

Sockeye Salmon Stocking at Solf Lake

Project number: 01256B

Restoration Category: Subsistence

Proposer: USFS

Lead Trustee Agency: USFS

Cooperating Agencies: ADF&G

Alaska Sea Life Center: No

Duration: 6th year, 7-year project

Cost FY 2000: \$159.5

Cost FY 2001: \$24.4

Cost FY 2002: \$20.0

Cost FY 2003: \$5.0

Cost FY 2004:

Geographic Area: Prince William Sound

Injured Resource: Subsistence/Sockeye Salmon

ABSTRACT

This project is designed to benefit subsistence users of Western Prince William Sound. Solf Lake has been recognized for many years as an opportunity to establish a self-sustaining sockeye salmon run. Habitat improvements were made in 1978, 1980 and 1981 to provide access to the lake for anadromous fish. The lake was never stocked and subsequent investigations suggested that it was fishless. There are two phases to this project: Phase 1, which began in FY96, has verified the ability of Solf Lake to support a sustainable population of sockeye salmon. Phase 2, included stocking the lake with approximately 100,000 sockeye salmon fry, then ensuring access to Solf Lake for returning adult salmon. The stocking program began in 1997 and outlet flow control structures were completed in 1997 and 1998. The reconstruction of the fishway in the eastern channel will be completed in the summer of 2000 ensuring returning adult salmon access to Solf Lake in the year 2001.

INTRODUCTION

Subsistence use of resources in the oil spill area declined following the spill. Although restoration studies have shown that harvest levels have since returned to pre-spill levels in most oil spill communities, Chenega Bay and Tatitlek are exceptions (Seitz and Fall, 1995; Seitz and Miraglia, 1995). These communities showed reduced harvest levels in 1993/94 and an increased reliance on salmon harvests (Seitz and Fall, 1995; Seitz and Miraglia, 1995). Solf Lake provides an opportunity to establish a large replacement fishery that is easily accessible, approximately 40 miles from Chenega Bay.

This proposal is a request for continued support from the Trustee Council to fund the sixth year of a seven-year project to restore sockeye salmon (*Oncorhynchus, nerka*) runs to Solf Lake. Construction on water control structures at the two outlets of Solf Lake is complete and the stocking and rearing of sockeye salmon fry is underway. Reconstruction of the fishway to ensure access to Solf Lake for returning adult salmon will be completed in the summer of 2000.

Two additional years of stocking and monitoring are required to establish a run of sockeye salmon and evaluate the performance of the structural improvements. Approval of this proposal would provide the necessary funding to evaluate improvements, stock Solf Lake for an additional year and collect information on returning adults. The first returns from the 1998 stocking are expected in May and June of 2001, at that time the fishway should be evaluated for fish passage effectiveness and spawning habitat utilization by returning fish.

Solf Lake has been recognized as an opportunity to reestablish a sockeye salmon run in Prince William Sound for many years. According to Nickerson (1978), "This system had historic runs of sockeye salmon. An earthquake in the 1930's caused blockages of the natural outlet resulting in water flowing over an impassable fall." Starting in the early 1970's, various attempts have been made to reestablish sockeye salmon in Solf Lake. For two years in this same period, ADF&G personnel transported adult sockeye salmon from Eshamy River to Solf Lake (Jackson, personal communication). Unfortunately, necessary stream improvements had not been completed when the offspring from the transplanted fish returned. In 1978, 1980 and 1981, the USFS implemented improvements to the lake and outlet stream. The work consisted of improving the eastern outlet and partially damming the western outlet. The dam was designed to raise the level of the lake to provide adequate water flow for fish passage at the eastern outlet. The improved eastern outlet channel is less than 100 meters in length, with an average gradient of 23 percent, see (Figure #2 in Appendix) for site details. Stocking of Solf Lake never occurred because of other priority projects for both the USFS and ADF&G, and the outlet improvements fell into disrepair.

ADF&G surveyed Solf Lake in 1985/1986 as part of a lake investigation study. The results of this survey, which included attempts to capture fish, suggest that the lake may be fishless (Pellissier and Somerville, 1987). However 1996 minnow trapping by USFS crews indicated a larger population of Dolly Varden (*Salvelinus malma*) than has been previously observed, but still not significant. These results are also supported by the composition and biomass of the zooplankton populations, which were sampled in 1986 (P. Shields, personal communication 1996). The Pellissier and Somerville (1987) survey also documented three minor barriers to fish passage in the eastern channel.

ADF&G recommends stocking levels based on their zooplankton studies. ADF&G will also take a conservative approach to stocking because barren lakes often have unstable macrozooplankton communities when faced with predation. With close evaluation, and by experimenting with stocking strategies, significant impacts to the macrozooplankton community will be ameliorated. Major reasons for the disparity of response to stocking barren lakes include 1) the inherent low productivity of these lakes; 2) macro zooplankton abundance, composition, and ability to adapt to predation; 3) stocking density; 4) morphometric factors and 5) variability in the indirect effects of predation in individual lakes. While Solf Lake is most likely capable of supporting stocking at the 500,000 fry level, it has been decided to take a more conservative approach to stocking. Based on available spawning habitat and the RPT's (Regional Planning Team) recommendations a target of 100,000 sockeye fry will be stocked into Solf Lake on an annual basis.

Solf Lake is a clear water lake with a mean depth of 42.5 m and a surface area of approximately 0.61 km² (Barto and Nelson, 1982). Based on historical limnological data from the 1980's, stream survey data collected in 1996, and analysis of current limnological data it is reasonable to expect that the lake is capable of supporting a sustainable sockeye population. Based on the available spawning area, it is estimated that Solf Lake could sustain a run of approximately 10,000 sockeye salmon. An escapement goal of approximately 4,500 fish would be required to fully seed the system without depleting the zooplankton populations, leaving 5,500 sockeye available for harvest. Consequently, we are recommending stocking at the 100,000 fry level to meet the objective of the stated return and the assumption that there will be a high fry to adult survival.

