Fishery Data Series No. 96-45

Annual Summary of Instream Flow Reservations and Protection in Alaska

by

Christopher C. Estes

November 1996

Alaska Department of Fish and Game

Division of Sport Fish

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
Monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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ABSTRACT

This report summarizes instream flow water rights applications and related activities of the Alaska Department of Fish and Game (ADF&G) during the tenth year of the statewide instream flow program. The status of instream flow applications prepared by other agencies and the private sector in Alaska is also reported. Alaskan legislation, regulations, and other activities that influence instream flow protection are identified and reviewed.

Between July 1, 1995 and June 30, 1996, instream flow analyses were completed by the ADF&G for six river reaches: Kobuk River (two reaches), Glacier Creek, Lemon Creek (two reaches), and Klehini River. Applications to acquire instream flow reservations were prepared based on these analyses and will soon be submitted to the Alaska Department of Natural Resources (DNR) for adjudication.

Ten of 67 instream flow reservation applications, filed by the ADF&G between 1986 and 1996, have been granted by the DNR. Adjudications for two of the ADF&G's 57 pending applications were recently initiated by the DNR. It is anticipated the remainder will be slated for adjudication by July 1997 as part of a DNR backlog project to process all pre-1996 water right applications.

Nineteen applications have been filed to reserve instream flows in Alaska water bodies by other agencies and the private sector. Four of these applications were filed by the U.S. Bureau of Land Management (one has been granted), thirteen by the U.S. Fish and Wildlife Service, and two by the private sector.

Two reservations of water were recently granted by the DNR as mandated by instream flow provisions of the 1992 water export amendments to the Alaska Water Use Act (AS 46.15.035). The reservations were processed as part of the adjudication process for the Blue Lake water export project in Sitka.

An 11 month process was initiated by the DNR in January 1996 to identify and select options for reducing the state's costs associated with managing water allocation in Alaska. Options range from eliminating the Alaska Water Use Act to retaining the status quo. Completion of this process is anticipated by the end of 1996.

Key words: instream flow, flow reservation, water rights, adjudication, Alaska Water Use Act, statutes, AS 46.15, Regulations, Tennant Method, Montana Method, flushing flow, Glacier Creek, Lemon Creek, Kobuk River, Klehini River, Blue Lake, Sawmill Creek, negotiation, water marketing, water exports, water management, water allocation.

INTRODUCTION

Alaska has abundant and diversified sport fisheries which are of considerable recreational importance to anglers and others (Howe et al. 1996). Approximately 15,000 water bodies in Alaska have been formally identified as supporting anadromous and resident fish species (ADF&G 1994). Many others have yet to be investigated.

Sufficient water of good quality is among the most essential requirements for sustaining fish productivity within Alaska's fish bearing water bodies (e.g. rivers and lakes). Consequently, Alaskans are faced with the challenge of maintaining these conditions while satisfying needs for expanded municipal, community, and individual water supplies. Adding to this challenge are growing demands for water by private, government, and commercial developments, including the sale of water for export to other states and nations. Unless these increasing demands for and uses of Alaska's waters are properly managed, they will harm fish production and other instream uses through unacceptable modifications to flow characteristics in rivers (instream flows) and water volume in lakes.

Fortunately, the Alaska legislature amended the Alaska Water Use Act (AS 46) in 1980 in recognition of the economic and social benefits that would be derived from retaining sufficient

water in rivers and lakes. These amendments (AS 46.15.03 and AS 46.15.145) are referred to as the "instream flow law". They provided the opportunity for private individuals; in addition to state, federal, and local government agencies, to legally acquire water rights (appropriations of water) to maintain a specific flow rate in rivers (or level of water in rivers and lakes) for one or a combination of four types of uses:

1) protection of fish and wildlife habitat, migration, and propagation;
2) recreation and parks purposes;
3) navigation and transportation purposes; and
4) sanitary and water quality purposes.

Under Alaskan law (AS 46.15.145) and regulations (11 AAC 93.970), an appropriation of water for these purposes is also defined as a "reservation of water". Reservations of water can be described as the rate or volume of flow in a river, the volume of water in a lake, or a related physical attribute such as water depth. A reservation of water to protect flow related characteristics can also be called an "instream flow reservation".

Subsequent amendments to the Water Use Act related to instream flow protection were approved in 1982 and 1992. The 1982 amendments established formal mechanisms for adjudicating Federal Reserved Water Rights (instream flow and out-of-stream) under the jurisdiction of the Alaska court system. The 1992 amendments provided water export and sales criteria, including mandatory instream flow protection for water bodies used for water export. Regulations to implement the original 1980 instream flow law were adopted by the Alaska Department of Natural Resources (DNR) in September 1983. Additional regulations were promulgated in 1990 (Estes 1992), 1993 (Alaska Administrative Code 1993 a, b, c) and 1996 (Alaska Administrative Code 1996) relating to the instream flow and other water rights application processes, application fees for water rights, conservation fees for water exports, and administrative fees associated with processing new and existing water rights.

To reserve water, an application containing supporting data and analyses that substantiate the need for the amount of water being requested must be submitted to the DNR for adjudication (the administrative determination of the validity and amount of a water right, including the settlement of conflicting claims among competing appropriators). Forms required to apply for reservations of water were first made available by the DNR in November 1983. Further information related to Alaska's instream flow water laws can be found in Curran and Dwight (1979), White (1981), Estes (1984), Estes and Harle (1987), Harle (1988), Estes (1987-1995), and Harle and Estes (1993).

The Fish and Game Act (AS 16) requires the Alaska Department of Fish and Game (ADF&G) to, among other responsibilities, "...manage, protect, maintain, improve, and extend the fish, game and aquatic plant resources of the state in the interest of the economy and general well-being of the state" (AS 16.05.020). AS 16.05.050 enables the ADF&G to acquire water rights to further its objectives or purposes. The Division of Sport Fish of the ADF&G initiated an ongoing program in 1986 to take advantage of the new opportunity to acquire instream flow water rights for sport fishery resources and related instream uses.

This report summarizes the tenth year of this program (July 1, 1995 to June 30, 1996) in which the primary objective was to estimate seasonal quantities of instream flows necessary to sustain sport fishery resources in four stream reaches. The status of instream flow related activities of other agencies and the private sector is supplemented by relevant summaries of Alaskan legislation, regulations, and administrative actions.

METHODS

STUDY DESIGN

Procedures for site selection, instream flow analysis, and completing applications for instream flow reservations were selected to comply with requirements established by state law (AS 46.15.145), state regulations (11 AAC 93.141-146), reservation of water application form instructions (Estes 1993), and the *State of Alaska Instream Flow Handbook* (DNR 1985).

SITE SELECTION

Six river reaches (Figure 1; Appendices A1-A5) were selected for instream flow analyses and preparation of instream flow reservations in Fiscal Year 1996 (FY 96, July 1, 1995 to June 30, 1996): Kobuk River (two reaches), Glacier Creek, Lemon Creek (two reaches), and Klehini River.

Reaches were nominated and selected following procedures in the 1984 Departmental Instream Flow Work Plan (ADF&G 1984, Estes 1985), and as modified in 1986 (Instream Flow Committee 1986). The final selection of a site was made by the Statewide Instream Flow Coordinator in consultation with Regional Supervisors for each region of the Division of Sport Fish or designees. The choice of a site was based on the importance of a water body to the sport fishery resources, the likelihood for competing out-of-stream uses, whether existing hydrologic and biologic data for a stream reach were adequate for performing an instream flow analysis (including the subsequent preparation and submission of an application), and whether other state and federal statutory mechanisms would provide better or more cost effective protection than an instream flow water right acquired under Alaskan law.

Stream reach boundaries for each FY 96 instream flow application were selected to insure that flow, habitat, and fish periodicity (seasonal use of habitat for passage, spawning, incubation, and rearing) characteristics within the reach were uniform throughout the study reach. Reaches were defined on U.S. Geological Survey (USGS) topographic maps with the assistance of ADF&G's biologists and USGS' hydrologists. Topography, watershed, and channel patterns, fish periodicity, USGS gage site descriptions and mean daily flow data were collectively analyzed.

Fish periodicity data for defining stream reaches and flow requirements were obtained and summarized from reviews of scientific literature, interviews with fishery and habitat biologists from the ADF&G and other agencies, the *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 1994), and *Harvest, catch, and participation in Alaska sport fisheries during 1994* (Howe et al. 1995).

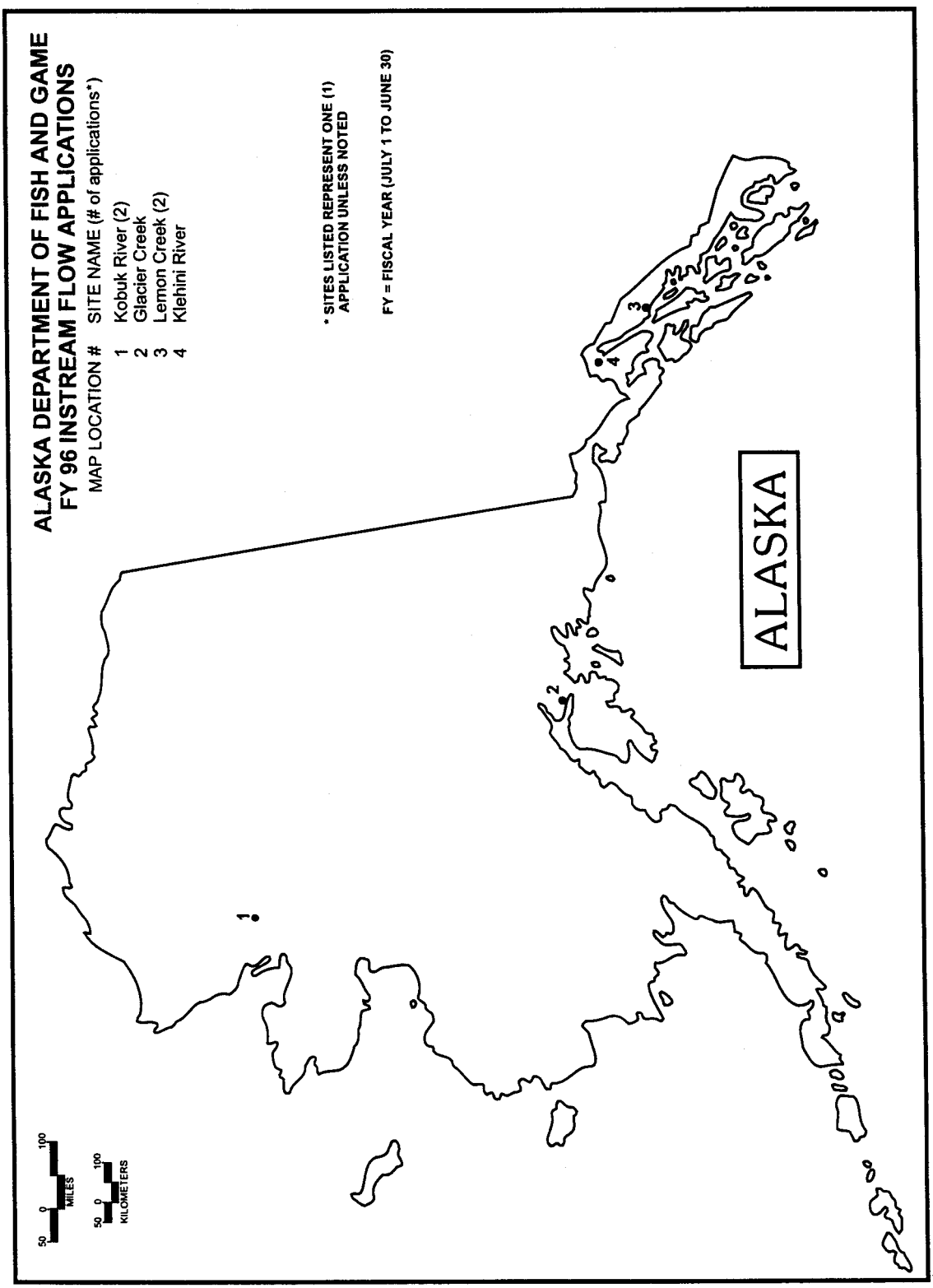

Figure 1.-Locations of July 1, 1995 to June 30, 1996 Alaska Department of Fish and Game instream flow reservation application reaches.

ADF&G biologists (responsible for the areas encompassing targeted instream flow reaches) reviewed and refined the syntheses of periodicity data. If discrepancies were discovered among data sources for species distribution and life phase occurrence within a reservation reach area, individuals responsible for data sources were consulted to reach a consensus as to which data to use. The final periodicity chart was based on these consultations.

Flow data and gage site descriptions used for delineating reach boundaries were obtained from USGS *Water Resources Data for Alaska* reports; and from interviews with ADF&G;s biologists, USGS hydrologists, DNR Division of Mining and Water hydrologists and water resource specialists, and other resource specialists that are known to have data pertinent to the reservation. Alaska water laws and regulations required that stream reach boundaries encompassed a stream reach with homogeneous flow and biologic characteristics. Boundaries were first determined by evaluating watershed and channel characteristics upstream and downstream of a stream gage or discharge site. Seasonal fish distribution and species periodicity were used to refine reach boundaries that were hydrologically defined. The resulting selection of boundaries were then refined based upon reviews by USGS hydrologic personnel and ADF&G's regional biologists.

INSTREAM FLOW ANALYSIS

An applicant's choice and use of a specific method for quantifying instream flow requirements is not restricted by existing Alaska water laws, regulations, or a set of established standards (DNR 1985, Estes and Harle 1987, AAC 1993a). However, the rationale for the selection of a method or methods must be documented and include a description of the procedures. This information must accompany the resulting instream flow application. The Tennant Method, also referred to as the Montana Method (Tennant 1972, 1976), was selected as the basis for quantifying instream flow requirements for the FY 96 study sites. The Tennant Method analysis was combined with an evaluation of mean daily flows, mean monthly flows, duration flows, and other hydrologic characteristics (Orsborn and Watts 1980, Estes 1984, Estes and Orsborn 1986, Shaw 1988) to determine whether sufficient water could be expected to be within each study reach during the various periods of the year in which the reservation was requested, and to enable a refinement of the instream flow choices derived with these analyses.

USGS surface water flow data, required for performing all of these analyses, were downloaded from local USGS computers. Each data set was transferred into Statistical Analysis System (SAS) data files (SAS 1990); and, summary analysis was used to check the data for simple errors. After initial error checking was complete, the data were analyzed by a series of SAS programs using the procedures outlined below to estimate the long-term average annual and average monthly mean daily flow values and the monthly (and/or semi-monthly) flow duration parameters.

Descriptive information pertaining to the fishery and hydrologic characteristics of the study sites were acquired through literature review and interviews with ADF&G's biologists, USGS' hydrologists, the DNR's Division of Water hydrologists, and other state, federal, and private resource specialists that were known to have data pertinent to the reservation analyses.

The ADF&G biologists and USGS hydrologists, most familiar with each study site, assisted with the refinement of this information whenever discrepancies occurred.

Tennant Method

The choice of the Tennant Method was based on its acceptance by both the DNR and Alaska courts as a valid instream flow analytical procedure (Supreme Court of Alaska 1995), and the limited availability of data, previous analyses, and financial resources required to prepare instream flow applications.

The first step of the Tennant Method was to calculate the average annual flow, QAA, (arithmetic mean of the annual mean of mean daily flows for all years of record) for each stream reach. Next, each QAA was multiplied by eight Tennant Method coefficients (percentages) to calculate instream flows for eight habitat categories. Seven of the Tennant Method habitat categories (ranging from 10% to 100% of the QAA) represent a range of poor to optimum habitat quality conditions for fish and wildlife. The eighth category (200% of the QAA) represents the short-term flushing flow that Tennant (1972) considers necessary to maintain channel substrate characteristics suitable for fish spawning and egg incubation, and benthic invertebrate production. Research by Estes (1984, Reiser et al. 1985) suggests supplemental analyses are required to modify or substitute for Tennant Method flushing flow calculations.

Next, hydrologic analyses were performed to estimate baseline flow conditions in each stream reach. This involved calculating mean monthly flows (QAM), the arithmetic mean of the monthly mean daily discharge for a given month for the entire period of record, and flow duration estimates (the expected frequency of occurrence of mean daily flows within a particular month).

Finally, seasonal instream flow requirements for individual life phases of fish for each stream reach were chosen by comparing the eight Tennant Method flows, fish periodicity data, QAM, and flow duration estimates. With the exception of flushing flows, instream flows were selected that corresponded to both fish periodicity and the highest of the other seven Tennant Method habitat categories that did not exceed flow duration estimates during that same period. During the months when spawning occurs, flows within the highest qualitative instream flow condition were selected from the Tennant analysis output that did not exceed those estimated by other hydrologic analyses (i.e. mean monthly flow or duration analysis values) during that same time period. During other life phase time periods, the highest of the flows were selected that were expected to occur within the system during that time period that fell within the Tennant ranges of "fair to excellent". When more than one life phase occurred for the same or different species during the same time period, the life phase for that time period requiring the highest instream flow value were requested for that time period.

A flushing flow calculation was calculated as part of the Tennant Method analyses, but not used to file for a flushing flow water right due to provisions in the Water Use Act (AS 46.15.145) that are interpreted by the DNR to limit reserving this type of flow to water bodies with controlled flows. Resources were also unavailable to perform supplemental flushing flow analyses recommended by Estes (1984) for refining or substituting for flushing flow results derived by using the Tennant Method.

Average Annual Flow Procedures

Calculation of QAA, from the existing USGS mean daily flow records for the stream reaches, involved first obtaining the mean of the mean daily flows within each water year (October 1-September 30):

$$qaa_h = \frac{\sum_{i=1}^{d_h} q_{hi}}{d_h}; \quad (1)$$

where: qaa_h equaled the mean annual daily flow for each year (h) of record; d_h equaled the number of days in each year of record (note that only complete years of record were used in this analysis; d_h varied only between leap and non-leap years); q_{hi} equaled the daily mean flow in cubic feet per second for each day in the record.

Next, QAA was estimated as a mean of the annual mean daily flow values over all complete years of record:

$$\hat{QAA} = \frac{\sum_{h=1}^{n} qaa_h}{n}; \quad (2)$$

where: n equaled the years of record (with complete daily flow records for each water year).

Mean Monthly Flow Procedures

The QAM was estimated similarly by first estimating the mean daily discharge for each complete month in the record:

$$qam_{jh} = \frac{\sum_{k=1}^{d_{jh}} q_{jhk}}{d_{jh}}; \quad (3)$$

where: qam_{jh} equaled the monthly mean daily flow for each month (*j*) for each year of record (*h*); d_{jh} equaled the number of days in each month of record (note that only complete months of record were used in this analysis); q_{jhk} equaled the daily mean flow in cubic feet per second for each day in the record.

Next, QAM was estimated as a mean of the monthly mean daily flow values over all complete years of record:

$$\hat{QAM}_j = \frac{\sum_{h=1}^{n} qam_{jh}}{n_j}; \quad (4)$$

where: n_j equaled the years of record with complete daily flow records for each *j*.

Duration Analysis Procedures

Flow duration estimates were calculated as percentiles of the distribution of observed values within the time periods involved over the years of record. For example, flow duration estimates for the month of April were calculated by combining all mean daily flow values for April (for all years having complete April records). Then the empirically defined distribution (observed-

combined mean daily flow values) was calculated as follows. If the quantity to be calculated was defined as the "t^{th}" percentile, where p = t / 100, then setting:

$$np = j + g$$

where: n was equal to the number of observed mean daily flow values in the combined group (for example 300 days for a 10 year- record of complete months of April); j was the integer part of n times p; and g was the fractional part of n times p. For example, if n = 300 and we wanted to calculate the 97th percentile, then j = 291 and g = 0; or for the 2.5th percentile, then j = 7 and g = 5.

Then the t^{th} percentile (y) was defined as:

$$y = \left(x_{(j)} + x_{(j+1)}\right)/2 \qquad \text{if } g = 0; \tag{5a}$$

or

$$= x_{(j+1)} \qquad \text{if } g > 0; \tag{5b}$$

where: $x_{(j)}$ and $x_{(j+1)}$ were the ordered (from smallest to largest) values in the combined group of mean daily flow values.

The above information was incorporated into instream flow applications (Estes 1993) with other required information following procedures defined by the DNR (1985). Additional descriptions of procedures are presented in each instream flow application (ADF&G 1996a, b, c d, e, f).

RESULTS

Analyses were completed and applications prepared to request instream flow protection for fish in six stream reaches in four river systems (Figure 1; Appendices A1-A6; ADF&G 1996a, b, c d, e, f): Kobuk River (Reach A), Kobuk River (Reach B), Glacier Creek, and Lemon Creek-Reach A, Lemon Creek-Reach B, and Klehini River. Applications are undergoing review prior to submitting them to the DNR.

The lengths of the six stream reaches, ranged from approximately 1.5 miles (Glacier Creek, Appendix A3 and Lemon Creek-Reach A, Appendix A5) to 75 miles (Kobuk River-Reach A, Appendix A1).

Fish periodicity for each stream is illustrated in Appendices A7-A12. Lemon Creek-Reach A (Appendix A10) and Lemon Creek-B (Appendix A11) had the lowest variety of fish species reported (four) and both Kobuk River-Reach A (Appendix A7) and Kobuk River-Reach B (Appendix A8) had the most species (15). Appendix A13 lists the common and scientific names of the fish species listed in the periodicity charts (Appendices A7-A12).

Historical records of USGS mean daily flow data varied from 4 years for Lemon Creek-Reach A to 21 years for Lemon Creek-Reach B (Appendix A14).

QAA, mean monthly flow, and Tennant Method results are summarized in Appendices A15-A20. QAA values ranged from 154 cubic feet per second (cfs) for Lemon Creek-Reach B (Appendix A19) to 15,640 cfs for the Kobuk River-Reach A (Appendix A15). Mean monthly flows ranged from 5 cfs in Lemon Creek-B during February (Appendix A19) to 47,750 cfs in the Kobuk River-Reach A during June (Appendix A15). Optimum habitat flows ranged from 92-154

cfs for Lemon Creek-Reach B (Appendix A19) to 9,384-15,640 cfs for Kobuk River-Reach A (Appendix A15) . Poor habitat flows ranged from 15 cfs for Lemon Creek-Reach B (Appendix A19) to 1,564 cfs for Kobuk River-Reach A (Appendix A15). Tennant flushing flow values ranged from 308 cfs for Lemon Creek-Reach B (Appendix A19) to 31,280 cfs for the Kobuk River-Reach A (Appendix A15).

Instream flow values requested usually ranged from 60% to 100% of the QAA for the spawning and passage seasons, and 10% to 40% of the QAA for incubation and rearing seasons (ADF&G 1996a, b, c d, e, f).

There is presently no legal mechanism for reserving flushing flows in unregulated streams and rivers in Alaska. Research by Estes (1984) suggests flushing flow calculations, using the Tennant Method, require additional analyses that were not funded. Therefore, Tennant values were not modified and used for reserving flushing flows for the six river reaches. Nonetheless, a flushing flow statement was included in each instream flow application to establish a basis for protecting flushing flows in these unregulated systems (until an acceptable method is developed for use under state law). The statement explained that flushing flows were required to maintain fish habitat and (at a minimum) must be safeguarded whenever significant flow modifications or a structure capable of controlling flows were planned.

Instream flow regimes requested are not included in this report because they are subject to modification both while undergoing departmental review prior to submission to the DNR and during the various stages of the DNR adjudication process. These data will be presented in future reports following the completion of these processes.

DISCUSSION

RESERVATIONS OF WATER

Status of Applications

Between 1980 and 1996, the DNR received a combined total of 92 applications for reservations of water from the ADF&G, federal agencies, and private sector (Appendix A21, Estes 1987-1995, Harle 1988, Harle and Estes 1993; Keith Bayha, U. S. Fish and Wildlife Service; Anchorage, personal communication, Mary Lu Harle U. S. Fish and Wildlife Service, Anchorage, personal communication; Bernice Sterin, U. S. Bureau of Land Management, Anchorage, personal communication). Not including the 1996 ADF&G applications, 67 have been completed by the ADF&G (66 for instream flow reservations and one for a reservation of water in a lake), four by the U.S. Bureau of Land Management (BLM), 13 (includes one application for a lake reservation) by the U.S. Fish and Wildlife Service (USFWS), four by the Anchorage Audubon Society, two by private individuals, one by the Arctic Unit of the Alaska Chapter of the American Fisheries Society (AFS), and one by the Juneau Chapter of Trout Unlimited (TU). The 92 ADF&G, BLM, USFWS, TU, and AFS applications met the DNR requirements and were accepted for adjudication. The other six applications were rejected by the DNR for a variety of reasons (Estes 1993, Harle and Estes 1993). One of the BLM and 10 of the ADF&G applications for instream flow reservations have been adjudicated and granted by the DNR (Estes 1994). Adjudications for another two of the ADF&G's applications were recently initiated as part of a project initiated by the DNR to adjudicate all pre-1996 water rights applications (Appendix B-1). The remaining 73 applications are pending adjudication by the

DNR (Harle and Estes 1993-1995). Although some of the ADF&G applications have been pending adjudication for eight years, the DNR plans to process their entire backlog of water rights by July 1997. How this will be accomplished is unknown.

Other Reservation of Water Categories

Two instream flow reservations were granted by the DNR as part of the adjudication process for a water right application filed by the City and Borough of Sitka to export water from Blue Lake. These two reservations and the application to export water were the first to be granted under 1992 amendments to the Alaska Water Use Act (AS 46.15.035 and AS 46.15.037) and are discussed in more detail below.

OBSTACLES TO CURRENT AND FUTURE PROTECTION

More than 15,000 fish bearing freshwater bodies (ADF&G 1994) are potentially subject to water extraction and flow modification in Alaska. Thus, it is not surprising the Alaska Legislature and Governor approved amendments to the Alaska Water Use Act in 1980 to allow for the formal reservation of water (AS 46.15.145) for, among other reasons, to help sustain the production of Alaska's invaluable fishery resources in rivers and lakes. To qualify for water rights protection under AS 46.15.145, many of these 15,000 fish bearing rivers must be subdivided into five or more individual instream flow reservation reaches. Each of these reaches will require a separate instream flow reservation application. Therefore by multiplying the 15,000 anadromous water bodies by a conservative estimate of only four reaches equals 60,000 potential instream flow reaches requiring protection. One may therefore question why less than 100 river reaches and 2 lakes (out of an estimated 60,000 or more fish bearing river reaches and thousands of lakes) have been targeted for formal instream flow and related protection during the past 10 years. And of the applications for reservations of water filed and accepted, why have so few been granted; and, why are the remainder pending adjudication? There are several reasons; among them are: insufficient allocations of personnel and financial resources needed for performing application and adjudication functions related to the reservation of water, insufficient hydrologic data required for defining water availability and instream flow requirements, lengthy administrative processes for preparing and adjudicating applications for water reservations, insufficient public education relating to instream flow and other water reservation protection opportunities, and except for state agencies, reservation of water application fees (Estes 1993, Harle and Estes 1993).

Limited Hydrologic Data

The dearth of hydrologic data in Alaska is perhaps the most limiting factor governing our ability to define instream flow and other water uses. Although Alaska has approximately 40 percent of the nation's surface freshwater supply (Harle and Estes 1993), only 397 USGS continuous flow stream gaging sites have been established in Alaska since 1908 (Brabets 1996). This equates to flow measurements for less than 1 percent of Alaska's water bodies. Eight of these Alaskan gage sites have less than 1 year of continuous flow data, 111 have 1 to less than 5 years of continuous flow data, 79 have 5 to less than 10 years of continuous flow data, 107 have 10 to less than 20 years of continuous flow data, 69 have 20 to less than 50 years of continuous flow data, and 2 sites have 50 or more years of data (Appendix A22). Typically, no more than 20 percent of these Alaskan gages are active in any one year due to funding restrictions (Estes 1991-1995, Brabets and Hawkins 1995, Brabets 1996). Sixty-eight USGS gaging stations were operating in Alaska

during Water Year 1996, October 1, 1995 to September 30, 1996 (Thompson 1996). This represents an average of one stream gage per 8,400 square miles in Alaska (Thompson 1996). Alaska's density of gages contrasts significantly with the lower "48" average of one gage site per 400 square miles. The stream gaging trend in Alaska is especially alarming, because as of September 30, 1996, only 45 percent (178) of the Alaskan gage sites (Appendix A22) could meet the USGS 10 year-minimum historical data standards for supporting a statistically reliable regional flow analysis. Daily stage and water surface elevation data are non-existent for the majority of Alaskan lakes.

Ironically, to quantify instream flow and related requirements and apply for a reservation of water for ungaged stream reaches, one must use regional hydrologic models to estimate flow characteristics. It is obvious the USGS databases, from which these models were developed, will limit the ability to evaluate naturally occurring hydrologic patterns at these sites with confidence. It is also more time consuming to estimate flow characteristics for streams having a limited or non-existent database as opposed to summarizing data for a stream having an adequate historical record. Precipitation information also required for these ungaged flow models is also limited, further complicating the process for estimating flow availability. Similar data limitations hamper efforts to quantify water reservations for lakes.

Basic hydrologic data are required by all potential water users (out-of-stream and instream), and water management agencies to enable them to project the reliability and amount of water that might be available, even if there were no other competitors for their targeted water source. Continuous flow and stage data are also necessary to manage and enforce existing water rights. Limited road systems, extremes in weather conditions, and difficulties such as loss of equipment to bears and other wildlife make data collection difficult and expensive in Alaska. Therefore, unless a commitment is made to close these data gaps in Alaska, we will continue to be limited to making decisions regarding water allocation using these models with little or no hope for improving the precision or accuracy of our flow estimates. Therefore, it should be obvious that additional gaging stations should be added for a minimum of 10- to 20 years to improve the accuracy of the information used to make decisions pertaining to water availability and allocation in Alaska.

Limited Financial Resources

In an attempt to compensate for limited financial and personnel resources and the above hydrologic conditions, the ADF&G has developed and refined a cost-effective approach to acquire the majority of its instream flow protection for fish by using the Tennant Method as its primary technique for analyzing instream flow needs. When necessary, this method has been modified and new procedures (requiring minimal resource expenditures) were developed (Estes 1989, 1992) to request specialized instream flow and related reservations of water (e.g., flushing flows, and water depth and area in lakes). Consequently, as a rule, uses of more sophisticated and expensive methods for reserving water, such as the Instream Flow Incremental Methodology (Bovee 1982) have been limited to situations where competition between out-of-stream uses and instream related requirements was likely to be highly controversial and required an incremental quantitative flow analysis. Projects under federal jurisdiction (e.g., projects requiring a Federal Energy Regulatory License) have occasionally mandated a specific data collection and analytical procedure. Basin wide adjudications for quantifying Federal Reserved Water Rights may also

require the use of more costly data collection and analysis processes. Unfortunately, supplemental funding, available in the past for projects requiring application of more sophisticated methods, has become increasingly difficult to obtain. Funding has also been unavailable to systematically evaluate whether reservations of water have been providing the desired protection and to monitor whether water uses have been in compliance with governing appropriations. Insufficient distribution and life history data combined with habitat suitability data are also limiting.

Duration of Administrative Processes

Administrative processes can be an added deterrent to potential and existing applicants, for reservations of water, including the ADF&G. Based upon past experiences, an estimated 1- to 3-weeks of an applicant's time may be required to participate in the various phases of the DNR adjudication process for each outstanding instream flow application (Estes 1994). Adding to an applicant's frustration, is the absence of a fixed timetable for the DNR to adjudicate water rights applications after they are filed. There have been no adjudications of the ADF&G's and other applicants' pending applications for reservations of water since 1991 (Estes 1992-1995, Harle and Estes 1993). However, the DNR recently granted two mandatory reservations of water required by 1992 water export amendments to the Water Use Act (AS 46.15.035-040).

The DNR's variable schedule for processing water rights applications for instream flow and other water reservations, and the overall backlog of water rights actions by the DNR adds another obstacle and level of difficulty. According to Gary Prokosch (Alaska Department of Natural Resources, personal communication), the DNR backlog for all classes of water rights has been reduced to approximately 600 water rights applications (which includes the ADF&G's and other parties' applications). Prokosch added that another 1,500 water use related administrative house keeping actions add to another form of a backlog. The water rights application backlog is estimated to have been growing at a ratio of approximately one application for a reservation of water per ten applications for out-of-stream water rights. And, as noted above, the DNR plans to adjudicate their entire pre-1996 backlog by July 1997. Accordingly, if too many adjudications of ADF&G's applications were scheduled by the DNR (at any one time), the added resource and time requirements would overtax ADF&G's instream flow program resources.

Complicating the adjudication of the DNR backlog are water rights for out-of-stream uses that were grandfathered by the DNR in 1966. Many of these water rights were granted without identifying whether the quantity of water claimed by an applicant actually existed, was needed, or used. This may have resulted, or will result, in overappropriations from some of the affected water sources.

DNR's eventual adjudication of its backlog of applications for out-of-stream uses of water (derived from or affecting fish bearing water sources) will provide another type of opportunity for instream flow and related protection. This is because under AS 46.15.080 (b)(3), the DNR is required to provide the ADF&G the option to review any proposed water use that may affect fish and wildlife production. The ADF&G can, based upon its review, request the DNR to condition (revise or deny) an applicant's proposed out-of-stream water use for the purpose of protecting fish and wildlife. On the other hand, the timing for adjudicating these out-of-stream water rights has the potential to strain ADF&G's instream flow and other program resources (similar to concerns expressed above associated with reservation of water adjudication processes). The

potential benefit of this provision is also questionable because the unallocated water, resulting from a DNR condition placed on a water right (in consideration of a request from the ADF&G), remains subject to future appropriations. This is because the DNR is only required to consider the input of the ADF&G and can accept, modify, or ignore the ADF&G's recommendations under this provision.

Findings of Fact and Conclusion of Law Documentation

An absence of standards governing how the DNR documents its rationale for adjudication decisions under AS 46.15.080 further weakens instream flow related considerations under these provisions. Inadequately documented decisions for denying or reducing the amount of water granted to an applicant for an out-of-stream use (in response to a request from the ADF&G) may result in future DNR adjudicators inadvertently interpreting that the remaining unallocated water in a water body remains subject to allocation, when in fact, a public interest decision had been previously made for purposes of instream protection. This record keeping problem would be solved if the DNR were to adopt findings of fact and conclusions of law procedures for all water rights applications. Presently, this process is only mandatory for reservation of water adjudication decisions (11 AAC 93.0145). These were among the reasons AS 46.15.145 provisions were enacted to establish a formal mechanism for allocating water rights for instream flows and other reservations of water (Harle and Estes 1993). Accordingly, it is in the best interests of the ADF&G to closely monitor the DNR's future plans for adjudicating their large backlog of out-of-stream water rights and completing other pending water allocation related administrative actions.

Date of Priority

The growing backlog of the ADF&G's applications for water reservations pending adjudication has, until recently, not been interpreted to pose an immediate threat to desired instream flow and related protection. This is because a priority date was assigned to each application for a reservation of water at the time it was accepted by the DNR. The priority date establishes the order of priority for the allocation of water within and from the source of water. However, until the adjudication process is completed, the amounts of water requested in applications for water reservations and out-of-stream water uses remain subject to modification or rejection by the DNR. Until recently, this principle has been applied consistently. Thus, until an instream flow or reservation of water right application has been fully adjudicated, it is assumed 100% of the original amount of water requested in the application will be managed by the DNR on behalf of the applicant.

The ADF&G has become increasingly concerned as more time passes before an application for a reservation of water is adjudicated. This is because it is more likely that those responsible for the original instream flow and water reservation analyses and application preparation, and the DNR staff who completed the initial phases of an adjudication will have changed employment or responsibilities. It is also conceivable that out-of-stream competition for water from sites pending adjudication of previously filed applications for instream flow and other reservations of water will increase over time.

Experiences gained by other states indicate that protection of instream flow and other reservation of water uses is often judged to be less important than allocating water to competing out-of-stream water uses when competition for water allocation is keen. Accordingly, lengthy delays in

adjudicating applications for reservation of water uses may result in less than desired protection than would otherwise be granted today, while competition from other out-of-stream water uses remains minimal.

DNR Water Diversion Policy

Another limitation of existing water management practices, is the DNR policy of not managing water diversions when water is not used. For example, this applies to a water body that has been diverted but no use has been made of the water, and the water is returned to the original water source at the same or different location from the point of diversion. The DNR claims they have no water management authority for this type of diversion unless someone possesses a prior water right for instream flows or water extraction within the river reach that was diverted. The DNR bases its position on the belief that they cannot manage the water unless it is put to a beneficial use (even if fish were identified as using the reach from where the water was diverted). This DNR policy could result in the dewatering of portions of fish bearing waters, unless the ADF&G were notified of the water diversion and exercised its AS 16.05.840 and 870 authorities.

Fees

Fees charged by the DNR for filing instream flow and other reservation of water applications are another deterrent for applicants. With the exception of state agencies, all applicants seeking to acquire a reservation of water are charged $500 per application (AAC 1993b). There is no charge to state agencies. The $500 fee is expensive relative to application fees charged by the DNR for most other water rights and (unlike other water rights) is not based on the amount of water requested. An additional regulatory fee was adopted by the DNR in 1993 (AAC 1993c). It enables the DNR to charge for the cost of staff time expended on the adjudication of water rights that exceeds the application fee. This supplemental fee is discretionary and serves as another obstacle for filing instream flow and other reservation of water applications by the private sector, and perhaps federal agencies.

Applications Summary

The above factors, and the complexity of water law and regulations, all contribute to the low number of applications filed for reservations of water.

THE FUTURE

Some of the above and related concerns have been addressed by the Alaska Legislature (Estes 1992-1994, Harle and Estes 1993), the Interagency Hydrology Committee for Alaska (IHCA), and the Alaska Water Management Council (AWMC). It is likely some of these issues will be addressed again in the future.

Alaska Water Management Council

The AWMC was established in 1992 to improve water management through better interagency state and federal coordination and cooperation. One of the products produced by council participants details water data issues for Alaska (Munter 1992) and is a good reference. The Governor of Alaska signed an Administrative Order formalizing the activities of the AWMC in 1993 (Hickel 1993). Federal agencies challenged the language and requested modifications. The order was voided. The revisions requested by federal agencies were never formalized. The AWMC has not met since the Fall of 1993. It is unlikely the AWMC will be reinstated by the current administration of Governor Knowles, the current Governor of Alaska.

Interagency Hydrology Committee for Alaska

The IHCA was formed in the early 1970s to coordinate technical concerns relating to the collection, analysis, and reporting of Alaskan hydrologic and climatologic data by state, federal and local agencies. In 1993, the IHCA accepted a request from the AWMC to serve as their technical advisor. The IHCA continues to meet twice a year despite the demise of the AWMC.

Water Exports

Alaska legislation enacted in 1992 (AS 46.15.020-.037), relating to the export and marketing of water (House Bill 596), has the potential to affect the protection of instream flows and other water reservations on a large scale (Estes 1992, Harle and Estes 1993). Regulations for conservation fees, required by the legislation, were promulgated in early 1996 (Alaska Administrative Code 1996). However, regulations defining how to execute the provisions were never completed and unavailable for guiding the first export under the law.

This uncertainty created confusion during the adjudication of the first water export application under this 1992 water export legislation. The application was filed by the City and Borough of Sitka to acquire a water right to annually withdraw fourteen thousand acre-feet of water from Blue Lake for export and sale. Global Water, Inc., a Canadian firm, has a contract with the City and Borough of Sitka to purchase and ship the water by tanker to China and the Far East. The City and Borough of Sitka may earn between $30 million to $80 million per year if the full amount of water appropriated is exported annually. The State of Alaska is limited to earning a maximum of $80 thousand per year based on water export conservation fee regulations promulgated this year. Two instream flows were granted for this system as mandated by the Water Use Act. Reservations of water were granted establishing protection for fish in Blue Lake, and to protect instream flow needs of fish in Sawmill Creek.

Interest for exporting water from Alaska to other states and countries appears to be increasing. Two water use applications to export water from Alaska were filed by Sun Belt, a California based company, prior to the passage of HB 596. The applications were closed due to incomplete information. If these water rights had been granted by the DNR, Sun Belt would have withdrawn water from Orchard Lake in Ketchikan and the tailrace of the Snettisham Hydroelectric Project in Juneau. Water has been purchased from the Municipality of Anchorage water supply for export to Seattle, and eventually Saudi Arabia, by Alaska Glacier Fresh. The company hopes to eventually export 14 million gallons of water per tanker load using a Saudi Arabian ocean vessel (Estes 1995). The Municipality of Anchorage sold 1.7 million gallons of water to an unspecified industrial plant in Japan during 1994 (Blumberg 1994). The water was sold for $3.14 per 1,000 gallons, for a total sale of $5,338. The water was transported to Japan by an industrial ocean tanker. Other development plans for water export operations in Alaska include Crystal Creek water in Petersburg, subsurface water from aquifers in the vicinity of Starrigavan Creek in Sitka, Alaska, and a planned Saudi Arabian operation to bottle and export water supplied by the Ketchikan Public Utility hydroelectric facility at Beaver Falls near Ketchikan. The effects of water exports and sales will undoubtedly increase as time passes, placing a greater emphasis on the laws passed to regulate these activities. Accordingly, the impact of this law cannot be fully assessed at this time.

Hydropower Development and Hatchery Water Rights

The development of small and medium sized hydropower operations in Alaska is on the rise and adding to increased competition for water needed instream and within lakes for fish production. Transfers of hatcheries to the Division of Sport Fish by other divisions of the ADF&G have resulted in the identification of inadequate water rights needed for hatchery operations and instream flow water rights required for fish production in waters impacted by these hatchery operations.

Elimination of the Water Use Act

Perhaps, the most significant threat to future instream flow protection in Alaska are cost savings options being considered by the DNR. These range from elimination of the Alaska Water Use Act and the DNR Water Management Section within the Division of Mining and Water to retaining the status quo (Estes 1995, Appendix B). The options were developed by the DNR and modified based on a series of public meetings held in 1996. A decision by the DNR is anticipated by the end of December 1996. Correspondence regarding this and other concerns discussed above are included in Appendix B-1 and Estes (1995).

Summary of Other Demands for Instream Flow Protection

In addition to filing for reservations of water with limited resources, the ADF&G's instream flow protection program has become increasingly burdened with an annual increase in the number of requests for instream flow and related technical support by other ADF&G staff, agencies, and the private sector. Without additional staffing and financial resources, the limitations above, combined with the growth in demands for assistance to others, will increasingly hamper the ability of the ADF&G to maintain its average production rate of seven applications per year (Estes 1987-1994).

RECOMMENDATIONS

Based upon the experiences of the ADF&G, the following recommendations are provided to improve instream flow protection.

1) Additional ADF&G staff (fishery biologists and hydrologists) and financial resources should be allocated to the instream flow program to allow for a greater number of applications to be processed for reservations of water on an annual basis. Staff should also be provided to perform adjudication activities without impeding the completion of new applications.

2) Additional staff of the ADF&G (fishery biologists, hydrologists/hydraulic engineers) and financial resources should be allocated for instream flow related protection to allow the ADF&G to provide better and more technical reviews of AS 46 water rights applications filed for water withdrawals, diversions, and impoundments. The DNR submits these applications to the ADF&G to provide the Department an opportunity to express its instream flow and other fish and wildlife concerns pertaining to the proposed out-of-stream water uses. A full-time hydropower coordinator is also needed to insure instream flow and other impacts are coordinated and will be adequately addressed under Federal Energy Regulatory Commission processes

3) Legislation should be enacted annually to continue funding additional stream gage data collection stations based upon the recommendations of the USGS network evaluation. The

stations are required to improve flow projection models and estimates and to determine the availability of water for out-of-stream, instream and related uses. They are also required to predict and monitor floods.

4) Out-of-stream appropriations of water should be automatically reviewed by the DNR once every 10 years, as are reservations of water.

5) The DNR water rights database should be fully automated and easily accessible to other agencies and the public.

6) All water rights acquired under grandfather provisions in 1966 should be evaluated to determine their accuracy based on hydrologic analyses of water availability. If analyses of flow data indicate water is overappropriated and public interest criteria were not addressed adequately, corrective adjustments should be made to the affected certificate of appropriation.

7) The ADF&G should review the status and adequacy of all water rights held by the department. The department should also evaluate whether all water uses comply with state statutory and regulatory requirements.

8) The Instream Flow Incremental Methodology or other equivalent methods should be used to reanalyze the adequacy of instream flow reservations obtained using the Tennant Method for the most important sport fisheries. If results indicate additional water should be reserved, a supplemental instream flow reservation application should be completed and filed. This may also include monitoring of fish population dynamics.

9) All DNR water rights decisions and the rationale for granting, conditionally granting, or denying diversionary, withdrawal, and impoundment water rights (i.e. findings of fact and conclusion of law) should be in writing. This requirement is mandatory for instream flow water rights, but only optional for out-of-stream water rights.

10) Legislation should be enacted or regulations established that will guarantee a base level of instream flow protection for stream reaches that are classified as supporting fish.

11) A formal instream flow educational program should be funded to encourage public participation in the instream flow reservation process.

12) An instream flow methods and application handbook should be prepared to provide sufficient guidance for the public and other interested parties to file for instream flow reservations.

13) Private sector instream flow applicants should be exempt from optional administrative fees that can presently be assessed by DNR to pay for DNR staff adjudication time and resources.

14) The DNR should provide the ADF&G a 2- to 4-week warning prior to beginning the adjudication of a pending instream flow application filed by the ADF&G.

15) The validity of statutory provisions, that can be interpreted to automatically grant instream flow water rights for water bodies within Alaska State Parks, should be established.

16) The Alaska Water Use Act should be amended for consistency with the Alaska Constitution and Alaska Water Management regulations to clarify that priority of use for instream flow water rights is on equal footing with priority of use for other water allocation purposes.

17) Regulations for implementing all of the provisions of House Bill 596 should be completed.

18) The DNR should reevaluate the validity of earlier policies preventing management of water that is diverted from a water body and not used.

19) The ADF&G's recommendations relating to the DNR evaluation of cost savings options in Appendix B-1 should be implemented.

CONCLUSIONS

The ability of the ADF&G and others to complete instream flow reservation applications and acquire instream flow water rights is becoming increasingly difficult. Competing uses of and demands for water are increasing. At the same time, data requirements and delayed adjudication processes will continue to limit the number of reservations completed, submitted, and granted. This will unfortunately widen the gap between the number of applications filed for water withdrawals versus reservations of water. Needed are a combination of improved laws and regulations governing the processes to reserve water in addition to increased resources that can be used to support data collection and analyses, and the preparation and defense of applications to counter these limitations. It is better to reserve water today as opposed to attempting to restore a fraction of whatever water is remaining in the future.

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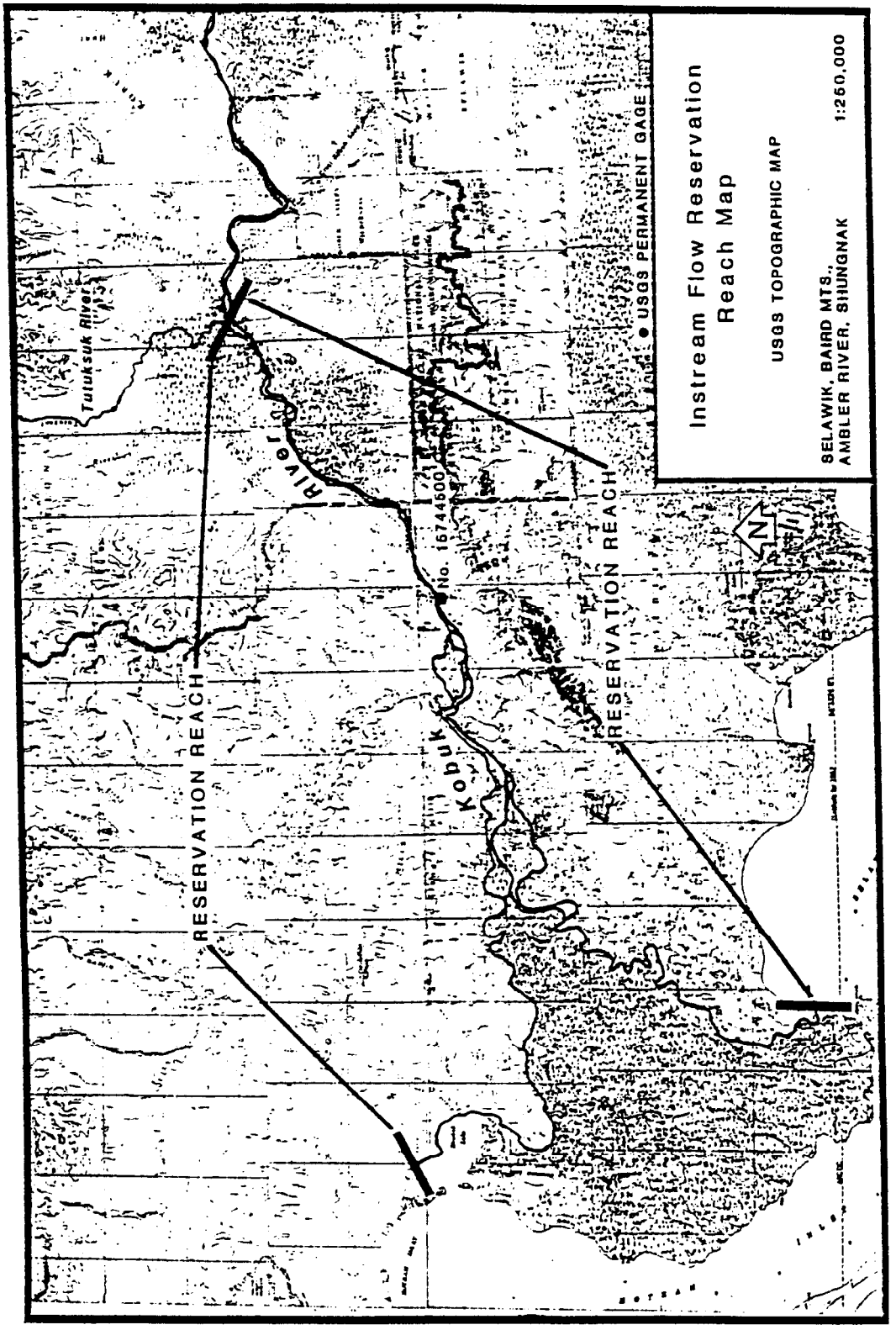
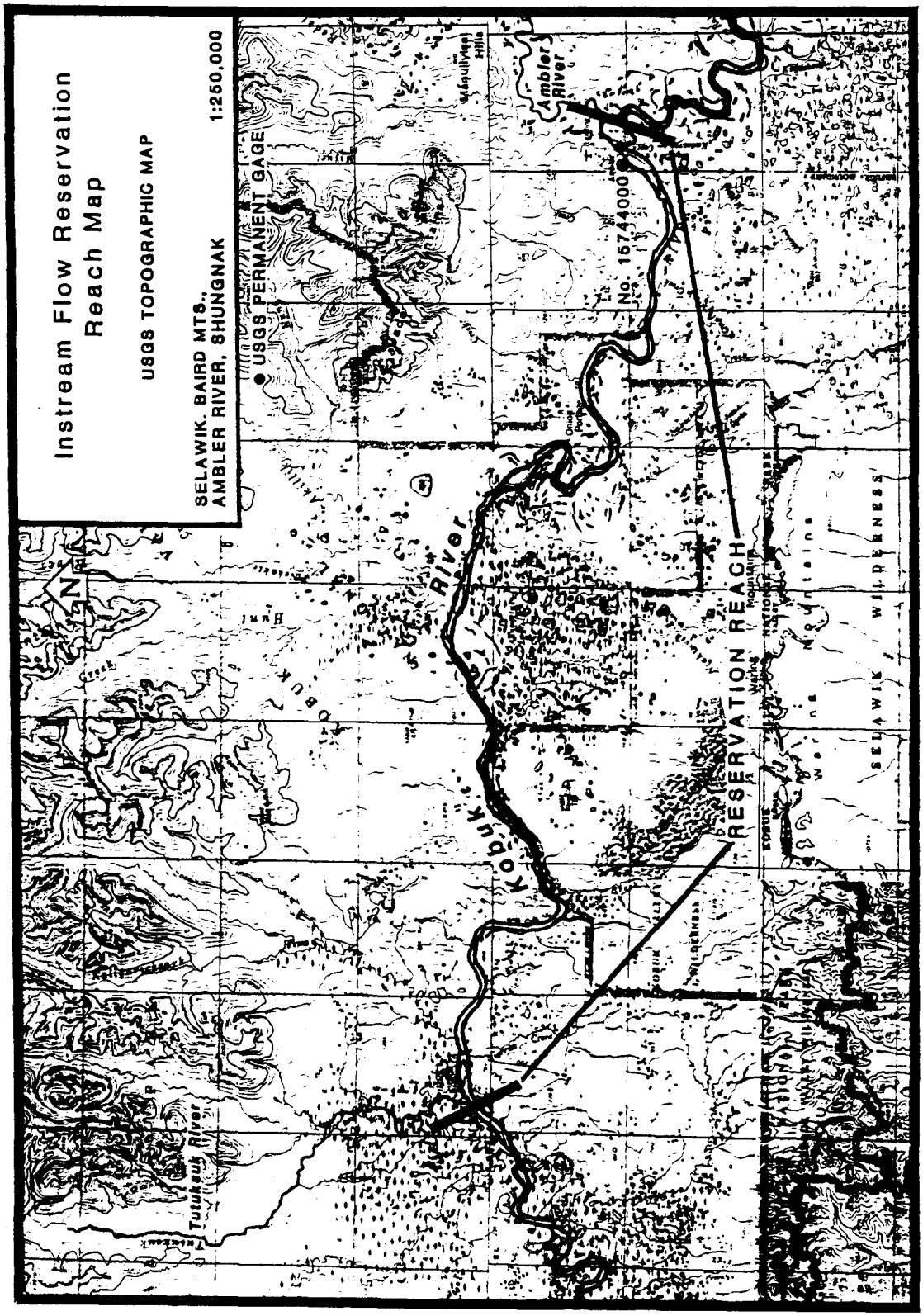
APPENDIX A. FIGURES AND TABLES

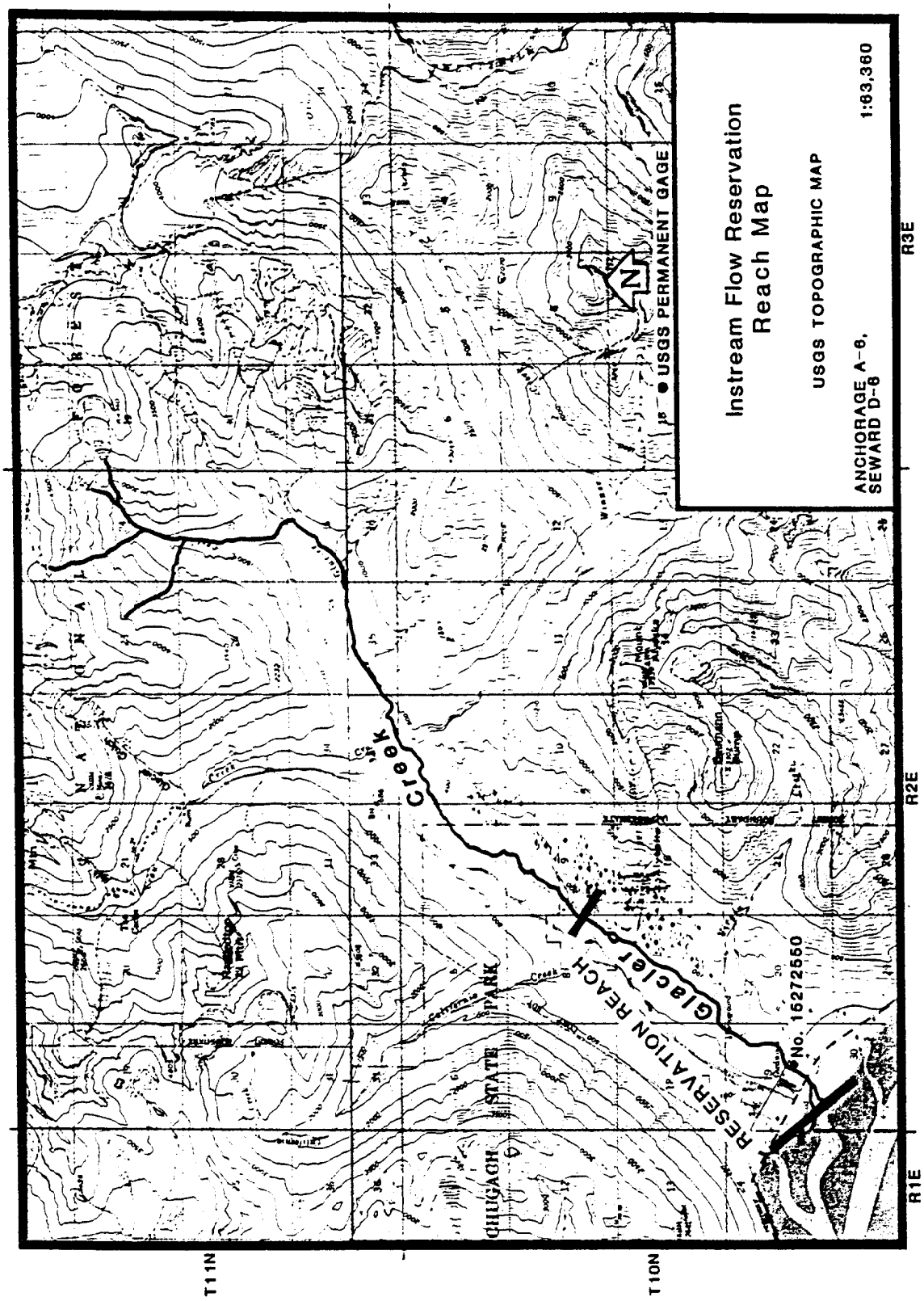
Appendix A1.-Reservation reach boundaries, Kobuk River-Reach A.



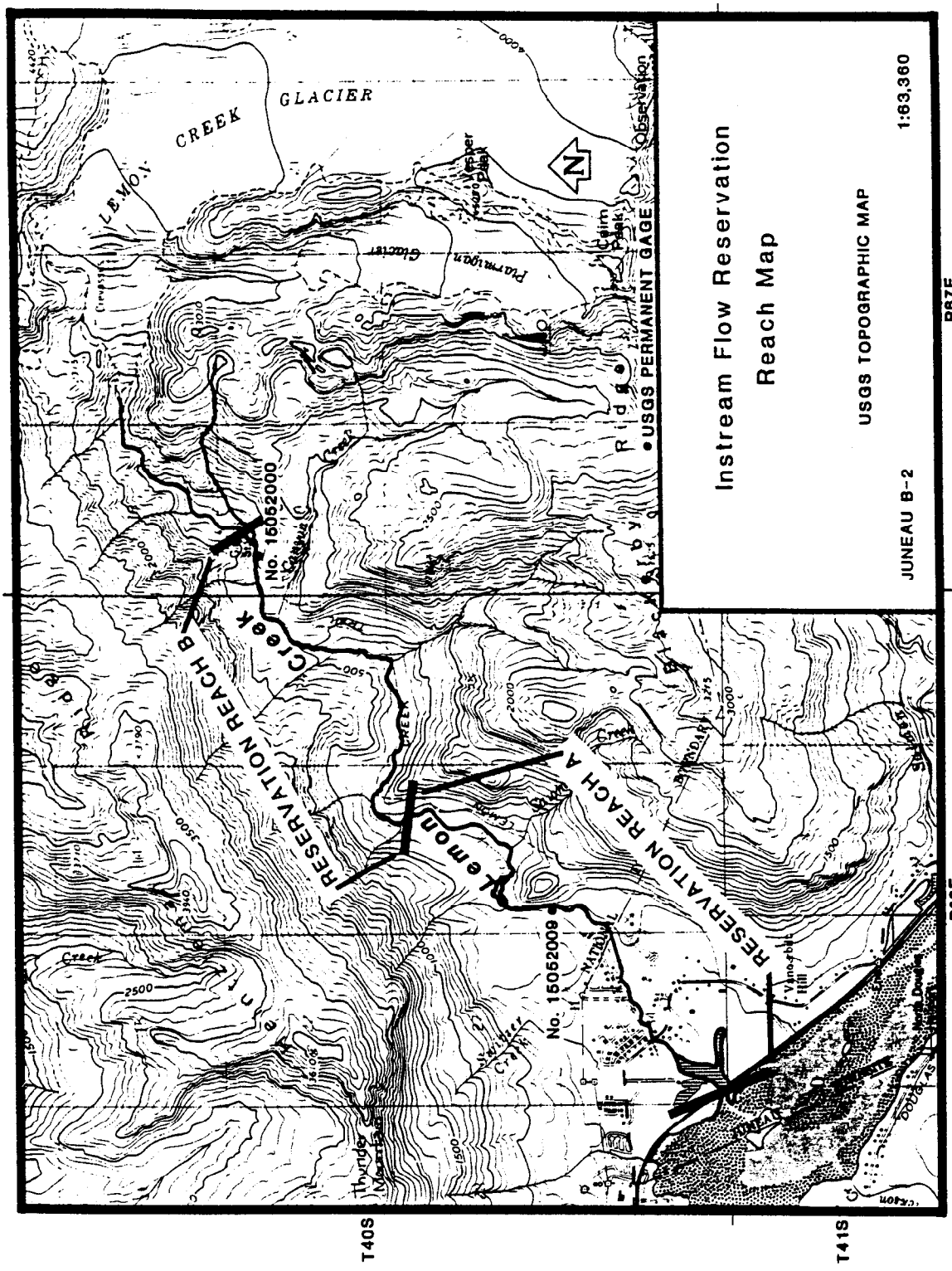
Appendix A2.-Reservation reach boundaries, Kobuk River-Reach B.



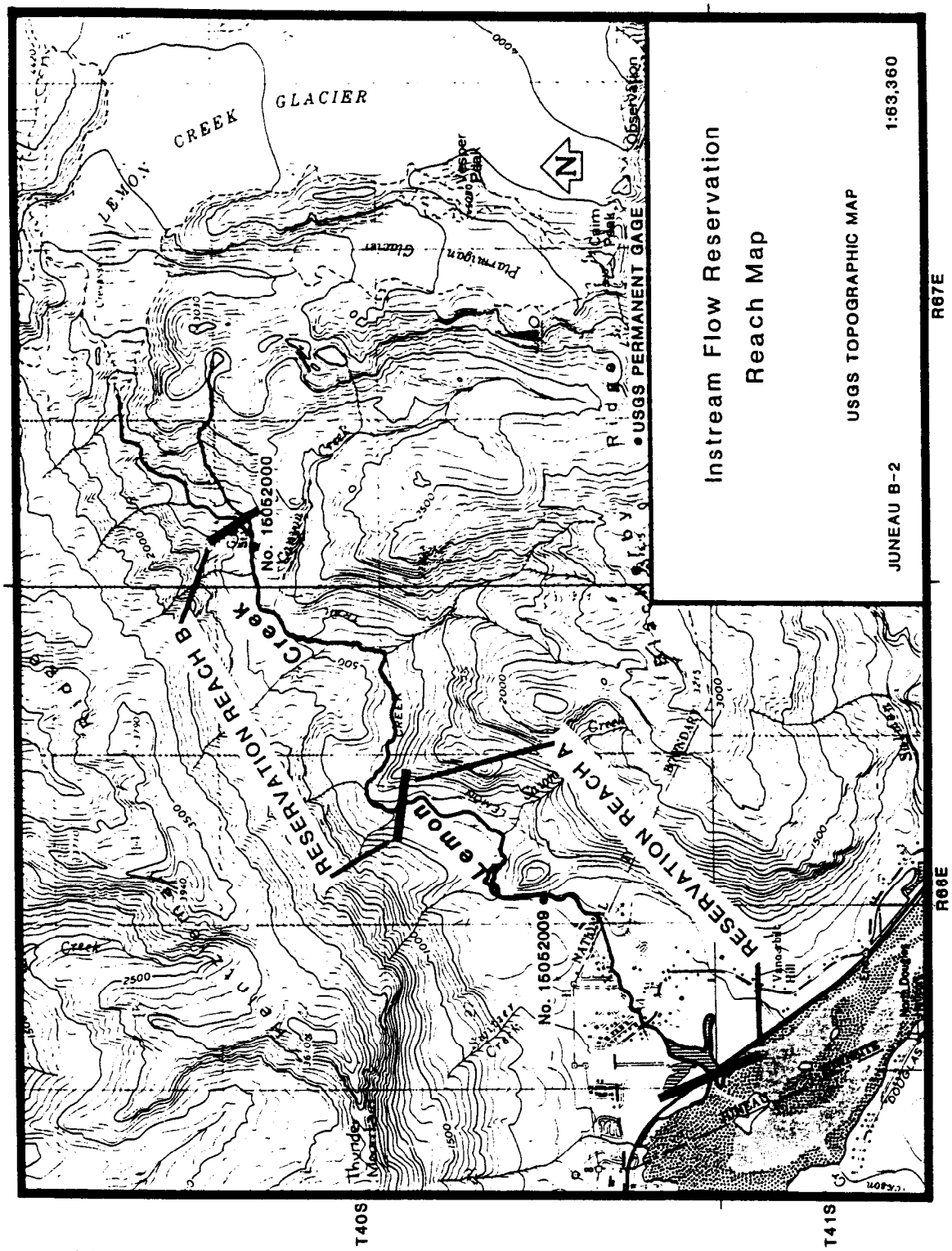
Appendix A3.-Reservation reach boundaries, Glacier Creek.



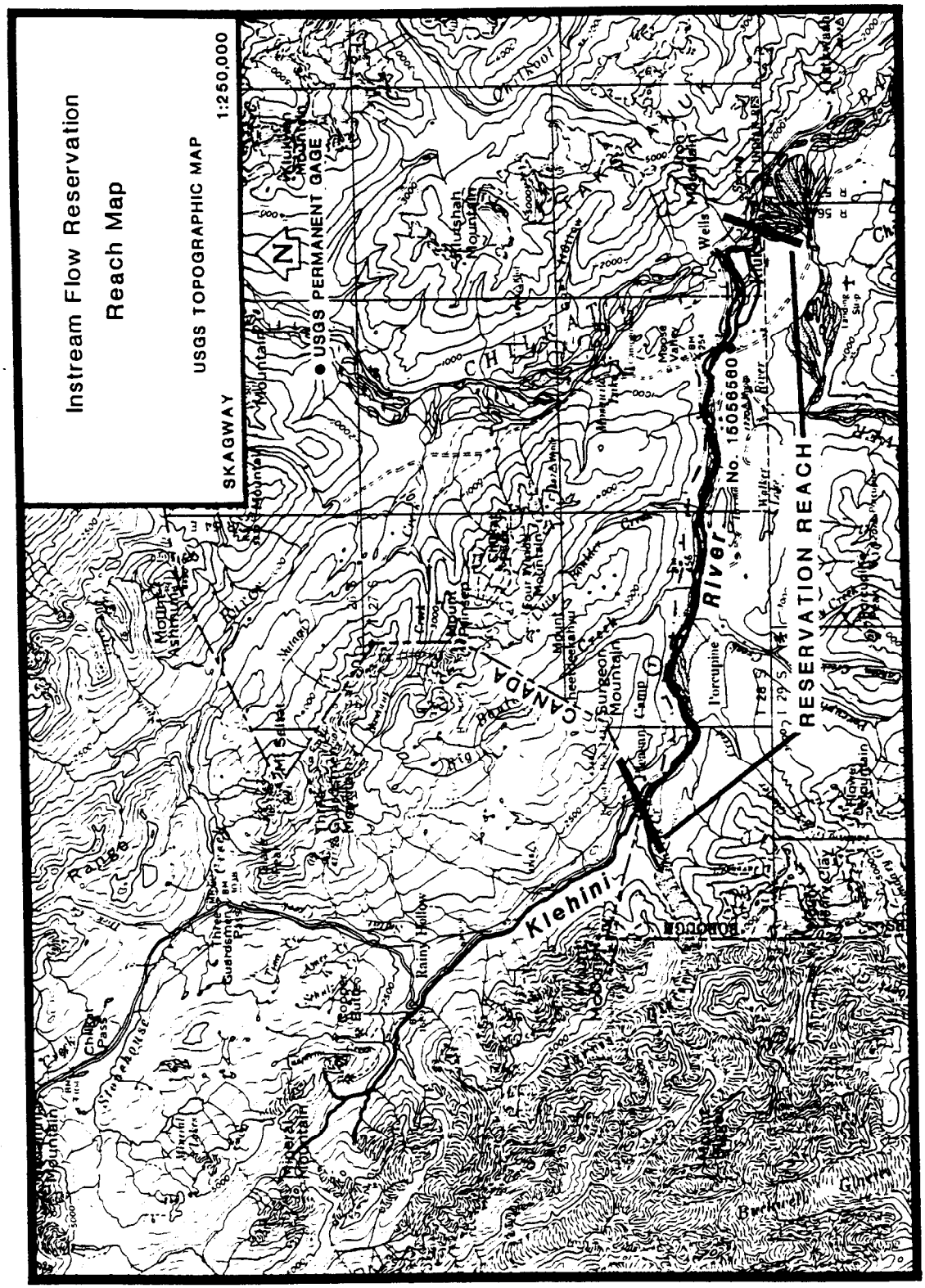
Appendix A4.-Reservation reach boundaries, Lemon Creek-Reach A.



Appendix A5.-Reservation reach boundaries, Lemon Creek-Reach-B.



Appendix A6.-Reservation reach boundaries, Klehini River.



Appendix A7.-Species periodicity chart for Kobuk River-Reach A.

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					XXXX	XXXX						
Adult Passage								XX	XXXX	XX		
Spawning												
Incubation												
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Chum Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					XXXX	XX						
Adult Passage							XXXX	XXXX	XXXX			
Spawning							??	????	????	????		
Incubation	????	????	????	??			??	????	????	????	????	????
Rearing			XX	XXXX	XX							

Northern Pike	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning					XX	XXX						
Incubation					X	XXXX	X					
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Longnose Sucker	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning					XXXX							
Incubation					XXX	XXXX						
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Sheefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage						XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Spawning ?												
Incubation ?												
Rearing					XX	XXXX	XXXX	XXXX	XXXX	XXXX		

Humpback Whitefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage					XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	???
Spawning									???	????		
Incubation	????	????	????	????	??					????	????	????
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Dolly Varden	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage						?X	X					
Adult Passage	????	????	????	????	XXXX	XXXX	X???	??XX	XXXX	XXXX	XX??	????
Spawning ?												
Incubation ?												

Burbot	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning	????	????										
Incubation	????	????	????									
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Slimy Sculpin	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning					????	????						
Incubation					????	????	?					
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Round Whitefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning									??	????	?	
Incubation	????	????	????	????	??					????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Broad Whitefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	????
Spawning									??	????	???	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				X	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Least Cisco	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					??X	XXXX	?					
Adult Passage	????	????	????	????	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	????
Spawning									XXX	XXXX	?	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				X	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Rainbow Smelt	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage							XX??					
Adult Passage					??X	XX?						
Spawning					?X	XX?						
Incubation						XXXX	?					
Rearing							XX??					

Chinook Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					??	XX??						
Adult Passage							XXXX	?				
Spawning ?												
Incubation ?												
Rearing ?												

Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage						?XX?						
Adult Passage							?XXX	?				
Spawning							????	?				
Incubation ?												
Rearing ?												

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

Appendix A8.-Species periodicity chart for Kobuk River-Reach B.

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					XXXX	XXX						
Adult Passage								XX	XXXX	XX		
Spawning												
Incubation												
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Chum Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					XXXX	XX						
Adult Passage							XXXX	XXXX	XXXX			
Spawning							??	????	????	????		
Incubation	????	????	????	??			??	????	????	????	????	????
Rearing			XX	XXXX	XX							

Northern Pike	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning					XX	XXX						
Incubation					X	XXXX	X					
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Longnose Sucker	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning					XXXX							
Incubation					XXX	XXXX						
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Sheefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					???	????	??					
Adult Passage						XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Spawning												
Incubation												
Rearing					????	????	????	????	????	??		

Humpback Whitefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage					XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	???
Spawning									? XX	XXX?		
Incubation	XXXX	XXXX	XXXX	XXXX	XX					XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Dolly Varden	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage						?X	X					
Adult Passage	????	????	????	????	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX??	????
Spawning ?												
Incubation?												
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Burbot	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning	?XXX	XX?										
Incubation	XXX	XXXX	????									
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Slimy Sculpin	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning					????	????						
Incubation					????	????	?					
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Round Whitefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning									XX	XXXX	?	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				X	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Broad Whitefish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	????	????	XXXX	XXXX	XXXX	XXXX	XXXX	????
Spawning									XX	XXXX	XX?	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				X	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Least Cisco	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	????
Spawning									XXX	XXXX	?	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				X	XXXX	XXXX	XXXX
Rearing				XXXX	XXXX	XXXX	XXXX					

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Lake Trout	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Spawning									??	????	???	
Incubation	????	????	????	????	????					??	????	????
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Chinook Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					??	XX??						
Adult Passage							XXXX	?				
Spawning												
Incubation												
Rearing												

Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage						?XX?						
Adult Passage							?XXX	?				
Spawning							????	?				
Incubation												
Rearing												

Based upon professional judgment of ADF&G biologists

Smolt passage is for juvenile emigration to estuarine/marine environment

Adult passage: for salmon is immigration: for other species, immigration and emigration unless noted

Incubation life phase includes time of egg deposition to fry emergence

? = Data not available or timing is incomplete

Appendix A9.-Species periodicity chart for Glacier Creek.

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				?X	XXXX	X?						
Adult Passage								XXXX	XXXX	XXXX		
Spawning									?X	XXXX	XXXX	?
Incubation	XXXX	XXXX	XXXX	XX?					X	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Chinook Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				?	XXXX	X						
Adult Passage ?												
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			?X	XXXX	X?							
Adult Passage							?XX	XX?				
Spawning							?	XXXX	?			
Incubation	XXXX	XXXX	XXXX	XX?			?	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			?X	XX?								

Chum Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			?X	XXXX	?							
Adult Passage							?XX	XXX?				
Spawning							?	XXXX	X?			
Incubation	XXXX	XXXX	XXXX	?			?	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			?X	XX?								

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for steelhead and resident fish species, immigration and emigration.
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Sockeye Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Smolt Passage				?	XXXX	XXXX	?				
Adult Passage						?	XXXX	XX?			
Spawning ?											
Incubation ?											
Rearing ?											

Threespine Stickleback	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Adult Passage ?											
Spawning ?											
Incubation ?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for steelhead and resident fish species, immigration and emigrati
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

Appendix A10.-Species periodicity chart for Lemon Creek-Reach-A.

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				XX	XXXX	XX						
Adult Passage									XXXX	XXXX	X	
Spawning										XXXX	XXXX	X
Incubation	XXXX	XXXX	XXXX	XXXX						XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Chum Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fry Passage			XX	XXXX	XX							
Adult Passage								X	XXXX	XX		
Spawning									XXXX	XXXX	XX	
Incubation	XXXX	XXXX	XXXX						XXXX	XXXX	XXXX	XXXX
Rearing			XX	XX								

Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fry Passage			XX	XXXX	X							
Adult Passage							XXX	XXX				
Spawning							XX	XXXX	X			
Incubation	XXXX	XXXX	XXXX				XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			X	X								

Dolly Varden	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XX	XXXX	XXXX	XX						
Adult Passage							XXX	XXXX	XXXX	XXXX	XX	
Spawning									XX	XXXX	XX	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				XX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for steelhead and resident fish species, immigration and emigration
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

Appendix A11.-Species periodicity chart for Lemon Creek-Reach-B.

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				XX	XXXX	XX						
Adult Passage									XXXX	XXXX	X	
Spawning										XXXX	XXXX	X
Incubation	XXXX	XXXX	XXXX	XXXX						XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Chum Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fry Passage			XX	XXXX	XX							
Adult Passage								X	XXXX	XX		
Spawning									XXXX	XXXX	XX	
Incubation	XXXX	XXXX	XXXX						XXXX	XXXX	XXXX	XXXX
Rearing			XX	XX								

Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fry Passage			XX	XXXX	X							
Adult Passage							XXX	XXX				
Spawning							XX	XXXX	X			
Incubation	XXXX	XXXX	XXXX				XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			X	X								

Dolly Varden	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XX	XXXX	XXXX	XX						
Adult Passage							XXX	XXXX	XXXX	XXXX	XX	
Spawning									XX	XXXX	XX	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				XX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for steelhead and resident fish species, immigration and emigration
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

Appendix A12.-Species periodicity chart for Klehini River.

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				XXXX	XXXX	XXXX						
Adult Passage									XXXX	XXXX	XXXX	XXXX
Spawning									XX	XXXX	XXXX	XXXX
Incubation	XXXX	XXXX	XXXX	XXXX	XX				XX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Chum Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XXXX	XXXX	XXXX							
Adult Passage							XXXX	XXXX	XXXX	XXXX	XXXX	
Spawning								XXXX	XXXX	XXXX	XXXX	XXX
Incubation	XXXX	XXXX	XXXX	XX				XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XX	XXXX	XX							

Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XXXX	XXXX	XX							
Adult Passage							XXX	XXXX	XX			
Spawning							XX	XXXX	XXXX			
Incubation	XXXX	XXXX	XXXX	XXXX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XXXX	XXXX	XX							

Chinook Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XXXX	XXXX	XXXX							
Adult Passage							XXXX	XXXX	XX			
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for steelhead and resident fish species, immigration and emigration
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Sockeye Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				XXXX	XXXX	XX						
Adult Passage						XXXX	XXXX	XXXX	XX			
Spawning ?												
Incubation ?												
Rearing ?												

Cutthroat Trout	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				XXXX	XXXX	XXXX						
Adult Passage				XXXX	XXXX	XXXX	XXX	XXX	XXXX	XXXX	XX	
Spawning ?												
Incubation ?												
Rearing ?												

Steelhead Trout	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XX	XXXX	XXXX							
Adult Passage		XX	XXXX	XXXX	XXXX							
Spawning ?												
Incubation ?												
Rearing ?												

Dolly Varden	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			XX	XXXX	XXXX	XX						
Adult Passage		XX	XXXX	XXX	XXX	XXXX	XXXX	XXX	XXXX	XXXX	XXXX	
Spawning									XXXX	XXXX	XXXX	
Incubation	XXXX	XXXX	XXXX	XXXX	XX				XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for steelhead and resident fish species, immigration and emigration
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

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Threespine Stickleback	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage												
Adult Passage	XXXX	XXXX	XXXX	XXX	XXX	XXXX	XXXX	XXX	XXXX	XXXX	XXXX	XXXX
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based upon professional judgment of ADF&G biologists
Smolt passage is for juvenile emigration to estuarine/marine environment
Adult passage: for salmon is immigration: for steelhead and resident fish species, immigration and emigration
Incubation life phase includes time of egg deposition to fry emergence
? = Data not available or timing is incomplete

Appendix A13.-Common and scientific names of fishes identified in periodicity charts (Appendices A7-A12).

Common Name	Scientific Name
Broad whitefish	*Coregonus nasus*
Burbot	*Lota lota*
Chinook salmon	*Oncorhynchus tshawytscha*
Chum salmon	*Oncorhynchus keta*
Coho salmon	*Oncorhynchus kisutch*
Cutthroat trout	*Oncorhynchus clarki*
Dolly Varden	*Salvelinus malma*
Humpback whitefish	*Coregonus pidshian*
Lake trout	*Salvelinus namaycush*
Least cisco	*Coregonus sardinella*
Longnose sucker	*Catostomus catostomus*
Northern pike	*Esox lucius*
Pink salmon	*Oncorhynchus gorbuscha*
Rainbow smelt	*Osmerus mordax*
Rainbow trout	*Oncorhynchus mykiss*
Round whitefish	*Prosopium cylindraceum*
Sheefish	*Stenodus leucichthys*
Slimy sculpin	*Cottus cognatus*
Sockeye salmon	*Oncorhynchus nerka*
Steelhead trout	*Oncorhynchus mykiss*
Threespine stickleback	*Gasterosteus aculeatus*

Appendix A14.-Summary of U.S. Geological Survey (USGS) hydrologic data for instream flow reservation application reaches (Appendices A1-A6).

Stream/Reach	USGS Site Number	Years of Daily Flow Record
Kobuk River near Kiana-Reach A	15744500	1976-1995
Kobuk River near Ambler-Reach B	15744000	1965-1978
Glacier Creek near Girdwood	15294450	1981-1986
Lemon Creek near mouth near Juneau-Reach A	15052009	1982-1986
Lemon Creek near Juneau-Reach B	15052000	1951-1953 1954-1973
Klehini River near Klukwan	15056560	1981-1993

Appendix A15.-Tennant Method analysis for Kobuk River-Reach A.

Tennant Method Flow Classifications (adapted from Tennant 1975)

Seasonal Base Flow (Q) Regimens as Percentages (%) of Average Annual Flow (QAA) for Kobuk River-Reach A

SEASONAL FLOW DESCRIPTIONS	% OF QAA NOV-APR	FLOW (cfs)
QAA	100	15640
Flushing or Maximum	200	31280
Optimum Range	60-100	9384-15640
Outstanding	40	6256
Excellent	30	4692
Good	20	3128
Fair or Degrading	10	1564
Poor or Minimum	10	1564
Severe Degredation	<10	<1564
	MAY-OCT	
QAA	100	15640
Flushing or Maximum	200	31280
Optimum Range	60-100	9384-15640
Outstanding	60	9384
Excellent	50	7820
Good	40	6256
Fair or Degrading	30	4692
Poor or Minimum	10	1564
Severe Degredation	<10	<1564

MONTH	LONG-TERM MEAN MONTHLY FLOW
Jan	2607
Feb	2143
Mar	1906
Apr	1912
May	25100
Jun	47750
Jul	22570
Aug	29720
Sep	29150
Oct	14420
Nov	5515
Dec	3451

Appendix A16.-Tennant Method analysis for Kobuk River-Reach B.

Tennant Method Flow Classifications (adapted from Tennant 1975)

Seasonal Base Flow (Q) Regimens as Percentages (%) of Average Annual Flow (QAA) for Kobuk River-Reach B.

SEASONAL FLOW DESCRIPTIONS	% OF QAA NOV-APR	FLOW (cfs)
QAA	100	8857
Flushing or Maximum	200	17714
Optimum Range	60-100	5314-8857
Outstanding	40	3543
Excellent	30	2657
Good	20	1771
Fair or Degrading	10	886
Poor or Minimum	10	886
Severe Degredation	<10	<886
	MAY-OCT	
QAA	100	8857
Flushing or Maximum	200	17714
Optimum Range	60-100	5314-8857
Outstanding	60	5314
Excellent	50	4429
Good	40	3543
Fair or Degrading	30	2657
Poor or Minimum	10	886
Severe Degredation	<10	<886

MONTH	LONG-TERM MEAN MONTHLY FLOW
Jan	1448
Feb	1237
Mar	1111
Apr	1155
May	15034
Jun	30898
Jul	14945
Aug	15319
Sep	13589
Oct	8585
Nov	3245
Dec	1904

Appendix A17.-Tennant Method analysis for Glacier Creek.

Tennant Method Flow Classifications (adapted from Tennant 1975)

Seasonal Base Flow (Q) Regimens as Percentages (%) of Average Annual Flow (QAA) for Glacier Creek

SEASONAL FLOW DESCRIPTIONS	% OF QAA NOV-APR	FLOW (cfs)
QAA	100	265
Flushing or Maximum	200	530
Optimum Range	60-100	159-265
Outstanding	40	106
Excellent	30	80
Good	20	53
Fair or Degrading	10	27
Poor or Minimum	10	27
Severe Degredation	<10	<27
	MAY-OCT	
QAA	100	265
Flushing or Maximum	200	530
Optimum Range	60-100	159-265
Outstanding	60	159
Excellent	50	133
Good	40	106
Fair or Degrading	30	80
Poor or Minimum	10	27
Severe Degredation	<10	<27

MONTH	LONG-TERM MEAN MONTHLY FLOW
Jan	55
Feb	54
Mar	34
Apr	62
May	312
Jun	616
Jul	625
Aug	490
Sep	437
Oct	270
Nov	138
Dec	75

Appendix A18.-Tennant Method analysis for Lemon Creek-Reach-A.

Tennant Method Flow Classifications (adapted from Tennant 1975)

Seasonal Base Flow (Q) Regimens as Percentages (%) of Average Annual Flow (QAA) for Lemon Creek-Reach A

SEASONAL FLOW DESCRIPTIONS	% OF QAA NOV-APR	FLOW (cfs)
QAA	100	214
Flushing or Maximum	200	428
Optimum Range	60-100	128-214
Outstanding	40	86
Excellent	30	64
Good	20	43
Fair or Degrading	10	21
Poor or Minimum	10	21
Severe Degredation	<10	<21
	MAY-OCT	
QAA	100	214
Flushing or Maximum	200	428
Optimum Range	60-100	128-214
Outstanding	60	128
Excellent	50	107
Good	40	86
Fair or Degrading	30	64
Poor or Minimum	10	21
Severe Degredation	<10	<21

MONTH	LONG-TERM MEAN MONTHLY FLOW
Jan	67
Feb	45
Mar	56
Apr	65
May	167
Jun	357
Jul	495
Aug	584
Sep	352
Oct	250
Nov	55
Dec	61

Appendix A19.-Tennant Method analysis for Lemon Creek-Reach-B.

Tennant Method Flow Classifications (adapted from Tennant 1975)

Seasonal Base Flow (Q) Regimens as Percentages (%) of Average Annual Flow (QAA) for Lemon Creek-Reach B

SEASONAL FLOW DESCRIPTIONS	% OF QAA NOV-APR	FLOW (cfs)
QAA	100	154
Flushing or Maximum	200	308
Optimum Range	60-100	92-154
Outstanding	40	62
Excellent	30	46
Good	20	31
Fair or Degrading	10	15
Poor or Minimum	10	15
Severe Degredation	<10	<15
	MAY-OCT	
QAA	100	154
Flushing or Maximum	200	308
Optimum Range	60-100	92-154
Outstanding	60	92
Excellent	50	77
Good	40	62
Fair or Degrading	30	46
Poor or Minimum	10	15
Severe Degredation	<10	<15

MONTH	LONG-TERM MEAN MONTHLY FLOW
Jan	8
Feb	5
Mar	6
Apr	13
May	85
Jun	261
Jul	418
Aug	455
Sep	359
Oct	147
Nov	49
Dec	18

Appendix A20.-Tennant Method analysis for Klehini River.

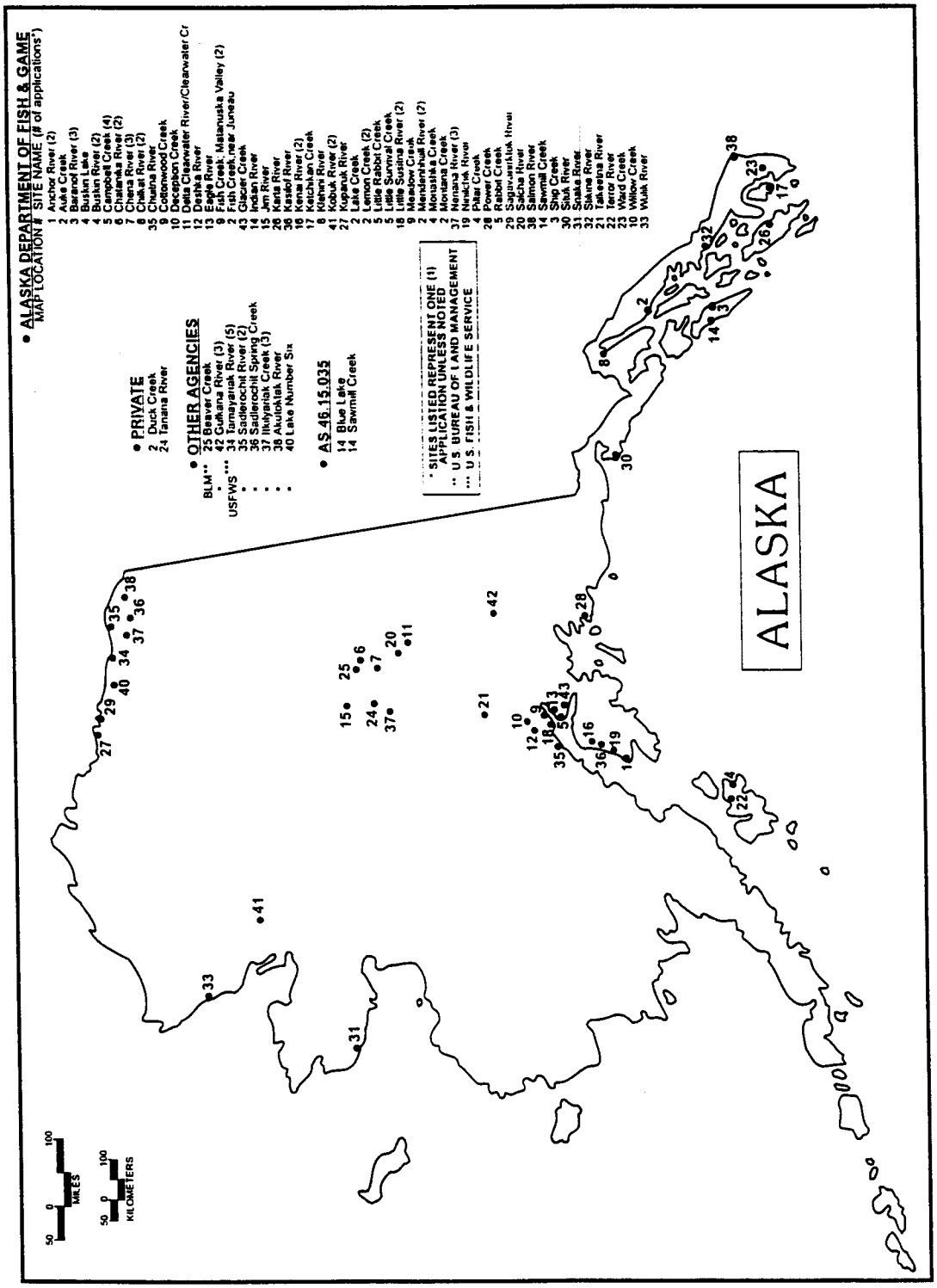
Tennant Method Flow Classifications (adapted from Tennant 1975)

Seasonal Base Flow (Q) Regimens as Percentages (%) of Average Annual Flow (QAA) for Klehini River

SEASONAL FLOW DESCRIPTIONS	% OF QAA NOV-APR	FLOW (cfs)
QAA	100	1507
Flushing or Maximum	200	3014
Optimum Range	60-100	904-1507
Outstanding	40	603
Excellent	30	452
Good	20	301
Fair or Degrading	10	151
Poor or Minimum	10	151
Severe Degredation	<10	<151
	MAY-OCT	
QAA	100	1507
Flushing or Maximum	200	3014
Optimum Range	60-100	904-1507
Outstanding	60	904
Excellent	50	754
Good	40	603
Fair or Degrading	30	452
Poor or Minimum	10	151
Severe Degredation	<10	<151

MONTH	LONG-TERM MEAN MONTHLY FLOW
Jan	285
Feb	242
Mar	222
Apr	390
May	1782
Jun	3730
Jul	4151
Aug	3204
Sep	1763
Oct	1323
Nov	518
Dec	375

Appendix A21.-Locations of July 1, 1986 to October 31, 1996 instream flow reservation application reaches (including reservation of water sites per AS 46.15.035) in Alaska.



Appendix A22.-Historical data summary for U.S. Geological Survey continuous streamflow gage sites in Alaska, 1908 to September 1996 including estimated number of active gages for water year 1997, October 1, 1996 to September 30, 1997.

Number of Gage Sites	Period of Record (Years)
8	0 to < 1
21	1
111	1 to < 5
79	5 to < 10
107	10 to < 20
69	20 to < 50
2	≥50
75	Estimated number of active gages for the period October 1, 1996 to September 30, 1997

Data from Brabets (1996).

APPENDIX B. ALASKA DEPARTMENT OF FISH AND GAME CORRESPONDENCE

Appendix B1.-November 1, 1996 comments from the Alaska Department of Fish and Game (ADF&G) to the Alaska Department of Natural Resources on draft proposals for modifying the State of Alaska's water management program (ADF&G cover letter with three attachments).

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

HABITAT AND RESTORATION DIVISION

TONY KNOWLES, GOVERNOR

P.O. BOX 25526
JUNEAU, AK 99802-5526
PHONE: (907) 465-4105
FAX: (907) 465-4759

November 1, 1996

Mr. Jules Tileston
Director
Alaska Department of Natural Resources
Division of Mining and Water
3601 C Street, Suite 800
Anchorage, AK 99503-5935

Dear Jules:

This letter and accompanying materials represent the Alaska Department of Fish and Game's (ADF&G) responses to a request by the Alaska Department of Natural Resources Division of Mining and Water (ADNR) for public comments on draft proposals for modifying the State of Alaska's water management program.

The ADF&G's responses are incorporated in this cover letter and added to the attached amended ADNR document, *"Draft Recommendations to the Commissioner - Water Resources Management (with ADF&G's Comments Added - November 1, 1996)"* (attachment one). The ADNR letter requesting this public review is also attached (attachment two).

Many of these ADF&G comments were presented during your and my December 14, 1995 meeting in Juneau with Leonard Verrelli (Alaska Department of Environmental Conservation), Gary Prokosch (ADNR), and Christopher Estes (ADF&G), by Christopher at five of the six ADNR public meetings held earlier in 1996 (Juneau-2, Anchorage-2, and Fairbanks-1), and in correspondence to you of September 18, 1996 (attachment three).

General Comments

The ADNR proposals reviewed by this letter and attachments represent a summary of the first nine months of an eleven month public process initiated by the ADNR in January 1996. The purpose of this process is to explore options for reducing or eliminating the state's costs for administering water allocation programs in Alaska. Proposals by the ADNR range from eliminating the water management program (and its enabling legislation) to maintaining the status quo. These proposals are represented as a series of ADNR recommendations and analyses in the attached version of the ADNR document. As noted above, ADF&G's review comments are presented in this cover letter and integrated into this ADNR document.

These and previous ADF&G comments reflect the views that the current water allocation system administered by ADNR, and its basic legal framework, should not be reduced or eliminated. Alaskans cannot afford the long-term liability/risk and costs that would be associated with piecemeal and multi-jurisdictional approaches for managing water, as proposed by some of the options under consideration. Water management is subject to natural hydrologic variability. To be cost effective and equitable to all citizenry, it must be performed as an integrated process, irrespective of geographical and political boundaries.

Retention of the current water allocation system is essential for avoiding overappropriation of Alaska's water resources, and for sustaining the health of fish and wildlife resources and the overall future economic well-being of Alaskans. Accordingly, sufficient funding is also required to administer the various elements of the program.

Many of the individuals at the ADNR public meetings, attended by the ADF&G, urged the ADNR to maintain the status quo system. Participants recommended the ADNR consider charging additional fees, if expended to cover the costs of maintaining the existing water program. It was also suggested that the ADNR better utilize its existing authorities to generate revenues, and if necessary, add to its authority to assess sufficient user and administrative fees to cover its costs of maintaining the current system as provided by 11 AAC 005.010 (8) (L) to (P).

Although ADF&G has commented on each proposal, there is currently insufficient information presented by the ADNR to fully and accurately assess the merits and cost effectiveness of the current ADNR water management program and alternative options under consideration. That is, criteria and data presented by the ADNR do not identify prior, current, and projected costs of maintaining a portion or all of a particular program function, whether and how well ADNR has or is meeting objectives of individual program functions, the basis for those functions, benefits of those program functions, and costs and liabilities for not implementing a particular function under the various options or combinations of options being considered.

Also lacking in the ADNR draft document, are sufficient explanations for all of the assumptions used, and whether costs and liabilities will vary over time. For example, it is unknown whether one course of action will cost $"x" and another $"y" over a 50-year period; and, whether a

particular program element should be judged as essential or optional, and why.

A comprehensive risk analysis and cost/benefit assessment of the past and current ADNR program functions and each alternative to the current program will be essential before one can truly identify if and what types of changes are or should be made. This type of assessment should be completed by a qualified independent entity. It would evaluate the state's long-term liability for costs and other impacts passed onto its citizenry as part of the DNR evaluation process for selecting specific and combinations of options for reducing or eliminating elements of or complete functions. Cost estimates should be based on existing, short, and long-term projections. Both direct and indirect costs should be included.

Without this critical information, the majority of proposals under consideration may produce the opposite of the desired effect and add to operating costs with no perceived gain to water administration. This may lead to irreversible water allocation decisions that are detrimental to the long-term economy of the state.

As stated at public meetings, the ADF&G also remains concerned formal notices describing this process were not distributed to all water rights holders and water right applicants. We are supportive of the efforts by ADNR to advertise public meetings in newspaper announcements and through hundreds of select mailings. However, many of the proposals under consideration have the potential to affect existing water rights holders, those with pending applications, and future applicants. Thus, we again suggest ADNR formally notify these stake holders.

In summary, the ADF&G, at a minimum, favors the status quo water management program, including retention of the Doctrine of Prior Appropriation system. The ADF&G also supports the concept of automated instream flow protection proposed by Recommendation 9 in the attached ADNR document.

Accordingly, the ADF&G recommends against any changes to the ADNR Water Management program and Water Use Act (AS 46.15) that will diminish the ability of the ADNR and other state agencies to fulfill their duties to manage water to serve the best public interests of Alaskans. These criteria are established by the Alaska Constitution (Article VIII, Sections 1, 2, 3, 4, 13, 16, and 17), Alaska Statutes (AS 46.15), Regulations (11 AAC 05.010 and 11 AAC 93), and through common law, in the form of the Public Trust Doctrine.

The ADF&G would like a copy of all written comments received by the ADNR related to this important evaluation process. Please also send us copies of tapes or transcripts produced from tape recordings of the public meetings.

If you desire additional information and are unable to reach me, please feel free to contact Christopher Estes, Statewide Instream Flow Coordinator (267-2142), or Lance Trasky, Southcentral Regional Supervisor of the Habitat and Restoration Division (267-2335).

Thank you for the opportunity to comment on the attached public document. I hope this information will be useful.

Sincerely,

Janet Kowalski by C.E.

Janet Kowalski
Director

cc: Marilyn Heiman, Governor's Office
John Shively, ADNR
Marty Rutherford, ADNR
Frank Rue, ADNR
ADF&G Division Directors
Christopher Estes, ADF&G
Lance Trasky, ADF&G
Al Ott, ADF&G
Lana Shea, ADF&G
Tina Cunning, ADF&G

Enclosures (3)

Amended Version *"Draft Recommendations to the Commissioner - Water Resources Management" prepared by the Alaska Department of Natural Resources with the Alaska Department of Fish and Game's Comments Added*

THE ALASKA DEPARTMENT OF FISH AND GAME'S (ADF&G) POSITIONS AND COMMENTS ON THE ALASKA DEPARTMENT OF NATURAL RESOURCES' (ADNR) DRAFT RECOMMENDATIONS FOLLOW THE ADNR ANALYSIS FOR EACH ADNR RECOMMENDATION PRESENTED. ALL ADNR INFORMATION IS BORDERED ON ONE OR MORE SIDES (formatttting was modified from the original for inclusion in this appendix).

ADNR RECOMMENDATIONS CATEGORY - AMMENDMENTS TO THE ALASKA CONSTITUTION

These recommendations were made by the public, local governments, state agencies, federal agencies, native villages, native corporations, and others during a series of public meetings, public workshops, and public written comments over the past nine months. These recommendations have not been adopted or accepted and should not be interpreted as the views of the Division of Mining and Water Management, or the Department of Natural Resources.

1. **Recommendation Under Consideration by ADNR: Replace the existing prior Appropriation system with a riparian water rights system in Alaska. If you own the property, you should own the water that runs through it or is located under it.**

ADNR Analysis: The essential differences between the existing appropriation system established by the constitution and a riparian system are:

RIPARIAN	**APPROPRIATION**
Ownership of water goes to adjacent land owner.	Ownership of water based on "first-in time, first in right". The first person to apply for the water and put it to beneficial use has the prior right to the water.
Rights are land owners regardless of actual use.	Must put water to beneficial use to have the rights.
Water is shared as common property, and no person has a fixed amount.	Each water rights holder has a clear statement to his or her rights, (amount, use, source, location of use, and priority date).
No loss of rights for non-use.	Water rights may be lost due to non-use.
Water right remains with land.	Water right can be severed from the land, transferred, sold, or leased to other parties or uses.
No priority of use under water shortage.	Use of water under shortage condition based on priority.
Public interest values may not be considered, such as fish, wildlife, recreation, navigability.	Public interest values are considered.
Public Trust Doctrine applies.	Public Trust Doctrine applies.

Changing our water right system would require a constitutional amendment and the revocation of the 16,000 existing water rights in the State. DNR eliminated this alternative prior to starting the water management review process.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The Alaska Department of Fish and Game (ADF&G) disagrees with this proposal to amend the Alaska Constitution. It would replace the existing water rights system (based on the Doctrine of Prior Appropriation) with a Riparian Doctrine system.

Under the Riparian system, water can only be withdrawn from a water body by adjacent land owners. Unquantified amounts of water, defined as "reasonable amounts of water", can be withdrawn. There are no provisions for allocating water for instream uses, and to share water with those who do not own land adjacent to a water body. The Riparian system favors those who are located furthest upstream, because it does not address impacts associated with cumulative water uses on past, current, or future downstream water users. The lack of recognition for instream flow water uses is a major concern to the ADF&G.

The Riparian system met the water allocation needs for eastern states during their early years of settlement because of the limited competition for water. There was also no recognition of the need to protect instream uses, including placer mining. Today, eastern states are amending their Riparian systems by adopting permitting provisions associated with the Doctrine of Prior Appropriation system. The resulting hybrid Riparian system provides a basis for accommodating multiple water users, instream flow protection, and the Public Trust Doctrine.

The western United States initially developed the Doctrine of Prior Appropriation system (used by Alaska) to provide a basis for equitable distribution of water when water was in short supply and to enable individuals to use water for beneficial purposes, even if they didn't own land adjacent to the water (e.g. placer miners). Unlike the original Riparian system, the Prior Appropriation system provides a basis for conditioning or denying a portion or all of a water use request by weighing the affect of a proposed water use on other future, existing, and past beneficial water uses. It also provides a basis for accommodating existing and future downstream water users.

The framers of the Alaska Constitution understood the historical evolution of water law in our country and the need for a system that places an equal value for instream water needs as it does for out of stream or diversionary water uses. They knew that the future of Alaska's economy was dependent on instream uses such as fish, navigation, recreation, placer mining, hydropower generation, etc. in addition to water withdrawal uses. Both instream and out-of-stream water uses are dependent on adequate water supply that is properly managed. Thus, the Doctrine of Prior Appropriation system was embodied in Article 8, Sections 2, 3, 4, and 13 of the Alaska Constitution.

In summary, a Riparian system would enable owners of lands adjacent to waterbodies to have exclusive use of a public resource with no consideration of greater public interests. An upstream land owner would have the ability to use the majority of water from a water source and prevent water from being delivered downstream. This would be a major step backwards, would threaten past, existing, and future water users, and the production of fish and wildlife resources. implementation of this proposed recommendation would be accomplished by eliminating references to the Doctrine of Prior Appropriation and current "common use"

protections currently extended to all citizens of Alaska in the Alaska Constitution. It would negatively impact industries and economies based on resources under Article VIII sections 4 and 13 of the Alaska constitution, including instream flow protection for fish and wildlife.

Please also note the ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because shortand long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

ADNR RECOMMENDATION CATEGORY - STREAMLINING

1. **Recommendation Under Consideration by ADNR: Proposed Amendment to the definition of " significant amount of water" under 11 AAC 93. 970(14).**

   From: "significant amount of water" means any use of more than 5000 gallons of water in a single day from a single source, or the regular daily or recurring use of more than 500 gallons of water per day for more than 10 - days per calendar year from a single source, or the non-consumptive use of more than 30,000 gallons of water per day (0.05 cfs) from a single source, or any water use that might adversely affect the water rights of other appropriators or the public interest.

   To: " significant amount of water" means the daily or recurring use of more than 5,000 gallons of water in a single day, from a single source, or the non-consumptive use of more than 30,000 gallons of water per day (0.05cfs) from a single source, or any water use that might adversely affect the existing water rights of other appropriators or the public interest.

ADNR Analysis: This change allows the use of up to 5,000 gallons per day (gpd) of water without a permit or certificate and without being in violation of AS 46.15.180(a)(1) CRIMES. Currently there are about 12,500 water rights that use 5,000 gpd or less or about 80% of all existing water rights. It should be noted that over the past five years the percent of new water right applications that use 5,000 gpd or less only makes up about 20% of the applications files. This amendment may result in fewer water right applications being filed, and will result in fewer temporary water use applications being filed. Note: The use of water without a water right gives the user no legal standing in the event of a dispute or should there not be enough water to meet existing or future needs.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G disagrees with the proposal to amend the definition of a significant amount of water under 11AAC 93.970 (14) to allow users to remove up to **5,000** gallons of water per day without a permit or certificate. This recommendation would result in two or more adverse impacts on fish production in Alaska. The first impact relates to screening and other potential physical impacts associated with a water withdrawal, and the second to instream flow protection. (corrected to 5,000 on 11/20 per discussion w G. Prokosch - C.E.)

Implementation of this recommendation would encourage the removal of water with little or no oversight or opportunity to insure rearing fish were protected through the use of proper screening when water is withdrawn. The elimination of the requirement to file a water right for this quantity of water, may result in a water user being unaware of the continued need to obtain a Title 16 permit from the ADF&G if the withdrawal is from fish bearing waters. Thus, there would be no opportunity for ADF&G to review plans for withdrawing the water and insure that anadromous and resident fish are protected.

The second problem is related to elimination of the consideration of whether an individual withdrawal or cumulative withdrawals for several uses would negatively impact instream flows needed by fish. This would be a particularly serious problem in small to moderate sized stream systems, where most coho and chinook salmon rearing occurs.

Exempted water users would be unable to protect their water use if competing water users filed a water right to withdraw water from the same source and insufficient water were available to all users.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

2.	Recommendation Under Consideration by ADNR: Amend 11 AAC 93.130, Issuance of a Certificate of Appropriation of Water, to allow the Commissioner to issue a Permit and Certificate of Appropriation (Water Right) to a first class city, homerule city, or a borough for the quantity of water currently being used and for a quantity of water that can reasonably be put to use for " PUBLIC WATER SUPPLY" purposes within 20 years of the issuance of the Certificate of Appropriation.

ADNR Analysis: This change would establish some preference for future **public water supplies** as intended by the Alaska Constitution and by Statute (AS 46.15.090 & AS 46.15.150). Amendment to these statutes may also be required. The change will result in fewer applications from municipal public water suppliers and result in fewer amendments and extensions to existing and future permits to appropriate water. The amendment would also add additional security and certainty to a municipal public water supply water right.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: This proposal defeats the purpose of the current appropriation system and is not needed. Public water supplies currently have guaranteed preference and security under the State Constitution (Article VIII, Section 13) and the Water Use Act (AS 46.15). The current system also protects the general public by requiring mitigation for senior water users who lose all or a portion of a prior water right in the event preference is subsequently established by a government entity.

It is doubtful implementation of this recommendation would result in significant cost savings. Negative impacts to ADF&G, associated with this recommendation, could be minimized or eliminated by integrating automatic instream flow protection for fish and wildlife into this proposal.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

3. **Recommendation Under Consideration by ADNR:** Amend AS 46.15.145(f) and 11 AAC 93.146(d)(2) and eliminate 11 AAC 93.147. These statute and regulations require that a Reservation of Water (instream flow) be reviewed once every 10 years to determine if the purpose and findings for the reservation still apply.

ADNR Analysis: The elimination of the 10-year review of instream flow reservation is a valid option, but as water resource managers, it would be better to subject all water rights to a ten-year review to assure that the water is still being used in the quantity, for the stated purpose, and from the source it was originally granted. As a management tool, this would eliminate those water rights that had been abandoned, it would allow for ownership records to be updated, and where necessary assure that the

water user has the rights to the quantity of water actually being used. In the long run, a review system that allows for management and upkeep of files would save the State money in the future. In reality, this would require additional work and funding which would be contrary to current management goals.

ADF&G Position: The ADF&G Agrees with this Recommendation if assumptions in our comments apply.

ADF&G Comments: According to the above ADNR assumption, reviews of water withdrawals and diversions will not become mandatory. Under this scenario, the ADF&G would agree to amending AS 46.15.145 (f) and 11 AAC 93.146 (d) (2) and eliminating 11 AAC 93.147. This would remove the requirement that instream flow reservations be reviewed every 10-years and would result in a cost savings.

It is unlikely there would be impacts to other resources or users. Instream flow reservations are calculated and prepared at considerable cost to ADF&G and not likely to change over the 10-year time. Costs savings would accrue over time because ADNR would not expend resources to reevaluate an existing instream flow without justification. Expenses for ADF&G staff would also be reduced. The impacts of inadvertently protecting instream flows that are later identified as no longer being required do not compare with what may be irreversible negative impacts resulting from inadvertent overappropriations for water withdrawals or diversions.

However, we also concur with the ADNR analysis that it would be preferable to establish mandatory periodic reviews for all classes of water rights instead of only instream flows. We disagree with the ADNR statement that the costs associated with a mandatory review process for all water rights would be contrary to management objectives. Instead, we believe it would be more accurate to state that a required review of all water rights would be contrary to their agency's objectives to achieve cost reductions. It is therefore likely a mandatory review would instead improve the ability of the ADNR to execute management objectives that comply with the Alaska Constitution.

Costs of the mandatory review option could be minimized by randomly sampling various thresholds and classes of water rights appropriations. Over time, it is predicted that the benefits of a mandatory review would negate, if not exceed, the added costs of implementation.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation (including the recommendation in the ADNR analysis); and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local),

and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

4. **Recommendation Under Consideration by ADNR:** Develop a general permit that combines the permitting processes of the Department of Natural Resources (quantity), the Department of Fish and Game (habitat), and the Department of Environmental Conservation (quality).

ADNR Analysis: A process that combines the public review, public notice, adjudication, and permitting into one process has a lot of merit and should be considered in a joint process with all three agencies, and the public. This type of change is beyond the scope of what DNR can accomplish on its own regarding any statute or regulation changes. The Commissioners of DNR, DEC, ADF&G should establish a task force of the three agencies, and the public, to identify the major components of a combined water use decision process. This task force should also consider ways to integrate the state's process with the current authority of local governments (Title 29 authority).

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G disagrees with the recommendation to develop a general permit that combines the permitting processes of ADNR, Alaska Department of Environmental Conservation (ADEC), and ADF&G. There is no evidence that the present permitting system does not meet the public need as long as there are adequate staff to process the applications in a reasonable amount of time.

This concept has been reviewed by several administrations. The final conclusion reached from each analysis has been to maintain the status quo.

A coordinated permitting process already exists for multi permit projects in the coastal zone; and, there is no reason to believe that a new or alternative generalized system is needed and would be any better or more efficient.

ADF&G takes pride in its permitting efficiency and the tracking of its permit process. The average time for review of permit applications and issuance of a fish habitat permit by the ADF&G is 18-days. On the other hand, both ADNR and ADEC can take months or years to issue similar authorizations. Combining the processes would simply delay the issuance of ADF&G permits.

One of our most significant concerns is that a general permit for water appropriations would not enable the ADF&G to comply with its statutory mandates to protect fish habitat if it couldn't assess the specific biologic and hydrologic impacts and site conditions for a proposal.

A general permit is likely to be so complicated that it would be difficult to understand A combination of the three current permit systems would create an unnecessarily cumbersome, and inefficient system, with little corresponding public benefit.

Often overlooked when discussing general permit ideas, is that delays in the decision making process related to water permits are often due to the dearth of stream gage data for Alaska's water bodies. With less than 1% of all water bodies gaged, water availability (needed to process a water right and insure sufficient water is available for the intended uses) must be estimated or new data collected.

Since 1908, less than 600 stream gages have been operated in Alaska. And only 80 gages operate today. This equates to an average of 1 gage per ~8,000 square miles as opposed to the lower 48 average of 1 gage per 400 square miles.

The U.S. Geological Survey recommends 20-years of data collection are required to establish a reliable stream flow data base for estimating water availability over time. Most sites in Alaska have no flow data and 20-years are uncommon. Often agencies will therefore be required to settle for 5-years of flow data collection, despite the greater error in predicting water availability. Thus, it is important to remember when an application is filed to withdraw water, it is often unknown whether a sufficient amount of water will actually be available on a year to year basis (due to natural variability), even if the applicant were granted 100% of the water. This adds to the difficulty for permitters to assess the amount of water available for allocation, and can often frustrate a developer.

One solution to improve the overall permitting process would be to implement the multi-year stream gage program recommendations of the ADNR/U.S. Geological Survey stream gage network evaluation, previously funded by the Alaska legislature and federal government. Funding for implementation has also been endorsed by the Interagency Hydrology Committee for Alaska during 1995 and 1996.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

A thorough review of prior analyses of similar recommendations is also recommended.

5.	**Recommendation Under Consideration by ADNR: Combine the water programs of the Department of Natural Resources with the water programs of the Department of Environmental Conservation and have one department be responsible for the management**

of water (quality and quantity).

ADNR Analysis: This type of change is beyond the scope of what DNR can accomplish on its own, regarding any statute or regulation changes. The Commissioners of DNR and DEC should establish a task force, that includes the public, to identify the major components of a combined water section.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G questions the utility of combining ADEC and ADNR water programs without a comprehensive evaluation of both programs and specific cost savings, if any, that would be achieved. Water programs in both agencies are based on different statutory objectives.

ADNR is responsible for allocating public water resources between competing user groups (with consideration of impacts to water quality based on input from the ADEC, other agencies, and the public), and maintaining data records.

ADEC is responsible for enforcing state and federal water quality statutes to maintain public health. These are two different missions. Each requires different types of expertise for management staff. Combining them may not save much money, if both types of staff have to be employed.

However, both agencies overlap in their need for water quantity and quality data collection and analyses to perform their respective duties. Perhaps there is an opportunity to combine some of those functions with less staff and share some expenses for data collection and analysis. ADEC is presently funded to perform water quality related functions. Thus, if the water related functions of these two agencies were combined, water allocation work would still have to be funded through general funds or program receipts.

In the past, it has also been recommended that agencies with some overlapping functions review past interdepartmental memorandums of understanding to identify if they are currently being implemented, implemented effectively, or require modification.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

6.	**Recommendation Under Consideration by ADNR: The adjudication of water rights should be based on priority of risk, by major river/stream drainage.**

ADNR Analysis: When there is a backlog of applications DNR has sometimes prioritized the adjudication of water right applications by balancing the applicants need (financing, the status of other permit decisions needed before the water can be used, expected conflicts over quantity, and other reasons for expediting an adjudication) within it's existing funding. This method of prioritization allowed DNR to process the applications for larger projects, environmentally sensitive projects, and time sensitive projects, but results in a backlog of less important applications. There are very few areas with current water availability problems or conflicts that the risk associated with the adjudication of a water right is high. Only in areas such as Anchorage hillside, Eagle River Valley, Ship Creek, Chena Ridge in Fairbanks, Gold Creek in Juneau, and a few others around the state would the risk be high, and these areas already receive special attention as described above.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G opposes this recommendation to establish priorities for adjudication based on the limited information provided. More specifics are required. Risk assessment processes and guidelines should be defined, including how the priorities would be selected and by whom. Also, how will other pending water rights be treated? How will needed hydrologic data be acquired? Not adjudicating a water right within a reasonable time period (and out of sequence) may be a disadvantage to an applicant if it were to result in a reduced allocation.

The public criticized the current ADNR reprioritization process for expediting adjudications out of sequence at the second ADNR public meeting held in Anchorage. Those concerns should be addressed and included in the discussion of this recommendation.

The ADF&G is unable to evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

7.	**Recommendation Under Consideration by ADNR: The adjudication process should be based on a watershed approach. The adjudication of water right applications should be given priority where there is an existing watershed evaluation or plan in progress. In areas**

of high risk due to limited water supply or public interest concerns, DNR should start the watershed plan.

ADNR Analysis: There are no DNR watershed plans and none are currently funded. However, DNR has been working with ADEC, and other state and federal agencies to develop a state watershed approach and framework document under a federal funding grant from EPA. This document describes how DNR can identify watersheds it feels would be good candidates for a watershed plan, and if appropriate, with public participation start the watershed process, including the water right adjudication process. The concept is very good but state and federal funding to complete comprehensive watershed management plans for significant parts of Alaska may be a problem.

ADF&G Position: Agree

ADF&G Comments: The ADF&G agrees that a watershed management plan (WMP or basin) is a logical approach for adjudicating both instream flow reservations and out-of-stream appropriations of unappropriated waters, particularly where there are limited water supplies and substantial public interests. Adjudication of Federal Reserved Water Rights, navigability, and access determinations could also be integrated into this type of approach.

The state's current WMP, under development by ADEC and EPA, does not address data related problems for appropriating water and reserving instream flows for fish and wildlife. The current WMP is unfortunately limited to addressing water quality and public participation. A true watershed process should include a complete interdisciplinary assessment, similar to the Level B studies performed in the late 1970s.

To implement this recommendation, state, federal, and local agencies would have to formally commit to a valid watershed approach. A commitment would also be required to expand Alaska's limited stream gaging data collection and analysis program to generate essential flow data prior to initiating the adjudication process for a basin. Collection of biologic, recreational use, socioeconomic, and water quality data may also be needed. These data would be required to identify water quantity and instream flow requirements for the entire basin (rivers, tributaries, and lakes). Subsurface waters and water allocations for wells would also be addressed. Data collection would likely require 5-years of time before a basin could be adjudicated.

Under this process, applications pending adjudication should not be processed until the needed data were available. It is recommended that all water bodies qualifying for instream flow protection (not previously granted an instream flow reservation) would receive an automatic priority date for instream flow protection equivalent to date the 5-years of coordinated data collection began. Once a 5-year data collection process (for a targeted basin) began, it would be recommended that applications for new water rights would not be accepted until the data processes were completed. New applications should also not be accepted until all pending water rights applications (filed for water uses in the basin prior to initiating the data collection process) had been adjudicated.

A watershed approach has been used in Montana, for the Yellowstone River Basin. The Yellowstone River has a length of 678 miles and is the longest free-flowing river remaining in

the lower-48 states. During the 1970s, the Montana Legislature established a process for placing a moratorium on accepting new water rights for this river basin until all water rights were adjudicated for the basin.

An equitable process for defining the priority for basin adjudications in Alaska would also be required. The Interagency Hydrology Committee for Alaska is a logical choice for making these recommendations with public input. It is likely a process for addressing prior water rights applications and water rights considerations in other portions of the state would still be required to supplement this basin by basin approach. This process would also require a solution.

Although, there are a host of associated benefits to a valid watershed approach, it is assumed it would initially require a substantial increase in funding for water data collection and management programs. However, based on reviews of lower-48 water allocation problems, it is likely the benefits of this integrated approach would help avoid overappropriations of water and result in a more equitable water management scheme for all Alaskans. This would provide long-term cost savings for Alaskans. This savings would be based on avoiding the hundreds of millions of dollars in costs presently incurred by other states who are attempting to correct poorly made water management decisions that were made when their stage of water allocation was equivalent to that of Alaska's today.

Unfortunately, there does not seem to be a readily available source of state or federal funding for implementing the watershed type of approach. Nonetheless, this recommendation deserves further consideration.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

8. Recommendation Under Consideration by ADNR: Establish a special water management area (SWMA) where there are existing water supply problems or public interest concerns.

ADNR Analysis: Document public concerns and water supply problems and coordinate with interested public, municipal, state and federal agencies. Present the concerns to the legislature with a specific funding request to address the situation. If problems are significant enough for specific

legislative funding, the hydrology and water rights concerns would be addressed. If funding is not granted, the SWMA designation is revoked. Although this recommendation has merit, it would be an additional cost to DNR to establish the SWMA and document the problems and concerns. A method to designate an SWMA could be developed by DNR for use by the public, municipalities, special interest groups, and others to document the problems and concerns prior to involving DNR or requesting legislative funding. This concept could tie in closely with the watershed and major river drainage recommendations found in numbers 6 & 7.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: A critical water management process already exists under AS 46.15. Establishing a special water management area would not necessarily include an entire watershed and may even include portions of several watersheds. This would not be an improvement over the status quo.

The same concerns expressed for the preceding ADF&G response to recommendation number 7 apply, except number 7 is the preferred alternative for this type of approach.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

9. Recommendation Under Consideration by ADNR: Amend the Statutes to include an instream flow reservation on all water bodies with anadromous fish.

ADNR Analysis: Amending the statute would create a reservation of water (instream flow or lake level water right) in all water bodies of the state with anadromous fish, and in doing so, establish a priority date which would be senior to all future water users. This would eliminate the need to spend any effort to document or adjudicate the quantity of water needed for anadromous fish streams, assuming a percent of the stream flow is specified in the amendment. An applicant requesting to appropriate water from an anadromous stream would have to quantify the reservation of water in order to determine if there would be water available for the new proposed use. With this amendment, the reservation of water and the priority date, all future water needs would be subject to the senior water rights established by the reservation of water for all anadromous streams. If the ten year review of reservations is eliminated as proposed in Recommendation 3 there would be no way to determine if a reservation is still necessary. In 1990, the State Legislature failed to pass a similar bill to create a

reservation of water for all anadromous streams. Under current Statute (AS 46.15.145) the state, an agency or a political subdivision of the state, an agency of the United States or a person may apply to reserve sufficient water to maintain an instream flow. If an instream flow for a specific stream is important enough to obtain the water rights, then an existing process is already in place.

ADF&G Position: Agree

ADF&G Comments: The ADF&G supports this recommendation to amend State Statutes to guarantee an automatic instream flow water right to reserve sufficient water in all anadromous fish bearing waters to sustain anadromous fish production. This amendment would be consistent with Article 8, Section 13 of the Alaska Constitution, which (among varying opinions) can be interpreted to require an instream flow reservation of water for fish and wildlife. The water export portion of the Water Use Act includes similar provisions (AS 46.15.035-7). It is clear this recommendation would reduce unnecessary labor expended on adjudications, result in cost savings, provide a basis for knowing how much water is available for diversionary or withdrawal purposes, and greatly improve the state's ability to address public trust and interest considerations.

This proposal also deserves serious consideration based on the history and current status of instream flow protection in Alaska. The present requirements for developing an instream flow reservation are time consuming and costly. In many instances, stream gage data are limited or non existent. Instream flow protection is also not on equal footing as an out-of-stream appropriation.

It is assumed few Alaskans would disagree that, second to the oil industry, the health of Alaska's fishery resources can significantly impact the state's economy throughout Alaska. Sufficient instream flows are essential to fish production and one of the primary factors dictating whether the state will be able to sustain or enhance the present level of fish production.

To date, 15,000 anadromous fish bearing water bodies and several thousand resident fish bearing waters have been documented in Alaska. One may thus question why less than 100 applications for instream flow water rights have been filed since passage of enabling legislation in 1980. And, why have only 11 of these applications been adjudicated with the remainder pending adjudication by the ADNR?

The average annual ratio of new water rights filed for instream flow reservations versus those filed for water withdrawals (out-of-stream appropriations) during the past 10-years is approximately 150:8 and adds to this dilemma. This 10-year trend equates to 1,500 out-of-stream appropriations versus 80 instream flow reservations, assuming all applications will be granted. Over the next 50-year period, this same trend would result in an additional 7,500 water rights for water withdrawals versus 400 instream flow reservations. This does not take into consideration plans by the federal government to reserve water for refuge lands using the state water allocation system.

It is obvious that instream flow protection for fish and wildlife is not keeping pace with out-of-

stream appropriations under the present system. According to the ADNR Analysis for Recommendation 1 above (constitutional amendment), there are 16,000 ADNR water rights. Of these, less than 100 are for instream flow protection. Without positive changes, this gap will only increase. These concerns are detailed and expanded upon in: Estes, C. C. 1995. *"Annual Summary of Department of Fish and Game Instream Flow Reservations Applications, Fishery Data Series No. 95-39".*

Part of this problem can be traced to the history of water development and the outdated, but not forgotten, water philosophy of the early European settlers in the West, "*use it or lose it*". This phrase was used to imply that unregulated water (which remains in a river or lake) is wasted water because it will evaporate or flow downstream for someone else to use or complete its journey to the ocean. This rationale failed to acknowledge instream values and was short sighted. Eventually, this philosophy lead to the overappropriation and regulation of most western waters. This in turn, resulted in the decimation of fish and wildlife resources, and habitat degradation. It had resulted in short-term gains with immense long-term expenses. These experiences demonstrated the earlier approach for water allocation had been incorrect.

Today, overappropriation of water in the west and attempts to purchase or lease back a portion of this water (to restore a fraction of needed instream flows) are costing federal and local taxpayers hundreds of millions of dollars every year. Unfortunately, the results of these efforts have achieved limited success. Only a fraction of the fishery and other instream flow values, that once existed and contributed to our nation's economy, are being restored. Many resource managers believe these costs will continue increasing, regardless of the limited success associated with restoration.

We prefer to describe an instream flow reservation as being the equivalent of saving money in an interest earning savings account. It is very rare for the value of an instream flow not to increase over time. Thus, in the event more water were inadvertently protected instream than would later be demonstrated as being needed, the excess instream flow would still be available for withdrawal, without harming instream flow uses.

One may therefore conclude the old adage of "*use it or lose it*", promoted living beyond ones means, and in some cases resulted in a form of bankruptcy for our natural resources and instream flow uses. One might also logically question whether the ADNR would better serve its citizenry to allocate its limited operating resources on placing a greater emphasis on preventing too much water from being allocated for water withdrawals and diversions, versus their high expenditure of effort to verify instream flow requests. This logic also supports the recommendation to establish automatic instream flow protection. After all, an instream flow is a form of a "permanent fund for fish, wildlife, and the state's water based economy".

We disagree with the assumption in the ADNR analysis that elimination of the 10-year review would provide instream flow protection where none may be required. Instream flow uses would be documented when a future applicant for water rights performed the analyses outlined in the ADNR scenario.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this

recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors. We do however, believe implementation of this recommendation would result in one of the greatest cost savings actions taken by the state that will lead to significant socioeconomic gains for current and future generations of Alaskans.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

10. Recommendation Under Consideration by ADNR: Establish a process in regulation that allows the Department of Natural Resources to issue general permits (temporary water use permits) for construction and other temporary camps where the water use is 30,000 gpd or less.

ADNR Analysis: The general permit (GP) under the authority of a temporary water use permit (TWP) could be granted for statewide or regional use of water and would include the necessary conditions to protect current and future water right holders and the public interest (fish and wildlife, recreation, aesthetics, navigation, etc.). A TWP could be established through a regulation amendment under 11 AAC 93.210 and 11 AAC . 93.220. This amendment would require public and agency notice of the proposed GP and finding under the public interest criteria AS 46.15.080(b). The GP would not be binding on ADF&G or ADEC. The user of the GP would still be required to obtain the necessary authorizations from these two agencies and if the proposed camp is in the Coastal Zone a consistency determination may still be required. The establishment of a GP that covers all resource agency permits and the requirements of the Alaska Coastal Management Program is out of the scope of these recommendations.

ADF&G Position: ADF&G does not support recommendation (if all conditions below cannot be met).

ADF&G Comments: We are skeptical about this proposal based on reviews of similar recommendations in the past. However, there may be geographic regions where the ADF&G would not object to ADNR issuing a general permit for construction and temporary camps provided that ADNR abided by all of the elements in their analysis above for this recommendation. ADNR (with ADF&G input) would also have to determine (in advance) that the water source could support a 30,000 gpd withdrawal without negatively impacting fish and wildlife, other instream uses, and other existing water users. The permit would also have to contain stipulations requiring intake screening etc., and a notice that a Title 16 fish habitat permit was required in fish bearing streams. Thus with the general permit, there would still be a need to evaluate cumulative impacts of multiple permits for withdrawals from the same water

source, monitoring the water use, etc.

Under this process, the ADNR would still be required to consult with the ADF&G to identify how much water is needed for fish and wildlife and to coordinate permitting. Hydrological and biological data needs would also still have to be addressed to make the determination whether the general permit is warranted. Another concern is related to how one insures the applicant will contact the other appropriate agencies for the respective permits.

Agencies should evaluate whether this general permit approach would lead to interagency differences instead of a coordinated cooperative review. If there were conflicting agency positions at the end of this process, implementation would possibly be more expensive than the current status quo. Disagreements under this process would also confuse and irritate the public.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

A review of earlier interagency and administration evaluations of general permit proposals would also benefit this evaluation.

11. Recommendation Under Consideration by ADNR: Establish a billing system where the Administrative Service Fee is billed every five or ten years rather than yearly.

ADNR Analysis: A five or a ten-year billing cycle would save both the water right holder and the State money in the administration of the bills. One problem DNR would likely face is keeping up with address changes; after five years, finding the correct address or in many cases the new owner of the water right, if the property changes hands, could be very time consuming. For public and industrial water users it could result in a savings of time and effort. The other problem is the fact that these funds are considered program receipts which DNR is allowed to use for its water program only in the year they are received. If the receipt received in year one was for five years of bills, there is no current method to carry over the funds for use during the following four years.

ADF&G Position: No Position

ADF&G Comments: This recommendation was presented by some of the participants at the

ADNR public meetings. Some of the water rights holders expressed opinions that paying an annual administrative fee is inconvenient. Others didn't want to pay any fee and were not sure how the fee related to their water right and the water right process. Larger water users didn't object to paying a fee, but didn't want to carry the full burden of fees. Perhaps, there are other alternatives to this recommendation that can be addressed in another forum.

According to the above ADNR analysis for this recommendation, the ADNR is dependent upon annual receipts for funding a portion of its operations. Without a portion or all of these fees, the ADNR would be forced to find an alternative source of funding or further reduce its program. In light of the overwhelming support (at the majority of the ADNR public meetings) for maintaining the status quo of the current water allocation system, the resistance to retaining the administrative fee may be eliminated with more public involvement and improved customer service.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

12. Recommendation Under Consideration by ADNR: Use the permit condition authority of the Water Use Act to issue a permit to appropriate water with general, or broader range of conditions instead of holding up a permit to appropriate water for such things as land use authorizations, rights-of-way, detailed engineering and environmental studies. If the proposed project falls through due to other agency permits, or adverse feasibility studies, the water permit can be closed.

ADNR Analysis: Currently DNR issues a Permit to Appropriate Water when it's been determined that the proposed use of water is in the public interest and meets all the requirements of the existing statutes. A review of the regulations and DNR's condition authority to determine if streamlining the permit process, without putting the issued permit in a limbo type situation is possible.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G disagrees with this recommendation, because it is inconsistent with the coordinated permitting requirements of the ACMP in the coastal zone where most water appropriations are issued. This proposal would pit one agency against the other, confuse the general public, and result in chaos. It is a proposal that defeats the checks and balances designed to insure public interest and public trust considerations are fully

addressed.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

13. Recommendation Under Consideration by ADNR: Create a separate water rights application for water uses under 5,000 gpd.

ADNR Analysis: If the use of 5,000 gpd is exempt from applying for water rights (*See recommendation number 1 regarding the definition of a significant amount of water*) a simplified water right application could be developed that would serve as the permit or certificate of appropriation by simply signing (by DNR) the application after it has been accepted for completeness, date stamped (priority date), assigned a LAS identification number, and the data entered into the water rights computer system. The signed application would be returned to the applicant and serve as a Permit to Appropriate Water with an expiration date and an attachment of standard conditions. **If** the water was already perfected (in use) the applicant would sign a "Statement of Beneficial Use" which would be part of the application. The application would be signed by DNR, notarized, and would serve as the Certificate of Appropriation (water right). The applicant would be required to record the document in the appropriate recording district. **If** the applicant was first issued a permit, once the permit had been perfected, the application is returned to DNR with the signed "Statement of Beneficial Use" and DNR would sign and notarize the permit and it would then serve as the Certificate of Appropriation (water right). The water rights holder would be responsible for recording the document in the appropriate recording district. DNR would update the water rights computer system.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: There are no cost/benefit and comprehensive risk assessment analyses provided by the ADNR to evaluate this proposal and the ADNR analysis. See comments above for related Recommendation 1. We do not believe this quantity of water should receive an automatic exemption and granted formal status as a water right without a review process.

This proposal would enable a combination of related or non related individuals to each acquire 5,000 gpd water rights to be appropriated without identifying water availability and other public interest criteria. The magnitude of the impact of this size of withdrawal or combinations of this

amount of withdrawal will reflect on the time of the year and the hydrologic characteristics of the water source. In some instances, there may be a possibility to simplify the review process for this quantity of water; but, the details would have to evaluated and a mutual agreement reached. And, how much time and money would be required to administer these adjudicated rights on an annual basis?

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

ADNR RECOMMENDATIONS CATEGORY - RECOMMENDATIONS BASED ON PUBLIC DISCUSSIONS OF THE ORIGINAL FIVE ALTERNATIVE MANAGEMENT PROPOSALS PRESENTED BY ADNR AT THE SERIES OF PUBLIC MEETINGS

14. Recommendation Under Consideration by ADNR: Status Quo. Maintain the water rights program as it is currently administered.

ADNR Analysis: Due to budget restrictions DNR is not currently able to fully comply with the requirements of the Water Use Act. Given the increasing demand for reducing general fund expenses, how would this be funded?

ADF&G Position: Agree

ADF&G Comments: At a minimum, the ADF&G recommends maintaining the existing ADNR water rights program. The current program is designed to serve the best public interest, adheres to the Public Trust Doctrine, Doctrine of Prior Appropriation, and Constitutional mandates. If however, a comprehensive evaluation identified cost savings without sacrificing the public trust and public interest, we would be pleased to review those recommendations.

It is important to note that the ADNR has stated that resource limitations prevent staff from performing all of their duties required by the current program. Duties, routinely not being performed, include: onsite monitoring of existing water rights, onsite inspections to identify whether applications for water rights and temporary water uses have been perfected and comply with conditions established by the ADNR, and participation in hydroelectric project reviews.

A current 18-month process for eliminating the ADNR's 8-year plus backlog of water rights is slated for completion in June 1997. It further diminishes the ADNR staff's ability to perform the preceding and following other important duties. The ADNR's ability to place more effort into this evaluation process is also limited. Once the backlog process is completed, it is assumed ADNR may be able to redirect some of its limited resources to the above and following duties.

Under current law, findings of fact and conclusion of law for out-of-stream-appropriations are optional. This can and has lead to potential gaps in historical information for subsequent reviews of past water allocations. The small number of ADNR hydrologists and limited stream gaging data for Alaska's water bodies are often insufficient to provide information needed for timely and better water allocation decisions. Lastly, as noted above, instream flow reservation protection mechanisms require improvement to provide more instream flow protection (Recommendation 9).

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus adoption of other recommendations. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: a comprehensive breakdown of ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to maintain the status quo on an objective by objective and in some instances task by task basis, and detailed costs incurred by other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit. Comparisons of costs from previous individual years versus productivity for each function performed would also benefit and improve this analysis.

15) **Recommendation Under Consideration by ADNR: Modified Status Quo. Minor amendments to exempt the use of up to 5,000 gpd of water for filing for water rights; amendment to allow first and second class cities to obtain water rights for current and future public water supply uses; and closer coordination with cities and boroughs in the issuance of water rights and general water management. (*See recommendation number 1 about the definition of a significant amount of water and recommendation number 2, water rights for public water supplies*). Adopt other house keeping amendments to the regulations that could streamline the adjudication process. No major changes to the Water Use Act.**

ADNR Analysis: As with the status quo, the long range funding will likely not to be available. How would this be funded given increasing demands for reducing general fund expenses? SEE STRAWMAN #1

ADF&G Position: ADF&G does not support recommended modifications to the status

quo presented above and recommends modifications. We have also added others which are supported.

ADF&G Comments: The ADF&G's comments for each of the following recommended modifications to the "status quo" ADNR program are addressed below:

a. The ADF&G does not support exempting water appropriations of less than 5000 gpd, from review.

b. The ADF&G would be willing to reevaluate the proposal for municipal water entitlements, if it guaranteed adequate instream flow protection. The instream flow protection would have to be on equal footing with the diversionary, impoundment and other withdrawals resulting from this entitlement.

c. Based on a comprehensive independent assessment of the past, current, and projected ADNR water rights program, the ADF&G would be willing to consider new alternatives.

d. The ADF&G would support an automatic reservation for instream flows required to sustain instream uses, etc.

e. The ADF&G would support increases in fees assessed by ADNR for water export. These fee increases are warranted based on experiences gained from the Blue Lake water export project. Whereas the owner of the water source to be exported, the City and Borough of Sitka, will earn between $30 million to $80 million per year for water sales (if the water project is fully developed), the State of Alaska will only earn a maximum of $80 thousand annually based on the current conservation fee structure for water exports. According to the City of Sitka's contract with the water purchaser, the purchaser will also pay the $80 thousand annual conservation fee to the State.

   We suspect the gap between Sitka's and the state's annual income from this export of water will help support a reassessment of the ADNR fee schedule, especially when ADNR and other agencies are attempting to reduce operating costs and find alternative sources of revenues.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of these recommendations versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment, the following information will be needed for each recommendation: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt a recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

16) Recommendation Under Consideration by ADNR: Transfer Authority to Local Governments

ADNR Analysis: Turn over water rights authority and responsibility to the local governments for all water rights except those involving federal government applications, federal reserve water rights, instream flow reservation, and request for water use greater than 30,000 gpd from a surface source and 100,000 gpd from a groundwater source. This was a very unpopular alternative with local governments that participated because they felt it was an unfunded mandate and the responsibility of the State. Others commented that many local jurisdictions share watersheds with other local, state, federal jurisdictions.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G disagrees with the proposal to transfer water rights authority and responsibility to local governments. This system creates a mosaic of management and would confuse all participants. It would also be very difficult and very costly for the ADF&G to meet its statutory mandate to protect fish and wildlife resources if staff had to deal with 50 to 100 local governments, rather than ADNR It is also assumed local governments do not have the resources or expertise to administer the water rights system.

This recommendation does not provide a basis for addressing prior rights and pending applications for water rights in existence. Under this proposed scenario, treatment of Federal Energy Regulatory Commission licensed projects, Federal Reserved Water Rights, and other elements of water allocation would be chaotic and costly.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

17) Recommendation Under Consideration by ADNR: Court Decree System

ADNR Analysis: Transfer all water rights authority to the Alaska Court System. The courts would have the authority to determine water rights and make the best interest findings. DNR would have staff for technical support only. This was a universally unpopular alternative.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G does not believe that a Court operated water rights program would be in the public interest or a cost savings even without the benefits of formal cost/benefit and risk assessment analyses.

This would be an expensive, cumbersome, and inefficient system without any corresponding public benefit. Lawyers would be required to resolve any all issues; and, water litigation often takes years for reaching a decision. According to statements by individuals (familiar with Colorado) at the ADNR public meetings, Colorado has one of the most costly systems in the nation using this process. One of the public participants commented that Colorado currently has more than 500 water attorneys, or approximately 90% of the nation's water rights attorneys.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

18. RECOMMENDATION UNDER CONSIDERATION BY ADNR: WATER RIGHT REGISTRY SYSTEMS:

The following five registry systems are similar, the major differences have to do with the quantity of water. 18a and 18b only address uses of less than 5,000 gpd and 18c, 18d, and 18e address water quantities of 100,000 gpd groundwater and 30,000 gpd surface water. Other differences deal with adjudication by geographic location or statewide, administrative processing (applicants or DNR responsibility), and public interest determinations.

18a) Recommendation Under Consideration by ADNR: Establish domestic water rights by individuals recording (Registry) a standard form (DNR provided) at the state recorder's office. No adjudication is needed until a dispute arises. A court or arbitrator can be used, at the affected parties expense, to settle.

ADNR Question Related to this Recommendation: Do you support a registry system for individual domestic water rights where there is no adjudication and the individual domestic use of water is assumed to be in the public interest?

ADNR Analysis: Currently the process to issue a domestic water right takes about an hour unless there is a water availability shortage or the use is controversial. Most of this time is spent establishing the water rights record on the Land Administrative System, Water Subsystem. This electronic data system allows for fast retrieval of water rights information (source of water, quantity, water use, locations of water use, take points, priority dates, status of the water rights, water right holders name and address) and is used to locate senior water right holders when notice is required. The recorder's office is not tied into the Water computer system. If a registry system is established through the **recorders office**, a computer link to the water subsystem will need to be established. Note: If the recommendation to amend the definition of a significant amount of water is changed and the use of 5,000 gpd is exempt from obtaining a permit or certificate, the current process now used on applications for 500 gpd or less can be used on applications up to 5,000 gpd.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G cannot support this type of process. There are no safeguards, to insure water would not be overappropriated. ADNR discusses labor expended for this type of water right adjudication under the current program (see above ADNR analysis). The ADNR analysis should also identify risks that may result from not informing other affected agencies and existing water rights holders before these new water rights are processed.

A review of past disputes and the associated costs to the state related to resolution of the backlog for single family water rights disputes for the Anchorage Hillside area during the 1980s should provide a warning about the long-term negative impacts of this type of process.

The dearth of hydrologic data to make a preliminary judgment is another reason for opposing this recommendation.

As an alternative to this domestic water rights related recommendation, we suggest ADNR consider performing a comprehensive review to identify opportunities to expedite the process under the current system. One idea may be to provide a discount for water application fees for applicants who are willing to enter required application information directly into designated computer terminals at the ADNR state offices and various libraries. This type of electronic filing should, in theory, also facilitate transferring information to the ADF&G, and ADEC when applicable. Mark sense forms also provide opportunities for greater efficiency and cost savings.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use

permit.

In summary, the unanswered questions of how much money would be saved by this and the associated proposals, and at what risk of overappropriation, future conflicts, and long-term costs based on short term and possibly negligible savings, form the basis of our opposition.

18b) Recommendation Under Consideration by ADNR - Registry System: Do you support a system that allows for a registry of an application for water rights, with the Water Management Section, where the use does not exceed 5,000 gpd and when the water rights are adjudicated only when a conflict between users arises or when a water right is needed for financing or other purposes?

ADNR Analysis: DNR would conduct the adjudication and make the final finding prior to issuance or denial of the water right. A Statute amendment (AS 45.15.180) would be required to allow for a registry water right to use water without a permit or certificate of appropriation unless the definition of a significant amount of water is amended to include only the use of water more than 5,000 gpd. (*See recommendation number 1 about the definition of a significant amount of water*) This is similar to recommendation number 18a, except that DNR would try to address disputes prior to any court action.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: Waiting until a conflict arises to resolve disputes mimics the earlier mistakes of the western states that lead to the economic burden associated with their respective water allocation systems. A solution that provides cost savings today by burdening others in the future is unwise. Please also refer to our comments for the previous recommendation and the comments in our September 18, 1996 correspondence (attached).

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

18c) Recommendation Under Consideration by ADNR - Registry System: Do you support a system that allows for a registry for all water uses under 100,000 gpd from a groundwater source and 30,000 gpd from a surface water source regardless of the use and geographic

location?

ADNR Analysis: A registry would be conducted through DNR, Division of Mining and Water Management. All water right information, (quantity, point of water use, point of water take, purpose of use, applicants name and address, and other pertinent information) would be entered by DNR and stored in the existing water rights computer system. The adjudication would take place **only at the request of the applicant for financing purposes, other permit requirements (federal, state, local), or when a conflict arises.** The total adjudication cost would be the responsibility of the applicant. Use of consultants to conduct the procedural processing (notice to agencies, prior appropriators notice, public notice, hydrologic data collection and pertinent studies) would be allowed. A final finding would be completed by DNR. Where no adjudication is conducted due to lack of conflicts or applicants need, no public interest or public trust determination is made. A Statute amendment (AS 45.15.180) would be required to allow for a registry water right to use water without a permit or certificate of appropriation if the adjudication of the actual water rights are not conducted until a need arises. DNR would still be responsible for the adjudication of federal government applications, federal reserve water rights, instream flow reservation, and request for water use greater than 30,000 gpd from a surface source and 100,000 gpd from a groundwater source. Is the surface or groundwater quantity too low or too high?

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: All of the previous comments above for the other registry program recommendations apply (18a and 18b). The additional quantities of water in this recommendation add to our concerns and hence opposition. The mixture of treatments for adjudicating different types of water rights would add to the challenge and complexity to avoid overappopriations and conflicts. How would ADNR know what levels of staffing to maintain to support this type of process? This is one of the recommendations that truly merits a thorough long-term risk assessment.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

18d) Recommendation Under Consideration by ADNR - Registry System: The same as 18c above, except the registry system would only apply to areas outside of specific geographic areas where water availability problems may become a reality or where there currently exists

water availability problems or where a critical management area is established by DNR in accordance with 11 AAC 93.500-540.

ADNR Analysis: DNR would be responsible for all adjudications within the special designated areas and for the adjudication of federal government applications, federal reserve water rights, instream flow reservations, and request for water use greater than 30,000 gpd from a surface source and 100,000 gpd from a groundwater source. Is the surface or groundwater quantity too low or too high?

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: All of the previous comments above for the other registry program recommendations in 18a, 18b, and 18c apply. Accordingly, we oppose this recommendation. Similar to 18c, the mosaic of management approaches makes this another of recommendation that requires a thorough long-term risk assessment.

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

18e) Recommendation Under Consideration by ADNR - Registry System: The same as 18c above, except the water right adjudication would take place in the order the application was received, and the applicant would be responsible for the procedural processing (notice to agencies, prior appropriators notice, public notice, hydrologic data collection and appropriate studies) of the application.

ADNR Analysis: Upon DNR's receipt of the procedural processing information and if no adverse comments were received the appropriation of water would be found to be in the public interest and the permit or certificate would be issued. If adverse comments were received, the adjudication would be completed by DNR staff and a final finding would be issued prior to the issuance or denial of the permit or certificate. DNR would still be responsible for the adjudication of federal government applications, federal reserve water rights, instream flow reservation, and request for water use greater than 30,000 gpd from a surface source and 100,000 gpd from a groundwater source. Is the surface or groundwater quantity too low or too high?

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: All of the previous comments above for the other registry program recommendations in 18a, 18b, and 18c apply. Accordingly, we oppose this recommendation. Similar to 18c, and 18d, this is another of the recommendations that truly merits a long-term risk assessment. It is also unclear whether this adjudication would only be triggered when requested by the applicant (similar to 18c).

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

ADNR RECOMMENDATION CATEGORY - WHO PAYS?

1. **Recommendation Under Consideration by ADNR: Determine a method of separating the cost of a water right adjudication (computer entry, notice to other water right holders, public notice, and issuance of the permit or certificate) from the cost of protecting the public interest (fish and wildlife, recreation, aesthetics, navigation, parks, etc.). Once done, the applicant pays the cost of adjudication and the State (general funds) pays the cost of protecting public interests.**

ADNR Analysis: The acceptance of an application, computer entry, notice to other water right holders, public notice, and issuance of the permit or certificate are fixed cost. Public interest determination depends on the water right request and the potential effects of that appropriation on the public interest. The fixed costs are the application costs, and existing application fees were determined based on the average cost of an adjudication with the quantity of water being the variable. In all cases a public interest determination is made prior to the issuance of the permit or certificate of appropriation. For water uses less than 5,000 gpd the public interest determination is done without public or agency notice. The actual adjudication cost often exceeds the application fee, but more often the location not the water quantity of the proposed appropriation is the reason for higher cost. DNR currently receives about $45,000 in application fees a year which covers only a portion of the actual cost of the water right adjudication function. All applicants, except other state agencies, are required to pay an application fee. State agencies apply for about 15 water use authorizations a year. Most water right applications are from areas without a water shortage or competition for high value water uses. Currently DNR has the authority to charge an additional water right application fee if the actual cost of an adjudication exceeds the original application fee. At present this authority is used only for large mining projects. This still doesn't address who pays the cost of protecting the public interest? Should it be the state agency responsible for the management of the public interest in question? An option would be to collect the full cost of the adjudication and have the responsible

state agency absorb the cost for public interest determinations as part of that agencies permitting decision. For example, ADF&G could do the public interest aspect for fish, game and subsistence use as part of its existing Title 16 (Habitat) permit.

ADF&G Position: ADF&G does not support recommendation.

ADF&G Comments: The ADF&G disagrees with this recommendation to charge an applicant for water rights for a portion of the cost of adjudication. Why should the state be burdened with the costs associated with protecting the public's interests and complying with its Public Trust responsibilities when a private individual will derive personal economic benefits from private use of a public resource? It is reasonable, in a time of declining revenue, to charge applicants, who will benefit from receiving title to utilize a public resource (i.e. water), for the cost of providing and administering that benefit. However, the purpose of any review and management system is to determine if that transfer is in the public interest and when applicable the Public Trust. Therefore, it would seem reasonable to charge an applicant the real cost of reviewing a water rights application, which includes a public interest review.

More cost/benefit and risk assessment related information was provided in this recommendation and accompanying ADNR analysis than most recommendations under consideration. However, this information is still insufficient for the ADF&G to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because comprehensive short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following additional information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

2. **Recommendation Under Consideration by ADNR: Amend the regulations to allow a consultant or applicant to conduct the procedural portion of the adjudication (conduct public notice, conduct prior appropriators notice, notify the appropriate state and federal agencies, collect and evaluate all necessary hydrologic data, conduct appropriate environmental studies to address state and federal agencies concerns) and file the completed package with DNR for review, public interest determination, and issuance or denial of the Permit to Appropriate Water.**

ADNR Analysis: This process was recommended as an alternative to DNR conducting the full adjudication. For large projects, most of what is included in this recommendation currently is already required of the applicant. Under this recommendation the consultant would access electronically the DNR water rights databases to obtain prior water rights holder's name and address, and the consultant

or applicant could prepare and mail out all required notices, prepare draft responses. The adjudication process by DNR, Water Management Section would then involve the review of the project data, studies, comments, and recommendations from the public and agencies, and the final public interest determination. Shifting the burden of notice to the applicant would save DNR time in the long run. Some water right applicants may not be willing or able to incur the added cost or to undertake the task.

This process would require DNR involvement in pre-application meetings, and the one time development of an instruction packet regarding appropriate notice requirements. The LAS, water subsystem is designed to locate prior water right holders, and would have to be protected to allow for public use without the ability to change existing information. Keeping the current system updated and accurate would be essential to ensure proper notice is given.

ADF&G Position: ADF&G is neutral without more information

ADF&G Comments: The ADF&G does not object to allowing a consultant or applicant to conduct the procedural portion of the water rights adjudication process; however, it is not clear how much time and cost this will save the applicant or ADNR. ADNR would still be obligated to review and verify that the notice, studies, data, etc. meet legal requirements. It is also assumed ADNR would be liable if there were some type of a procedural error.

Another concern would be based on whether this approach would preclude those with limited resources from applying and acquiring water rights. Would those who couldn't afford to perform all of the procedural functions be more likely to have their water right application placed in a backlog situation? And, would these costs and requirements be passed on for water allocations requested for public interest purposes?

The ADF&G is unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

3. Recommendation Under Consideration by ADNR: Establish a system of State licensed water right examiners.

ADNR Analysis: It was not clear from this recommendation what a state water right examiner would do. The State of Washington has water right examiners that conduct field inspections and document

the actual use of water and the adequacy of diversion works, prior to the permit holder being allowed to apply for the certified water right. This could also relate to recommendation number 2 above, which would allow the applicant or a consultant to conduct the procedural portion of the adjudication. This type of non-state examiner might also be used to resolve disputes under any of the proposed registry options.

ADF&G Position: ADF&G is neutral without more information

ADF&G Comments: It is not clear why a State licensed water rights examiner would be needed as opposed to hiring a qualified consultant. The ADF&G would not object to this proposal as long as examiners were limited to pre-application activities and had no involvement in actually allocating water or adjudicating disputes. However, more specific information is needed to evaluate the merits of this recommendation.

The ADF&G was unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

4. Recommendation Under Consideration by ADNR: Replace the Administrative Service Fee (ASF) with a water user fee. The ASF is not a fair way to collect revenue from water users, only the larger water users are required to pay a fee for water management. Everyone should pay the $50.00 yearly fee, or no one should pay the fee.

ADNR Analysis: The ASF was never meant to be a water user fee, it was established to recover funds spent on administrative tasks associated with existing permits and certificates of appropriations. For this reason, the domestic water use of less than 1,500 gallons per day was exempted from the fee, as the administrative tasks associated with domestic files on a yearly basis was minimal. It has been suggested in the meetings and workshops that the ASF fee be eliminated in favor of a Water User Fee based on the quantity of water permitted or certificated. A water user fee would require all water rights holders regardless of the quantity of the water right to pay a user fee based on the quantity of water used. An example would be that a use of water less than 5,000 gpd would pay $25.00 per year, and a water use of between 5,001 gpd and 45,000 gpd would pay $50.00 per year, any water use over 45,000 gpd would pay $1.00 per acre foot (1 acre foot equals 325,851 gallons of water), public owned hydroelectric water use $.25 per acre foot, and nonconsumptive placer mining water use $0.25 per acre foot. SEE STRAWMAN # 1.

ADF&G Position: ADF&G supports recommendation

ADF&G Comments: The ADF&G agrees that all users (that derive economic benefits by acquiring the right to use a public resource) should pay a reasonable amount for the use of public waters. This should cover the cost of administering the program as well as the cost of protecting other public interests. Sufficient research should be conducted to insure the fee structure is equitable and actually serves its purposes.

The ADF&G was unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit.

ADNR RECOMMENDATIONS CATEGORY - MANAGEMENT RECOMMENDATIONS

1. **Recommendation Under Consideration by ADNR: Allow for time and effort to be spent doing education and PR for the water right program. In order for people to become interested in the management of the State's water resources DNR needs to do a much better job of educating the public and the legislature. Make sure the public knows about the successes and failures of the program; if the public never hears anything they assume there is nothing to get excited over and everything is working well. Use the technology available through the INTERNET system, establish a home page. Seek support from municipalities and industry. Comment made in Anchorage, Juneau, and Susitna workshops.**

ADNR Analysis: A good education program has to be done from outside the department to really be effective. Not only would this appear to be "self serving," but would take time away from adjudicating water rights and would cost additional funds.

ADF&G Position: ADF&G supports recommendation

ADF&G Comments:

Public involvement is critical to the success of every program. It will especially be important to help explain why fees are being imposed and the risks for eliminating the ADNR water programs.

However, based on the current financial concerns to fund the ADNR program, public involvement will have to be prioritized among other ADNR water allocation functions.

The ADF&G was unable to fully evaluate the potential economic impacts for implementation of this recommendation versus maintaining the status quo. This is because short and long-term cost/benefit and risk assessment analyses were not provided. We assume analyses of this recommendation by other respondents will also be limited by these factors.

Therefore, to expand upon our assessment of this recommendation, the following information will be needed: ADNR's current staffing and associated operating costs for implementing the various elements of the existing status quo program; estimates of the costs and time required to adopt this recommendation; and the detailed costs of implementation incurred by ADNR, other agencies (state, federal, and local), and the public. Similar cost analyses should address impacts on those who currently posses water rights or temporary water use permits, and applicants waiting for the completion of the adjudication of a pending water right or temporary water use permit. This type of analysis will be essential for a public involvement program to succeed.

2. Recommendation Under Consideration by ADNR: The State should consider the future cost of water rights and water management as it relates to the cost today.

ADNR Analysis: The essential objective of this ongoing outreach project by the Department is to identify risks to water users in Alaska and to the public interest. A primary assumption by the Department was that the existing water rights and management system was OK; DNR just does not foresee adequate funding to meet its requirements. Comments to date have not disputed that assumption. Funding for a study of the risks involved in changes to the "Water Use Act" and the economic consequences of the proposed changes on the current and future economy of Alaska is not anticipated.

ADF&G Position: ADF&G supports recommendation

ADF&G Comments: ADF&G agrees with this recommendation as well as the ADNR analysis of the likelihood of obtaining funding for this study. However, the ADF&G also believes that the ADNR and citizens of Alaska cannot afford to risk revising the current system without this type of analysis. Please also refer to our September 18, 1996 comments (attached).

Implementation of this recommendation would result in an evaluation of the potential economic impacts for implementing all of the recommendations under consideration versus maintaining the status quo. It would assess short and long-term cost/benefits and provide a detailed risk assessment analysis for each option. Perhaps, the first step needed is to develop a request for proposal and identify the estimated cost and time to complete this analysis.

As a separate recommendation, we suggest that the Western States Water Council and International Association of Fish and Wildlife Agencies be among those that are consulted, but not as a substitute for this risk assessment.

3.	**Recommendation Under Consideration by ADNR: Hire an outside expert on water rights and have him or her review the existing water rights system in Alaska and make recommendations on how we can improve the current system.**
ADNR Analysis: See Management Recommendation number 2.	

ADF&G Position: ADF&G supports combining this recommendation with Management Recommendation 2.

ADF&G Comments: Hiring an "outside expert or experts" would be the best approach to implement Management Recommendation 2. However, sufficient funding and time would have to be allotted to perform this evaluation. This was the approach taken by the state when it hired Frank Trelease in the 1960s to draft the initial recommendations for a water code for Alaska. It still serves as the basis for the present Water Use Act (AS 46.15).

To insure this type of evaluation will be objective, individuals from several water related agencies in the state should serve on an oversight committee for this contract. See also Management Recommendation 4). The ADF&G would be willing to assign an individual to this oversight committee.

4.	**Recommendation Under Consideration by ADNR: Form an advisory committee or board to assist in the development of recommended changes to the Water Use Act. This board should be made up of public members, appointed by the governor/commissioner, who represent water users of the State.**
ADNR Analysis: Developing recommendations for changes to the Water Use Act is what DNR has been doing over the past 10 months. Funding for such an advisory committee or board is questionable. Staffing such an organization would take time away from the application backlog and streamlining.	

ADF&G Position: ADF&G does not support recommendation as proposed.

ADF&G Comments: The formation of an Advisory Committee or Board, as proposed, would duplicate the work which has been achieved through the ADNR public meeting process. As an alternative, we recommend a committee/board could serve as part of an oversight group for the contractors who perform Management Recommendations 2 and 3. Participants should include an ADNR representative, ADF&G representative, private sector individuals, and other state, federal, and local agency representatives (see ADF&G comments for previous recommendation).

ADNR RECOMMENDATION CATEGORY - OTHER RECOMMENDATIONS OR COMMENTS THAT WE MAY HAVE OVER LOOKED OR THAT YOU FEEL WOULD BENEFIT THE OVERALL REVIEW PROCESS.

ADF&G Comments: Please refer to the ADF&G's September 18, 1996 comments (attached).

ADNR RECOMMENDATION CATEGORY - STRAWMEN

The last three recommendations (STRAWMAN 1, 2, & 3) on the next three pages were subsequently developed by DNR as discussion documents regarding various ways of delivering DNR's water management responsibilities while also recognizing the State's overall revenue forecast

NOTE: ***We emphasize the fact that the Department of Natural Resources has not yet determined what its budget recommendations to Governor Knowles and the Legislature will be for the Alaskan Water Resources Section component assigned to the Division of Mining and Water Management.***

FY 1998 Water Resources Section's Budget: ADNR STRAWMAN 1 - *(A) Legislatively create a water user fee as a 6i resource; and (B) Provide the legislative and regulatory streamlining features that come out of the ongoing Division outreach program. This is basically a modified Status Quo System except the operating funds would be generated through user fees.*

Legislative concept is a sliding scale similar to that developed for water exports. Total estimated revenue to the General Fund (GF) is $3 to $7 million annually excluding state entities and whether there are discounts for uses such as hydroelectric power and high Alaskan employment sectors when deemed in the public interest.

Category A annual fees – $25/year for all water rights under 5,000 gpd. (12,500 water rights = approx. $305,000 annually to the GF.)

Category B annual fees – $50/year for all water rights between 5,001 and 44,600 gpd. (1,100 water rights = approx. $55,000 annually to the GF.)

Category C annual fees – $1/acre foot of water. (1,100 water rights with 16.8 million acre feet = approx $6.7 million to the GF if state entities, such as Fish and Game, are exempt. If $0.50/acre foot then $3.4 million.)

The individual home or lodge owner with a water right from a well stream or lake and most small businesses would be under category A. Community water systems serving a combination of less than 90 homes and/or small businesses, and most placer mines using a suction dredge or small sluice box system would be under Category B. Whereas, businesses such as seafood processors, large fish hatcheries, large in-stream flows, large municipal water supply, hydroelectric projects, large agricultural enterprise, pulp mills, oil and gas development and processing would be under Category C. Water export fees would remain essentially as they now exist for large exports.

ADNR Analysis - Pros

Cons shown in STRAWMAN 2 & 3 are not appropriate.

If treated as a 6i concept the Permanent Fund revenue is increased.

Most other water application, admin. service fees and other water right related fees would be abolished.

Promotes water conservation and leaves water available for future allocation for beneficial uses that today are speculative.

Spreads the costs as a small increment to secondary users such as customers of large municipal water supplies and hydroelectric generation facilities.

Would be similar to the existing fee structure for water exports under 11 AAC 05.010(a)(8)(P).

ADF&G POSITION: PREFERABLE OF 3 STRAWMAN OPTIONS

ADF&G Comments: The ADF&G supports the concept for STRAWMAN 1. However, funding should be requested from the legislature to establish a stream gage network required for allocation and management of water resources.

Funding to upgrade the data base for improving the Land Administrative System should also be provided if water resources begin generating revenue for the Permanent Fund.

Levels of fees should be carefully evaluated. ADF&G believes current water conservation fees are too low to achieve objectives..

Independent program review still needed for improving efficiency of existing process.

Better options for instream flow protection are needed.

ADNR Analysis - Cons

Category B and C users will pass costs on to customers. Increased costs may affect ability to market the particular service for large water users in some export fields.

Increased fees by oil and gas producers and transportation companies such as Alyeska Pipeline Service Company will be deducted as a cost that also will reduce the revenue stream to the Permanent Fund. The extent of any such reduction is not known, but is expected to be small.

Category C users will urge Legislature to exempt or significantly reduce any fees.

Annual fees are onerous unless there is a recognized benefit; fees = taxes.

Results in an increased fee for low volume and low income water users who are now exempt from additional fees if water right is less than 1,500 gpd.

No defined interest group to support legislation, especially if the result is an annual cost to all water users.

ADF&G POSITION (continued)

ADF&G disagrees with the concept of charging anyone a fee for water uses that benefit the general public, such as instream flow reservations. This fee is proposed under Category C.

It is acknowledged that the ADF&G reservations would be exempt from fees. Reservations filed by the public and other agencies should also be exempt.

FY 1998 Water Resources Section's Budget: STRAWMAN 2 – *(A)Eliminate all General Funds ($800,000);(B) Retain Dam Safety.*

ADNR Analysis - Pros

Pros identified in STRAWMAN 3 apply except as noted below.

All work will be done on the basis of user pays within the existing authority to collect $437,700 in funds other than GF (GF/Program Receipts, Interagency Authorization, and Federal funds).

All dam safety work will be on basis of user pays through increased fees for processing Dam Safety applications and inspections. This is estimated to be $130,000 for FY 97.

Staff of one professional.

Public safety elements of all existing and future jurisdictional dams continue.

Projects involving new dams will have a definitive decision process that reduces potential litigation and delay.

ADNR Analysis - Cons

Cons identified in STRAWMAN 3 apply except as noted below.

Clerical/admin. support absorbed into existing funded positions in other programs.

Responsible parties for the existing jurisdictional dams and for future jurisdictional dams will have to pay the full costs of the dam safety position.

ADF&G POSITION: ADF&G OPPOSES STRAWMAN OPTION 2

ADF&G Comments: Insufficient information is provided for evaluating this proposal. It is not clear how the $437,000 in funds received from users would be expended.

Please refer to comments for STRAWMAN 3 and the ADF&G September 18, 1996 correspondence to the ADNR (attachment 3).

Water Resources Section's Budget: STRAWMAN 3*(A) No General Fund appropriation or program receipt authority; (B) Abolish Water Use Act, Dam Safety and Alaska Hydrological Survey legislation and regulations; (C) Enact legislation for a water right registry system for beneficial consumptive uses of water*

ADNR Analysis - Pros

DNR budget authority for $1.2 million; and the estimated funding of $260,000 by other state agencies not required.

$800,000 DNR's GF available for reallocation.

Costs shifted from State to local government, courts, and user.

17 full time occupied positions abolished in DNR and two positions in DFG that now make instream flow applications and review water use applications would no longer be needed. Reduced work load in DGC, AG, and ADEC from water right application and coastal zone consistency reviews.

LAS water right data base and other water data bases entries/revisions and updates not needed.

Adjudication of available water and any public interest goes to court or arbitrator, with losing party paying.

Fees eliminated.

14,000 existing holders of water rights have significant value since there will be no more water rights with both an adjudication and a public interest finding.

Costs associated with periodic technical reports for 80 jurisdictional dams eliminated.

ADNR Analysis - Cons

Federal Reserved Water Rights (ANWR, Federal Refuges and Parks especially) can only be challenged by the State in court.

Other litigation where the Constitutional mandate for "public interest" is an issue will involve the State.

Lawyers are expensive and must have technical support from hydrologists and biologists that are no longer available.

There is no one to evaluate or supervise consultant reports.
$170,000 water/dam applications and administrative service fees not available for appropriation.

Refund of estimated $30,000 one time refund for pending applications on July 1, 1998.

Estimated long-term annual loss of $500,000 from water exports to the general fund.

ADF&G estimates an additional cost of $350,000 for expanded Title 16 permitting and monitoring.

Any controversial future road, airport, port, mining, forestry, hydroelectric, flood control, food processing, fish hatchery, water export or municipal/domestic water supply project not in the existing 14,000 approved water right category will be subject to litigation and project delay on basis of no public interest determination which is required by the Constitution.

Instream flow reservations to protect high value public resources are eliminated.

No comprehensive data base for existing and future water use or hydrological surface and ground water information.

Safety requirements for 80 existing and all future "jurisdictional" dams left to responsible party associated with the dam.

Approximately 20-50% cost increase to DNR, DFG, DOT and DEC for water lab work and for private hydrologic and dam safety consultants

ADF&G POSITION: ADF&G OPPOSES STRAWMAN OPTION 3

ADF&G Comments: The ADF&G is opposed to all parts of STRAWMAN 3 A, B, and C.

Without suitable alternatives, abolishing the Water Use Act would eliminate protection for existing water rights. A host of water allocation related disputes would lead to judicial challenges. Long-term consequences would result in harm to the state's economy (see also attachment 3).

Federal Reserved Water Rights (FRWR). FRWR would have to resolved in the federal court system.

The ADF&G disagrees with the above STRAWMAN 3 Pro statement that "two ADF&G positions would be eliminated" if this STRAWMAN package were adopted. This contradicts information provided in ADF&G's September 18, 1996 correspondence (attachment 3).

The ADF&G addresses other elements of STRAWMAN 2, 3A and B in earlier comments presented in this attachment 1 to our November 1, 1996 cover letter.

November 1, 1996

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF MINING AND WATER MANAGEMENT

TONY KNOWLES, GOVERNOR
3601 C Street, Suite 800
Anchorage, ALASKA 99503-5935
Phone: (907) 269-8624
FAX: (907) 562-1384

Dear Alaskan:

Progress Report and Request for Comments on the Alaskan Water Management Program

This past winter, spring and summer the Department of Natural Resources (DNR), Division of Mining and Water Management solicited public comment on an evaluation of the existing Alaskan water management program. We emphasized three basic concepts: (1) the water management program is not broken and, that in our opinion, the overall statutory framework is one of the best in the United States; (2) long-term funding for the existing program is not likely; and (3) there is a general perception that there is an abundance of water in Alaska and except for a few places there are no immediate significant water allocation problems.

Our sense of the comments from those who attended the various meetings, workshops and those who commented in writing is that the basic program is OK. However, there were areas within the overall program that streamlining of the existing process could result in some costs savings. At the same time there was no consensus on either how to continue the program without adequate funding or how best to change the management of water if no funding is available.

The long-term fiscal realities of declining oil revenue, combined with the commitment of the Legislature and the Knowles Administration to reduce the overall state budget, leaves little doubt that the existing water management program will have less funding over the long-term. If our prediction about a significant and continuing decline in available funding for the Alaskan water management program is valid, the questions are: 1) Should parts of the existing water management program be suspended as "unfunded mandates" or should these parts be abolished by changing the basic law and regulations? 2) Which parts of the Alaska water management program (or areas of the State) have the highest priority? 3) What is the appropriate methodology to deal with water rights if DNR is unable to adjudicate water rights?

The enclosure summarizes recommendations presented in our request for comment about the future of the existing Alaskan water management program. Each issue is followed by a discussion of that issue and then asks your opinion. Room for additional comment is provided. Some recommendations are dependent upon other recommendations, others are mutually exclusive.

As noted above, there was no consensus about what to do with an under funded program. Accordingly, the Division has subsequently created three "strawman" budget options that all have the common element of no appropriation from the General Fund. Each strawman option is intended to sharply focus attention on conceptual ways to deal with an Alaskan water management program without appropriations from the General Fund. This is because the combined streamlining recommendations presented in the public recommendations attached will not provide a significant budget or staffing savings to DNR.

The first strawman option incorporates the many recommendations and suggestions for better program efficiencies. This strawman option also requires legislative revisions to the existing water management laws and regulations. The other two strawman options require significant legislative and regulation change.

Please note that all three strawman options are for the ***total*** water management budget which in addition to the Water Management project, includes funding for the Alaska Hydrologic Survey and for the Dam Safety program.

I emphasize the fact that the Department of Natural Resources has not yet determined what its budget recommendations to Governor Knowles and the Legislature will be for the Alaskan Water Resources Section component assigned to the Division of Mining and Water Management. Accordingly,

WE SINCERELY REQUEST YOUR THOUGHTS!

Comments should be to me no later than **October 25, 1996.**

I can be reached by

Phone at: (907) 269-8625,
FAX at: (907) 563-1853, or by
E-mail at: julest@dnr.state.ak.us.

Jules V. Tileston
Director

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

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DEPARTMENT OF FISH AND GAME

Habitat and Restoration Division

MEMORANDUM

TO: Jules Tileston, Director
Division of Mining and Water Management

FROM: Janet Kowalski
Habitat and Restoration Division

DATE: September 18, 1996

SUBJECT: ADNR Proposal To Reduce Water Management Program

This memo is in response to your phone call to me of August 30, 1996 regarding an analysis of projected impacts related to the elimination of Division of Mining & Water's water program. You asked us to share with you the impacts of this proposal on our budget. I apologize it took this long to respond to you. If you come up with any additional or alternative proposals for changes to the program. we'd like to see them so that we can assess the impacts, if any, to our programs here at ADF&G. After our telephone conversation, I asked staff to respond to the following three questions:

1. What savings would we experience if ADNR cut the water management program ?

2. What additional costs would we have? i.e. a new project is proposed which would require water from a previously untapped highly productive salmon stream.

3. What does this mean for fish?

Attached you will find a response to the three questions. We understand that you are considering options, and that no formal proposals are being made at this time. I hope you find this information helpful.

cc: John Shively, ADNR
Marty Rutherford ADNR
Frank Rue ADF&G
ADF&G Division Directors
Lance Trasky ADF&G
Christopher Estes ADF&G
Tina Cunning ADF&G

ADF&G Comments on Water Management Reduction Scenario

GENERAL COMMENTS

We are available to review various options for improving the efficiency of the water management program, and we appreciate the opportunity to share our thoughts with you. During last year's meeting with ADF&G and DNR representatives, DNR shared that they were considering eliminating the water program as one of the options addressed as part of an 11-month public process (January -November 1996). The purpose of this public review was to evaluate cost-savings alternatives to the existing water management program. We were also informed of a plan to eliminate the backlog of water rights applications (filed through December 1995) by June 1997. At that time, we strongly advised DNR that an option for increasing their budget should receive equal consideration. We also urged DNR to perform a risk analysis and cost/benefit assessment of the state's long-term liability for costs and other impacts passed onto its citizenry as part of the DNR evaluation process for reducing or eliminating their program.

1. What savings would we experience if ADNR cut the water management program?

The short answer is none— without an acceptable alternative, this proposal would result in cost increases to others. Costs associated with poor resource planning would be high. DNR's consideration for eliminating the administration of the Water Use Act AS 46.15 will not result in savings for the Alaska Department of Fish and Game (ADF&G). The same will probably hold true for other state and federal agencies and the private sector.

The Fish and Game Act (AS 16) requires the Alaska Department of Fish and Game (ADF&G) to, among other responsibilities, "manage, protect, maintain, improve, and extend the fish, game and aquatic plant resources of the state in the interest of the economy and general well-being of the state" (AS 16.05.020). Definition of, acquisition and protection of, sufficient water is integral to accomplishing this mandate.

Regarding the effect of the DNR proposal on ADF&G (see also discussion below for question 2), AS 16 would necessitate the ADF&G attempt to accomplish some of the functions provided by DNR. Thus, the ADF&G would require additional resources to expand its existing instream flow and water permit review functions to compensate for the loss of the state water allocation system to insure adequate water is available for sustaining fish and wildlife regardless of land ownership. The Fish and Wildlife Coordination Act, other federal laws, and actions such as the Federal Energy Regulatory Commission licensing process, federal assertions of Federal Reserved Water Rights. Navigability, access and other water allocation related issues also require ADF&G

participation, with or without the DNR. The ADF&G also has a need for water withdrawals for domestic and operational functions for its hatcheries, etc.

DNR should not assume ADF&G's need to expend resources to define and protect water needs would be diminished if DNR's water management activities were reduced or eliminated. AS 16 does grant ADF&G authority to define and (with limitations) protect the quantity and quality of water needed to sustain fish and wildlife and perform other mandated Title 16 functions. There are limitations to expanded implementation, however. Although it would provide some of the needed protection, this authority would not substitute for the current DNR water allocation system or DEC's role of protecting water quality. Accordingly, ADF&G, at present, does not fully use this portion of our authority based on interagency agreements with DNR and DEC which provide expanded protection through their statutory functions. This in itself is a cost savings and avoids unnecessary duplication where authorities are perceived to have an overlap.

GENERAL CONSIDERATIONS APPLICABLE TO ADF&G, OTHER AGENCIES AND THE PUBLIC

If funding were eliminated for the DNR water management program without an acceptable substitute, it would ultimately result in an irreversible increasing debt load placed on future generations of Alaskans. and limit future developmental opportunities. The elimination of the program would be a recipe for disaster. It is one that unfortunately would not become apparent until conflicts and/or damage were intense (based on the experiences of western states water development over the past 150-years).

According to DNR, present costs for the administration of water rights are covered by an annual appropriation of $400,000 in general funds and approximately $123,000 in fees. If these program costs are accurate, how can anyone, who is familiar with our country's water development, equate the wholesale elimination of a $523,000 program (required to administer existing and new water allocations) as a savings? Without a water allocation system, Alaska will eventually experience a future colored by over-appropriation of water with inadequate water for: fish and wildlife production, navigation, recreation, water quality, and sustaining commercial and municipal needs. Are these the desired results?

DNR WATER PROGRAMS AFFECTED BY THIS PROPOSAL

The current DNR water management program includes: management of the state's surface and subsurface waters (not including medicinal and mineral waters) for common use and is subject to appropriation for appropriation and beneficial use (AS 46.15.030). Appropriations include withdrawals, diversions. and impoundments of surface and subsurface waters, and reservations of water levels and instream flows. A dam safety program is also integrated into the water management program. Resolution of Federal Reserved Water Rights claims and participation in the Federal Energy Regulatory Commission licensing process are other DNR water management functions. The Hydrologic Unit of the DNR water program contributes to water quantity and quality data

collection. A program to match state and U.S. Geological Survey funds has (until recently) been one of the primary sources of funding for needed stream gage data. The stream data collection portion of the DNR program has already been reduced and will limit the ability to identify water availability, plan for developments, assess flood risks, etc.

PROJECTED LIABILITY

Partial or complete elimination of the state water management process, without establishing an acceptable alternative, would be subject to litigation as a violation of the Public Trust Doctrine. That is the state would be abandoning its role as the trustee for the management of and protection of public uses of navigable waters of the state, and (in many instances) non-navigable waters that are tributary to navigable waters and subject to this doctrine. These public trust responsibilities are an obligation accepted by the state when it was granted statehood and ownership of navigable waters and their beds. .

The state constitution embraces the Public Trust Doctrine by establishing public interest criteria established by the Alaska Constitution Article VIII, Sections 1, 2, 3, 4, 13, 16, and 17 and provides another basis for challenging the current and similar proposals. Therefore, partial or complete elimination of the state water management process, without establishing an acceptable alternative, would be subject to litigation as a violation of the state constitution.

AS 46. the Water Use Act and associated regulations, provide a basis for implementing the water management responsibilities express by the state constitution. The elimination or reduction of this program without the ability to fully execute this statute would also be subject to litigation based on the Public Trust Doctrine and the state Constitution. Elimination of the Water Use Act without providing for an acceptable alternate would also be subject to litigation.

2. What additional costs would we have? i.e. a new project is proposed which would require water from a previously untapped highly productive salmon stream.

Approximately an estimated additional $350,000 would initially be required for expanding Title 16 permitting and monitoring to include water allocation considerations for fish and wildlife. We would also have to generate and analyze our own hydrology. This cost could add up considerably. Unfortunately, this alternative form of protection would still have limitations based on not knowing how far Title 16 authority could be expanded upstream and the effectiveness of using Title 16 as the sole basis for protecting instream flow or other ADF&G water needs. And, what if a competitor wants water for the same purpose as ADF&G? Who resolves the dispute—the courts?

ADF&G would also have to access the existing DNR LAS data base to research and incorporate prior appropriations for affected Title 16 permit applications. And, who would update the DNR data base?

ADF&G, as would other agencies and the public also have increased time consumed in matters of litigation based on resolving water disputes if an administrative solution were unavailable. It is also likely ADF&G would gradually assume other state responsibilities related to water management if no other entity had a program related to water quantity. These added duties would increase our costs. Without an umbrella comprehensive state water management program there would undoubtedly be an unknown cost resulting from losses of fish and wildlife for water uses that cannot be managed through Title 16.

The bottom line: these costs are an estimate - a best guess with limited information for analysis. Further, no funds are currently available for ADF&G to do this work.

ALTERNATIVE SOLUTIONS

It would be more cost effective for the ADF&G or another agency to take over the entire DNR water program, if accompanied with the existing budget. This is especially true if DNR has no interest in working to insure they meet their mandates and public interest and trust responsibilities associated with water management. The current DNR water management program is already suffering from insufficient funding.

3. What does this mean for fish?

One of the AS 16 provisions enables the ADF&G to acquire water rights to further its objectives or purposes (AS 16.05.050). Other provisions such as AS 16.05.840 and .870 establish permitting authority to insure that fish passage and anadromous fish habitat are protected. Without water this can't be accomplished. Our existing authority provides some capability to compensate for elimination of a state water management system. But as discussed above it would not be cost effective as we would have less protection with added expenses.

Without establishing replacement programs, elimination of the DNR water rights program would mean that DNR would not be able to adjudicate existing or accept new water right applications. It also means they would not monitor existing water rights and resolve disputes. It would affect our Department's existing and pending instream flow water rights, hatchery and fish pass water allocations.

This is bad decision for fish and wildlife protection without an acceptable alternative and sufficient funding, and the overall negative impacts of the DNR proposal on water allocation for other agencies and the private sector cannot be ignored.