

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

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PHONE:

January 19, 1982

Mr. Jeff Weltzin
Fairbanks Environmental Center
218 Driveway
Fairbanks, Alaska 99701

Dear Mr. Weltzin:

Thank you for your interest in the Alaska Department of Fish and Game's views regarding aquatic habitat impact issues being considered by the Su Hydro Mitigation Technical Group as presented in your December 3 letter. We regret that you were not afforded an opportunity to question this Department's representative, Tom Trent, regarding mitigation issues at the October 23, 1981 meeting with other Mitigation Technical Group members.

At an earlier Mitigation Technical Group meeting in Seattle the indications were that the October 23 meeting would be a public meeting where all members of the group would participate. However, at the October 23 meeting of the Technical Group, Mr. Kevin Young of Acres indicated only he, Dr. Milo Bell, Mr. Clint Atkinson and Mr. Bob Williams would attend the meeting with you and Eric Myers. Therefore, Mr. Trent and other Technical Group members from Alaska, Mr. Dana Schmidt of Terrestrial Environmental Specialists (TES) and Acres consultant, Woody Trihey, did not participate in the meeting.

Pertaining to the subject of ADF&G's participation at past APA Public Participation Workshop series, ADF&G was not invited to those workshops. However, with respect to the Environmental Public Participation Workshop series planned for October that was cancelled, we had been invited to participate. We, in fact, may have been partly responsible for its cancellation. This is because we informed APA that our data collected in 1981 would not be ready for public presentation until February, 1982. Su Hydro staff members, however, did indicate they would attend the workshops had they been held in late October or early November to:

- (a) summarize what ADF&G's overall position was with respect to the project;
- (b) describe our role in the project;
- (c) describe the types of studies we were performing and what we hoped to learn; and
- (d) answer any questions from the public on these subjects.

It must be emphasized, however, that we would not have been prepared in the fall to actually present findings of our 1981 studies or give any explicit detailing of our views on project impacts.

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Your first observation on the discussions held with Mitigation Technical Group members on October 23 was:

"Discussion initially focused on downstream flow changes during post-project. Task Force members indicated that effects to side sloughs are possible, such as dewatering and reduced access to spawning salmon.

1. Do you agree with this and does ADF&G have any additional information on possible effects to side sloughs used by salmon? What effects will the proposed post-project flows have on sloughs upstream of the Talkeetna River? Does your preliminary data indicate that the post-project flows will be capable of supporting spawning and rearing salmon?"

We concur with the assessment that side sloughs utilized by salmon as spawning and rearing habitat in the Devil Canyon to Talkeetna reach of the Susitna River will be impacted by the project operation flows at Gold Creek, as projected by Acres American and which were also provided to the Mitigation Technical Group (these flows are between 8,000 to 10,000 cfs monthly average during the summer months). Based on the flows the Mitigation Technical Group worked with up to October 23, and based on the information ADF&G has at hand, essentially 100 percent of the slough environments would be deprived of river stage levels necessary to permit access by salmon and successful spawning. We must qualify this statement, however, in that only five sloughs out of more than 40 have had the intensity of study which would explicitly show this impact. The hydraulic model produced by R&M Associates does not permit evaluation of stage and slough water levels which permits a better analysis of river stage-slough relationships at all locations. In the judgment of Department staff, however, further studies would probably bear out the 100 percent impact on access and spawning which has been suggested. Stage gauge information at ADF&G study sites will be used to help refine the R&M hydraulic model to the extent possible.

A more recent project flow at Gold Creek provided to the Technical Group by Acres at their December 10 meeting in Seattle, provided higher flows (approximately 12,000 cfs) during the time adult salmon are in the system. At this flow some sloughs will have some water in them. We cannot draw any specific conclusions on the impact of that more recent flow level projection. More detailed work in the future will be needed to determine impacts on these slough habitats at various incremental flows. Further examination of ADF&G data and the R&M hydraulic model by the TES representatives will be needed before we can give an objective opinion on the impact of the newest flow regime suggested by Acres. However, the R&M hydraulic model does generally support the statements made above and further indicates flows in the range of 19,000 cfs at Gold Creek are necessary to maintain flow through sloughs.

Your second question was posed as follows:

"When sediment transport was discussed, Milo Bell indicated that the Task Force expected little change to the reach of the Susitna below Devils Canyon to the Talkeetna River from changes in sediment transfer rates during post-project conditions. He indicated that the river is well armored and will be altered very little.

2. How do you view effects from sediment transport changes in this reach of the Susitna?"

Generally, we would tend to agree with Dr. Bell's assessment of the character of the bed of the river in the Talkeetna to Devil Canyon reach of the Susitna River. Some issues related to the nature of bed load movement and sediment transport changes and their potential impacts on mainstream spawning salmon are pertinent to this, however. These are:

- a). will there be a change in the bed characteristics of areas utilized by chum salmon for mainstem spawning; and
- b). will this change beneficially or negatively affect chum salmon spawning; and
- c). will this change influence the productivity of other members of the aquatic community and hence influence the resident and anadromous fishery?

In evaluating question (a) it must be noted that, according to Acres, gravel and other sediment being transported downstream in the drainage above Devil Canyon will be fundamentally captured within the impoundments, and any new contributions of sands, gravel and larger material to the bed of the Susitna River will originate solely from tributaries below the Devil Canyon dam site. Since major flood events, as they presently occur, that result in major downstream transportation of sediment will be substantially diminished under those post-project flows, a build up of smaller material in the Talkeetna to Devil Canyon reach may occur and this reflects on question (b), which we discuss hereafter.

Redistribution of stream bed gravels could be beneficial if it created more suitable habitat for chum salmon or potentially other salmon spawning provided post-project flows are sufficient to carry this material and distribute it into beds with a composition suitable for the species of concern. However, project flows may not be able to make these redistributions. Accumulation of new material in the mainstream may occur only in close proximity to tributary mouths which introduced this material. This would diminish the potential for increasing suitable spawning habitat. We cannot objectively state that positive impacts based solely on increase of suitable spawning substrates would occur and this relates to question (c). Other factors such as the suitability of project water quality, water temperature, velocities of flow, etc., need to be factored into the decision on whether an increase in suitable spawning substrates would be beneficial to the overall fishery and other members of the aquatic community.

Your third question was framed as follows:

"Regarding changes in post-project sediment transfer from Talkeetna River to the Delta Islands reach, Milo Bell indicated that the Task Force was not too concerned about possible changes to the present river configuration of channels, bottoms and banks. He indicated that any changes in sediment transfer would be very gradual and probably would be insignificant. When advised of External Review Panel member Starker Leopold's concern over possible reconfigurations of the Susitna due to changes in sediment transfer, Milo Bell indicated that streams are only altered at "bank full".

3. What is your view of post-project sediment transfer changes to this reach of the Susitna? Does the Department agree that the Susitna will be changed at only 'bank full'?"

Our response to your second question covers our view of possible changes in the Talkeetna to Devil Canyon reach. We are in general accord with Dr. Bell's statements for that area. However, the influence of the Talkeetna and Chulitna rivers flow contribution for the section below Talkeetna has not been discussed in detail and we (ADF&G) have not formulated any opinion of change possibilities for the Talkeetna through Delta Islands reach.

As to the transport of material at "bank full" we are in general agreement with Dr. Bell.

The fourth question in your letter was stated as follows:

"Discussing changes in water temperature release during post-project, Bob Williams indicated that temperature models show that there will be a gradient of water temperatures within the proposed Devils Canyon impoundment. While he did not mention the specific temperature variations, he did maintain that this variation would be suitable to allow use of a multi-intake structure to assist in controlling water temperature release during post-project. In addition, Bob Williams said that TES is using temperature and hydraulic models to predict post-project temperature and quantity of water flow downstream to the Delta Islands.

4. Do you agree with this evaluation of the temperature regime for the proposed Devils Canyon impoundment? And do you agree with the suggested suitability of using a multi-intake structure to control water release downstream during post-project? What is your evaluation of the temperature and hydraulic models being used by TES?

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Do you feel these models are adequate to predict how changes in temperature and water flow will affect salmon populations?"

Acres American, we are aware, is actively running evaluations related to temperature and water flows downstream of the project for several scenarios. Some inadequacies in temperature and flow modeling do exist. Therefore, it is not appropriate at this time to do more than comment on the general conditions that may be expected post-project.

We basically agree that a graduation of temperatures will occur in the impoundment, however, we believe it is generally conceded that development of a thermocline as occurs in clearwater lakes or impoundments will not develop. On a seasonal basis these gradients, based on Acres preliminary assessments, may offer the potential to match existing downstream temperatures during the summer through use of multi-intake structures or some other comparable construction. During the winter, however, the temperature gradient existing in summer will no longer exist, if the current model is correct, and the temperature of reservoir releases will very likely be about 39°F. Currently, winter temperatures of the river run about 32°F.

We do not have complete confidence in either the temperature or hydraulic models at this time, and hope that they can be refined through specific and more extended data collection efforts to insure that adequate judgment of project impacts can be made.

Your fifth question was stated as follows:

"In addressing possible changes in flow and sedimentation on the normally clear low volume flow of the Susitna during winter, Milo Bell indicated that winter flows would be increased and would be slightly milky with fine silt. When asked how these changes would affect juvenile salmon using the main channel during winter for rearing, Milo Bell indicated that there could be disruption of this rearing habitat, but that it is still not known to what extent juvenile salmon use the main channel during winter.

5. How do you view the significance of this rearing habitat and possible changes due to proposed post-project conditions of increased flows and turbidity?"

We do not believe an objective knowledge of the post-project downstream turbidity exists. It should be less, but it is very difficult to say that turbidity will be of some X value. If we had such a value perhaps it could be translated to some visual frame of reference or comparison with other stream systems having that turbidity level. To say the Susitna River will look like this or that river or stream elsewhere in Alaska is impossible now. Literature review alone is not usually adequate because data and findings cited for one location are

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not likely to fully or accurately represent another specific location. More often than not, the species present in a system have adapted over time to the natural range of conditions found in that system. Whether the species can withstand acute or chronic changes to the system must be thoroughly investigated. If we could effect such a comparison then some generalization on the positive or negative impacts on the fishery resource from the standpoint of turbidity might be made. The significance of post-project turbidities related to fish, in our view, depends on developing some range of expected turbidity values. Whether this can be determined through modeling or other study we are unsure and will pursue this subject in discussions with the APA and Acres in February on information needs.

Implications of winter flows on rearing resident fish and juvenile salmon will require the completion of an adequate instream flow assessment program in succeeding years. We do know that rearing chinook salmon occur throughout the Susitna system downstream of the project but with the information available presently, we cannot specifically state that post-project rearing habitats for this species and others will increase or diminish in the river from the Devil Canyon to the Cook Inlet estuary.

Your sixth question was as follows:

"On the issue of the recommendations and conclusions TES must make to Acres American by February 15, Bob Williams felt that potential impacts could be defined and possible mitigation measures developed and proposed by this deadline. Clint Atkinson and Milo Bell stated that they will not be able to address all mitigation measures, but at the same time they felt that any shortcomings could be addressed in the proposed phase II studies. All members felt that enough could be said by February 15 to determine project feasibility.

6. Do you feel confident that potential impacts can be identified and mitigation measures defined by February 15? In addition, what is your position regarding the number of field seasons needed before a determination of impacts can be made and mitigation measures developed?"

This Department does not believe that the full range of potential impacts or mitigation measures required to offset fishery impacts will be defined for the project area from the impoundments to the Cook Inlet estuary by February 15. In a recent December 30 letter from my office to Mr. John Lawrence of Acres American on the APA's draft mitigation policy, it was stated that, "This Department does not believe adequate opportunity will be afforded the natural resource agencies to evaluate or review mitigation plans due to the accelerated nature of APA's schedule," and "Also, this Department has relayed to the APA on numerous occasions our concern that a more extended period of fisheries studies

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needs to be performed before adequate impact analysis is made and thence feasible mitigation alternatives developed."

We expect that some specific appraisal of impacts will be available for the impoundments to the expected impoundment water level. For the Talkeetna to Devil Canyon reach a few general impact conclusions might be drawn. However, the assessment of impacts presented for the Talkeetna to Cook Inlet estuary reach of the river may be expected, in our opinion, to be quite general and nebulous for lack of sufficient data.

TES has a difficult task, in our view, to meet the February 15 deadline with a product which will ultimately meet the requirements that we expect FERC and the resource agencies will regard as a satisfactory appraisal of project impacts and mitigation of these impacts on Susitna River fish and fish habitats. The difficulty of performing this task is primarily a function of an artificially set and unrealistic schedule to apply for a FERC license with minimal baseline study in our opinion.

This year's studies by this Department should enable a better assessment of the fundamental impact issues that need further study in Phase II, and the impact assessment by TES should define many gaps in our knowledge also.

The idea of determining project feasibility by February is really a larger issue than just feasibility from the fish and wildlife perspective. Feasibility determination must realistically be based on a complex of socioeconomic and environmental factors. In our judgment, the time frame established to FERC license application has limited scrutiny, by the Legislature, concerned state and federal agencies, and the public of the state, about other scenarios for hydro development on the Susitna River or energy alternatives which may complement or possibly replace hydro development on the Susitna River.

Your seventh question was related as follows:

"Discussing the implications of salmon enhancement for the upper 130 miles of the Susitna (with and without the dams) and the possibilities of increased salmon production to Cook Inlet, Milo Bell said he had not been asked by the APA to consider this potential. Bob Williams indicated that Acres and TES would not address upper Susitna salmon enhancement potential either. Both felt that consideration of salmon enhancement as an alternative development for the upper Susitna was beyond the scope of the Fishery Mitigation Task Force mandate.

7. Do you agree that upper Susitna salmon enhancement should not be evaluated by the Task Force? What is your opinion regarding the potential

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of upper Susitna salmon enhancement absent the proposed hydro project?"

We would agree with Dr. Bell and Mr. Williams that enhancement of the upper Susitna River has been generally considered as beyond the scope of the present Susitna River feasibility studies. The mandate of law and regulation covering water development projects, in our opinion, basically requires mitigation to achieve a no net loss of habitat values or parity with existing biological conditions. Programs to achieve enhancement of biological productivity beyond the existing baseline condition cannot be required of the Alaska Power Authority as the agency empowered to construct this proposed hydropower development. These types of studies are above and beyond the scope of this project, and must be directed to our fishery divisions and the Board of Fisheries to determine their merit.

Potential for enhancement of salmon resources both upstream and downstream of the impoundments does exist. Enhancement potential downstream of the dams under project conditions would have the greatest possibility of realization if natural fish stocks are undiminished and provided that project flows and water quality meet specific conditions which maintain current habitat diversity. Some manipulative techniques and alterations related to existing slough habitats may provide a practical and relatively inexpensive enhancement benefit. We cannot definitively state that this would occur, however, as a comprehensive assessment of the hydraulic connection between the mainstream river and these sloughs as well as other biological and other factors would be necessary. This enhancement potential downstream would exist without the project also.

Potential for enhancement of salmon by providing access past the Devil Canyon rapids without the project may also exist. The tributaries upstream of the Watana dam site may offer potential as salmon spawning habitat. Obviously, the feasibility of engineering fish passage past the Devil Canyon velocity barriers would have to be assessed and we suspect that to obtain the passage of fish may entail considerable expense for construction or other work.

With the hydro project, some of the enhancement potential may be diminished due to inundation of tributary stream habitats in the impoundments. Passage of fish upstream past the dams would require costly structures, and the passage of downstream migrants would entail problems perhaps similar to those encountered with dams on the Columbia River system.

We might note that a concept of linking a tributary of the Copper River system to Lake Louise which is tributary to the Susitna to provide passage to the Susitna system has been offered in the past. However,

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opening up the upper Susitna system to salmon for enhancement purposes could not be done without fully weighing the impacts on the natural biological system, the probability of success, and the real dollar costs versus benefits.

If you have future questions please do not hesitate to contact us.

Sincerely,



for Ronald O. Skoog
Commissioner

cc: R. Andrews
S. Pennoyer
R. Roys