water intake (screened or unscreened) is placed in a non-anadromous stream small enough that the intake, either physically through it own presence, or by increasing the water velocities on either side of itself, may constitute an impediment to the efficient passage of fish.

5 AAC 94.120 PERMIT TO CONDUCT ACTIVITIES IN OR AFFECTING ANADROMOUS FISH WATERS.

This section clarifies that no person or agency may undertake any of the listed uses or activities in, across, or affecting anadromous fish waters unless the Commissioner has been notified and has issued a permit. Permits are currently being required for all of the uses and activities listed in this section, though not in all regions.

Activities that "affect" anadromous waters can be activities located upstream of or adjacent to anadromous waters and which a reasonable person would conclude may have an adverse impact on anadromous fish or their habitat. Generalized examples of activities that a reasonable person would expect to have an effect on an anadromous waters are described below. These examples are drawn from our case files and are activities we have in the past or will in the future require to get a permit.

1) Material pits located in the floodplains of anadromous streams. Flooding of these sites can cause channelization, with subsequent erosion and sedimentation problems downstream, or can cause stranding of anadromous fish once flood flows recede.
2) Dewatering of flooded gravel pit adjacent to anadromous waters. Dewatering can cause lowering of the groundwater table and drying up of an anadromous water nearby.
3) A material site or placer mine located upstream of an anadromous reach; suspended sediment from poorly designed or inadequately reclaimed sites can damage spawning beds and reduce stream productivity in the anadromous reach.
4) Clearing land adjacent to an anadromous stream in order to build a restaurant and gravel parking lot. Without retention of adequate vegetation along the stream, in-water temperature changes and sedimentation from parking lot erosion or snow plowing could adversely affect adjacent spawning beds.

The "affecting" clause included in these regulations is not intended as a means to impose "buffer strips" on commercial timber harvesting operations. We expect this issue will be discussed and addressed in the interagency Forest Practices Act revision process that is currently underway.

Activities that occur in anadromous fish waters and which are not listed in this section or in section 5 AAC 94.110(a) do not require a fish habitat permit. The use of snowmobiles and some all-terrain vehicles in or across anadromous fish waters is exempt from the permit requirements under certain conditions which are listed.

5 AAC 94.130 REQUIREMENT TO MITIGATE.

This section discusses mitigation requirements and lists five mitigation techniques. Each permittee shall mitigate adverse effects on fish and their habitat that actually result or will likely result from the permittee's activity, although damage caused by an overwhelming force of nature is not included. The

Commissioner may also specify by permit amendment additional provisions for mitigating damage to fish populations or their habitat that results from the permittee's activity or the permittee's failure to comply with a permit condition.

ARTICLE 2. FISH HABITAT PERMIT STANDARDS

5 AAC 94.200 APPLICATION OF STANDARDS.

This section indicates that, besides the procedural requirements of 5 AAC 94.400 -- 5 AAC 94.460, certain standards will be used by the Commissioner to decide whether to condition, approve, or deny a permit. All the standards apply to a permitted activity unless the standards are specifically waived in the permit. The standards that specifically apply to AS 16.05.840 (fish passage) permits and to AS 16.05.870 (anadromous fish waters) permits are identified. Only those standards found in 5 AAC 94.220, 5 AAC 94.230(1)-(5), and 5 AAC 94.240--.260(d) apply to AS 16.05.840 permits, while any of the standards found in 5 AAC 94.220--.290 apply to AS 16.05.870 permits.

The Commissioner may add additional conditions to the permit for aspects of the use or activity that are not covered by the standards in this article and that are necessary for 1) the efficient passage of fish, 2) the protection of anadromous fish or their habitat, or 3) to make the use or activity consistent with the requirements of the Alaska Coastal Management Program.

Until his or her permit or any of its conditions expire, a permittee who obtained a fish habitat permit before the effective date of these regulations is not required to meet the standards of this article. However, no prior approved activity may be significantly changed or expanded without first obtaining a new permit under the procedures of 5 AAC 94.400--.460.

5 AAC 94.210 WAIVER PROVISION.

This section says that the standards in Article 2 may be waived by the Commissioner in cases where alternative approaches will achieve the results intended by the standards and will not adversely impact fish spawning, rearing, or migration in the affected system.

5 AAC 94.220 STANDARDS FOR EFFICIENT PASSAGE OF FISH.

Intended to interpret the statutory mandate of AS 16.05.840, this section indicates that efficient passage and movement of fish, both upstream and downstream of the permitted use or activity, must be

assured. For information purposes, it also lists some of the factors that the Commissioner may evaluate to determine if efficient passage of fish will be provided.

5 AAC 94.230 STREAM, RIVER, AND LAKE BED PROTECTION STANDARDS.

This section states that, unless authorized by the Commissioner on a permit, no person or agency may perform the following activities in streams subject to jurisdiction of AS 16.05.840 or 16.05.870:

1) conduct an activity that creates a potential fish entrapment basin;

2) construct a stilling basin or settling pond in the portion of the streambed that is covered by ordinary high water;

3) place, stockpile, discard, or otherwise dispose of any material in waters frequented by fish;

4) divert or channelize a stream frequented by fish;

5) remove human-made inwater structures unless the beds are restored to a stable, approximately original condition; or

6) excavate material from anadromous fish waters that are used for spawning or which have a significant use for rearing.

5 AAC 94.240. DIVERSION CHANNEL STANDARDS.

This section indicates that a temporary stream diversion channel may be allowed if approved by the Commissioner, and if the channel is constructed, controlled, and rehabilitated in the manner specified in this section. Temporary stream diversions are to be designed to withstand a mean annual flood event without overtopping the channel banks. The other requirements are listed.

This section also indicates that a permanent diversion will be allowed only where no feasible alternative exists and if it is in the public interest. Such diversions must be contructed to, at a minimum, replicate the original unaltered stream characteristics.

5 AAC 94.250 WINTER ACTIVITIES.

This section states that a snow ramp, ice bridge, or approved cribbing that may be required to provide

access across a frozen fish-bearing waterbody must be constructed so as to preclude cutting, eroding, or degrading of river, lake, or stream banks. Standards for snow ramps and ice bridges are listed. To prevent fisheries damage from freeze-down, water extraction and removal of snow cover are prohibited from waterbodies or locations where the Commissioner determines that this would be harmful to the survival of overwintering fish.

5 AAC 94.260 WATER INTAKE STANDARDS.

This section clarifies that all water intake structures must be designed, operated, and maintained to prevent fish entrapment, entrainment, or injury.

Specifications are also listed indicating how each water intake directly accessible by fish shall be enclosed and centered and what water screen mesh size and water velocity are allowed. A table outlines screen mesh/velocity options that the Commissioner has determined will provide adequate fish passage. These options are based upon the species of fish occurring with the stream reach where water will be extracted, as well as the age, size and swimming ability of the fish species. Under the waiver provision, 5 AAC 94.210, variations of these options may be allowed as field conditions dictate. The screen mesh and velocity criteria do not apply to water withdrawals where no fish are present during the intake operation.

5 AAC 94.270 CULVERT INSTALLATION STANDARDS.

This section indicates that all culverts must be designed, installed, and maintained such that the efficient passage of fish, both upstream and downstream, is assured. It lists culvert installation standards that describe how culverts should generally be selected, installed, and stabilized. A table identifies the maximum allowable cross-sectional water velocities through different culvert lengths that can be successfully negotiated by several Alaska fish species; factors to be considered in the application of the data are also listed.

This section also indicates that culverts may not be installed in anadromous fish waters that are used for spawning or that have significant use for rearing.

An editor's note states that a culvert design manual is being jointly prepared by the Alaska departments of Fish and Game and Transportation and Public Facilities; it is scheduled for release in December 1989. Subsequent regulatory amendments to this section will probably follow release of the design manual.

5 AAC 94.280 BED AND BANK STABILIZATION STANDARDS FOR ANADROMOUS FISH WATERS.

This section states that for uses or activities conducted below ordinary high water that may disturb the bed or bank, the Commissioner may require revegetation or other appropriate measures to restore fish habitat and stabilize the bed or bank. Bank stabilization material must be approved by the Commissioner. In addition, approved materials must be properly installed to stabilize the bank over the design life of a project and must help restore fish habitat in disturbed areas without causing more bank erosion or bed scour either upstream or downstream of the project.

5 AAC 94.290 BLASTING STANDARDS.

This section states that no person or agency may discharge explosives that produce, or are likely to produce, an instantaneous pressure change greater than 2.5 pounds per square inch (psi) in the swim bladder of an anadromous fish, or a peak particle velocity greater than 0.5 inches per second (ips) in a spawning bed during the early stages of egg incubation. An editor's note states that a summary of the most recent information concerning setbacks from fish-bearing waters which will ensure that buried explosive charges meet these standards is available from department offices.

5 AAC 94.300 STATUTORY INTERPRETATION.

This section constitutes an agency interpretation of language used in AS 16.05.840 (Fishway required) and AS 16.05.895 (Penalty for causing material damage). Defined are: 1) "across," 2) "built," 3) "durable and efficient fishway," 4) "obstruction," 5) "material damage to the spawning beds," and 6) "prevents or interferes with the migration of anadromous fish." A Department of Law publication indicates that definitions for statutory terms should be kept separate from definitions for regulatory terms, hence the need for this section.

ARTICLE 3. PERMIT PROCEDURES

5 AAC 94.400 APPLICATION PROCEDURES.

This section discusses the application procedures and indicates that each applicant must submit a completed application on a form or in a manner approved by the commissioner. The department has developed its own application form but will also accept the forest

practices notification, the Annual Placer Mining Application, or a Public Notice of Application for Permit submitted to the U.S. Army Corp of Engineers if it meets the criteria stated in this section as to what must be included in a completed application. (Sometimes these "alternative applications," particularly forest practices notifications, do not contain enough detail to be considered a "completed" application when they are first submitted.)

This section goes on to indicate that a completed application must be submitted to the department's habitat division office managing the region in which the proposed activity will occur. Finally, applications for uses or projects in, across, or affecting waterbodies located in legislatively designated special areas follow the permit procedures, general provisions, and standards of Chapter 95 in addition to the standards of Chapter 94.

5 AAC 94.410 PERMIT DECISION.

This section indicates that the Commissioner will issue a permit if he or she determines that the requirements of this chapter are met. The Commissioner will notify an applicant in writing if the application is denied. Denied applications may be resubmitted, with new or additional materials, to the Commissioner for reconsideration or the applicant may appeal the decision.

5 AAC 94.420 PERMIT CONDITIONS AND ASSIGNMENT.

This section states that certain permits may be conditioned and indicates the types of conditions that may be required. Further, a permit may not be transferred or assigned without prior written consent of the Commissioner, and a permit applicant may be required to sign and date the permit prior to its validation.

The prohibition against permit transfer or assignment without prior consent is designed to prevent a parent company from abrogating responsibility for a subcontractor's performance under the terms of a permit by assigning the permit to the subcontractor. On the other hand, the department would likely have no objection to, and would quickly approve, the transfer of an existing fish habitat permit to a company that is buying out an existing permittee's assets and liabilities.

5 AAC 94.430 PERMIT TERM.

This section states that the term of a permit will be fixed and will not exceed two years, except that

permits for activities that are permanent in nature may be issued for longer than two years. Definitions of "permanent" and "temporary" are provided in 5 AAC 94.590.

5 AAC 94.440 AMENDMENTS TO THE PERMIT.

This section describes what constitutes an amendment to the permit, the conditions under which an amendment will be issued, the procedures for applying for an amendment, and the term of a permit amendment. The Commissioner may require, and the permittee is required to obtain, an amendment in certain circumstances described in this section.

5 AAC 94.450 PERMIT RETENTION AND SITE INSPECTIONS.

This section indicates that a copy of the permit must be retained at the work site and that authorized representatives of the state must be allowed to inspect the permitted activity. Authorized representatives of the state will make every reasonable effort to give the permittee the opportunity to accompany them during an inspection, but this does not preclude unannounced inspections.

5 AAC 94.460 RENEWAL OF PERMIT.

This section discusses permit renewal. If a permittee requests renewal of an existing permit before it expires, and no substantive changes in project scope or circumstances are expected, filing of a new application is not required. If such changes are anticipated (and filing of a new application is to be avoided), a permittee must seek amendment of the existing permit before a renewal can be requested. If an existing permit expires or is terminated, a new permit may be obtained only by filing a new application.

5 AAC 94.470 GENERAL PERMITS.

This section indicates that the Commissioner may issue a permit to the public at large for a specific activity in an area listed in the permit.

ARTICLE 4. GENERAL PROVISIONS

5 AAC 94.500 FAILURE TO ADHERE TO PERMIT CONDITIONS.

This section indicates that the Commissioner may require that a permittee correct a condition, undertake further mitigation specified by the Commissioner, or both, in order to minimize or prevent adverse effects to fish or their habitat that result from activity that is not in accordance with a provision of the permit.

5 AAC 94.510 APPEAL PROCEDURES

This section outlines procedures under which an affected applicant or permittee may appeal directly to the department regarding any decision or action made under 5 AAC 94. It states that the department will, within 30 days of receiving a written appeal, take one of four listed actions--either render a final written decision based on the existing case files, conduct an informal conference, schedule a hearing, or summarily deny the appeal request. The following four sections provide more detail on these potential departmental actions. Section 94.510 also states that an interested person may initiate an appeal of the issuance or denial of a permit required under 5 AAC 94.120 by following procedures outlined in the state's Administrative Procedure Act, AS 44.62.330--44.62.630.

5 AAC 94.511 INFORMAL CONFERENCE.

This section provides that the department may not make a final and binding appeal decision based on an informal conference unless the decision is reduced to writing. This guarantees that, in the event that an informal conference is the basis upon which a binding decision is made, the applicant or permittee will receive a written document that provides the information specified under 5 AAC 94.513. Section 94.511 also says that, if a party objects to an informal conference at any time before a binding decision has been made, the department may suspend the informal conference and proceed with the appeal by choosing one of the three other alternatives listed in 5 AAC 94.510.

5 AAC 94.512 HEARING PROCEDURE.

This section describes the procedures for conducting an oral hearing, one of the alternatives allowed under 5 AAC 94.510. It also gives the department the option of electing to hold a formal hearing under the Administrative Procedure Act for any appeal of a decision made under this chapter.

5 AAC 94.513 DECISION.

This section specifies the eight categories of information that will be provided by the department in its decision of an appeal. This decision will be written, will be served either via mail or in person, and will state what further rights of appeal, including applicable time limits for appeal, that a person may have.

5 AAC 94.514 SUMMARY JUDGEMENT.

This section indicates that in any appeal that is summarily dismissed under 5 AAC 94.410, the department must issue and serve by mail or in person a written decision indicating the reasons for the dismissal. 5 AAC 94.510 to be remanded for reconsideration.

5 AAC 94.520 PERMIT SUSPENSION OR ABATEMENT OF ACTIVITY.

This section describes under what conditions and procedures the Commissioner may interrupt the term of a permit, require abatement, or initiate revocation proceedings.

5 AAC 94.530 EXEMPTION FOR EMERGENCY AND POLICE POWER ACTIONS.

This section clarifies that in an emergency the Commissioner can issue oral permits but a completed application must be submitted as soon thereafter as possible.

5 AAC 94.540 BONDING OR SECURITY.

Except that it excludes reference to wildlife or their habitat, this section is nearly identical to 5 AAC 95.950, which became effective June 5, 1986, as part of the department's special areas regulations. Section 5 AAC 94.540 allows the Commissioner, in his or her discretion, to require a performance bond or other surety to secure the performance of the terms and conditions of a fish habitat permit. The section describes amount, review, and release of bonds, and does not limit the department's right to seek further compensation for permit violations or damage to fish or their habitat.

5 AAC 94.550 VIOLATIONS.

This section clarifies that: 1) a violation of this chapter is a violation of AS 16.05.840 or 16.05.870, subject to certain penalty provisions that are listed; and 2) a violation of the terms and conditions of a fish habitat permit is a violation of this chapter.

5 AAC 94.590 DEFINITIONS.

This section defines terms used in these regulations.

Rationale for Blasting Standards (5 AAC 94.290)
Developed to Prevent Explosive Injury to Fish

Introduction

Attendant with the development of Alaska's resources has been the increased use of high explosives especially in conjunction with seismic exploration, rock quarrying and road construction. Indiscriminate use of explosives in or near waterbodies is potentially harmful to fish. In light of conserving Alaska's anadromous fish resources pursuant to AS 16.05.870, the Alaska Department of Fish and Game has developed Blasting Standards for use in areas where protection of fish resources is a consideration.

Physical Phenomena Associated with Blasting

Explosives are a chemical substance which, when detonated, release large quantities of energy over a minute interval of time (DuPont, 1980). Common explosives derive their energy from chemical reactions such as the oxidation of black powder or breaking of high energy chemical bonds as in trinitrotoluene (TNT) Energy is released as pressure, light, and heat (Figure 1). The pressure generated produces a shock wave in the surrounding medium (air, soil, water). As the spherical wave spreads out from the source, its energy is distributed over an area that is proportional to the square of the sphere's radius. Thus, the energy per unit area varies inversely to the square of the distance from the source, which partially explains the attenuation of shock waves by distance.

Explosives detonated underground produce pressure or seismic waves within the earth (Figure 2). Two modes of seismic wave propagation have been identified, body waves and surface waves. Body waves are propagated through the earth and two kinds are recognized: compressional (P) waves and shear (S) waves. Compressional waves have higher velocities than shear waves. The P designation refers to the primary arrival of compression waves at any given point as opposed to the secondary (S) arrival of shear waves. Of concern here is that compressional seismic waves will be propagated from the earth into water bodies.

The second mode of wave propagation is along the earth's surface. Surface waves are usually produced when a body wave travels to the surface and is reflected back. Surface waves contribute to production of ground vibrations that are of concern to incubating fish eggs.

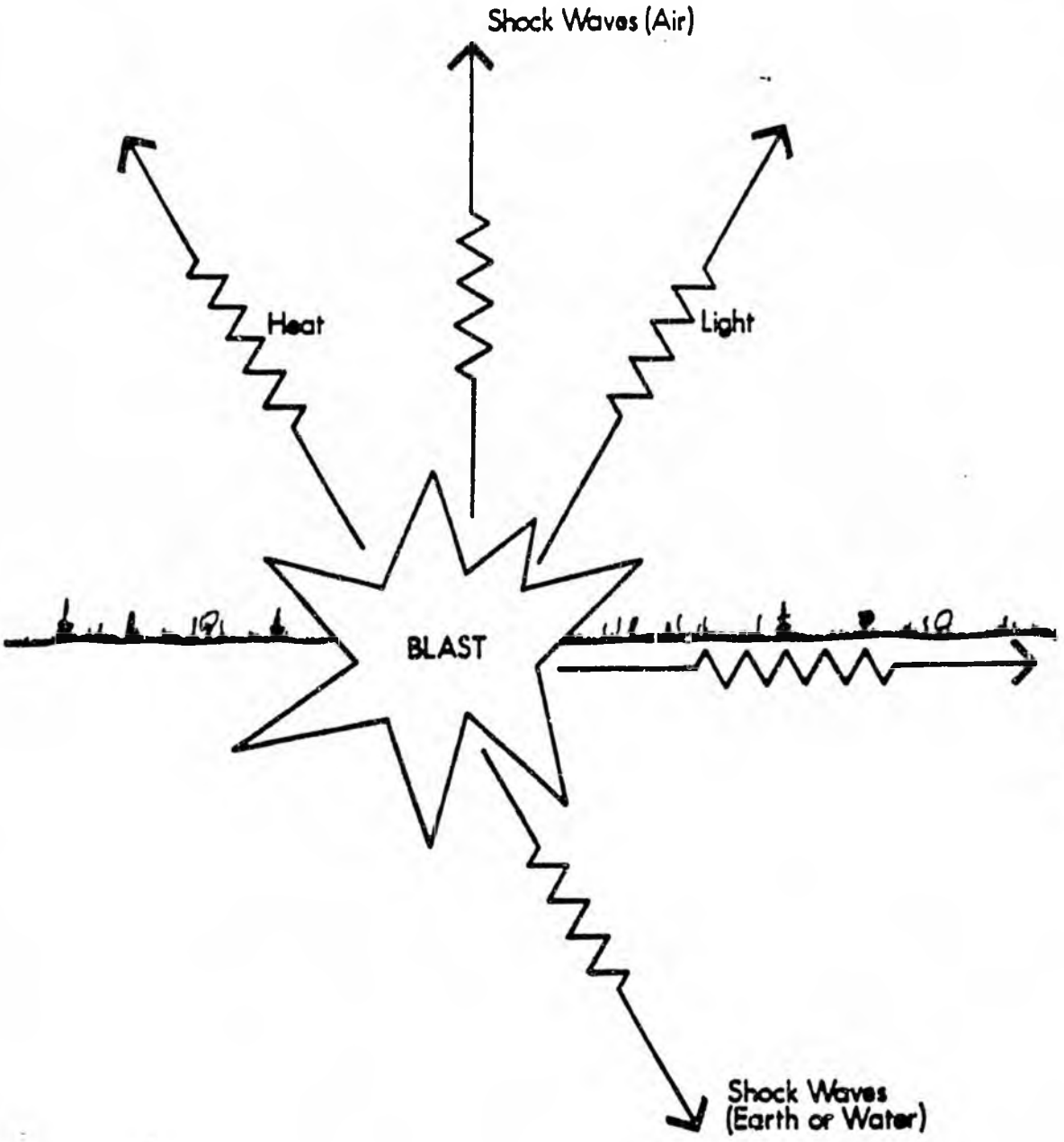

FIGURE 1. DISSIPATION OF EXPLOSIVE ENERGY

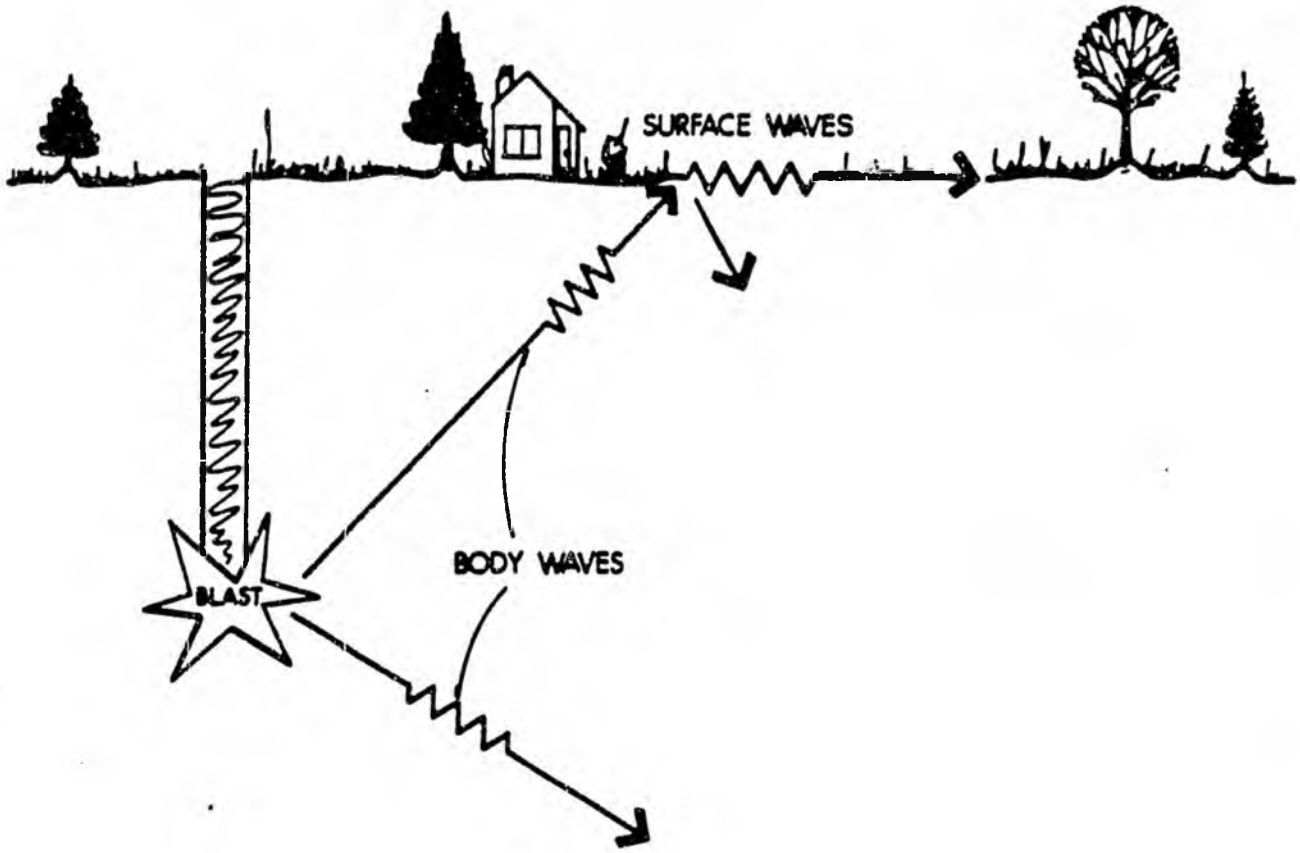

FIGURE 2. SEISMIC WAVES

Underwater shock waves generated by explosives are compressional waves that have almost instantaneous rise times to peak pressure followed by an exponential decay and rarefaction or drop below ambient pressure (Cole, 1948; Figure 3). In terms of their effect on fish, shock waves generated by inwater explosions have a greater lethal effect than waves propagated from the ground into water because they have a sharper pressure-time signature and, in underground explosions, part of the energy is reflected back into the ground at the ground-water interface.

Effect of Compression Waves on Fish

High peak pressures with instantaneous rise times followed by rarefaction of the surrounding medium are known to be responsible for traumatization of fish (Hubbs and Rechnitzer, 1952).

The effects of sudden changes of hydrostatic pressure resulting from explosions may result in trauma and death of fish. Injuries range from ruptured internal organs to loss of scales. While the heart, kidney, vessels, liver, and gonads may be injured, the swim bladder is the most sensitive organ to pressure changes. Fish without swim bladders are relatively insensitive to underwater shock waves. However, except for Arctic lamprey, all anadromous fish that are important to sport, commercial, and subsistence fisheries in Alaska have swim bladders.

The swim bladder is a hydrostatic organ that maintains the buoyancy and stability of the fish. Swim bladders are generally adapted to a great range of pressure changes; however, exposure to rapid pressure variations generated from explosions cannot be accommodated. When subjected to pressure variations greater than the limits of accommodation, the swim bladder will experience trauma ranging from slight tissue strain to complete rupturing with massive hemorrhaging of the internal organs. Fatalities are caused either directly by trauma or indirectly through loss of equilibrium resulting in increased predation or inability to feed. Body shape and orientation with respect to the wavefront affect susceptibility to pressure changes. Fish with cylindrical bodies are less likely to be injured by rapid pressure changes than those with dorsoventrally flattened bodies exhibiting a high surface area to volume ratio. Body size also has been correlated to injury (Yelverton, 1975). Smaller fish are more likely to be injured than the larger fish. No difference in response has been noted between fish having ducted bladders (physotomatous) and those with closed swim bladders (physoclistous).

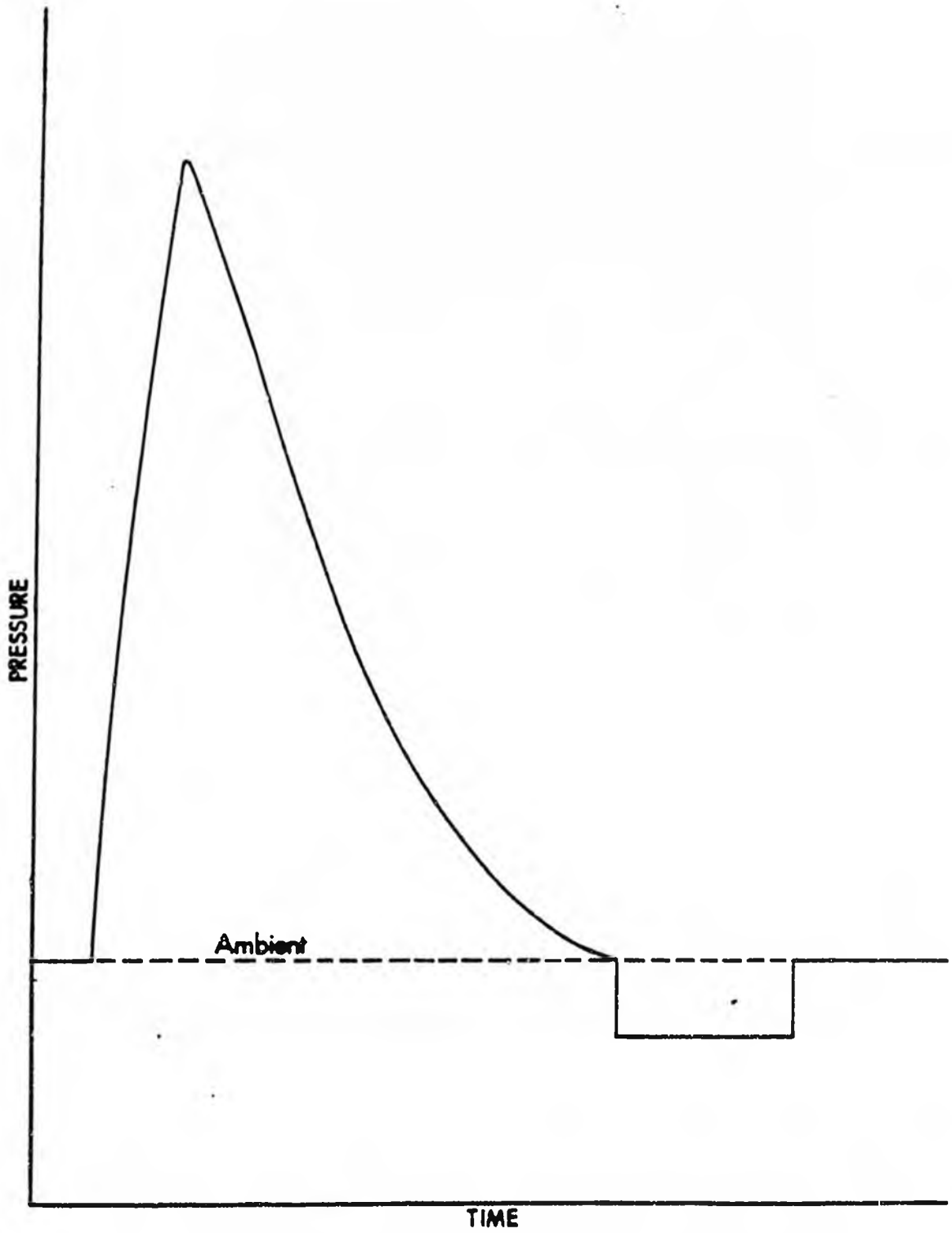

FIGURE 3., SIGNATURE OF UNDERWATER PRESSURE WAVE PRODUCED BY EXPLOSION.

Effect on Larvae

Larval stages of swim bladder fish do not develop a swim bladder until they have absorbed their yolk sack and have left the spawning bed. Therefore, it is expected that they would be fairly resistant to rapid pressure changes. This has, in fact, been shown by investigations on the effects of pressure changes associated with hydroelectric turbines.

One study (Bishai, 1961) reported that newly hatched salmon and herring can withstand pressures of 71.0 psi and return to ambient pressure without suffering ill effects. When the same fish reached 3-6 months of age, they died within 24 hours when exposed to pressures exceeding 2.8 psi.

Effects on Fish Eggs

The sensitivity of salmonid eggs to shock or agitation has been recognized by fish culturists for many years. Research (Smirnov, 1954; 1955) has revealed that sensitivity varies with the stage of development. Table 1 shows the results of agitating pink salmon eggs at various stages of development (Smirnov, 1954). The magnitude of agitation produced by Smirnov's testing approximates ground vibrations with a displacement of 0.12 inches and a frequency of three cycles per second. This is within the range of ground vibrations generated by blasting activities.

Table 1. Mortality of pink salmon subjected to mechanical agitation during incubation (at temperatures between 46° to 49°F).

Age after Fertilization	Stage	Loss in Percent
0	Prior to placing eggs in water	1
30 min.	During water absorption	95
2 hours		16
3 hours		5
1 day		24
2 days		26
3 days		56
9 days	Embryonic streak 2 mm.	75
18-19 days	Blastopore closing	30
22-24 days	Figment in eyes	2
28-30 days	Eyes grey	0
39-40 days	Appearance of abdominal fins	0
51 days	Beginning of gill formation	0
63 days	Prior to hatching	0

Table 1 shows that there is a high degree of sensitivity to shock and vibration until the closing of the blastopore. This confirms fish culturists' observations that eggs become shock resistant with "eyeing-up," the stage of development just following blastopore closing. It is important to note that salmonid embryonic development is controlled by thermal input; eggs developing in cold Alaska waters will require a greater length of time to reach the various developmental stages shown in Table 1. Generally, 250-300 T.U. (1 T.U. = 1 centigrade degree day) are required by salmon to reach the eyed stage.

Rationale for Blasting Standards

Numerous physical models have been advanced to predict and relate fish trauma to explosive shock waves. All of the models have inherent weaknesses in predicting what will happen under actual field conditions. This is particularly true for blasting adjacent to waterbodies where soil conditions, the geometry between the blast source and the waterbody, and the soil-water interface act to attenuate, reflect and refract shock waves. Until further research develops a consistent model for predicting fish mortality, protection of fish populations can be achieved by limiting the instantaneous hydrostatic pressure change in the fish habitat to very low levels. A pressure change of 2.5 pounds per square inch (psi) appears to be the lower limit where adverse effects on fish have been measured (Rasmussen, 1967). Protection to incubating fish eggs can be achieved by limiting ground vibrations in spawning beds during the early stage of egg incubation to low levels also. Ground vibrations with a peak particle velocity of 0.5 inches per second (ips) are perceptible to humans but are four times below the vibrations which Smirnov found caused egg mortality. Interestingly, Smirnov's tests correspond to the safe limit established by the U.S. Bureau of Mines for structural vibrations from blasting (Nicholls, et al., 1971). Until additional research further defines the precise relationship between vibration and egg mortality, a 0.5 ips standard should provide adequate protection to incubating eggs during the sensitive stage of development.

Analysis

The following analysis was used to derive the charge-distance setbacks necessary to protect aquatic life in fish-bearing waters. The equations were taken from Dupont, 1977 and Nicholls et al., 1971 and were adapted to meet the standards described in the above rationale.

Equation (A) is used to describe the transfer of shock pressure from the soil to a waterbody:

$$(A) \quad Pw = \frac{2 \times \frac{Zw}{Zr} \times Pr}{1 + \frac{Zw}{Zr}}$$

where Pw = pressure in water in pounds per square inch (psi)
Pr = pressure in the soil in psi
Zw = acoustic impedance of water
Zr = acoustic impedance of the soil

Equation (B) is used to describe the relationship between acoustic impedance and the density and velocity of the medium through which the compressional wave travels:

$$(B) \quad \frac{Zw}{Zr} = \frac{Dw \times Cw}{Dr \times Cr}$$

where Dw = density of water = 62.5 pounds per cubic foot (lbs/ft^3)
Dr = density of the soil in lbs/ft^3
Cw = compression wave velocity in water = 4800 feet per second (fps)
Cr = compressional wave velocity in the soil in fps

The following values were used for Dr and Cr for various soil types:

	Dr		Cr
	lbs/ft^3	g/cm^3	fps
Rock	165	2.64	15,000
Frozen Soil	120	1.92	10,000
Ice	61	0.98	10,000
Saturated Soil	130	2.08	4,800
Unsaturated Soil	120	1.92	1,500

Equation (C) describes the relationship between the peak particle velocity (Vr) and the pressure, density and compressional wave velocity in the soil:

$$(C) \quad Vr = \frac{2 \times Pr}{Dr \times Cr}$$

Equation (D) is known as the scaled distance relationship and is used to equate the peak particle velocity to charge weight and distance:

$$(D)\quad Vr = 160\left(\frac{R}{W^{\frac{1}{2}}}\right)^{-1.6}$$

Where Vr = peak particle velocity in inches per second (ips)
R = the distance to the blast in feet
W = the charge weight in pounds

Example solution for calculating charge-distance setbacks to meet 2.5 psi limit for blasting in rock

1. From equation (B): $\frac{Zw}{Zr} = \frac{62.5 \times 4{,}800}{165 \times 15{,}000} = 0.12$

2. From equation (A): $Pw = \frac{2 \times 0.12 \times Pr}{1.12} = 0.21\ Pr$

3. Limit Pw to 2.5 psi: $Pr = \frac{2.5}{0.21} = 11.9$ psi

4. Convert psi to dynes/cm^2: 11.9×68947

$= 8.2 \times 10^5$ dynes/cm^2

Note: dynes are expressed as gram-centimeters per second-squared (gcm/sec^2) in step 5.

5. From equation (C):

$$Vr = \frac{2 \times Pr}{Dr \times Cr} = \frac{2 \times 8.2 \times 10^5\ gcm/sec^2}{2.64\ g/cm^3 \times 15{,}000\ ft/sec \times 30.48\ cm/ft}$$

$$= 1.4\ cm/sec$$

6. Convert cm/sec to ips: $1.4 \times 0.39 = 0.55$ ips

7. From equation (D): $Vr = 160\left(\frac{R}{W^{\frac{1}{2}}}\right)^{-1.6}$

$$R = W^{\frac{1}{2}} \times \left(\frac{Vr}{160}\right)^{-0.625}$$

$$= W^{\frac{1}{2}} \times \left(\frac{0.55}{160}\right)^{-0.625}$$

$$= W^{\frac{1}{2}} \times 35$$

Example solution for calculating charge-distance setbacks to meet 0.5 ips limit in spawning beds

1. From equation (D): $Vr = 160\left(\frac{R}{W^{\frac{1}{2}}}\right)^{-1.6}$

$$R = W^{\frac{1}{2}} \times \left(\frac{Vr}{160}\right)^{-0.625}$$

$$= W^{\frac{1}{2}} \times \left(\frac{0.5}{160}\right)^{-0.625}$$

$$= W^{\frac{1}{2}} \times 38$$

References Cited

Bishai, H.M. 1961. The effects of pressure on the survival and distribution of larval and young fish. Zoology Dept. Faculty of Science, Cairo University, Egypt. pp. 292-311.

Cole, R.H. 1948. Underwater explosions. Princeton University Press, Princeton, NJ. 437 p.

DuPont. 1980. Blasters' handbook. 16 Edition. Explosives Products Division, E.I. duPont de Nemours & Co. Wilmington, Delaware. 494 pp.

DuPont. August 10, 1977. Letter from M.E. Swanson to Mr. MacMillan c/o Ferrante Construction Co. Pouch 818, Valdez, AK 99686. E.I. duPont de Nemours and Company Polymer Intermediates Dept., Suite 601 400-108th Ave. NE, Bellevue, WA 98004. 4 pp.

Hubbs, C.L., and A.B. Rechnitzer. 1952. Report of experiments designed to determine effects of underwater explosions on fish life. Calif. Fish Game 38: 333-366.

Nicholls, H.R., C.F. Johnson, W.I. Duvall. 1971. Blasting vibrations and their effects on structures. U.S. Department of Interior, Bureau of Mines, Washington D.C. Bulletin No. 656. 105p.

Rasmussen, B. 1967. The effects of underwater explosions on marine life. Bergen, Norway. 17 p.

Smirnov, A.I. 1954. The effect of mechanical agitation on developing eggs of the pink salmon (Oncorhynchus gorbuscha) (Walbaum) Salmonidae. Dokl. Akad. Nauk. SSSR, 97(2):365-368 (Transl. from Russian by Fish Res. Board Can. Trans. Ser. No. 231, 1959).

Smirnov, A.I. 1955. The effect of mechanical agitation at different periods of development on the eggs of autumn chum salmon (Oncorhynchus keta infrasp. autumnalis Berg, Salmonidae). Dokl. Akad. Nauk. SSSR, 105(4):873-876. (Transl. from Russian by Fish. Res. Board Can. Transl. Ser. No. 230, 1959).

Yelverton, J.T., D.R. Richmond, W. Hicks, K. Sanders, and E.R. Fletcher. 1975. The relationship between fish size and their response to underwater blast. Defense Nuclear Agency, Dep. Defense, Washington, D.C. Topical Rep. DNA 3677 T. 42 p.

Rationale for Water Intake Standards (5 AAC 94.270)
For Water Withdrawal Operations
Up to 5 cubic feet per second

Introduction

Water withdrawals from fish-bearing waters pose a potential problem for adult and young fish swimming in the proximity of an intake structure. Most water withdrawal operations use a screened intake to avoid entraining gravel or debris, which can result in damage if a pump is being used. Generally, 0.25-inch mesh screen is used to provide protection for a pump. However, this screen mesh size allows for the entrainment of fish into the pump or intake. In addition, the use of large intakes and high flow rates can result in fish mortality by drawing the fry up and holding them against the screened intake surface. This action results in suffocation or physical damage of the impinged fish. In an effort to preclude the entrapment, entrainment, or impingement of fish, especially slow- or weak-swimming fish, the Alaska Department of Fish and Game (ADF&G) has developed screening and velocity criteria for water intakes. These criteria are based upon the size and swimming (avoidance) abilities of the fish species present during the water withdrawal operation.

Upon completion of a review of available literature and communication with representatives from the Salmon Enhancement Program, Government of Canada (Attachment I), the ADF&G has identified five fish screen options designed to prevent fish entrainment or entrapment (see Table 2, 5 AAC 94.270). The decision as to which criteria apply to a proposed intake operation will be made by the ADF&G and will be based upon the species of fish present and their age and swimming ability.

Two major considerations must be evaluated in the design of intake screening that will protect fish resources. These include: (1) the approach velocity of the water through the intake to prevent impingement of fish against the screen resulting in suffocation of or physical damage to the fish; and (2) the maximum allowable mesh size of the screen (to preclude fish passing through the screen and into the intake).

Approach Velocity

The 0.1 foot per second (fps) standard cited under the most stringent of the five alternative criteria in the proposed regulations was originally recommended by the ADF&G's Fisheries Rehabilitation, Enhancement and Development Division (FRED). Their experience with water intakes associated with fish hatchery operations has shown that unless approach velocities were 0.1 fps or less, very young

whitefish can be entrained in intake structures. Their recommendation did not specifically address impingement.

Information reviewed during our literature search was used to determine whether or not this recommended approach velocity was reasonable based on the experience of published researchers. Following is a summary of the information reviewed during our literature search.

Clay (1961), citing fish swimming ability studies of Kerr (1953) on chinook salmon ranging from 1-7 inches in length and striped bass; Brett, Holland, and Alderdice's (1958) work on sockeye and coho salmon 2-6 inches in length; and Bainbridge's (1960) work on dace, trout, and goldfish 2.5-6 inches in length; concluded that, "for practical purposes the smallest Pacific salmon fry might be expected to cruise at speeds of 0.5 fps for the longer intervals necessary to keep themselves away from screens and to find a safe bypass." Clay also recommended that it would be desirable to use an approach velocity of 0.4 fps as a safety factor for screens which are "properly maintained and in a clean condition." He also noted that in experiments performed in Canada where screens were placed in irrigation ditches, approach velocities above 0.4 fps impinged the "smallest salmon fry," those having just emerged, against screens, causing their deaths.

Fisher (1981) conducted experiments to determine the long-term (6-hour) swimming abilities of juvenile (mean fork length* 1.5 inches) chinook salmon. He found that, once accustomed to their surroundings, salmon were not reluctant to rest on retaining screens at the lowest velocity used (0.2 fps). At 0.4 fps, the smaller fish rested for greater lengths of time but were capable of movement off the screens. At 0.6 fps definite impingement occurred with resulting mortality. Several investigators have suggested relationships between body length and swimming capability. Bainbridge (1960) suggested a general relationship of four times the fish's length per second as the predicted speed which can be maintained for periods of at least 20 seconds. Brett (1967), investigating sockeye salmon, determined the 5% and 95% fatigue velocities to be 3.1 and 4.8 body lengths per second, respectively. Fisher (1981) observed that Brett's relationship applied favorably to his observed results with chinook salmon and with other researchers' observations related to juvenile salmon.

Application of Brett's and Bainbridge's relationships to fish of varying body lengths is shown in the following table:

* Fork length means the length of a fish from the tip of the snout to the notch in the tailfin of fork-tailed fishes (or to center of fin when tail is not forked).

Swimming Ability

Body Length (in)	Brett (1967) 5% Fatigue	Brett (1967) 95% Fatigue	Bainbridge (1960) 20 Second Duration
0.50	0.13 fps	0.20 fps	0.17 fps
0.75	0.19 fps	0.30 fps	0.25 fps
1.00	0.26 fps	0.40 fps	0.33 fps
1.50	0.39 fps	0.60 fps	0.50 fps

Velocity distribution across the screen face can also be quite critical to whether or not fish will become impinged. While the average velocity ($V=Q/A$, where V = average velocity of water in ft/sec, Q = rate of flow in ft/sec and A = the cross sectional area of a waterbody in ft^2) may be acceptable there may not be uniform distribution; through-screen velocities may be markedly higher on some portions of the screen. Unequal velocity distribution is most pronounced in cylindrical-well type screens. The velocities are greatest at the intake (proximal) end where the screen is attached to the intake pipe and drop off rapidly toward the outflow (distal) end. This effect can be lessened somewhat by placing a perforated intake pipe sleeve within the screen. For screened boxes, desirable results can be obtained by placing the intake equidistant from the wetted sides.

Another aspect of approach velocity that has only been discussed briefly here is mortality from impingement. Fisher and Clay both cite 0.4 fps as being the highest velocity at which young salmon fry can be impinged against a screened surface without significant mortality. The relative body size and predicted swimming capabilities of whitefish suggests that their impingement mortality would be higher at velocities that are considered safe for Pacific salmon.

Screen Opening Size

Where approach velocities have been limited to levels where fish are not being actively transported in pumped water and may freely move away from screened intakes, screen opening size becomes one of the governing factors in exclusion of fish. Bell (1973) suggests the following formulas may be used with care to compute M, the maximum mesh opening size for various shapes of fish:

with M = Maximum opening size in inches;
L = Length of fish in inches;
D = Depth of fish in inches; and
L/D = F (Fineness Ratio):

M = [0.4+(L-2.35)0.04]F where F is 5* to 6.5.
M = [0.03+(L-1.86)0.03]F where F is 6.5 to 8.
M = [0.02+(L-1.6)0.02]F where F is 9+.

The typical F for presmolt Pacific salmon = 5.

However, application of this formula using fish lengths typical for juvenile anadromous fish results in the following:

L(in)	M(in)
0.50	-0.17
0.75	-0.12
1.00	-0.07
1.25	-0.02
1.50	-0.03

The formula, therefore, does not appear applicable to small fish since the screened opening size cannot have negative values.

Clay (1961) suggests the following opening sizes based on live tests:

Size and Species (one side of square)	Size of Mesh Opening
Pink salmon fry immediately after emergence from gravel (about 1 inch long)	0.10 inches
Sockeye salmon fry, chinook salmon fry, (about 1.2 inches long)	0.12 inches
Larger chinook and coho salmon fry (about 2 inches long)	0.15 inches
Yearling salmon (about 3.5-6 inches long)	0.25 inches

Clay also recommends that open area comprise at least 50% of the screen areas, otherwise velocities at the openings may be high enough to entrap fish even though the approach velocity may be acceptable. The effective open area of the screened intake is a serious consideration related to hydraulic head loss for the water intake operation. The head loss through a clean screen is relatively insignificant. A more important consideration is head loss incurred by collection of debris. For vertical screens without automatic cleaning, the head loss of the clean

screen is the minimum that can be expected. Under normal operating conditions, even with frequent manual cleanings, head loss can be expected to be many times greater than with a clean screen. The amount of head loss that can be tolerated depends upon the application. In ditches where flow is supplied by gravity, a small amount of head loss can greatly decrease the amount of water passing through the screen. In submerged pump intakes, the same amount of head loss might be considered insignificant. The Department of Fisheries of Canada specifies a gross screen area of 10 ft^2 for each cubic foot per second (cfs) pumped for manually cleaned screens and all screens must have at least 50% open area (Clay 1961).

Summary

Based on the preceding discussion, we believe that the following points support the five currently proposed options for screened pump intake structures:

1. Approach velocities of greater than 0.4 fps exceed the sustained swimming speed of small juvenile salmon and, probably, small juvenile whitefish.

2. The Department of Fisheries of Canada specifies a gross screen area of 10 ft^2 for each cfs for manually cleaned screens (Clay 1961). This standard results in an approach velocity of 0.1 fps.

3. Approach velocities of greater than 0.5 fps will result in mortality of Pacific salmon juveniles and, probably, whitefish juveniles impinged on screens.

4. Experience and tests by the ADF&G at the Clear Hatchery have shown that square screen openings of 0.1 inches on a side are effective in excluding young salmon fry; however, they may be too large to exclude young whitefish.

5. Where head loss is a critical factor, fouling of manually cleaned screens will be a problem but may be compensated for by increasing screen area.

Recommendations

The screen intake criteria contained in Table 2 of 5 AAC 94.270, have been developed by ADF&G for incorporation into the fish habitat regulations and are necessary to protect fish from entrapment or entrainment.

References

1. American Society of Civil Engineers, 1982. Design of water intake structures for fish protection. Library of Congress Card Catalog No. 81-70988.

2. Bainbridge, R. 1960. Speed and stamina in three fish. J. Exptl. Biol. 37(1): 129-153.

3. Bell, M. C. 1984. Fisheries handbook of engineering requirements and biological criteria. U.S. Army Corps of Engineers, North Pacific Division, Fish Passage Developments and Evaluations Program. Portland, Oregon, 290p.

4. Brett, J. R. 1964. The respiratory metabolism and swimming performance of young sockeye salmon. Fish. Res. Bd. Canada, 21(5):1183-1226.

5. Brett, J. R. 1967. Swimming performance of sockeye salmon in relation to fatigue time, and temperature. J. Fish. Res. Bd. Canada 24(8).

6. Brett, J. R., M. Hollands, and D.F. Alderdice 1958. The effect of temperature on the cruising speed of young sockeye and coho salmon. Canada 15 (4):587-605.

7. Clay, C. H. 1961. Design of fishways and other fish facilities. Department of Fisheries of Canada, Ottawa, 301p.

8. Dutta, L. Pers. Com. Civil Engineer, Water Use Unit, Habitat Protection Division, Government of Canada, Fisheries and Oceans.

9. Finnigan, R. J. Pers. Com. Senior Engineer, Salmonid Enhancement Branch, Special Projects Division, Government of Canada, Fisheries and Oceans.

10. Fisher, F. W. 1981. Long term swimming performance of juvenile American shad (Alosa sapidissima) and chinook salmon (Oncorhynchus tshawytscha). California Department of Fish and Game Anadromous Fisheries Branch Administrative Report 81-2, March 1981, 14p.

11. Kerr, J. E. 1953. Studies of fish preservation at the Contra Costa steam plant of the Pacific Gas and Electric Co. California, Fish and Game, Fish Bull. No. 92. 66 pp.

12. Post, R. A. Recommended criteria for water intake screening. Alaska Department of Fish and Game Memorandum to Bruce Baker dated March 11, 1982.

13. Turnpenny, A. W. H. 1981. An analysis of mesh sizes required for screening fishes at water intakes. Estuaries 4(4): 363-368.

ALASKA FOREST PRACTICES ACT REVIEW

Final Report

June, 1989

Land & Resource Section, P.O. Box 107005, Anchorage, AK. 99510
(907) 762-2660

Alaska Department of NATURAL RESOURCES

Department of Fish and Game

Department of Environmental Conservation

Alaska Forest Practices Act Review

Preface

INTRODUCTION

This document reflects over five months of work by the Alaska Forest Practices Review Steering Committee. The committee was formed at the direction of Governor Cowper to facilitate an objective and balanced review of the forest practices act, regulations, implementation.

The committee drafted an agreement-in-principle that includes recommendations for legislative and administrative changes in Alaska's forest practices program. The committee also drafted legislation to implement the agreement in principle. Not all of the changes in the state's forest practices program requires legislative change. Those that are not in the legislation will be reflected in regulations, or in the department's implementation of the regulations.

A description of the review process, including a list of ground rules and participants, is in Chapter 1 of the agreement-in-principle (page 1). A summary of the main points of the agreement and legislation begins on page iv.

A LACK OF CONSENSUS...

The committee attempted to operate by unanimous consent. Unanimous consent ensured that the committee's decisions respected all interests. Unfortunately, the committee did not achieve unanimous consent on its recommendations. Of the many difficult issues addressed, the disagreement in the final package focused on the effect of the state's forest practices act on harvest of federal timbered land.

The committee operated under five ground rules. Rule #5 specified that if all parties came to agreement, the agreement would be for the entire package, but that not to individual parts. Therefore, if any part was changed, the committee members would no longer be bound to support the package.

Those committee members who endorsed the legislation, did so only for the duration of the 1989 legislative session.

...WORK CONTINUES

In spite of the lack of consensus, the state agencies feel that this document reflects a tremendous advance over the disagreements that preceded the project. The review dramatically narrowed the areas of disagreement concerning the state's forest practices program and created a common understanding of the interests and problems of all groups. In addition, it provided avenues of communication and cooperation that previously did not exist.

At the urging of many steering committee members, state agencies will draft regulations as if the legislation had passed. If the act passes early in 1990, the regulations would become effective before the 1990 logging season as was originally envisioned. In addition, the Alaska Loggers Association has voluntarily offered to tailor its 1989 harvests, to the extent possible, to the riparian standards in the agreement.

State agencies hope these developments indicate the durability of the agreement. They feel that the areas of disagreement with the legislation are minor when compared to the areas of agreement. It is possible that forest practices act legislation will pass during 1990.

WHAT IS IN THIS DOCUMENT, AND WHO WROTE IT.

This preface was reviewed by the state resource agencies: DNR, DF&G, DEC, DGC. The remainder of this report contains the following parts.

1. Agreement-in-Principle, prepared by the steering committee.

2. Legislation, prepared by the steering committee. The legislation contains the statutory changes necessary to implement the agreement-in-principle. The agreement-in-principle was written before the legislation, and in a few cases, significant changes in intent were made during the legislative drafting process. Where this occurred, it is indicated in this copy of the agreement-in-principle.

3. Bill Analysis, prepared by DNR for the legislature.

Table of Contents

Agreement-in-Principle

Agreement-in-Principle
Summary

These pages summarize the main points of the agreement-in-principle of the Alaska Forest Practices Act Steering Committee. The remainder of the report contains the details of the agreement. However, the committee did not reach concensus on this document. See the preface for further details.

Major Points of the Agreement

I. Riparian Management

The agreement proposes a streamside management program for the protection of fisheries habitat and water quality.

Region I[1] - Private Land

On private land, a riparian management system is proposed that includes development of a channel typing system and riparian management prescriptions for each channel type. Of the nine channel types, six require a 15-meter (50-foot) conditional harvest zone within which timber harvest would require state agreement, and an additional 15-meter (50-foot) riparian management zone within which an operator would be required to leave 50% of the timber consistent with the existing size distribution of the timber stand within the zone. In addition, any timber taken from the conditional harvest zone or the riparian management zone in excess of timber retention standards must be replaced by comparably sized timber either in other sections of the riparian zone or in an area outside the riparian zone agreed to by DNR with due deference to DF&G. However, timber operators would not be required to leave more than 5% of the basal area in a landowner's operating area without compensation. (Basal area is the total cross-sectional area of trees measured 4.5 feet above the ground.)

Of the remaining three channel types, two require a 30-meter riparian zone, and one a 15-meter zone. In these zones, special prescriptions will apply to limit the impact of timber harvest on the riparian habitat. In addition, all activities will be subject to regulations to prevent slope instability and to prevent nonpoint source water pollution.

Region II[2] - Private Land

As an interim standard, a 30-meter special management zone (SMZ) will be used on all anadromous and high value resident fish waters. A SMZ is a shoreline or streamside area that will be managed primarily to protect anadromous and high value resident fish habitat and water quality. Timber harvest may occur in SMZs if it is sited and designed to be consistent with these fish habitat and water quality goals. Timber harvest decisions in the SMZ require DNR agreement with review and due deference to DF&G.
Region II groups will develop riparian standards within the next 12 months for Region II.

---

[1] Region I includes the Coastal Sitka Spruce-Hemlock Forest. Its boundaries are approximately all of Southeast, Prince William Sound, and portions of Cook Inlet and the Kenai Peninsula.

[2] Region II includes the boreal forest. It is north and west of Region I. It includes the Susitna Basin, the Cooper River Basin, and all of interior Alaska.

DNR will form a committee representing interested groups similar to the current forest practices steering committee. The recommendations of the group will be given to the Board of Forestry for review and then to DNR for adoption.

State Land[3]

On state land north of the Alaska Range, a 30-meter special management zone (SMZ) along all anadromous and high value resident fish waters will be managed primarily to protect anadromous and high value resident fish habitat and water quality. Timber harvest may occur in SMZs if it is sited and designed to be consistent with these fish habitat and water quality goals. (This standard is the same as the interim standard for private land in Region II.)

On state land south of the Alaska Range, there will be a no-cut zone within 30-meters of all anadromous and high value resident fish waters. Between 30- and 90-meters, timber harvest must be consistent with the maintenance of important fish and wildlife habitat.

Other Public Land

Borough, municipal, and other public land not managed by DNR (including trust lands such as mental health and university lands) will require a special management zone along all anadromous and high value resident fish waters. Timber harvest in this zone will follow the same requirements as those of the interim standards for private land in Region II, explained above.

II. The Enhanced Notification Process

The enhanced notification process is the proposed method for efficient state review of timber harvest plans on private and municipal land to determine the plan's conformance with forest practice standards. It includes the following points:

* A system of enforceable standards that harvest operations must follow. These standards will be written to satisfy the requirements of the forest practices act, to address forest water-quality related standards portion of DEC non-point source pollution programs and, on private land, to serve as the Alaska Coastal Management Program.

* A system of agency office and field review in which the agencies have an enforceable disapproval of proposed activities that would violate a forest practice standard.

* Public review of proposed harvest plans.

* Provision for "stop work orders" to halt proposed or ongoing work where agency personnel perceive a threat of imminent significant harm to the environment.

* A voluntary annual plan to give agencies and the public earlier information, and to give the landowner earlier feedback.

---

[3] This standard was changed during legislative drafting. The proposed legislative language is summarized here. The language of the April 10th agreement-in-principle is given on page 23.

* DF&G retains all previous authority under Title 16.

* DNR remains lead agency for forest practices activities outside streams. DNR will accord due deference to the expertise of DF&G concerning activities within the riparian zone. DNR will accord due deference to the expertise of DEC concerning water quality issues.

* DEC retains authority as lead agency for non-point source pollution control and water quality as in existing statutes.

III. Enforcement

The proposed agreement would add the following to the existing enforcement system:

* Procedures for imposing existing civil penalties are streamlined, and criminal penalties are added. DNR will also have the ability to issue a remedial order to correct violations of forest practice standards.

* Hearings will be conducted by an employee of the Division of Forestry with appeals to the Commissioner.

* State agencies are required to develop and implement a single state enforcement strategy for forest practices that violate forest practices act standards and other state requirements.

IV. Wildlife and Planning

DNR's forest planning process is changed in the following manner:

* New statutory and regulatory emphasis on wildlife habitat and other non-timber uses.

* Five-year sale schedule and enhanced public participation.

* Best interest finding under AS 38.05.035 for all sales, including increased analysis in the development of individual timber sale provisions.

* Enhanced opportunities for public participation at each of the forest planning stages.

* Planning for public lands will be required to allow for scenic quality and wildlife habitat, in addition to other considerations.

* On private lands, the landowners are encouraged to enter into cooperative agreements with DF&G to identify wildlife habitats, and management options to minimize adverse impacts.

V. Board of Forestry

The Board of Forestry is restructured to a smaller, balanced board with authority to provide advice concerning research and implementation of the Forest Practices Act and regulations. The board will include a member or representative of a fishing organization, a Native corporation, an environmental organization, and a forest industry trade association; and a professional fish or wildlife biologist, and a professional forester.

VI. Other Issues.

* Log storage and rafting -- a task group has been formed to develop guidelines for log rafting and in-water log storage, including review of meteorological and oceanographic factors, review of applied industry technology, and recommended construction and log handling and bundling standards.

* Reforestation -- the steering committee has recommended funding of the Reforestation Fund as provided by law.

* Consultation, education, and training -- the Division of Forestry will undertake new efforts to ensure that the public, landowners, operators, and agency personnel become fully informed of the state planning process and of proper practices for timber harvesting. Field workshops and interdisciplinary training will be used to ensure that the regulatory agencies, the public, and the timber industry understand each other's objectives, methods, and practices.

VII. Funding

Funding of $1.2 million will be required to implement the act. The funding will provide the agency review and field presence necessary to strengthen resource protection using a strong forest practices act while retaining a strong timber industry. The legislation should provide that funds come from receipts derived from timber sales on state lands, 25% of which would go to reforestation. If additional funds are required, the legislature should look to funds to be derived from other sources, in light of the standing timber and other costs contributed from the forest products industry through the terms of the proposed agreement, and contributions made from other forest users.

VIII. Future Review of the Forest Practices Program

This agreement-in-principle and the recommended legislation are intended to be reviewed within three years. This three-year time is intended to allow for further research, to gain experience implementing the act's regulatory and administrative standards -- especially the riparian standards and the enhanced notification system. It is presumed that a representative group will be convened for the review, or that the review will be conducted by the restructured Board of Forestry. The review will occur with full public input and participation.

Alaska Forest Practices Act Review

Agreement-in-Principle

The agreement-in-priciple in this document is the same as the April 10th version drafted by the steering committee except where significant changes were made during the drafting of the legislation. Where those changes occured, they are made in this document, and the April 10th version is placed in a footnote. The most significant change is in the riparian standards for state land.

PART I - Introduction

I. Purpose of the Alaska Forest Practices Act Review

In response to criticisms of the Alaska Forest Practices Act, and to improve resource protection while retaining a viable timber industry, the governor directed the Departments of Natural Resources, Fish and Game, and Environmental Conservation to conduct a public review of the act and make recommendations for improvements in the act, its regulations, and implementation. The Forest Practices Act (AS 41.17) and its regulations (11 AAC 95) governs forest practices on state, municipal, and private lands.

To achieve an objective and balanced review, the review process included representatives of timber land owners, state agencies, and users of public resources affected by forest practices. Recommended changes in legislation will be submitted by the Governor to the legislature during the 1989 legislative session. Any recommended changes in regulation and enforcement procedures will be promulgated by the appropriate departments.

The paragraphs below identify how different groups participate in this process.

The Steering Committee. The steering committee was the body responsible for guiding the review process and recommending changes in legislation, regulations, and implementation. The steering committee operates by unanimous consent to develop its recommendation. The public steering committee members were not picked by the governor or by the state agencies. They were chosen by the public groups.

Working Groups. Two working groups were formed by the steering committee to flesh out issues and make recommendations for resolution. Most of the work for the project occurred in working groups. For different issues, certain steering committee members were more active than others. For some issues, steering committee members may call on members of interest groups not represented on the steering committee. Final decisions were made by the Steering Committee.

Mediators. The mediators guided the mediation process but did not make decisions. The mediators were hired from outside state government to ensure an objective process. The mediators were selected by a committee composed of representatives of DNR, DF&G, and DEC. The mediators chaired working group and steering committee meetings. The mediators were Jim Waldo and Frank Gaffney of the Northwest Renewable Resources Center.

Public and Special Interest Groups. Interested groups not represented on the steering committee helped pick steering committee representatives; gave comments on issues and recommendations through telephone conversations or other formal and informal contact; and some participated on working groups for all of some or the issues.

The General Public. The general public is involved through the legislative process and standard agency process for promulgation of new or conforming regulations.

II. The Steering Committee

A. **Make-up of the Steering Committee.** Membership on the steering committee was a compromise of representation for all who are affected by the Forest Practices Act, and having a group size that allowed a workable process. In addition, the committee included equal representation from timber groups and non-timber groups. To achieve these objectives, the steering committee included thirteen members as indicated below: