Just CE.

March 30, 1979

Ms. Suzanne Weller
Trustees for Alaska
835 "D" Street #202
Anchorage, Alaska 99501

Dear Ms. Weller:

I have enclosed two documents which should largely answer the questions you posed in your letter of March 12. Our comments on your questions are summarized below.

Question:

1. How the Department of Fish and Game plans to cooperate with the Corps of Engineers, the U.S. Fish & Wildlife Service, and the Alaska Power Authority in coordinating studies to be done, and goals to be accomplished during the feasibility study?

Answer: The Department of Fish and Game hopes to insure that the biological studies proposed in the June 1978 Phase I Plan of Study (POS) for the Susitna Hydro Project are carried out. We will be coordinating our activities with each of the above mentioned and other agencies in an attempt to insure that all studies outlined in the POS are conducted and all requirements of State and Federal law are satisfied.

2. What sorts of studies are needed before the feasibility of the dam, from the viewpoint of its effects on fish and wildlife, can be determined?

Answer: The biological investigations proposed in the June 1978 POS identify the basic biological investigations which we believe are necessary and required to assess the feasibility of the Susitna Hydro Project.

Refers only to COE proposal

a. How much time will be needed to complete the studies? This time estimate should include study planning and analysis.

b. How much money will be required to conduct the studies? If possible, this should be broken down into dollar amounts needed for each year of study?

Answer (a & b): Please refer to the enclosed briefing document entitled "Susitna Hydro Biological Investigations." It includes a commentary on the budgets proposed by ADF&G for the full term 46 month feasibility investigations of the Phase I POS and our views on the need for a five year study in lieu of the shorter, 46 month investigation.

3. In light of past studies conducted in the area, what is the Department's current view regarding potential impacts of the proposed project, on fish and wildlife in the area?

Answer: Please refer to the appropriate section of the "Susitna Hydro Biological Investigations" briefing document and our 1978 report to the U.S. Fish and Wildlife Service, "Preliminary Environmental Assessment of Hydroelectric Development on the Susitna River."

The Department of Fish and Game appreciates your interest in the proposed Susitna Hydro biological investigations. If you have further questions regarding our involvement in the feasibility studies, please contact Thomas Trent, Regional Supervisor of the Habitat Protection Section in Anchorage, telephone 344-0541, extension 133.

Thank you for your inquiry on this matter. I hope this material will prove useful to you.

Sincerely,

Ronald O. Skoog
Commissioner

cc: T. Trent

bcc: C. Estes

ROS:RL:TWT:mr

3/30/79
Attachment

Susitna Hydro Biological Investigations

I. Background

The Alaska Department of Fish and Game (ADF&G) has been actively involved in coordinating, proposing, and conducting biological studies related to the Susitna Hydropower Project since 1974. From that time to today, we have had many problems in attaining the scope of study and funding the Department believes is necessary to adequately assess the biological impacts of this proposed hydropower development.

Initially our concerns were not only limited to funding of adequate studies, but also included geographic areas which would be studied. Early on in the Susitna Hydro environmental assessment, the Corps of Engineers (COE) restricted our work to the immediate impoundment area and downstream to the confluence of the Chulitna River. One gain we feel we have made is the consideration of the impacts of this project, the largest hydro development in North America, on the downstream environment below the Susitna dams and the area above the impoundment.

The Department of Fish and Game, through its data review of possible fish, wildlife and other environmental impacts of the Susitna Hydro project has identified a number of concerns. As a data base we have only a

limited amount of environmental assessment work the Department has done to date. We believe the assessment of fish and wildlife resources impacts in Phase I of the Susitna Hydro studies are fundamental to the determination of this project's feasibility. If the project proves feasible, these biological studies are basic to the mitigation of fish and wildlife impacts when the project is constructed.

A. Fisheries Studies Background

Background knowledge of the Susitna River basin is limited. The proposed hydroelectric development necessitates gaining a thorough knowledge of its natural characteristics and fish and wildlife populations prior to final dam design approval and construction authorization to enable protection of the aquatic and terrestrial communities from unnecessary losses.

The Susitna River basin provides important habitat to a wide variety of fish species, both resident and anadromous. Five species of Pacific salmon (chinook, coho, chum, pink, and sockeye) utilize the Susitna River drainage for spawning and rearing. The majority of the chinook, coho, chum, and pink salmon production in the Cook Inlet area occurs within this drainage. Grayling, rainbow trout, Dolly Varden, burbot, lake trout, whitefish, and sculpins are some of the more common and important resident fish species.

Baseline environmental fisheries studies have been conducted by ADF&G intermittently since 1974. The projects were financed with

Federal funding averaging $29,000 per year in 1974, 1975, and 1976, and an allocation of $100,000 in 1977. The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) first contracted ADF&G to conduct a one-year assessment of salmon populations utilizing the Susitna River in the vicinity of the proposed Devils Canyon dam site during 1974. The objectives of these studies were to determine the adult salmon distribution, relative abundance, and migrational timing and to determine juvenile rearing areas (Barrett, 1974). Funding was received in 1975, 1976, and 1977 from USFWS to continue and expand these studies and to monitor the physical and chemical parameters associated with the mainstem Susitna (USFWS, 1976; and Riis, 1977). Additional baseline studies were not initiated during 1978 due to lack of funding. A characteristic of ADF&G fish and wildlife studies to date on the Susitna Hydro Project area has been the discontinuity, uncertainty, and low levels of funding from several sources.

B. Wildlife Studies Background

The Susitna River basin has long been recognized as an extremely rugged wilderness area of high aesthetic appeal and as an important habitat to a wide variety of terrestrial wildlife species (ADF&G, unpubl. data). Most important to sport and subsistance users are moose and caribou, and to a lesser extent, grizzly bear and sheep. Hydroelectric development has been under consideration in this area for a number of years and some very general ungulate population

assessment work was begun in 1974 and completed in the spring of 1975 (USFWS, 1975). Additional studies were not conducted in the project area until March of 1977 when limited funds were made available to begin acquiring baseline information on moose and caribou populations within and adjacent to the project area. Funds received by Game Division for work to date were $2,000, $14,500, $46,700, and $16,500 for FY 74, FY 75, FY 77-78, and FY 78-79, respectively.

C. Evolution of the Proposed Phase I Susitna Hydro Biological Investigations

1. 1975 Proposal

The ADF&G entered its first comprehensive proposal for fish and wildlife investigations to the USFWS, and through that agency to the COE, on November 18, 1975. That proposal spread investigations over a five year period from FY 77 through FY 81, and indicated a cost of 3.62 million for ADF&G field work. To that figure should be added an additional cost for USFWS and NMFS coordination of $525,000, and therefore a total cost of 4.145 million dollars for proposed fish and wildlife work.

Estimated cost of the Susitna Hydro Project construction in 1975 was 1.5 billion dollars.

2. 1977 Proposal

On December 15, 1977, the ADF&G completed a review of the COE

prepared draft Susitna Hydropower Plan of Study (POS) of September 1977. In our comments to that document, we included the Department's estimate of fish and wildlife and habitat investigation costs and our recommendation of needed studies. Total costs for ADF&G field investigations for a five year period totaled 10.5 million dollars. This increase over 1975 was due not only to inflationary factors, but also because our limited studies from 1974 through 1977 indicated new problem areas where impacts on fish and wildlife must be assessed.

Estimated construction cost for the Susitna Hydro Project in 1977 was 2.1 billion dollars.

3. 1978 Proposal

The Department revised its December 1977 proposal early in 1978 to fit the 46 month time frame for Phase I studies which the Alaska Power Authority (APA) and COE said would be imposed. The Department objected then, and still does, to the compression of the time frame for biological investigations. My staff believes quite strongly that a minimum five year period is needed for an adequate biological study of the Susitna River Basin. The area encompassed is large and complex. Anadromous fish runs, for example, pose special problems of study because some salmon stocks have a five year life cycle.

In the June 1978 Susitna Hydropower Plan of Study, the COE gave some recognition to the need to complete fish and wildlife studies covering complete life cycles by stating in paragraph 2 on page 40 of the POS that: "some of the biological studies will require continuation through step 3 into construction to provide a base of life cycle, habitat, and other information needed to outline possible mitigation studies." However, we have no guarantee that funding to support these continuation studies will be made available. Furthermore, the preceding POS statement infers that the construction decision will occur before completing portions of the biological studies that are necessary for making the project feasibility decision. This clearly is in conflict with the Council on Environmental Quality Proposed Regulations under NEPA of June 9, 1978.

The Department's latest total budget recommendation of 7.9 million dollars for 46 months for Phase I feasiblility investigations related to fish and wildlife was submitted to the Corps on April 19, 1978. The Corps and APA, over our objections, finally included a budget of 4.3 million dollars in the Susitna Hydro POS in June of 1978, a difference of 3.6 million dollars. This is a difference we find hard to resolve considering the job we must do to adequately assess the feasiblity of this proposed project.

An independent analysis for Sport Fish Division by Milo Bell, a consulting engineer with extensive experience on Pacific Northwest hydro projects and fisheries related studies in Washington, indicated the fisheries feasiblity investigations for a hydro project the size of Susitna Hydro would run to about 5.0 million dollars, a figure comparable with our own estimate of 5.1 million dollars.

Estimated construction cost of the Susitna Hydro Project at this time, March 1979, is 2.6 billion dollars.

Therefore, the Department has seen the cost of the Susitna Hydro Project rapidly escalate from 1.5 billion dollars in 1975 to 2.6 billion dollars in 1979, a 73 percent increase. Meanwhile, the proposed budget for support of fish and wildife studies has gone from 4.145 million dollars in 1975 to 4.3 million dollars (imposed by the Corps and APA), a 3.7 percent increase.

4. 1979 Proposed One Year Funding of Fish and Wildlife Biological Investigations Funding

On November 3, 1978, the Department was contacted by the Corps of Engineers with a request to provide our estimated budget for 1979 biological investigation adjusted from our prior fiscal year development to a calender year and on a quarterly basis for the 1979 calendar year by November 4, 1978. These figures developed by ADF&G were:

1979	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
			$115,000.00	
Anadromous Fish Studies		$115,000.00	250,000.00*	$ 43,000.00
Resident Fish Studies		80,000.00	99,000.00	30,000.00
Aquatic Plants & Animals		5,000.00	15,000.00	
Economic Studies		10,000.00	90,000.00	
Support & Planning	$10,000.00	32,000.00		
Wildlife Studies		20,000.00	80,000.00	150,000.00
	$10,000.00	$262,000.00	$649,000.00	$223,000.00

*Sonar Development

II. Constraints and Things to be Done

A. Planning and Coordination

The Department's involvement with Susitna River Hydro Project has, in the past, been characterized by the implementation of short term projects, hastily contrived out of necessity, without the opportunity for long term and ongoing planning.

Due to the nature, magnitude, and complexity of the biological investigations necessary to assess the impacts of this project, detailed and comprehensive planning is essential. Only following this period of preparation can we insure the adequacy of fiscally responsible biological studies designed to fully assess project impacts.

In the first two quarters of this Department's proposed work on the Susitna Hydro biological investigations, we have a great need to do more detailed planning of specific project activities, methodology, and development of the organization and of the expertise to effectively carry through our proposed investigations and assure their integrity.

We consider it essential the very best expertise in the field of hydro projects be utilized during this planning process. This may necessitate contracting various qualified personnel from the northwest where the "state of the art" is well developed. It will likely necessitate travel to these northwestern states by key personnel to consult with qualified individuals and organizations.

A good deal of interagency coordination will be necessary and mutual fielding of various projects will require planning and organization. For example, we know the U.S. Fish and Wildlife Service will conduct specific study segments and the U.S. Geological Survey yet others. In the interest of economy and obtaining the best results, these activities require coordination.

We feel strongly that suitable time must be allocated to the process of planning and coordination before any field staff are hired, or biological studies fielded if adequate professional level results are expected.

Outcomes of the planning effort should be:

1. a table of organization for the administrative support and field staff to direct and carry out the biological investigations

2. the development of job descriptions and specific work plans and subcontract work items for Department biological investigations

3. the timetables for training personnel, development of special equipment, and the state of the art methodologies, and subcontracts for field studies.

B. Personnel

A project of this magnitude will necessitate employing personnel who possess both experience and knowledge of specific disciplines. For example, we will need people who are experts in the field of hydrology as it relates to fish and wildlife, those with engineering background, those capable of performing complex water/wildlife computer modeling, etc. It is going to be necessary for this Department to go outside its own organization to recruit many of these individuals, as we, to date, have not experienced the need which creates experience in these disciplines.

It should be understood that this hydro evaluation is going to require a staff of experts who work solely on this project. We cannot expect a biologically sound study to occur with adequate, professional solutions and answers if it is conducted on a part time basis by existing Department staff, as in the past. Personnel

constraints are particularly binding for the fisheries related work, because the Department's fisheries division staff are totally dedicated to management and research problems in other areas. There simply has to be a staff of qualified individuals, with the employment guarantees necessary to provide continuity to long term studies.

C. Funding

While the adequacy, or inadequacy of funding to perform fish and wildlife studies has been a major Departmental concern over the past several years, the continuity of it in the future is even a greater one. As this hydro project and initiation of the long term biological studies nears reality, it is paramount that money be appropriated for more than a few months or even a single fiscal year at a time. The accomplishment of the biological studies will require long term contracts for work, equipment development, and the maintenance of a qualified professional level staff. Personnel qualified to plan and conduct the involved research necessary to assess the impacts of the Susitna Hydro Project, cannot be recruited without long term employment guarantees.

Timing of funding appropriations are, and will continue to be, of critical importance; and again support the need for funding beyond a given fiscal year. For example, many of the studies can only be conducted at brief seasonal periods of the year due to particular

stream flow needs, migrational movements of wildlife, or spawning migrations of a specific fish species. To miss one of these periods, due to money appropriation difficulties, is to miss an entire study year.

D. Equipment and Material Aquisition

A great amount of materials, equipment, and scientific gear will be required for these studies. Much of it will require ordering well in advance. Major sonar and telemetry development is anticipated for fish migrational studies.

Many of these items will be ordered in one fiscal year and perhaps not received until the next one. Again, monies must be available beyond a single year. If funding terminates, we will likely have a number of commitments to purchase special equipment which will have to be honored.

E. Summation

Without continuity of funding beyond a single fiscal year, the personnel to plan and conduct the hydro related studies cannot be adequately recruited and/or retained. The large sum of money which may be authorized will, under these circumstances, be of little use.

The Department is being asked to participate in a biological evaluation of the largest hydroelectric project ever planned. It is critically important the project be planned, conducted, and finally assessed in a manner which brings credit to the State and which minimizes fish and wildlife resource protection and mitigation of project impacts.

The guarantee of continuity in study funding and timing may be the single most important factor in achieving this goal.

II. Potential Impacts

A. Fisheries

1. With considerable study of the project's impact on fish and wildlife resources yet to be accomplished, the ADF&G has collected sufficient information and addressed the potential biological impacts of the Susitna Hydro proposal in a number of documents which allow us to state that fish and wildlife resources will be adversely impacted.

   The construction and subsequent operation of the Devils Canyon and Watana dams will result in long-term ecological changes. The two dams will inundate an estimated 50,550 acres of the Susitna River Basin aquatic and terrestrial habitat upstream of Devils Canyon. Regulation of the mainstem river will substantially alter the natural flow regime downstream.

Secondary impacts such as improved road, water, and floatplane access may create some additional problems in regulating hunter and fishermen harvest.

Following is a brief summation of the major impacts of the proposed dams illustrating the importance of comprehensive biological studies to determine the extent these impacts will affect fish and wildlife populations.

Susitna Fisheries and Aquatic Habitat

The fish populations are the most obvious aspects of the aquatic community where impacts will be evident due to their high economic and recreational importance to the people of Alaska and the nation. However, impacts are not limited to the fishery resource alone due to the complex interrelationships between all biological components of, and within, the aquatic community and the associated habitat. Our preliminary studies have partially defined that the effects of impoundment and construction activities will include alteration of the natural flow regimes, water temperatures, water chemistry, transport of materials, and the quantity of wetted habitat. Habitat requirements of the critical life history phases for passage, spawning, egg incubation, and juvenile rearing of the Susitna salmon species studied are quite specific. The USFWS Cooperative Instream Flow Service Group has developed criteria which

demonstrate the narrow tolerances of certain salmonid and resident species to the hydraulic parameters of velocity, depth, substrate, and temperature (Bovee, 1978). The seasonally wide fluctuations of water velocity, depth, temperature, substrate and sediment of the free flowing mainstem Susitna, its sloughs and tributaries determine the availability and accessability of salmon habitat. Thus, any alterations to the existing Susitna aquatic ecosystem which restrict or reduce the availability of required habitat, will also reduce fish production in the Susitna Basin and Cook Inlet estuary.

For example, it is important to note that although the Susitna River is glacial and turbid more than half of the year, the river clears during the winter months and becomes the major winter rearing area for salmonids as they migrate from the clearwater tributaries and sloughs which freeze and dewater. Chinook and coho salmon, which are of high interest to both commercial harvesters and sport anglers in the Cook Inlet area are dependent on these freshwater rearing areas of the Susitna for a period of one to two years before migrating to saltwater. These important rearing areas will be lost downstream of the dams because the river will be turbid year round and have a higher water velocity due to a reversal of the natural seasonal flow and stage conditions after construction. Although total salmon escapement estimates have not been derived for this system, it is probably the second or third largest sockeye

salmon production area within Cook Inlet. Economically, the estimated average annual commercial value of the sockeye, king, pink, chum, and coho Susitna salmon stocks was $8,721,780 in 1975. This does not include the 1975 estimated value of $3,701,745 for the additional salmon in the Susitna River Basin necessary for producing this estimated potential catch. Although figures for subsequent years are unavailable because of insuffient data, it can be assumed the value of this fishery has greatly increased.

Economic values related to recreation are unavailable but assumed to be high due to high concentration of the population adjacent to the Susitna River. Non-consumptive economic values are also unavailable.

B. Terrestrial Wildlife

2. The proposed Susitna Hydropower Project will have impacts on several wildlife species which either reside in the project area, use the area for migration or other seasonal purposes or use habitat downstream which will be altered by the stabilization of water flow. Although many species of animals could be potentially influenced, terrestrial studies to date have focused on ungulate populations, primarily moose and caribou.

Moose

Moose are likely to be adversely affected in several ways.

1. Loss of habitat by inundation within the impoundment areas.

Preliminary studies indicate that several moose subpopulations occupy drainges flowing into the impoundment areas. These moose spend much of the year outside of the impoundment areas but each winter tend to migrate into or across these areas. Much winter range will probably be lost. This will be particularly critical in severe winters. Therefore, a substantial reduction in the number of moose in a large area surrounding the impoundments will probably occur.

Moose numbers are currently reduced in the area probably because of a combination of severe winters and predation. Therefore, hunter harvest has been restricted in recent years. However, an average of 146 are taken annually by 475 to 500 hunters from the moose subpopulation that will probably be impacted directly by the impoundments. This comprises about 3.5 percent of the statewide harvest of moose. However, the importance of the area to hunters is expected to increase as new National Parks and private land holdings restrict the area available to many hunters. If there were a 50 percent reduction in these moose subpopulations, there could be a loss of harvest of over 7500 moose over the 100 year life span of the project.

The reduction in moose densities could also lead to chronic predation problems. The impact on non-consumptive use of moose is difficult to estimate at this time. The Watana impoundment is expected to impact more moose than the Devils Canyon.

2. Loss of browse downstream.

The river bottom downstream to Cook Inlet provide winter range for moose from Game Management Units 13, 14, and 16. Stabilization of water flows may cause much of the willow in this area to be replaced by spruce. This could lead to a reduction in moose numbers in all of these units especially in severe winters. Adequate data are not presently available to even roughly estimate the magnitude of this impact.

3. Accidents

Moose, especially calves, frequently become mixed in mud. Ice shelving caused by winter drawdown also could lead to accidental moose deaths. The Watana impoundment would greatly increase the potential of fatal accidents but there is no way to estimate the importance of this at present.

Caribou

While some loss of caribou habitat may occur, the greatest impact would be through blockage of migrations. In past years, many caribou have migrated across the Susitna River in the impoundment area after calving. Although specific harvest data on the Nelchina caribou herd for this area are currently unavailable, major harvests of these caribou occurs in the vicinity of the Denali Highway during years of high numbers of caribou migration across the Susitna River. At the present time, it is not known if the impoundments will block the caribou from portions of their range or whether they will attempt to cross or go around the impoundments. It could lead to overgrazing of portions of the range and abandonment of other areas or increase mortality due to accidents in attempts to cross the impoundment.

Other Species

The impoundments will almost certainly reduce numbers of bears, wolves, wolverines, other furbearers, small game, and non-game species through loss of habitat. Furbearers and waterfowl may be reduced downstream as a result of altered water flow and fluctuations in the river that are important in providing the stimulus for new riparian vegetative succession with plant species important to these wildlife populations.

A small population of Dall sheep may be adversely affected by disturbance during construction unless human activities, particularly aircraft traffic are controlled.

C. Socioeconomics and Recreation

It is important to recognize that any direct or indirect biological impacts of this project may, and likely will, affect the recreational and/or commercial utilization of major salmon and resident fish species, and wildlife species and their associated habitat. The close proximity of municipalities containing half the human population of Alaska emphasizes the socio-economic values of the fish, wildlife, and habitat resources of the Susitna River Basin. The Susitna drainage is highly used and important to the sport and commercial fisherman, the recreational enthusiast, industry, and municipalities. The popularity of Denali State Park and nearby Mt McKinley National Park further attests to the high social, recreational, and aesthetic qualities of the area. Specific data on these subjects in the hydroelectric project area watersheds are incomplete or lacking. Adding to the importance of the area for fishing and hunting is the enactment of the D-2 and Antiquities Act provisions on other lands where certain recreational uses may be restricted.

D. Navigability

Much of the Susitna River drainage downstream of the proposed hydro development is one of major recreational development. Stream side

recreational sites and subdivisions are markedly increasing the numbers of people utilizing the river for transportation during both the summer and winter seasons.

It is unknown to what degree the substantial change in natural stream flows may affect travel and transportation (both recreational and commercial) of these downstream river portions. They may, however, be quite significant.

3/7/79