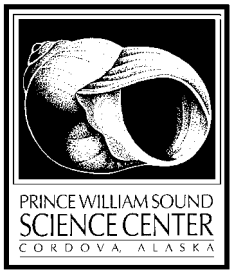

PRINCE WILLIAM SOUND SCIENCE CENTER RESEARCH PROPOSAL

Date: 14 April 2000

To: *Exxon Valdez* Oil Spill Trustee Council

Project Title: 01393 - Prince William Sound Food Webs: Structure and Change, Submitted Under the BAA

Federal/State/Private funding:
Amount requested: $ 122.6K (exclusive of agency overhead), FFY 2001

Desired time period for grant: Three years (Apr. 1999 - Sept. 2002), Contract year 3: 1 Apr. 2001 - 30 Mar. 2002

Principal Investigator:

Date:_____ _____
Thomas C. Kline, Jr. Ph. D.

Center Approval:

Date:_____ _____
G. L. Thomas, President

Prince William Sound Food Webs: Structure and Change, Submitted Under the BAA

Project Number:	01393
Restoration Category:	Research
Proposer:	Prince William Sound Science Center Cordova, Alaska
Lead Trustee Agency:	NOAA
Cooperating Agencies:	
Alaska SeaLife Center:	
Duration:	Year 3, 3-year project
Cost FY 01:	$ 122.6 K (exclusive of agency overhead)
Cost FY 01:	$ 131.2K (inclusive of agency overhead)
Geographic Area:	Prince William Sound
Injured Resource/Service:	Fishes and their Injured Consumers, Fisheries: Commercial, Recreational, and Subsistence

ABSTRACT

Recent research has shown that the advective regime connecting the northern Gulf of Alaska (GOA) with Prince William Sound (PWS) may affect recruitment and nutritional processes in Fishes (Kline 1999b). Accordingly, food webs are subject to changes in carbon flow occurring between GOA and PWS. This project seeks to: (1) conduct retrospective analysis of GOA production shifts since EVOS, and (2) address Ecopath model validation data gaps. These analyses will enable us to gain a better understanding of the ecological role of 'regime shift" processes conjectured to be impeding the natural restoration of populations in PWS affected by the EVOS.

INTRODUCTION

Stable isotope ratios of carbon and nitrogen have been shown to serve as effective tracers of energy supply in the Prince William Sound study area (Kline 1997a, 1997b, 1998, 1999b) This is due to (1) the conservative transfer of carbon isotope ratios between the lower tropic levels (phytoplankton to zooplankton to forage fishes, etc.) of Prince William Sound (PWS) and adjacent Gulf of Alaska (GOA) waters up to the top consumers and (2) the naturally occurring gradient in $^{13}C/^{12}C$ productivity generated in the Gulf compared with the Sound. Organisms acquire these isotope ratios in response to the importance of the food in bulk body tissues. Isotope ratio analysis of tissues thus provide insight into both habitat usage and assist in quantifying amounts derived from various areas. Nitrogen isotope ratios, in turn, provide excellent definition of relative trophic level. The heavy isotope of nitrogen is enriched by about 0.3 % with each trophic level and thus can accurately indicate the relative trophic status of species within an ecosystem (Minagawa and Wada 1984, Fry 1988) and is useful for food web model validation (Kline and Pauly 1998, Kline 1999b).

Results from prior work

Juvenile herring and pollock are the dominant pelagic fishes in PWS and both consume zooplankton. Juvenile herring and pollock from PWS shifted in $^{13}C/^{12}C$ content between 1994 and 1995 from which a change in carbon source dependency was inferred (Kline 1999b). Although both species shifted in concert to greater GOA dependency in 1995 than 1994, pollock were consistently less dependent on GOA carbon. Juvenile pollock and herring occupy different levels in the water column, have different schooling behavior, and recruit from the larval stage at different times, effecting access to a different forage-base as confirmed by the data. This difference may not be reflected in the species composition of diet but instead the where and when of the production cycle as integrated into the isotopic signature (Kline 1998), which reflects the assimilated carbon pool of the fish. The greater reliance on GOA-derived carbon in herring may reflect their dependence on carbon generated later in the season during the time when advection of GOA production was nearly the sole carbon source in 1995 as suggested by the data. The concordant shift to greater GOA dependency by both species in 1995, Sound-wide, implied that system-wide bottom-up effects permeated the whole ecosystem due oceanographic processes.

The isotopic gradient between PWS and GOA had a consistent relationship in the 1994-1996 period except for May 1996 when the gradient reversed owing to a large magnitude change in the GOA signature (Kline 1999b). Whereas PWS mean $^{13}C/^{12}C$ values ranged within 1 delta unit, and the difference between PWS and GOA averaged 3 delta units, the GOA mean value shifted

in Spring 1996 by 5 delta units. This large shift reflected a change in phytoplankon fractionation during uptake of CO_2 which varies as a function of growth rate (Laws et al. 1995, Bidigare et al. 1997). Thus the productivity pattern during the spring bloom of 1996 was markedly different from other times. Large fluctuations in productivity in the GOA suggests large inconsistencies in food availability for consumers from year to year if these fluctuations are typical. Thus the question arises : Are fluctuations in GOA spring bloom productivity, as evidenced by changes in $^{13}C/^{12}C$, typical?

The Ecopath modeling group (Pauly and Pimm et al.) Trustee Council sponsored synthesis of known ecological relationships of many of the organisms inhabiting PWS will be used to conduct perturbation experiments to examine EVOS and restoration effects. The utility of this effort will in part be dependent on how realistic their models are. One way to determine if the model is realistic is to compare model predictions with those made using an independent method. Ecopath generates as part of the output, the fractional trophic level for each functional group defined in the model input that can be validated with $^{15}N/^{14}N$ data (Kline and Pauly 1998). Kline and Pauly (1998) validated a preliminary PWS Ecopath model using this novel approach. They used a limited number of functional groups which contrasts with the full Ecopath model which will have ~ 50. In comparison to the preliminary model, the artifact of functional group over-aggregation will be significantly reduced in the full model, enabling a more robust Ecopath validation if $^{15}N/^{14}N$ data for a large proportion of the functional groups were available. See Kline (2000) for the preliminary results of this project.

NEED FOR THE PROJECT

A. Statement of Problem

The Problem: Recovery of EVOS damaged species is uncertain in light of regime shifts

Decadal-scale changes in the production cycles of the subarctic Pacific Ocean have been conjectured to effect population changes in fishes and their zooplankton forage base (Brodeur and Ware 1992, Francis and Hare 1994). A “ring of zooplankton” occurring near the Gulf of Alaska (GOA) continental shelf break appears to undergo dramatic oscillations in abundance over decadal time scales (Brodeur and Ware 1992). This “ring of zooplankton” is driven onto the shelf providing the ecosystem with an important forage base (Cooney 1988, 1993). Natural stable isotope (NSI) data suggested that the transport of zooplankton from the GOA into Prince William Sound (PWS) may provide significant quantities of forage for food webs and may be a good

method for detecting changes in biophysical coupling in the PWS region (Kline 1999b).

A recent "regime shift" similar to that seen in the past (Brodeur and Ware 1992, Francis and Hare 1994) is conjectured to be presently occurring in the North Pacific (Anderson et al. 1996). Post-EVOS recoveries are uncertain since the regime shift may impede population increases. Recently, using NSI, it has been possible to ascertain that GOA primary productivity patterns vary at inter-annual time scales and that GAO production is important to PWS (Kline 1999b). Using retrospective NSI analysis, it may be possible to assess whether fluctuations in primary production took place since EVOS. If so, this could explain the poor recovery of some injured species. Furthermore, fluctuations in the mass balance of carbon postulated to be taking place can be incorporated into applications of the Ecopath model being developed by Trustee Council funding which can also be validated using NSI data (Kline and Pauly 1998).

Need #1: Gulf of Alaska productivity fluctuations - retrospective analysis since EVOS

There is a discontinuity between the start of PWS ecosystem studies in 1994 and the timing of EVOS in 1979. Ecosystem shifts occurring in the GOA since 1989 were thus not incorporated in present studies. To overcome this perspective, retrospective NSI analyses may enable a reconstruction systematic ecological changes occurring since 1989.A retrospective approach is being used by GLOBEC in several projects in the N.E. Pacific as a means of overcoming temporal limitations in our database (U.S. GLOBEC 1996). Fixed tissues such as the protein layer on the exterior of mussels provide a recent record of changes in the isotopic composition of their phytoplankton diet. An opportunistic collection of *Mytilus californianus* from Middleton Island made in September 1997 provides an inexpensive approach to retrospective analysis. Middleton Island's location in the Alaska Current provides an "upstream perspective" on the EVOS area since samples from there will reflect changes in plankton upstream before interaction with PWS-origin carbon is possible.

Need #2: Mass-balance modeling validation data gaps

Kline and Pauly (1998) established the utility of using NSI data to validate the Ecopath mass-balance model (Project 330). This was done with a small number of highly aggregated functional groups. The final model has about 46 functional groups. Of the functional groups listed good isotopic representation was available for about 7 prior to this project. Thus confident model validation could only be performed for a limited selection of the functional groups. therefore this project will analyze additional samples to

increase the number of functional groups validated. These and preliminary results are listed in Kline (2000).

B. Rationale/Link to Restoration

Shifts in carbon flow occurring as a result in variations in the physical environment represent fundamental changes in the way the PWS ecosystem supports commercially important species. The availability of macrozooplankton forage for fishes varies in space and time because of changes in physical processes in PWS. The NSI approach is unique in its ability to integrate time and spatial scales at mesoscale levels. No other technique currently available can generate such results. The natural tracer aspects of the approach emulates artificial tracer experiments without the burden of needing to generate signals or experimental artifacts. Tracking the effect of Gulf carbon inflow on pelagic production that appears to vary between years will be used to resolve the question of how oceanographic process affect fisheries recruitment. Finally, the value of the Ecopath modeling effort funded as restoration tool would be greatly enhanced through a incorporation of a proven model validation concept.

C. Location

Prince William Sound

COMMUNITY INVOLVEMENT AND TRADITIONAL ECOLOGICAL KNOWLEDGE

The participation of the community and incorporation of local knowledge into regional science efforts was the raison d'être for the PWSSC. The Center has a web page and distributes brochures and newsletters to all PWS communities. Our 1999 building addition includes an area where public presentations are given. Our education program provides a unique community involvement. To further our invovement in the entire community and external governing board is being implemented in 2000. The following are some of the individuals and groups that have been invited to participate: President, Valdez Chamber of Commerce Valdez; Marine Safety Office Cmdr. US Coast Guard Valdez; Mayor, City of Whittier Whittier; President, Chugach Alaska Corporation Anchorage, SeaRiver; President, The Eyak Corporation Cordova; Alaska Dept. of Environmental Conservation, Valdez; U.S. Coast Guard Cmdr., Sweetbrier, Cordova; Herb and Barb Jensen, Cordova; Dave and Kim Erbey, Cordova Air Service, Cordova; Jim and Patty Kallander, Cordova; Sue Aspelund, Executive Director, Cordova District Fishermen United Cordova; Jack Babic, Jr., Cordova; Cal Baker, Cordova District Ranger, Cordova; Bob Baldwin. BP Exploration Shipping; Bob

Berceli, Alaska Dept.& of Fish & Game, Cordova; Trish Berg, ARCO Alaska Shipping; Russ Bradley, President, Cordova Chamber of Commerce, Cordova; Pat Carney, BP Exploration Shipping; Dave Cobb, Mayor, City of Valdez, Valdez; Tom Colby, Alaska Tanker Company, Valdez; John Devens, Executive Director, PWS Regional Citizens' Advisory Council, Valdez, Gail Evanoff, President, Chenega Bay Village Council, Chenega Bay; Senator Georgianna Lincoln, State Senate, Alaska State Legislature, Juneau; Bob Henrichs, President, Native Village of Eyak, Cordova; David Janka, Auklet Charter Services, Cordova; Representative John Harris, House District 35, Alaska State Legislature, Juneau; Margy Johnson, Former Mayor, City of Cordova, Cordova; Tim Joyce, Alaska Dept. of Fish & Game, Cordova; Gary Kompkoff, President, Tatitlek Village Corporation Tatitlek; Carroll Kompkoff, President, The Tatitlek Corporation Cordova; Dune Lankard, Eyak Preservation Council, Cordova; Gerald McCune, President, Cordova District Fishermen United, Cordova; Jody McDowell, President, Prince William Sound Community College, Valdez; Vince Mitchell, SERVS Valdez; Riki Ott, Ph.D.. Copper River Watershed Project, Cordova; Brad Phillips, Phillips Cruises, Anchorage; Steve Ranney, Fishing and Flying, Cordova; Gayle Ranney, Fishing and Flying, Cordova; Ken Roemhildt, Superintendent, North Pacific Processors, Cordova; Jerry Sanger, Charter operator, Whittier; Dan Sharp, Alaska Dept. of Fish & Game, Valdez; Dorothy Shepard, Cordova Coordinator, PWS Community College, Cordova; Stan Stephens, Stan Stephens Charters, Valdez; Paul Swartzbart, Cordova; Chuck Totemoff, President, Chenega Bay Corporation, Anchorage; Bill Webber, Jr., Cordova; Mark Willette, Alaska Dept. of Fish & Game, Cordova; Ed Zeine, Mayor, City of Cordova, Cordova.

Additionally, community involvement and traditional ecological knowledge were incorporated into the sampling. For example, local fishermen provided the T. Kline with the knowledge and opportunity to acquire the *Mytilus californianus* samples.

PROJECT DESIGN

Natural stable isotope abundances reflect (1) trophic level and (2) source of assimilated matter and are thus a proxy for the change in diet. Stable isotope ratios will thus be used as a indicator of production and shifts in predation as tests of hypotheses which are stated below in relation to the stated needs.

A. Hypothesis-based Objectives

The needs described above suggest several hypotheses, listed below, that form the basis for the project objectives.

For Need #1 -- thus Objective #1
$Ho_{1.1}$: The isotopic shift seen in 1995 was a singular anomaly, therefore the GOA $^{13}C/^{12}C$ values in earlier years will be consistent.
$Ha_{1.1}$: If they are different, what is the pattern (if there is one)?
$Ho_{1.2}$: The $^{13}C/^{12}C$ of *Mytilus californianus* = $^{13}C/^{12}C$ of *Neocalanus.* This is expected since both are herbivores.
$Ha_{1.2}$: If they are not equal is the there a systematic difference?

There are three goals to be fulfilled for Objective #2:

1. Reconstruct a $^{13}C/^{12}C$ time-series covering at least the 1989 - 1997 period.

2. Compare the time-series with observed $^{13}C/^{12}C$ changes in 1994-1997 (Fig. 2 plus the additional data-year (1997) currently being generated in project 311).

3. Publication of the results in the open literature.

For Need #2 -- thus Objective #2
$Ho_{2.1}$: Trophic level of each functional group predicted by Ecopath = the trophic level of each functional group predicted by their mean $^{15}N/^{14}N$.
$Ho_{2.2}$: Omnivory index of each functional group predicted by Ecopath = the standard deviation of trophic level of each functional group predicted by individual $^{15}N/^{14}N$ values.

There are three goals to be fulfilled for Objective #2:

1. Provide a better representation of the Ecopath functional groups so as to enhance model validation. Note that only a limited number of functional groups were used in the preliminary model validation (Fig. 3). The goal is to make a substantial improvement.

2. Provide validation data for the more model-sensitive higher trophic levels (D. Pauly, pers. comm.). Much of the predictive power of the Ecopath model is for trophic level 4 and 5 functional groups, therefore validation of these functional groups would provide a robust test of the model.

3. Publication of the PWS Ecopath model validation in the open literature, this would have to be a significant leap over Kline and Pauly (1998) to pass the reviewers, hence goals 1 and 2.

See Kline and Pauly 1998 for a description of the validation method.

Data Gaps

The proposed study will build upon the existing data base; adding new data will fill data gaps and further the construction and tests of conceptual food webs supporting productivity in the greater Prince William Sound area. The goal is to determine the trophic positions and to define the natural history parameters accessible from NSI data in light of the observed declines in their populations. These include changes in trophic level over the lives of pelagic organisms, habitat dependencies, seasonal energetics and trophic dynamics relative to other community organisms. As part of this goal, we will integrate our analytical work with the field and laboratory studies of other investigators looking at food web structure, productivity of lower trophic levels, and provide validation data for assessment of conceptual and quantitative models.

Sampling objectives are listed in relation to needs and their hypotheses. The emphasis will shift among the objectives by fiscal year (these are given proceeding each objective).

B. Objective-based Methods

For Objective 1, Retrospective Analysis Of GOA Production Shifts Since EVOS

FY99-00: Stable isotopic analysis of the outer protein layer (periostracum) on the shells and body tissues of Sea-mussels (*Mytilus californianus*) of varying ages collected at Middleton Island (N= 50 mussels) in September 1997. The periostracum will be analyzed by cutting sections (of 2.0 mg for each analysis) along annular growth rings. Mussels of different age will be used to extract data from various years (as annuli are wider and more distinct at earlier ages) to reconstruct an isotopic time series retracing conditions from 1997 backwards in time to EVOS and earlier. For example a 5 to 10 - year old mussel will resolve well recent years whereas a 10 to-20 year old will resolve years when the mussel was younger. Overlapping years (of periostracum samples) of good age resolution will be used to inter-calibrate mussels while younger mussels will be calibrated against our zooplankton database (Fig. 2). An estimated 250 isotopic analyses (~ n = 10/ mussel) will be required for this task in FY99 (*reduced from 500 in original DPD*). The expected results would consist of an isotopic characterization in GOA isotopic signature from 1989 (possibly earlier) to 1997. The following question will be asked: Did changes of the magnitude seen in 1996 occur in other years? If so, how often. If not, then the 1996 will be considered an anomaly rather than a common occurrence.

For Objective 2, Addressing Ecopath Model Validation Data Gaps

A) Analysis of available samples from the P.I.'s archives and samples from other P.I.'s.

The purpose of this objective is to acquire data most cost-effectively - without additional field sampling. Functional groups identified for additional analyses are noted by the underlined. Since the Ecopath model is centered on data collected from 1994-6 and for which years these samples are from, they are optimal for this purpose.

The methods for calculating trophic level and omnivory index are given in Kline and Pauly 1998 (duplicated in Kline 1999b). The data generated will used in a similar way.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

N/A

SCHEDULE

This schedule reflects project \393 commencement date of 1 April 1999.

A. Measurable Project Tasks for FY01 (October 1, 2000 - September 30, 2001)

Oct. 00 - Jun. 01:	Preparation of last samples (for Objectives 1 & 2) for mass spectrometry
Oct. 00 - Sep. 01:	Mass spectrometry at UAF (~ 6-9 month processing time)
Oct. 00 - Sep. 01:	Process new isotope data

B. Project Milestones and Endpoints

Jun. 2001:	Preparation of samples for mass spectrometry completed
Jan. 2001, 2002:	Attend Annual Restoration Workshop
Dec. 2001:	All data received from mass spec. lab.
Apr. 2002:	Isotope data processed
Apr. 2002:	Data integration and synthesis complete
Oct. 1999 - Sep. 2002:	Preparation for and dissemination of results at EVOS and other symposia
Jan. - Apr. 2001, 2002:	Preparation of reports
Apr. 15, 2002:	Draft final report
Sept. 30, 2002:	Final report

C. Completion Date

September 30, 2002 (Final Report)

PUBLICATIONS AND REPORTS

Kline and Pauly - a greatly augmented sequel to Kline and Pauly (1998) incorporating validation of the model developed in project 330) is planned for 2001-02.

Kline - A paper based on the retrospective analysis is planned for 2001-02.

PROFESSIONAL CONFERENCES

Travel is requested for the P.I. to present results at a national (or when appropriate, international) meeting such as ASLO or AGU and to attend workshops with collaborators. Travel to present project results at national meetings and to participate in collaborative workshops are essential to the project's success.

NORMAL AGENCY MANAGEMENT

N/A

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Collaboration with other EVOS investigators will continue and facilitate relating carbon-source dependency with e.g., somatic energy content (A.J. Paul) and trophic level (D. Pauly and S. Pimm). Other P.I.'s in possession of NSI data for certain functional groups, noted in Table 1 (their names proceeded by "see") will be asked to provide appropriate portions of pertinent data for incorporation into objective #2. Results of analyses will be exchanged at workshops and by telecommunications. Preliminary analysis from the integrated effort will be used to direct retrospective analysis of archived samples. Sampling will be coordinated with other P.I.'s and within the auspices of other biota sampling programs. Pertinent data of each sample (i.e. data on each individual fish will be shared among components). Coordination in relation to specific objectives listed in project design section.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

Since approval of funding for this project was delayed until December 1998 and the contract was not completed until 1 April 1999, the project schedule has been reset in time accordingly. It is still planned as a three-year project. The contract for the proposed final year of the project, FY2001, will thus start on 1 April, 2001 and end on 30 March, 2002. A no-cost extension will enable funding to the final report submission on the Trustee Council's 15 April scheduled due date in 2002 and revision by 30 September, 2002.

PROPOSED PRINCIPAL INVESTIGATOR

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PRINCIPAL INVESTIGATOR

T. Kline has been actively involved in stable isotope research since 1985. His has innovated applications of stable isotope analysis in fish ecology with emphasis on salmonid fishes in northern, western, south central and southeast Alaska. His techniques have enabled the quantification of the effect of salmon carcass nutrient input to juvenile sockeye salmon production. This research has been the first to provide direct evidence for the importance of salmon carcasses for juvenile salmon production (Kline et al. 1990) . His stable isotope models also enable the quantification of different sources of production important in salmon ecosystems (Kline et al. 1993). Dr. Kline also led an investigation relating feeding strategies to growth forms in North Slope salmonids (Kline et al. 1998). His on-going efforts include collaborations with ADF&G, the North Slope Borough, and BPX. The results of these projects have been presented in numerous scientific papers as well as in public forums (speaking to local groups and classes). T. Kline initiated project \320I which has been the first comprehensive project using natural stable isotopes in Prince William Sound. Through this project he has developed new models and application of natural stable isotope abundance methods (Kline 1997, Kline and Pauly 1998). He was the first to provide direct evidence of the importance of carbon from the Gulf of Alaska in Prince William Sound (Kline 1997, 1998). The role of Gulf carbon was extended in a second EVOS project \311 which like \320I was completed in 1999.

Kline also has previous experience in aging bivalve mollusks using their annual growth checks (Kline 1983); this of particular relevance for Objective 1.

OTHER KEY PERSONNEL

Fish Biologist: J. Williams. PWSSC. J. Williams received his Masters degree in Fisheries from Texas A&M University in 1995. While earning his degree, he spent one year conducting field research in a remote are of Venezuela, successfully incorporating native fishermen in his survey of reservoir fish populations. His research has been presented in a variety of forums and is currently under review for journal publication. J. Williams is a certified Rescue Diver, Divemaster and has eleven years of diving experience. He has recently become certified as a Scientific Diver, fulfilling American Academy of Underwater Science standards, in the PWSSC Scientific Diving Program. J. Williams is tasked with sample and data processing and data management for this project and will actively contribute to data synthesis.

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2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized *'FY 2000	Proposed FY 2001
Personnel		$0.0
Travel		$0.0
Contractual	$145.5	$111,216.9
Commodities		$0.0
Equipment		$0.0
Subtotal	$145.5	$111,216.9
General Administration	$2.9	$7,785.2
Project Total	$148.4	$119,002.1
Full-time Equivalents (FTE)	1.2	0.8
Other Resources		

LONG RANGE FUNDING REQUIREMENTS

Estimated FY 2002					

*'Dollar amounts are shown in thousands of dollars.

FY01

Prepared:

Project Number: 01393
Project Title: Prince William Sound Food Webs: Structure and Change, Submiited Under the BAA
Name: Prince William Sound Science Center
Agency: NOAA

FORM 3A
TRUSTEE
AGENCY
SUMMARY

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized *'FY 2000	Proposed FY 2001						
Personnel	$86.4	$67,792.8						
Travel	$3.7	$5,180.0						
Contractual	$25.1	$9,560.0						
Commodities	$2.5	$3,950.0						
Equipment	$3.5	$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$121.2	$86,482.8	Estimated FY 2002					
Indirect	$24.2	$24,734.1						
Project Total	$145.5	$111,216.9	$127.7					
Full-time Equivalents (FTE)	1.2	0.8						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

FY01

Prepared:

Project Number: 01393
Project Title: Prince William Sound Food Webs: Structure and Change, Submiited Under the BAA
Name: Prince William Sound Science Center

FORM 4A
Non-Trustee
SUMMARY

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2000
	T. Kline	Principal Investigator	6.0	8734.6		52,407.6
	TBN	Technician	4.0	3846.3		15,385.2
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	10.0	12580.9	0.0	
					Personnel Total	$67,792.8

Travel Costs:		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2000
	IABO/IAPSO meeting*	1400.0	1	8	110.0	2,280.0
	registration and car rental	300.0	1	8	55.0	740.0
	EVOS and collaborative workshops	300.0	2	8	145.0	1,760.0
	car rental	0.0	0	8	50.0	400.0
	*The Joint Assembly of the International Association for the					0.0
	Physical Sciences of the Oceans (IAPSO) and the International					0.0
	Association for Biological Oceanography (IABO), to be held in Mar					0.0
	del Plata, Argentina					0.0
						0.0
						0.0
						0.0
						0.0
					Travel Total	$5,180.0

FY01

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FORM 4B
Personnel
& Travel
DETAIL

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2000 - September 30, 2001

Contractual Costs:				Proposed
Description		cost per unit		FY 2000
PWSSC network charge by computer-months	computer months	10	100	1,000.0
Stable Isotope Analysis	number:	200	27	5,400.0
Freeze drier charge	number:	200	3	600.0
photocopying				400.0
shipping				500.0
communications (fax and phone)				660.0
page charges				1,000.0
			Contractual Total	$9,560.0

Commodities Costs:	Proposed
Description	FY 2000
Lab supplies miscl	1,000.0
Lab supplies: chemicals, vials, knives	750.0
Office supplies miscl	600.0
Computer supplies and upgrades	1,000.0
Dyesub, photog. (presentation materials)	600.0
Commodities Total	$3,950.0

FY01

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Project Number: 01393
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Name: Prince William Sound Science Center

FORM 4B
Contractual & Commodities
DETAIL

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2000 - September 30, 2001

New Equipment Purchases:	Number of Units	Unit Price	Proposed FY 2000
Description			
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage:	Number of Units	
Description		

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FORM 4B
Equipment
DETAIL