With the exception of 1986 prior to stocking activity, Diaptomus have accounted for more than 50% of the total biomass followed by Cyclops, which generally comprises about 30 % of the total. The remainder of the total macrozooplankton (TMZ) consisted primarily of the cladoceran form Bosmina and very small numbers of Daphnia. Diet selectivity studies for rearing sockeye fry have shown that fry presented with a wide choice of food items tend to select for cladoceran and large calanoid forms. Although sockeye fry do graze on Cyclops, it is not actively selected. Thus, In Solf Lake, we would expect the large, red pigmented, and therefore, highly visible Diaptomus, to be an indicator species of excessive grazing pressure and a guide to gauge stocking levels.

The 1999 stocking level of approximately 100,000, .5 gm., sockeye fry did appear to have an influence on (TMZ) and the abundance of Bosmina, indicated by a 81% decline in density and a 84% decline in biomass from pre-stocking means. Diaptomus declined similarly by 43% in density and 45% in biomass however these levels fall within the range of pre-stocking observations. The decline in Cyclops 66% and 69% respectively also fall within annual fluctuations and is probably not due to grazing, it is doubtful we would see a decline in this species before the highly preferred types, Figures #3 & #4 in Appendix. In February ADF&G and Forest Service biologist and Project Investigators reviewed the macrozooplankton results and determined that current stocking levels are still supported at Solf Lake and that the observed decline in macrozooplankton is within expected parameters.

Personnel from the Main Bay Hatchery successfully collected green eggs from Coghill brood stock and reared them at their Main Bay facility. Overall, survival of green eggs to released fry was approximately 90%. This resulted in the release of approximately 100,000, 0.50-gram fry into Solf Lake in the spring of 1999. A percentage of fry released were marked with half-length coded wire tags. PWSAC changed their Area Management Plan in 1999 to allow only Coghill brood stock at Main Bay Facility for future stocking activities; this resulted in a change to the stock used at Solf Lake. Discussions with the State Geneticist and the RPT have indicated that since the return at Solf is expected to be small the stock switch presents no concerns.

On 2 May 1999 the smolt enumeration box was installed in the flow control structure (northeast outlet) to capture all migrating smolts at Solf Lake. Later a fine mesh net was placed across the northwest dam to block smolt passage, forcing all emigrating smolts through the counting live-box at the NE outlet. The live-box was monitored periodically to avoid crowding and smolt mortality. On 17 June the counting box was replaced with an inclined-plane trap (Todd 1994) and fished for the remaining duration of the project, until 26 July. No smolts were caught in May. The first smolts were caught on 5 June, and the peak count occurred on 6 June when 189 smolt were enumerated. The 1999 total count was 248 sockeye salmon smolt and 45 Dolly Varden. The mean size of sampled ($N=16$) sockeye salmon smolt was 134.7 mm and 22.9 g. On the night of 27 September 1999 a hydroacoustic and tow-net survey were conducted on Solf Lake. There were essentially no targets (fish) recorded for the whole survey, 12 transects perpendicular to the longitudinal axis of the lake. Two tows were conducted at different depths using a 2 x 3 m tow-net and no fish were captured.

Because of the large sizes of sampled smolt and small number (248) counted during the spring emigration in 1999, and the lack of fish targets during the fall hydroacoustic survey, it is believed that the majority of fry stocked in both 1998 and 1999 emigrated as age-0 smolt during late summer. Cook Inlet Aquaculture Association (CIAA) has documented age-0 sockeye salmon smolts emigrating from their lake stocking programs; from 1990-1995, estimates of age-0 smolt emigrating Chelatna Lake (Susitna River basin) have ranged from less than 1% to 62% of the total outmigration (Fandrei 1995), and in Bear Lake (Seward) age-0 smolt estimates for 1990-1994 have ranged from less than 1%, up to 98% in one year (Hetrick and Prochazka 1998). At this time it is uncertain what the effects of this early emigration will have on ocean survival and consequently the number of returning adults to Solf Lake. This early outmigration is expected to discontinue as the available zooplankton is reduced and fry growth rates decrease and stabilize.

The eastern outlet to the lake required reconstruction of the "irrigation type" control dam; this work was completed in 1997. During the 1998 field season Forest Service personnel completed the installation of the diversion weir structure at the lakes western outlet, EVOS Project 98256b. The fishway in the eastern outlet will be completed in the summer of 2000 and is designed to provide sockeye salmon passage into Solf Lake. The design calls for two Alaska Steepasses one 30 feet, another 40 feet. in length installed at a 22% slope. Each steepass will require a concrete head wall and footers. The upper pass will spill into an excavated section of bedrock lined with concrete to form a watertight trench. Additionally five step pools will be created by the installation of five notched concrete weirs, to facilitate fish passage.

NEED FOR THE PROJECT

A. Statement of Problem

Subsistence use of resources in the oil spill area declined following the spill. Although restoration studies have shown that harvest levels have since returned to pre-spill levels in most oil spill communities, Chenega Bay and Tatitlek are exceptions (Seitz and Fall, 1995; Seitz and Miraglia, 1995). These communities showed reduced harvest levels in 1993/94 and an increased reliance on salmon harvests (Seitz and Fall, 1995; Seitz and Miraglia, 1995). Solf Lake provides an opportunity to establish a large replacement fishery that is easily accessible for subsistence users from Chenega Bay. Projects available for the restoration or replacement of lost subsistence services are limited; this proposal would use one of the few opportunities available.

This project has determined the feasibility of stocking Solf Lake with sockeye salmon and proposes the steps required to establish a replacement fishery for subsistence use. Based on historical limnological data from the 1980's and current observations, along with stream survey data collected in 1996 it is reasonable to expect that the lake is capable of supporting a sustainable sockeye population with an adult return of approximately 10,000 fish.

B. Rationale/Link to Restoration

The *Exxon Valdez* Restoration Office's Invitation to submit proposals for FY97 stated that subsistence users are traveling greater distances and must invest more time in subsistence harvesting than they did before the spill. Unlike many other oil spill communities, Chenega Bay still shows reduced subsistence harvest levels and a greater reliance on subsistence harvest of salmon (Seitz and Fall, 1995; Seitz and Miraglia, 1995). Solf Lake is located approximately 40 miles from Chenega Bay and provides an opportunity to establish a replacement fishery that is accessible to subsistence users. The lake is a clear water lake with a mean depth of 42.5 m and a surface area of approximately 0.61 km² (Barto and Nelson, 1982). Analyses of current data suggest that the lake may support a self-sustaining population of 10,000 sockeye with roughly half being available for harvest. Establishing this fishery would provide food for the tables of subsistence users in Western Prince William Sound.

Cost benefit calculation for subsistence resources are difficult to place a monetary value on give that the nature of these resources are more intrinsic and cultural. This project will provide a subsistence resource to local communities in perpetuity.

If this project were to be evaluated as a commercial enhancement activity the resultant harvest would be approximately 4,500 fish/yr. This would result in an annual harvest of 27,000 lb. of sockeye salmon. Assuming an ex-vessel price of \$1.75/lb. and a 2.5 multiplier to adjust for retail value providing a \$118,125 /yr. cash benefit. This information is provided purely to demonstrate a cash benefit to substance users whoever does not capture the intrinsic and cultural values this project will provide.

C. Location

Solf Lake is located off Herring Bay on Knight Island. The lake is approximately 40 miles by boat from Chenega Bay and 46 miles from Whittier. The lake is unnamed on USGS maps; however, Nickerson (1978), PWSRPT (1983 and 1986), Barto and Nelson (1982) all refer to the lake as Solf Lake (ADF&G Stream 690). The lake is described in the Anadromous Waters Catalog as number 226-10-16900-0010 (ADF&G, 1992). See location map, (Figure #1 in Appendix).

COMMUNITY INVOLVEMENT AND TRADITIONAL ECOLOGICAL KNOWLEDGE

This project is designed specifically to benefit subsistence users of PWS; therefore, community involvement is an important component for the success of the project. The feasibility phase of this project (FY96) has determined the ability of Solf Lake to support a self-sustaining population of sockeye salmon. Contacts with the Chenega Bay community liaison will be maintained throughout the feasibility and implementation phases of this project to discuss what the potential production might be for the lake, and project schedules. Opportunities will be identified to include residents of Chenega Bay in habitat improvement work or in the post-stocking monitoring program.

PROJECT DESIGN

A. Objectives

All of the objectives described in Phase 1 will be completed in FY99. The phase 2 objectives will continue to be addressed in FY00.

Phase 1. The overall objective of this phase of the project was to determine the feasibility of stocking Solf Lake with sockeye salmon. There are four components to this objective:

1. Determine if Solf Lake can sustain a population of sockeye salmon; (completed).
2. Determine appropriate stocking levels; (completed).
3. Coordinate with PWSAC and Main Bay hatchery to establish an appropriate brood stock and the necessary logistics to begin a stocking program; (completed).
4. Evaluate the existing habitat improvement structures to ensure adequate conditions for adult migration; (to be completed in FY99).

Phase 2. This is the implementation phase of the project it has three components.

1. Design and construct necessary improvements to the outlet channel and dam to ensure adequate passage for adult salmon migration; (75% complete).
2. Stock Solf Lake with sockeye salmon to produce a self-sustaining population that can provide an adequate subsistence harvest; (ongoing).

3. Monitor zooplankton and out-migration to ensure appropriate stocking levels; (discontinued).

B. Methods

Project 96256 included one season of data collection to determine presence of resident fish and the potential carrying capacity of Solf Lake. Information collected in 1999 will identify the habitat improvements needed to establish a sustainable sockeye run and allow for the design of the fishway. The following section is divided into two parts. Part 1 describes the methods needed to establish a self-sustaining sockeye salmon population. Part 2 describes the steps that may be needed to provide access for returning adult salmon.

Part 1. This section outlines the methods to implement a stocking program at Solf Lake.

Interagency Coordination: Close coordination between the USFS, ADF&G, PWSAC and the PWS/CR RPT is mandatory for the success of this project. Prince William Sound is a complex ecosystem and the potential stocking of Solf Lake needs to be considered in perspective with the overall management of the Sound. Interagency coordination started in 1996 and continues through 2000 to identify appropriate brood stocks, determine appropriate stocking levels, meet hatchery-related requirements, and to address mixed-stock fisheries issues.

Stocking Program (1998 to 2002): Appropriate stocking levels and strategies have been determined in coordination with ADF&G and PWSAC using all available data. Fry are currently being short-term reared at the Main Bay Hatchery and transported to the lake for release. The Eyak and Coghill stocks are identified in the PWS/CR Phase 3 Comprehensive Salmon Plan (PWS/CR RPT, 1994) as potential stocks for Solf Lake. At least four years of fry transplants would be required to establish a sockeye salmon run.

On the recommendation of the RPT, Eyak fish were selected as the brood stock for the Solf Lake project. At that time, there was concern that the incubation temperatures were too high in Solf Lake for early run Eyak fish. However, an early run stock was chosen to minimize management conflicts. Since that time, PWSAC has updated their Area Management Plan, which includes discontinuing the rearing of all sockeye stocks except Coghill fish at their Main Bay facility. On February 18th, 1999 a letter was sent to the RPT indicating that the Forest Service had no objection to switching the stock to Coghill fish, since these fish are also identified in the PWS/CR Phase 3 Comprehensive Salmon Plan as a suitable stock for Solf Lake. The mid run timing of the Coghill fish may additionally provide a more favorable incubation period than the Eyak stock, increasing the likelihood of a successful project. Discussions with the State Geneticist and the RPT have indicated that since the return at Solf is expected to be small and isolated from other stocks the stock switch presents no concerns.

Monitoring (1998 to 2000): Limnological data will be collected through 2000 of the stocking program to evaluate the affect of the stocking program on the plankton population. This monitoring will include a summer and fall sampling period for water chemistry analysis and monthly zooplankton sampling from May through September. These procedures are described in

detail in Koenings et. al. (1987). This would be a reduced sampling design from the one used during the feasibility assessment of the lake.

The success of the stocking program would also be monitored through sampling the fish population during the smolt out-migration and during adult escapement. Smolt will be collected by weir to estimate the total out-migration. Fish will be sampled to determine age, length and weight characteristics that can be used to evaluate the health of the population. Coded wire tags will be used to monitor the adult population. Additionally hydroacoustic and tow-net surveys will be conducted on Solf Lake at approximately 12 transects perpendicular to the longitudinal axis of the lake to enumerate fry abundance. Returning adults will be enumerated at a weir on the outlet stream and if possible with aerial surveys. Scales will also be collected and the age structure of the returning fish will be analyzed.

Part 2. This section recognizes the work that has been needed to provide access to the lake for returning adults. Construction of the fishway at the eastern channel in 2000 should ensure salmon have access to Solf Lake, however returning adults should be monitored closely to determine the success of the improvements.

Outlet Flow Control Structures (1997 – 1998): The existing improvement structures at the two outlets of the lake were evaluated. It was determined that the old structure, which dams the impassable western outlet, required extensive reconstruction to provide adequate flow for fish passage at the lakes eastern outlet. The eastern outlet, that would provide fish access to the lake also required reconstruction of the “irrigation type” control dam, this work was completed in 1997. An engineered survey of the western outlet and suitable dam design were completed in 1997 and in 1998, installation of the new diversion dam at the western outlet was completed.

Channel Modifications (2000): Solf Lake was visited by ADF&G personnel as part of a PWS lake investigation project in 1985 (Pellissier and Somerville, 1987). Three minor barriers to fish migration were identified in the outlet channel. These barriers were velocity barriers that ranged in size from 1.5 to 2.5 meters. The barriers may potentially be removed through the creation of plunge pools or by installing steeppasses. The report also suggested that the barriers might not exist if more water were in the outlet channel, which could be achieved by repairing or rebuilding the dam at the waterfall of the original outlet channel.

An engineered survey of the stream channel and hydraulic analysis revealed improvement were necessary to ensure fish passage into Solf Lake. The approved design will provide sockeye salmon moderately difficult passage into Solf Lake during anticipated low flow periods of 10 cfs., at any tide stage. The design calls for two Alaska Steepasses one 30 feet, another 40 feet. in length installed at a 22% slope. Each steeppass will require a concrete head wall and footers. The upper pass will spill into an excavated section of bedrock lined with concrete to form a watertight trench. Additionally five notched concrete weirs; to facilitate fish passage during periods of low stream flow will also be installed. Construction should be completed by mid summer of 2000 and evaluation of returning fish passage in 2001 will determine success. Figure #5 in Appendix.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

USFS will conduct the habitat surveys, evaluations of the habitat improvement structures, determine available spawning and rearing habitats, evaluate fish populations and construct improvements. Coordination will occur with PWSAC to make any necessary adjustments at the Main Bay Hatchery to accommodate additional incubation and short-term rearing. Coordination will also occur with PWSAC to perform any necessary fish culture work and transport the fry to the lake. Interagency coordination is essential to establish a successful population at Solf Lake. The PWS/CR RPT will be involved in assessing opportunities and for developing strategies for the stocking program. ADF&G, Residents of Chenega and the USFS will coordinate and develop a harvest strategy prior to sockeye returning to Solf Lake to prevent possible over escapements.

SCHEDULE

A. Measurable Project Tasks for FY01

Oct - June: PWSAC. Rear sockeye fry at Main Bay.
Oct: Attend Annual Restoration Workshop.
Jan - April: USFS. Prepare for field season award contracts for logistics.
Jan - April: USFS. Prepare and submit Annual Report and updated DPD.
June: PWSAC. Release fourth year of sockeye fry at Solf Lake.
April - July: USFS. Evaluate fishway and monitor returning adult salmon.
Oct - April: ADF&G. Prepare report, attend annual workshop.
Aug: PWSAC. Conduct egg takes for 2002 stocking at Solf Lake.

B. Project Milestones and Endpoints

Phase 1. The overall objective of this stage of the project was to determine the feasibility of stocking Solf Lake with sockeye salmon. This objective has been completed and mixed-stock fisheries and genetic risk issues are resolved.

Phase 2. This is the actual stocking phase of the project. With the completion of Phase 1 and a favorable recommendation from the RPT stocking began in FY98 and is on schedule for FY99. The evaluation of the eastern channel at Solf Lake indicates that additional work is needed to allow for adequate fish passage. These improvements would have to be made before adult fish

return to the lake in the year 2001. The following is a tentative schedule and measurable end points that apply to the two phases of this project.

Oct - Dec. FY97:	Determine appropriate brood stock and potential stocking levels. Coordinate with PWSAC and the PWS RPT for production planning.
Jan-April FY98:	Apply for necessary permits and hatchery space; complete NEPA process.
May-July FY99:	Survey and design of improvements for eastern channel.
April-July FY00:	Construct fishway in eastern channel, monitor for returning jack salmon.
June-July FY97-01:	Collect eggs for brood stock.
FY98 - FY02:	Release hatchery-reared fry Submit annual reports
FY01 - FY03:	Enumerate adult returns and evaluate fishway. Prepare and submit final report.

C. Completion Date

The final report will be prepared and submitted by April 15th 2003.

PUBLICATIONS AND REPORTS

Annual reports and an updated DPD will be submitted during each year of the project. A final report will be submitted in FY03.

PROFESSIONAL CONFERENCES

At this time, there are no plans to present this project at professional conferences however, a poster display for educational and informational purposes is planned.

NORMAL AGENCY MANAGEMENT

Given current agency priorities the opportunity to conduct this project under normal agency management either now or in the near future is unlikely. However, some aspects of the long-term maintenance and monitoring of the project, may fall under the normal agency management.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Initial coordination with ADF&G biologists in Cordova, with the Regional Planning Team, and with PWSAC will continue throughout FY99 to address the mixed-stock fisheries and genetic

risk issues that will influence the feasibility of this project. USFS Personnel attend the 1996 summer Regional Planning Team meeting to initialize the necessary coordination. The results from FY96 were presented to the RPT outlining, potential size of the stocking program and brood stocks. The information was used to assess the potential effects of this project on local wild stocks and on the commercial fisheries in the area.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

This proposal covers only one of the two locations described in the original proposal 96256. The proposal for the other site, Columbia Lake, was resubmitted as 97256a. The feasibility study of Columbia Lake determined that it would not be a good candidate for stocking at this time and has since been dropped from further study.

We proposed in the FY99 DPD to move back the implementation of the fishway construction until FY00, this modification has been approved by the Trustee Council. Close inspection of the eastern channel revealed subterranean flows and a great deal of rubble within the channel. These factors have required a much more detailed survey and an experienced Fisheries Engineer to develop a design that will function properly in this complex channel.

PROPOSED PRINCIPAL INVESTIGATOR

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PRINCIPAL INVESTIGATOR

The principal investigator of this project will Daniel Gillikin, Fisheries Biological Technician; Glacier Ranger District. Dan is the logistics and construction specialist for the fisheries department at Glacier and will coordinate this project for the USFS. Currently Dan holds the position of Fisheries Technician on the Glacier District. Dan has twelve years of experience as a fisheries technician with Private and Federal Agencies in Washington and Alaska. He would work with the project manager and conduct project implementation, environmental compliance, agency coordination, budget management and reporting.

ADF&G is the cooperating agency on the project. Gary Todd, Fishery Biologist I, will be the principal investigator for the limnological and bathymetry work.

OTHER KEY PERSONNEL

Cliff Fox, U.S. Forest Service Glacier Ranger District Chugach National Forest. Currently holds the position of Resource Staff Officer on the Glacier District. Cliff has 20 years experience in natural resource management with State and Federal Agencies in California, Idaho and Alaska.

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Shields, P., Fish Biologist I, Alaska Department of Fish and Game. Division of Commercial Fish Management and Development. Soldotna Limnology Lab. April 1996.

APPENDIX

Figure # 1. Solf Lake Location Map.

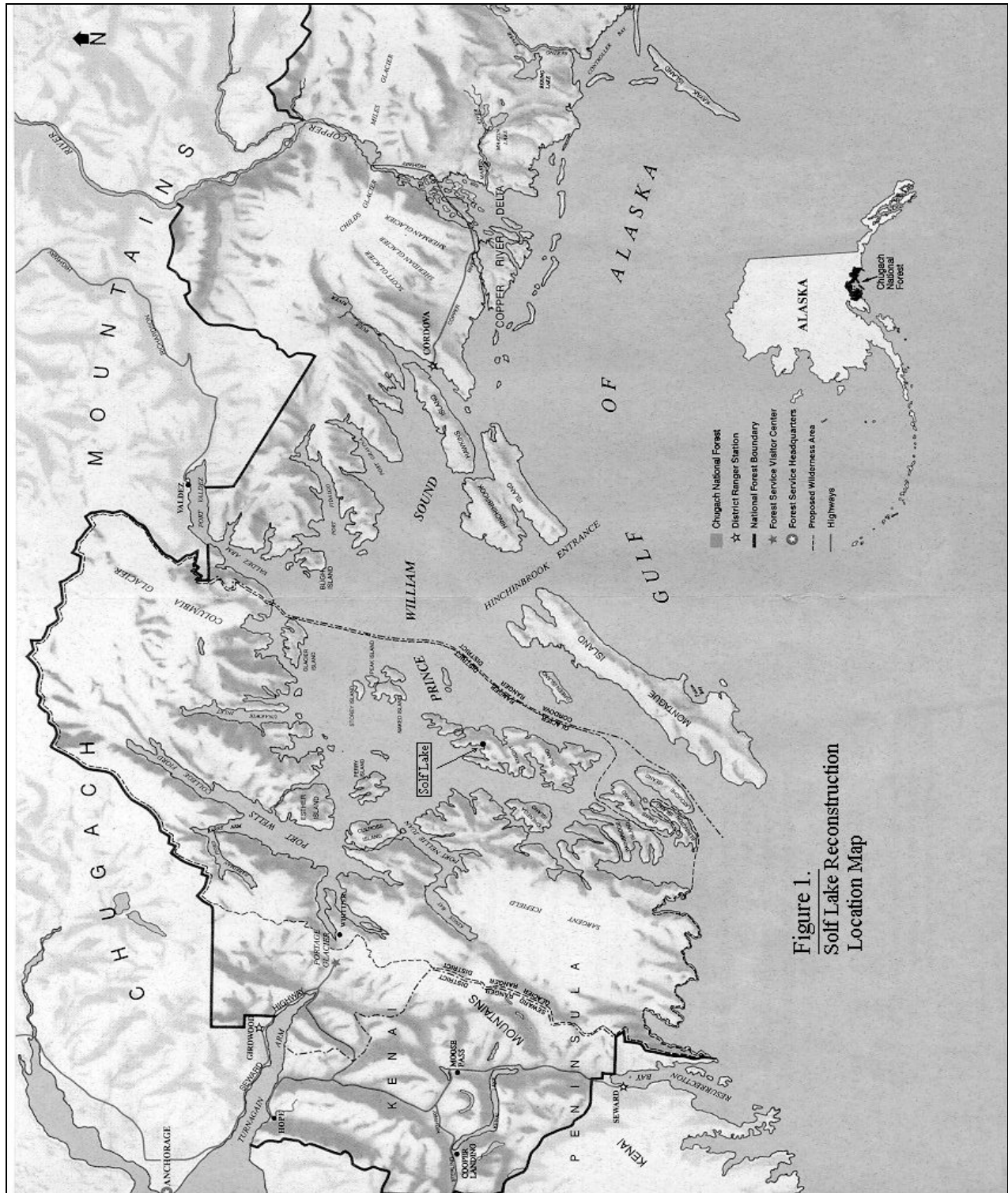


Figure 1.
Solf Lake Reconstruction
Location Map

Figure # 2. Solf Lake Site Plan

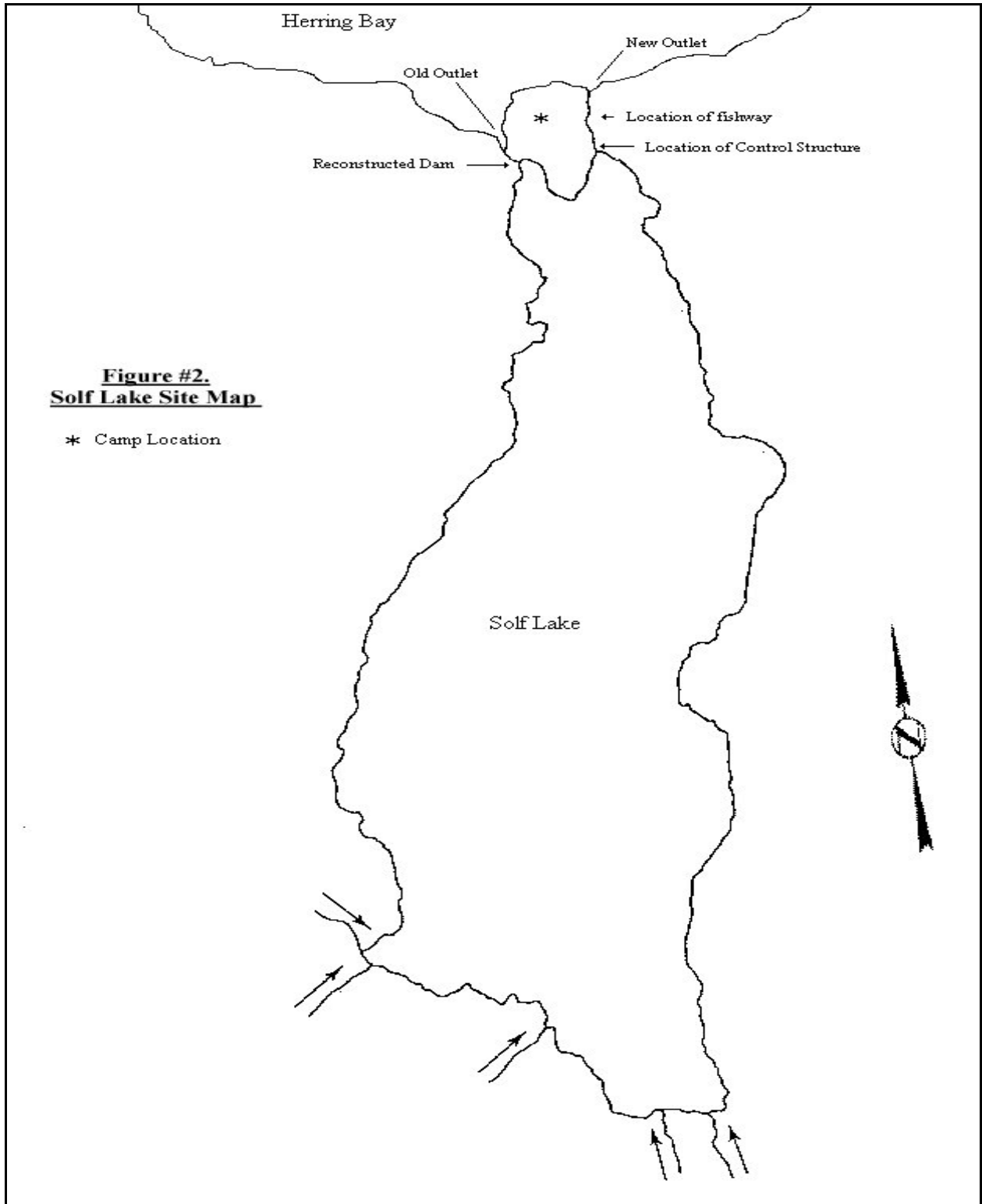


Figure # 3. Macrozooplankton Composition by Density.

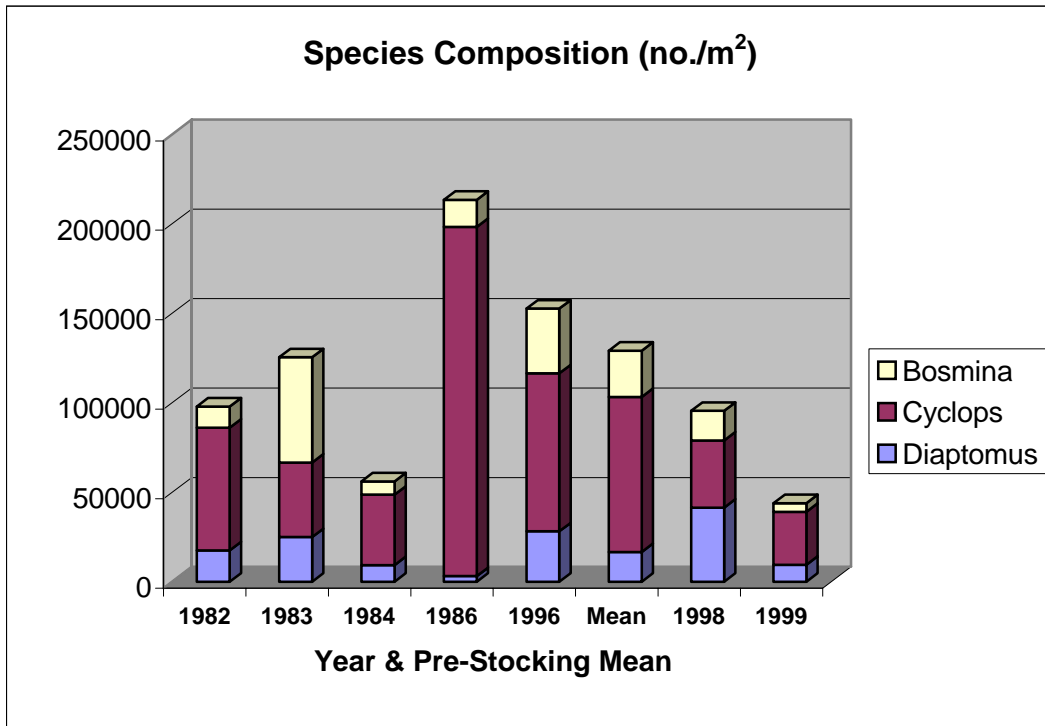


Figure # 4. Macrozooplankton Biomass (mg/m²).

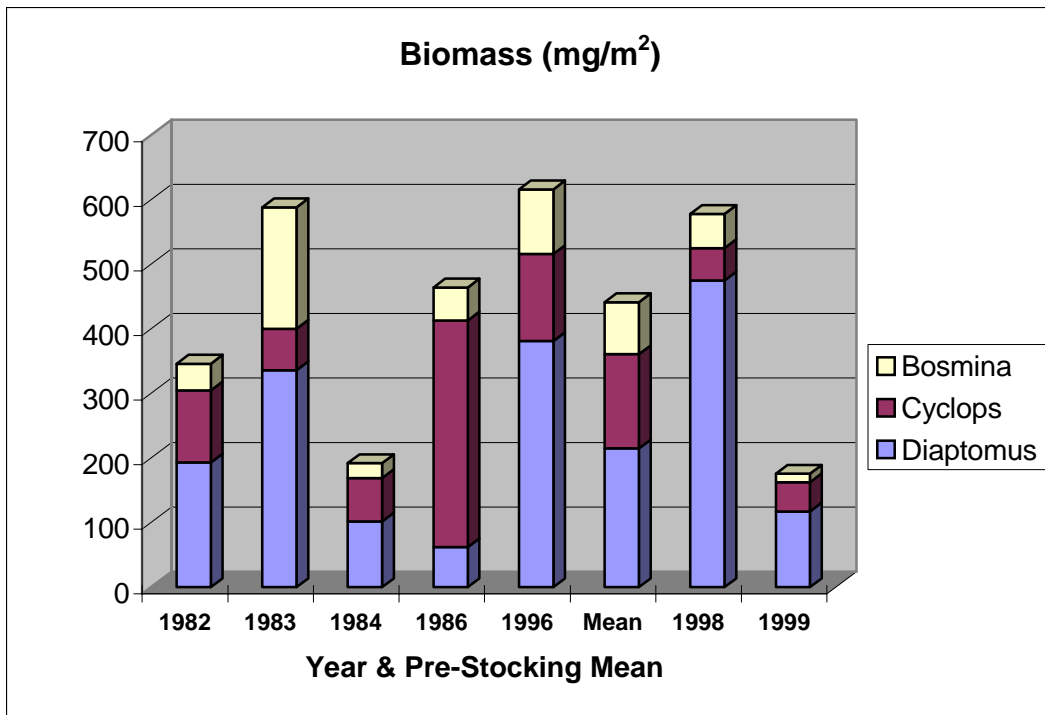
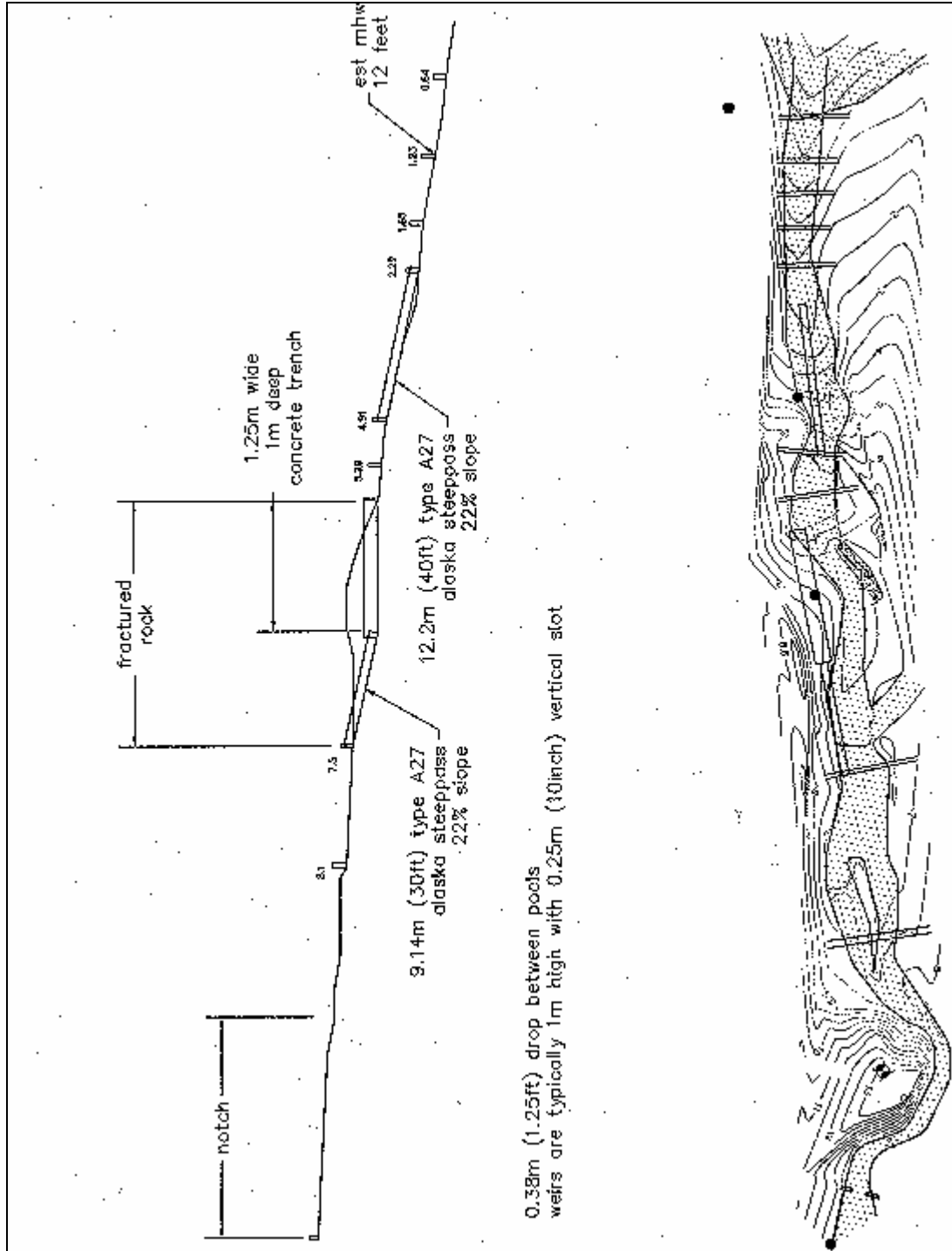


Figure # 5. View Plan Solf Fishway.



2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized FY 2000	Proposed FY 2001	PROPOSED FY 2001 TRUSTEE AGENCIES TOTALS				
			ADEC	ADF&G	ADNR	USFS	DOI
				\$6.5		\$17.9	
Personnel	\$70.3	\$14.5					
Travel	\$8.4	\$0.4					
Contractual	\$23.2	\$6.6					
Commodities	\$38.8	\$0.3					
Equipment	\$6.7	\$0.0					
Subtotal	\$147.4	\$21.8	LONG RANGE FUNDING REQUIREMENTS				
General Administration	\$12.1	\$2.6				Estimated FY 2002	FY2003
Project Total	\$159.5	\$24.4				\$20.0	
Full-time Equivalentents (FTE)	0.0	0.4					
Dollar amounts are shown in thousands of dollars.							
Other Resources	\$0.0	\$0.0				\$0.0	
<p>Comments: This is a continuation of project 00256B between the US. Forest Service and the Alaska Department of Fish and Game.</p>							

FY01

Project Number: 01256b
 Project Title: Sockeye salmon stocking: Solf Lake
 Lead Agency: USFS

Prepared:

Budget Category:	Authorized FY 2000	Proposed FY 2001					
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2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel	\$26.3	\$5.3					
Travel	\$0.4	\$0.4					
Contractual	\$2.5	\$0.0					
Commodities	\$3.3	\$0.0					
Equipment	\$2.5	\$0.0	LONG RANGE FUNDING REQUIREMENTS				
Subtotal	\$35.0	\$5.7				Estimated	
General Administration	\$4.1	\$0.8				FY 2002	
Project Total	\$39.1	\$6.5					
Full-time Equivalentents (FTE)		0.1					
Dollar amounts are shown in thousands of dollars.							
Other Resources							
Report writing and annual workshop.							

FY01

Project Number: 01256b
 Project Title: Sockeye salmon stocking: Solf Lake
 Agency: ADF&G

Prepared:

Personnel Costs:		GS/Range/	Months	Monthly	Overtime	2 of 9
Name	Position Description	Step	Budgeted	Costs		
Gary Todd	FB2	16D	1.00	5.3		
Richard Dederick	FTII	9F				

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Denise Cialek Seasonal	FTIII FTII	11L				
Subtotal			1.0	5.3	0.0	
Personnel Total						
Travel Costs:			Ticket Price	Round Trips	Total Days	Daily Per Diem
Description						
Air fare (1 round trip to Anchorage)			0.1	1	3	0.1
Whitter tunnel fare (2 round trip)						
Travel Total						

FY01

Project Number: 01256b
 Project Title: Sockeye salmon stocking: Solf Lake
 Agency: ADF&G

Prepared:

Contractual Costs:		
Description		
Air Charter (\$350 hr, 2.5 hr round trip), six round trips Hydroacoustic survey analysis (\$750 each), two surveys Calibrate hydroacoustic equipment		3 of 9

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

When a non-trustee organization is used, the form 4A is required.		Contractual Total
Commodities Costs:		
Description		
Per Diem (2 crew for 25 days @ \$18 day each) Misc. supplies and equipment (fry seine, sampling supplies)		
		Commodities Total

FY01

Project Number: 01256b
Project Title: Sockeye salmon stocking: Solf Lake
Agency: ADF&G

Prepared:

New Equipment Purchases:		Number of Units	Unit Price
Description			

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Those purchases associated with replacement equipment should be indicated by placement of an R.	New Equipment Total
Existing Equipment Usage:	
Description	Number of Units

FY01

Project Number: 01256b
 Project Title: Sockeye salmon stocking: Solf Lake
 Agency: ADF&G

Prepared:

Budget Category:	Authorized FY 2000	Proposed FY 2001			
Personnel	\$44.0	\$9.2			
Travel	\$8.0	\$0.0			
Contractual	\$20.7	\$6.6			
Commodities	\$35.5	\$0.3			
Equipment	\$4.2	\$0.0			
Subtotal	\$112.4	\$16.1			
General Administration	\$8.0	\$1.8			
			LONG RANGE FUNDING REQUIREMENTS		
			Estimated FY 2002	FY2003	5 of 9

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Project Total	\$120.4	\$17.9				\$20.0	\$5.0	
Full-time Equivalents (FTE)		0.3						
Dollar amounts are shown in thousands of dollars.								
Other Resources								
Comments: This covers administrative cost for report preparation and monitoring of adult salmon returns and fishpass effectiveness.								

FY01

Project Number: 01256b
 Project Title: Sockeye salmon stocking: Solf Lake
 Agency: USFS

Prepared:

Personnel Costs:		GS/Range/Step	Months Budgeted	Monthly Costs	Overtime	
Name	Position Description					
Dan Gillikin	Fish Technician	GS-9	1.5	3.5		
Rob Spangler	Fish Biologist	GS-9	0.5	4.2		
Seasonal	Fish Technician	GS-5	1.0	1.8		

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

					Subtotal		3.0	9.5	0.0
					Personnel Total				
Travel Costs:					Ticket	Round	Total	Daily	
Description					Price	Trips	Days	Per Diem	
					Travel Total				

FY01

Project Number: 01256b
 Project Title: Sockeye salmon stocking: Solf Lake
 Agency: USFS

Prepared:

Contractual Costs:	
Description	
Egg Take, Incubation, Marking and Release. PWSAC Contract at Main Bay Air Charter 4 trips @ \$600/trip	

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Existing Equipment Usage:	Number	
Description	of Units	
Forest Service Landing Craft	1	

FY01

Project Number: 01256b
Project Title: Sockeye salmon stocking: Solf Lake
Agency: USFS

Prepared: