MEMORANDUM

TO: Council, SSC and AP Members

FROM: Chris Oliver
Acting Executive Director

ESTIMATED TIME
10 HOURS

DATE: January 30, 2001

SUBJECT: Steller Sea Lions

ACTION REQUIRED

(a) Review SSC Report on the Biological Opinion.
(b) Receive report on the Kodiak adaptive management project.
(c) Discuss the independent scientific review and provide direction.
(d) Discuss the workplan for the 2002 amendment package.
(e) Provide direction on the Council's RPA Committee.
(f) Review analysis of VMS/monitoring alternative: initial review.

OTHER: Discuss Board of Fish action regarding Pacific cod fisheries (proposals 95, 96, 97)

BACKGROUND

SSC Report on the Biological Opinion

In December, the SSC could not provide a scientific review of the 600 page Biological Opinion in the available time, but instead volunteered to provide a more thorough review at a subsequent meeting. At this meeting the SSC will report on its findings, which should feed into the Council's discussions regarding the issues and questions to be addressed in the independent scientific review.

Kodiak adaptive management project

In February 2000, the Council approved a regulatory amendment to examine the effects of fishery closures on Steller sea lions. The study required two regulatory actions: establishing a ban on all trawl fishing in the Chiniak Gully region off the east side of Kodiak Island and allowing the reopening of the 10 nm no trawl zone around Gull Point and Cape Barnabas to conduct experiments on the effects of fishing in nearby waters. It is expected that this action will be in effect from August 1st to a date no later than September 20th during the years 2000 to 2003. The Council requested that NMFS provide an annual update on results of the investigation. NMFS staff will be on hand to provide an update.

Independent scientific review

Part of the Council's motion from December, supported by the P.L. 106-554, calls for an independent scientific review of the BiOp and proposed RPAs, the experimental design, and the underlying hypotheses of that BiOp. The actions of Congress support that initiative and direct the Council to undertake such a

review utilizing the expertise of the National Academy of Sciences (NAS). An initial proposal from the NAS contains a timeline which would not provide such a review in time to provide input into the Council's required actions by this fall. At the January special meeting the Council discussed this further with NAS representatives, and approved a motion calling for a two-stage process whereby a refined, limited set of relevant issues could be reviewed by June of 2001, with a broader set of issues addressed on a more extended timeline. The Council's Steering Committee and staff have been coordinating with NAS to determine the feasibility of this approach, develop a more defined Statement of Work for each stage of the review, and determine the specific role of the NAS in this process. After meeting with NAS recently, it is apparent that a comprehensive review of the Biop and underlying issues cannot be completed until next year, though such a comprehensive review should be very useful to our long-term actions regarding SSL.

It is also unlikely that the NAS review process will enable them to provide even a short-term review that will be informative to our 2001 process, except perhaps with regard to the experimental design for open/closed areas. Therefore, we need to determine at this meeting whether to proceed with a separate, short-term independent review that could inform our 2001 process on some of the underlying assumptions and hypotheses in question. For example, we could contract with a small group (perhaps two or three of the scientists we used in the 1999 review of pollock RPAs, or some other experts) to provide an expedited review of a focused set of questions by June. It may also be very useful to retain that same small group to advise our process through the summer and fall up to our final action in October. This would allow for that outside expertise to examine the analyses we will be doing, and the alternative RPAs being considered, relative to the information at hand and provide their expert advise on those alternative RPAs relative to SSL protection.

Item C-3(c)(1) is a draft approach to this issue, including questions we would want addressed by the long-term NAS study, and potential questions to be the subject of a separate, short-term independent review. Input we receive at this meeting from our SSC, and others, will need to be considered prior to finalizing this in a formal Statement of Work (SOW) as part of a contract with the NAS, or other independent reviewers. Dr. Chris Elfring from the NAS will be here Friday afternoon to discuss with the Council the potential NAS role in this process. We need to pin this down at this meeting so I can get the necessary wheels turning.

Item C-3(c)(2) is a letter from the Alaska Steller Sea Lion Restoration Team regarding major research questions. Item C-3(c)(3) contains correspondence and information related to potential shark predation on SSL, which should probably be considered in the overall picture along with killer whale predation.

2002 Amendment package

A full amendment package will have to be developed during this year for Council action in October 2001, which would propose a package of protective measures (RPAs) for implementation in January 2002. In January, the Council reaffirmed its direction to begin such an analysis, consistent with its December 2000 motion (attached for reference as Item C-3(d)(1)). Final action on that package would have to occur in October, to allow time for Secretarial review, including a separate Section 7 consultation on that package, and for implementing regulations to be developed by January 2002. Feeding into that process will be the Council's RPA Committee as well as information developed from the independent scientific review of the December 2000 BiOp and its underlying hypotheses. An initial set of alternatives will stem from previous RPAs recommended by the Council, the November 2000 Biop RPAs, and from the September 2000 EA/RIR/IRFA developed by NMFS for the Pacific cod fisheries and Council recommendations made at that September meeting. Because time will be short after the October 2001 meeting, it is the Council's intent that such an analysis include ESA considerations with regard to the alternatives being considered, so that formal consultation will be expedited after the October final decision.

A 'roadmap', developed by NMFS and Council staff, is attached as Item C-3(d)(2). This describes the flow of events this year, including specific Council actions, the analytical process, interactions with the Council's RPA Committee, and major checkpoints along the way. Council and NMFS staff are working to finalize a tasking gameplan to achieve this formidable schedule, which will involve a huge commitment of staff resources and outside contract assistance. We have had extended discussions with NMFS staff already, and the details of that analysis package (EIS) are still being developed, but we have summarized (Item C-3(d)(3)) the alternatives to date that will be included in that package. We assume that additional alternatives will be developed, and specified in more detail, through the Council/Committee process this spring, with a final set of alternatives identified at the June meeting.

Item C-3(d)(4) is a letter from NMFS describing their commitment to this process over the next several months. We need to confirm that the process outlined comports with the Council's expectations, and need to determine how the NMFS commitment to public hearings around the State interfaces, if at all, with our Committee and analytical process. It may be that the make-up of that Committee can serve, to a large degree, to provide the type of input envisioned in the public hearing process. For your information, Item C-3(d)(5) is a diagram summarizing recent discussions on SSL funding and research among various agencies.

RPA Committee

A critical part of this process in 2001 will involve an RPA Committee to be appointed by the Council at this meeting. The closed areas contained in the Biological Opinion (BiOp) would go into effect on June 10, 2001, subject to modifications proposed by the Council at the April meeting in Anchorage. Such modifications would be subject to meeting certain requirements of the BiOp with regard to minimum critical habitat protection. Longer term closed areas, those to be developed later for 2002 and beyond, will also have to provide for an experimental design and monitoring program, but that will not be the focus of adjustments for the latter half of 2001. In order to provide for ample time, public participation, and relevant information in the process of closed area consideration for the latter half of 2001, the Council will appoint a Committee (consistent with its December 2000 action to appoint an RPA Committee) to develop relevant information and report to the Council with its recommendations prior to the April meeting. This Committee will also be involved in the longer-term development of RPAs and experimental design, but will be tasked in the short term with development of open/closed area recommendations for the latter half of 2001.

The Committee will include members of industry, the conservation community, NMFS, SSC, and State agencies including the Restoration Team. The Committee will be appointed during the February Council meeting and begin its work shortly thereafter. Council direction to that Committee includes consideration of small boat concerns in development of open/closed areas for the latter half of 2001, with the added direction that such measures should be developed in a 'non-allocative' manner.

VMS/monitoring

NMFS will present a regulatory amendment package for initial review at this meeting which contains alternatives and options for a vessel monitoring system (VMS) and other proposed catch monitoring measures to implement the RPAs effectively. Final action would be scheduled for April.

Comments, including a draft resolution from the Alaska State Legislature, are under Item C-3 supplemental.

OTHER: Discuss Board of Fish action regarding Pacific cod fisheries. Comments which were copied to the Council offices are included under Item C-3 (BOF).

DRAFT Approach for Independent Review Process

Discussions with NAS indicate that it is unlikely they will be able to accommodate the Council's proposal for a two-stage independent review of the BiOp. Certain information is considered necessary by June, in order to feed into the Council process for a package of RPA measures in 2002; i.e., that process envisions, effectively, a parallel (informal) consultative process to arrive at a set of measures in October that will likely satisfy a Section 7 consultation. Later this month, the Council Chairman and ED will further discuss with the NAS their potential involvement in this review process, and the Council will need to provide final guidance at their February meeting regarding the nature of the review process and the specific questions we wish to be addressed by June 2001.

One approach would be to proceed with the long-range NAS independent review (a two year process) which would address the broad suite of issues and hypotheses contained in the BiOp, while contracting a separate, short-term review to address a more discrete set of issues which would provide information to the 2001 process to which we are obligated. Based on review of existing SSC, Council, and industry comments on the BiOp, the following abbreviated Statement of Work (SOW) is proposed. This would be finalized after receiving the SSC report in February, reports from the SSL Restoration Team, and other information the Council deems appropriate.

Phase I (could be NAS or other independent scientists)

By June of 2001, the review team would review the BiOp and other relevant information to address the basic questions of (1) **Does the evidence of the degree of overlap and potential adverse interactions of the Atka mackerel, pollock, and Pacific cod fisheries indicate that they (significantly?) impede SSL population recovery?** In addressing this question, the review should examine the types of interaction (overlap) to determine the (realistic) probability of competition that may impede SSL foraging opportunities for the three species. This evaluation should focus at the population level and should illustrate the probability of SSL and fisheries competing in a manner that would negatively affect foraging opportunities due to occupying the same time/space, in pursuit of prey of the same size. Points of overlap may include spacial and temporal distribution of SSL feeding areas and the fisheries under existing management measures, fish size distribution relative to SSL and the fisheries, and the potential effects of the fisheries on the overall groundfish prey base through localized depletion or interactive competition, as demonstrated by available evidence. This evaluation should consider the fraction of fish harvested and not-harvested relative to the total prey base (including all prey species), available analysis of localized depletion, and evidence of nutritional stress (given current SSL population levels and availability prey base). (2) **Given the information evaluated in question 1, what is the marginal benefit to SSL resulting from the November 2000 proposed RPAs, relative to existing RPAs which were previously approved by the Council as recommended by previous BiOps?**

An additional potential task for Phase I could include a review of the BiOp from an editorial perspective; i.e., identify misstatements, erroneous information, and inconsistencies. Choosing an independent review panel (assuming that the NAS process cannot address these short-term issues by June 2001) remains an issues. We have a list of potential reviewers which we could contract directly with, or request NAS to

compile a list, or submit our list to NAS and let them choose from among the list. We should also consider whether members of this short-term team could also be involved in the longer-term NAS study.

Phase II - Long term NAS Review

On a longer time frame to be agreed between the Council and the NAS, the NAS would conduct a comprehensive review of the BiOp and its underlying hypothesis. This review would examine the competition/localized depletion hypothesis in more detail than Phase I, and would compare this to alternative hypotheses relative to SSL declines and impediments to recovery. Issues to be examined include, but are not limited to - changes in adequacy of available forage for SSL as a result of climate regime shifts and other natural phenomena; evidence of competition for prey from groundfish and other fisheries; quantity vs quality of prey fish; updated foraging and migration observations and studies relative to extent of area actually critical to SSL foraging; extrapolated rates of SSL decline; large whale removals; killer whale and shark predation; potential enduring effects of past intentional kills; present subsistence takes; and, other causes of decline or impediments to recovery. Generally this review should attempt to assess whether food limitation, given current and past levels of prey base, is the most likely explanation for SSL population declines and/or ability to recover, relative to other factors. This review will also assess the proposed experimental design, relative to open/closed areas, contained in the BiOp, and/or the experimental design implemented for the January 2002 fisheries. A final report would be provided to the Council at its December 2002 meeting.

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

DEPARTMENT OF FISH AND GAME
Division of Commercial Fisheries

P.O. BOX 25526
JUNEAU, AK 99802-5526
PHONE: (907) 465-4150
FAX: (907) 465-2604

January 23, 2001

Mr. James M. Coe
Acting Science & Research Director
National Marine Fisheries Service
Alaska Fisheries Science Center
7600 Sand Point Way N.E.
P.O. Box 15700
Seattle, WA 98115-0070

Dear Mr. Coe:

The Alaska Steller Sea Lion Restoration Team is very supportive of the Alaska Fisheries Science Center's effort to develop a comprehensive and coordinated research program for Steller sea lions (SSL). With the substantial funding made available through the FY01 NMFS appropriations bill, the challenge is to develop an effective plan to answer the most pressing research questions associated with potential causes of SSL declines. Considerable progress on these research questions is crucial, if a restoration plan is to be developed with realistic chances to rebuild depressed SSL populations.

The state's Restoration Team will develop detailed research recommendations over the next several months. However, given your upcoming planning meeting and the desire to begin a process so that new studies can be implemented during the 2001 field season, we offer some general thoughts at this time. The Restoration Team believes that, in addition to gathering new information on critical life history parameters of sea lions (e.g., timing of weaning, seasonal food habits), alternative hypotheses concerning the continued decline and lack of recovery must be tested. Pursuant to these alternative hypotheses, the team has identified the following major research questions that may help to select specific research projects for inclusion in the comprehensive plan:

1. Are juvenile SSL nutritionally stressed, and if so, what are the roles of fisheries and climate-driven ecosystem shifts?

2. What are the current demographic problems associated with the continued SSL decline ? reduced rates of age-specific survival, reproduction, or both?

3. Can cumulative impacts of non-nutritional sources of mortality explain the current rate of SSL population decline? Mortality sources may include killer whale and shark predation, incidental take in fisheries, illegal shooting, subsistence harvest, entanglement in marine debris, and disease.

4. How does fishing affect the abundance, distribution, and consumption of prey at the spatial and temporal scales over which SSL forage?

5. What are the ecological attributes that define the spatial extent of SSL critical habitat?

6. What is the efficacy of fishery exclusion zones to improve SSL survival and reproductive rates by increasing the density of prey that are commercially harvested or otherwise adversely affected by fishing activity?

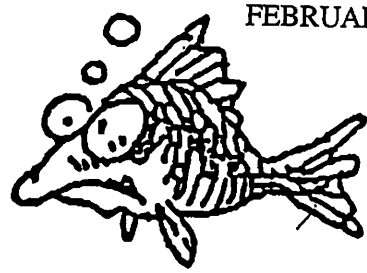
The Restoration Team realizes that limitations in technology, logistics, experienced personnel, and funding will make it difficult to completely answer these difficult questions. Intensive manipulative experiments are essential to make substantial progress on the most difficult ones – those related to potential fishing effects. We believe that the most successful comprehensive plan is one that draws upon the diverse and extensive knowledge of scientists from various North Pacific and Alaska agencies and institutions who are best suited to collaborate on certain projects given their areas of expertise. The Restoration Team hopes that these suggestions contribute to a successful meeting. If you identify any ways in which the team can assist your agency in your planning efforts, please do not hesitate to ask.

Sincerely,

Gordon H. Kruse Gordon H. Kruse, Ph.D.
Chair, Alaska Steller Sea Lion Restoration Team

cc: Kevin Duffy, ADF&G Deputy Commissioner

North
Pacific
Longline
Association



Agenda B-5

January 24, 2001

Mr. David Benton, Chairman
North Pacific Fishery Management Council
605 West 4th Avenue
Anchorage, AK

RE: Shark Predation and Steller Sea Lions

Dear Dave:

From testimony offered to the Council you may have gathered that we are of the view that predation is the likely cause of the decline and continuing low numbers of Steller sea lions in the BSAI and GOA - not the equivocal "localized depletion." Our prior testimony has focussed on Orcas.

For some years Dr. Bill Aron has urged us to consider sleeper sharks as sea lion predators. Sleeper sharks are large (20 ft.) bottom dwellers known to feed on pinnipeds in Greenland - they are said to have wiped out same near a whaling station that dumped offal into the sea, drawing in the sharks. Recently I have communicated with Bruce Wright of the Auke Bay Laboratory. He has done considerable work on top predators and their food base, most recently completing a study of the diets of sleeper sharks caught in Prince William Sound by the IPHC during a summer survey. Sure enough, marine mammal parts were discovered in several of the sharks. Bruce's communication on this topic is attached.

To us (and to many in the industry) it seems apparent that sleeper sharks near rookeries and haulouts should be studied as possible sea lion predators. Salmon sharks, next of kin to white sharks, have been observed to take sea otters - they might be another good candidate for study.

We hope the Council will review the attached material and assure itself that adequate shark studies are conducted promptly.

Sincerely,

Thorn

Thorn Smith

4209 21st Avenue West, Suite 300, Seattle, Washington 98199
TEL: 206-282-4639; FAX: 206-282-4684

From: william aron <waron@u.washington.edu>
To: Smith,thorn <Thorndog@worldnet.att.net>
Date: Thursday, January 25, 2001 4:22 PM
Subject: predation

Thorn:
The long list of comments on localized depletion vs predation, plus other comments clearly shows a pandora's box has been opened. I don't think we are in an either or situation- I'm not trying to discourage the localized depletion work, although it is hard to see that anything but ver expensive studies will result in an unequivocal answer that will satisfy the Courts.

The shark work I propose is cheap- at least in terms of providing a first cut. I doubt it will take more than the examination of 100 sleeper sharks and 100 salmon sharks to demonstrate if these animals are significant predators on sea lions and other marine mammals. The sharks should be taken in close proximity to rookeries during the time of the year that the young animals are leaving for the sea. The sleeper sharks should be at least 8-10 feet in length- the bigger the better, the salmon sharks might do damage to mammals at a smaller size, but again the bigger the better.

This work could be done by a small number of fishermen and a minimal gang to open the sharks. I can't believe this will cost more than$200,000, especially if people can volunteer some ship time. I can't but believe if there is a credible alternative to the localized depletion theory"- and predation may be the answer- the case against commercial fishing will be weakened.

The sea otter-killer whale work provides something of a model to demonstrate thast a relatively low number of predators can severely reduce a marine mammal population. While the population estimates of mackeral sharks are week and for sleeper sharks they are non-existent, I don't have a shadow of doubt that the shark populations are orders of magnitude greater than the killer whales.

Anyway- I would appreciate you distributing this message- if you agree- to the gang that seem to be involved in the game. It was nice to learn that Terry Leitzell is still around- I'd lost track of him.
Bill

From: william aron <waron@u.washington.edu>
To: Thorn Smith <Thorndog@worldnet.att.net>
Cc: Marasco,Rich <rich.marasco@noaa.gov>
Date: Monday, January 29, 2001 4:31 PM
Subject: Re: Fw: sea lion $'s - break down by agency

Thom: I really can't provide any insight on the budget withou seeing the actual details of what is planned for each item. I confess that the lateness of the start may cost this field season for determining predation by sharks on young sealions- they'll be long out to sea by the time anything starts. After they have left a failure to find them in shark tummies proves nothing- the studies must be done when the young are leaving the rookeries and the naive babes are available. Alas.
Bill

I'm passing this on to Rich- in case he has not seen the list.

Thorn Smith wrote:

> BILL, DOUG DEMASTER LEFT A MESSAGE ON MY TAPE SAYING THAT AT THE RECENT RESEARCH/BUDGET MEETINGS (END OF LAST WEEK) THERE WAS STRONG INTEREST IN SHARK STUDIES (I THINK HE SAID IT HAD TO DO WITH OUR EFFORTS), AND THAT HE THOUGHT THEY MIGHT BE SPENDING AS MUCN AS $600,000 ON WHALES AND SHARKS. DAVE FRASIER WAS AT THE MEETING, AND SENDS THIS SUMMARY OF STUDY ITEMS. NUMBERS 6,7,30,38,48 SEEM OT BE IN OUR BALLPARK. AS A NONSCIENTIST, I HAVE NO WAY OF EVALUATING THEM - CAN YOU? THORN——
> **Original Message——**
> **From:** dave fraser <dfraser@olympus.net>
> **To:** Terry Leitzell <TerryL@IcicleSeafoods.com>; Trevor McCabe <tmccabe@atsea.org>; Brent Paine <bpaine@ucba.org>; Donna Parker <dparker@arcticstorm.com>; Beth Stewart <beth@ptialaska.net>; John Gauvin <gauvin@seanet.com>; John Garner <JGarner@norquest.com>; vidar wespestad <vidar@worldnet.att.net>; Ed Richardson <Erichardson@atsea.org>; Paul MacGregor <PMacGregor@mundtmac.com>; Thom Smith <Thorndog@worldnet.att.net>; Al Burch <alaska@ptialaska.net>; Jay Stinson <pelagic@ptialaska.net>; John Sevier <jsevier@sssitka.com>; Glenn Reed <glennr@pspafish.net>; Joe Plesha <JoePlesha@TridentSeafoods.com>
> **Cc:** Steve Hughes (E-mail) <nrc@nrccorp.com>; Wally Pereyra <wpereyra@arcticstorm.com>
> **Date:** Monday, January 29, 2001 3:40 PM
> **Subject:** sea lion $'s - break down by agency
> NMFS still hasn't sent me a copy of the spreadsheet that i could email, so i retyped the important columns and pasted it below. this will give you a vague idea of what the endowed parties intend to do with their grants. it doesn't address what will be done with the discretionary moneys.df

#	agency	cost ($M)	general title
1	AFSC	1.800	localize depletion - cod, pollock, mackerel
2	AFSC	0.400	satellite tagging
3	AFSC	0.400	food habits studies, foraging behaviour
4	AFSC	0.600	forage fish assessment
5	AFSC	0.400	AI pass study, GLOBEC GOA
6	AFSC	0.400	shark biology and food habits
7	AFSC	0.400	killer whale studies
8	AFSC	2.600	monitoring surveys, branding, food habits
9	AKR	3.540	management, legal compliance
10	AKR	1.900	subsistence monitoring and biosampling
11	AFSC	-	fish stock assesment
12	NWFSC	-	contaminant status
13	OAR	0.500	comprehensive analysis of existing environmental daa re ssl
14	OAR	5.000	field and modeling program leading to updated analysis
15	OAR	0.500	coordination, communication, outreach
16	NOS	2.000	competitive process for directed research on predator prey re
17	ADF&G	2.000	ID of sensitive life history stages of ssl, body condition, PTT
18	ADF&G	0.300	collection of ssl vital stats in collaboration w NMML
19	ADF&G	0.150	modeling polulation responses of ssl to incidental take
20	ADF&G	0.250	surveys of blood borne disease
21	ADF&G	0.250	measurement of contaminants in ssl tissue
22	ADF&G	-	PWS Cook Inlet, Kodiak trawl surveys
23	ADF&G	-	PWS hydroacoustic surveys
24	ADF&G	-	SE AK herring assessment
25	ADF&G	-	Salmon enumeration
26	UAF	0.200	Kodiak seasonal ssl diets
27	UAF	0.300	Kodiak seasonal prey availabilty
28	UAF	0.100	Kodiak seasonal prey quality
29	UAF	0.200	Kodiak diet of ssl competitors
30	UAF	0.200	Kodiak killer whale and shark diets
31	NPUMMRC	0.250	bioenergetics of ssl
32	NPUMMRC	0.350	bias in scat analysis
33	NPUMMRC	0.040	new technologies for implantable vhf packs
34	NPUMMRC	0.011	effects of atka mackerel on ssl condition
35	NPUMMRC	0.013	ssl scat collection and diet studies - SE AK
36	NPUMMRC	0.019	bioenergetics modeling
37	NPUMMRC	0.012	timing of molt (for placement of tags)
38	NPUMMRC	0.017	killer whale predation modeling
39	NPUMMRC	0.103	Pribolof & Kodiak monitoring - subsistence harvest
40	NPUMMRC	0.050	long term viability in forage fish abundance

41	NPUMMRC	0.050	monitoring diet and demographics of Wash ssl
42	NPUMMRC	0.120	trends in diet and population in Oregon ssl
43	ASLC	1.000	feeding and metabolics of captive ssl, diet analysis of wild ssl
44	ASLC	1.500	remote video cameras, branding and monitoring w NMML
45	ASLC	1.500	capture and short-term holding of ssl, collection of pups
46	ASLC	0.300	endorcrien and immune funcition
47	ASLC	0.500	Chiswell seasonal prey availability
48	ASLC	0.200	Chiswell shark predation studies
49	ASLC	0.500	reproductive biology of ssl & effects of disease w NMML
50	ASLC	0.500	new technologies for implants & instrumentation
51	NPFMC	1.300	management - legal compliance documents
52	NPFMC	0.700	NAS review of BiOp
53	NMFS	4.560	unspecified research - RFP grants, etc
54	NMFS	5.000	contingency fund - FY02 (or earlier, as needed)

From: Bruce Wright <Bruce.Wright@noaa.gov>
To: Thorn Smith <Thorndog@worldnet.att.net>
Cc: Bill Aron <waron@u.washington.edu>
Date: Monday, January 22, 2001 6:23 PM
Subject: Re: shark predation

Thorne,

Three species of sharks have become very abundant in the northeast Pacific and parts of the Bering Sea during the last decade, spiny dogfish sharks, salmon sharks, and Pacific sleeper sharks. I became aware of these changes from reports by commercial fishermen and reports from fishing community residents (local knowledge).

SPINY DOGFISH SHARKS
Spiny dogfish numbers have been a problem for the fishermen near Yakutat and sometimes the Copper River areas. Some reports are of sockeye gillnet fishermen plugging their nets with dogfish sharks and discarding the ruined nets. The only work I have done on this species is to look at historical data sets, which show a marked increase in spiny dogfish shark numbers.

SALMON SHARKS
Salmon sharks are highly migratory based on our satellite tags deployed last summer. Three sharks were tagged in northern Prince William Sound. One of the tagged sharks was last located via satellite off the coast of BC, Canada, and the others are moving south too. An aerial survey last July in Prince William Sound counted 2,000 salmon sharks at the surface of a six square mile area. Average size of the salmon shark we are dealing with is 7 feet and 350 pounds. From the literature there were 2,000,000 salmon sharks out there in the mid 1990s in the western Pacific, and they seem to using the eastern Pacific now more than ever. According to a paper by Nagasawa, this population of salmon sharks could consume 250,000,000 salmon and 250,000,000 black cod per year. My research on this species is focused on their migratory behavior and diet. I am very interested in being able to understand how the returns of salmon may be impacted by this huge, and highly migratory predator field. Can you imagine what would happen if only 1,000,000 salmon sharks spent a part of next spring near False Pass? Perhaps that's what has been happening to the Yukon River chum runs. We also have visual accounts of salmon sharks killing and eating adult sea otters, and 50,000 sea otters are missing from the Aleutians. I want to know if there is a connection.

The increase of sharks in the region could be a result of several factors including changes in the marine food web (more large fish now like salmon, cod, and pollock), and the elimination of the high-seas gillnet fishery. I would like to work to determine the important factors contributing to the shark population increase.

SLEEPER SHARKS
Sleeper shark numbers and sizes have increased dramatically according three data sets, including data gathered by the International Pacific Halibut Commission (IPHC). We

participated on the last leg of the 2000 IPHC halibut survey which caught 592 sleeper sharks. We sampled 30 sleeper shark stomachs. Most had fresh pre-spawning adult salmon, one had fresh harbor seal and seven had cetacean chunks (porpoise or whale) in their stomachs. We have received reports of shark attacks on seals near Kodiak and walruses in the Bering Sea. Some fishermen have made contact with us and expressed their concern of the increases of sharks. Kathy Frost, a seal researcher with ADFG, is thinking sleeper sharks may be limiting recovery of harbor seals in Prince William Sound. Right now I don't know how important sleeper sharks were in the decline of Steller sea lions, or if they even eat sea lions, but we need to look.

I believe sleeper sharks are hunting under the cover of darkness and using their sixth sense to detect and attack prey. The apparent sleeper shark scaring on marine mammals indicates the attacks are to the prey's mid-section, likely an attempt to disembowel the prey, resulting in death. This attack may be useful in eviscerating the prey while the shark avoids the harm from the prey's teeth. If the shark is successful in breaching the abdominal wall allowing the intestine to extrude from the cavity, the prey would be expected to go into shock, die and be available for consumption by the sharks. If the shark's attack is in the mid-section but hit ribs the prey would not be eviscerated and would be more likely to escape. Many sharks use a similar technique that causes fatal injures to their prey, then the shark returns to finish eating the dead animal. I believe that Pacific sleeper sharks are stealthy, aggressive, powerful predators able to kill large, fast moving, and viable animals.

From our data I conclude that Pacific sleeper sharks are more abundant in the eastern Gulf of Alaska than 20 years, larger animals are using the area, some to 20 feet long and weighing over 6,000 pound, and some sleeper sharks are feeding, at least part of the year, on marine mammals. The diet of sleeper sharks may change seasonally. Our data, although only during the summer, indicated sleeper sharks have a preference for salmon. This is not surprising when salmon are so abundant. But when salmon are not abundant the sharks may prey switch to what is more available. The alternative prey are probably available to sleeper sharks all year, including black cod, rock fish, squid, and marine mammals. Even when salmon are abundant during the summer, we found that sleeper sharks were feeding on these alternative prey. Diet work during the late fall to early spring, before or after the salmon spawning runs, are necessary to determine if marine mammals are taken in greater numbers during this time of the year.

Since sleeper sharks appear to use the cover of darkness, and their sixth sense to detect their prey's electromagnetic field, winter might be the time of year that favors the sleeper shark's stealthy hunting strategy. Marine mammals may also be more available to sharks during the winter as they work harder to find prey and fulfill their need for more calories during the colder time of the year.

The National Marine Mammal Lab has access to millions of dollars for sea lion investigations. This is excellent. And, they are interested in funding some shark work. What I'm finding frustrating is that other non-shark NMFS researchers are attempting to take control of the shark research. I agree with your assessment that investigating shark lipids for marine mammal fatty acid signatures is important, and we have been collecting samples for that work for two years now. However, lipid signature analysis is still unproven for these species. What is really needed is a comprehensive approach to the shark vs seal and sea lion questions. I'm currently wrapping up a 10 year, $13,000,000 project tasked with

understanding the relationship with top predators and their food base (Apex Predator Ecosystem Experiment (see: http://pices.ios.bc.ca/picespub/ppress/May99/APEX_11.pdf). Under my leadership we resolved the "Is it Food? question, and we are reporting the results during the next year or so. We already have 72 publications from the research effort including addressing the northeast Pacific regime shift of the late 1970's (see: http://www.fakr.noaa.gov/oil/seasatmillennium.pdf).

A letter of support from you to Jim Balsiger and Science Center Director Jim Coe would probably be useful. I'm pleased to see that Jim Coe and the Alaska Science Center appear to have a good grasp of the issues that need to addressed, and they appear to be considering an ecosystem approach to their research effort. This is based upon a memo from Jim Coe on the subject of "Steller Sea Lion Research Planning, dated 1/21/01. That letter's attachments are well thought out, Draft Framework for FY2001 Steller Sea Lion Research.

Thanks for your support.

I look forward to working with you,
Bruce Wright

Bruce Wright, Chief
Alaska Regional Office, Auke Bay Laboratory
11305 Glacier Highway, Juneau, AK 99801
(phone) 907-789-6601
(fax) 907-789-6608
(e mail) bruce.wright@noaa.gov
(web page) www.fakr.noaa.gov/oil/burce.htm

Thorn Smith wrote:

> BRUCE,
>
> THANKS FOR THE E-MAIL AND ARTICLES. I WAS UNABLE TO OPEN THE URL ON
> YOUR IPHC STUDY. I HAVE FORWARDED YOUR E-MAIL TO SEVERAL INDUSTRY
> REPRESENTATIVES, AND WILL TRY TO GET A LETTER OF SUPPORT FOR YOUR EFFORTS.
> SHOULD WE ADDRESS IT TO JIM BALSIGER?
>
> HAVING SEEN REPEATEDLY WHAT ORCAS DO TO STELLER PUPS IN CALIFORNIA, I AM
> A STRONG ADHERENT OF THE PREDATION THEORY - AND NO SUPPORTER OF THE
> "LOCALIZED DEPLETION" THEORY.
>
> IT SEEMS TO ME THAT IT WOULD BE A GOOD IDEA TO STAB SOME SLEEPER SHARKS
> NEAR THE ROOKERIES IN THE BSAI. I DON'T KNOW THAT WE FISH NEAR

ROOKERIES,
BUT I'LL FIND OUT. DOUG SHOWED ME THE CROSSBOW SAMPLING DEVICES THEY HAVE
FOR ORCAS. I DON'T KNOW WHY THEY WOULDN'T WORK ON SLEEPERS. DO THE
SLEEPERS HAVE FAT UNDER THEIR SKINS? I AM ADVISED BY KIM DIETIRCH, OBSERVER
BAR NONE, THAT THEY DO. THE FREE FATTY ACID TEST SOUNDS A LOT EASIER THAN
TRYING TO LAND AND EVISCERATE 20-FOOT SHARKS, EVEN IF THE ELECTRIC KOOL-AID
ACID TEST IS MORE FUN.

WHAT DO YOU THINK IT WILL TAKE TO GET NMFS MOVING ON THIS?

THORN SMITH
——Original Message——
From: Bruce Wright <Bruce.Wright@noaa.gov>
To: ThornDOG@worldnet.att.net <ThornDOG@worldnet.att.net>
Cc: william aron <waron@u.washington.edu>
Date: Friday, January 19, 2001 8:23 PM
Subject: Re: shark predation

>Hi Thorn,
>
>I suppose Bill has talked to you about our shark work. It's been very
>interesting. Some of the popular press stories may be of interest to you,
>(see: http://www.fis.com/fis/worldnews/worldnews.asp?l=e&id=16281
>http://www.uaf.edu/seagrant/NewsMedia/00ASJ/12.08.00_SleeperShark.html
>http://www.uaf.edu/seagrant/NewsMedia/00ASJ/10.12.00_SharkInvasion.html
>http://www.uaf.edu/seagrant/NewsMedia/00ASJ/09.28.00_RiskyScience.html
>http://www.fakr.noaa.gov/oil/sharkADN8272000.htm
>
>We have summarized some of the early findings in the paper at the following
>URL:
>http://pices.ios.bc.ca/picespub/ppress/May00/Shark.pdf
>
>We are especially interested in our cooperative survey with the IPHC on
>which we sampled 32 Pacific sleeper sharks and found one to have parts of a
>harbor seal and seven had whale or porpoise parts. We are very interested
in
>obtaining additional stomach samples from sleeper or salmon sharks during
>the seasons when salmon are not present. I'm most interested in determining
>what sleeper sharks are eating near sea lion areas.
>
>The National Marine Mammal Lab is considering passing some funding on to
our
>shark investigations (Doug DeMaster is the director). Any support would be
>appreciated for having them fund our investigations.

>
>Keep in touch,
>Bruce
>
>Bruce Wright, Chief
>NOAA Office of Exxon Valdez Oil Spill Research and Restoration
>Alaska Regional Office, Auke Bay Laboratory
>11305 Glacier Highway, Juneau, AK 99801
>(phone) 907-789-6601
>(fax) 907-789-6608
>(e mail) bruce.wright@noaa.gov
>(web page) www.fakr.noaa.gov/oil/burce.htm
>
>william aron wrote:
>
>> Thorn: I have cc'd Bruce Wright to give you his e-mail. I think he may
>> still be away, but you should ber able to reach Mike Dahlberg who can
>> pass you on to Bruce's sidekick on the shark predation issue. I think
>> you should work with them and get some large sharks very quickly from
>> the areas in proximity to the sea lion rookeries. There may be some
>> neat suprises.
>>
>> For Bruce- Thorn is the Executive Director of the North Pacific Longline
>> Association.
>> Cheers- I hope something happens,
>> Bill
>
>

World News December 2000 24 GO!

A Pacific sleeper shark hunts for a meal in Alaska's Prince William Sound. (Photo:NMFS)

Do sleeper sharks eat Alaska sea lions?

UNITED STATES
Tuesday, December 26, 2000, 07:00 (GMT + 9)

As scientists seek to unravel the causes of Steller sea lion and harbour seal declines in Alaska, a number of likely culprits come to mind. Killer whales, some scientists say, may be responsible. Or perhaps changing ocean conditions are at fault. Now add to the debate a little-known shark called the Pacific sleeper shark. New research shows they eat marine mammals in Alaska.

The Pacific sleeper shark got its name because it's thought to be rather sluggish, and because it is often found just lying around on the ocean floor, says Bruce Wright, a shark scientist with the National Marine Fisheries Service in Juneau, Alaska. "Pacific sleeper sharks usually live down really deep," he says. "Most people think of them as a non-aggressive shark. One of the common names for them is 'mud shark'. When you bring them up alongside the boat, they're very docile."

But recently Wright had the opportunity to see sleeper sharks in action in Alaska's Prince William Sound. Each summer, millions of salmon return to the sound to spawn in streams and hatcheries. Increasingly, thousands of sharks have been converging there to feed on the migrating salmon. Among them are sleeper sharks, which Wright says are not as docile as scientists think.

"We're real interested in the increased number and size of sharks people are catching," says Wright. "Last year we looked at six sleeper shark stomachs and found that the sharks are eating salmon. That indicates that they are not docile, that they can be fast and aggressive predators."

Witnessing sleeper sharks easily catch fast-swimming salmon got Wright to thinking that maybe the sharks are capable of catching even larger, faster prey. He

MORE NEWS

Irish Republic
Dec 26, 23:30 (GMT + 9): Green light for Cleggan harbour expansion
Norway
Dec 26, 22:50 (GMT + 9): Norway imports more fishmeal
Mexico
Dec 26, 21:30 (GMT + 9): Certification of fisheries products contributes to responsible fishing
Spain
Dec 26, 20:20 (GMT + 9): Scientists intensify the search for new fisheries
Spain
Dec 26, 19:20 (GMT + 9): Fishing still plays a vital role in Galicia's economy
Mexico
Dec 26, 18:10 (GMT + 9): Veracruz leads aquaculture production
Canada
Dec 26, 17:00 (GMT + 9): Tough Christmas for Burnt Church families
Canada
Dec 26, 15:00 (GMT + 9): Fish boats urged to install flooding detectors
New Zealand
Dec 26, 14:00 (GMT + 9): International division of MFish keeps busy
United States
Dec 26, 13:00 (GMT + 9): Shrimpers volunteer to test finfish excluders
Thailand
Dec 26, 11:00 (GMT + 9): Thai 'Tom Yam Kung' soup might help prevent cancer
Norway
Dec 26, 10:00 (GMT + 9): No increase in capelin for human consumption
Canada
Dec 26, 09:00 (GMT + 9): Abalone enhancement group wants day in court
Spain
Dec 26, 08:00 (GMT + 9): Fishermen's associations appeal to the central government for further attention

wondered if sleeper sharks might be at least partly responsible for the decline of Alaska´s Steller sea lions and harbour seals. "My belief was that there is the potential for the Pacific sleeper shark to take seals and other marine mammals, and the reason I thought this might be the case is because the Greenland sleeper shark´s primary prey are seals."

To find out, Wright joined researchers with the International Pacific Halibut Commission to conduct longline surveys last summer of halibut in the Gulf of Alaska. Along with halibut, the researchers also caught sleeper sharks. It proved a perfect opportunity.

"When the commission runs their surveys they catch a lot of sleeper sharks, and on the last leg of their survey they caught 592 sleeper sharks," says Wright. "These sharks ranged in size from six to seven feet, to up to 18 feet long, and there´s been sleeper sharks caught in these waters that are 24 feet long. So these sleeper sharks can get almost as big as a small orca."

All but thirty sleeper sharks were released unharmed after being measured, weighed and fitted with tags. The sharks taken back to the lab allowed Wright to make a unique discovery. "Thirty sharks were sampled and of those, five of them had harbour seals and Dall´s porpoise parts in their stomachs," he says.

That´s enough to make Wright wonder if maybe scientists have overlooked the sleeper shark as yet another key player in the North Pacific food chain. Wright says he hopes to obtain funding to learn more about this misunderstood predator of the sea.

By Doug Schneider/Alaska Sea Grant Programme, UAF

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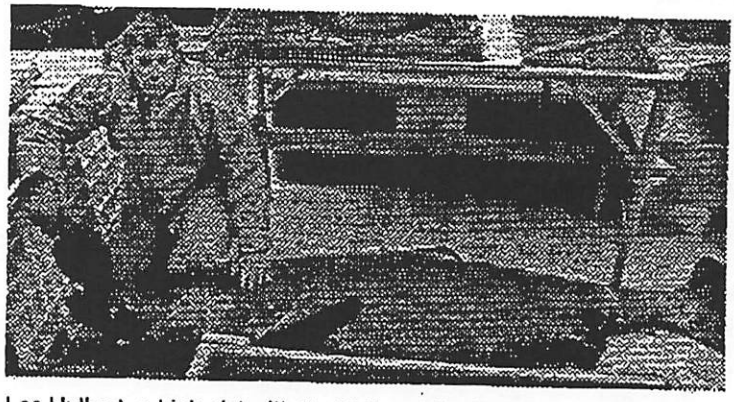
ARCTIC Science Journeys

Radio Script
2000



Lee Hulbert, a biologist with the National Marine Fisheries Service, poses with a Pacific sleeper shark in Prince William Sound, Alaska. Photo courtesy NMFS.

Listen to story on RealAudio

Download RealAudio

Related websites

Pacific Sleeper Shark

Alaska Shark Assessment Program

Salmon Shark Manual

Sleeper Sharks Not So Sleepy

INTRO: As scientists seek to unravel the causes of Steller sea lion and harbor seal declines in Alaska, a number of likely culprits come to mind. Killer whales, some scientists say, may be responsible. Or perhaps changing ocean conditions are at fault. Now add to the debate a little-known shark called the Pacific sleeper shark. As Doug Schneider reports in this week's Arctic Science Journeys Radio, the sleeper shark may not be so sleepy after all.

STORY: The Pacific sleeper shark got its name because it's thought to be rather sluggish, and because they're often found just lying around on the ocean floor. Bruce Wright is a shark scientist with the National Marine Fisheries Service in Juneau, Alaska.

WRIGHT: "Pacific sleeper sharks usually live down really deep. Most people think of them as a nonaggressive shark. One of the common names for them is mud shark. When you bring them up alongside the boat, they're very docile. They're a real soft-looking shark because they don't have that big square dorsal fin. Almost every researcher I've talked too, even a lot of shark researchers, think of them as a docile and nonaggressive shark."

But recently Wright had the opportunity to see sleeper sharks in action in Alaska's Prince William Sound. Each summer, millions of salmon return to the sound to spawn in streams and hatcheries. Increasingly, thousands of sharks have been converging there to feed on the migrating salmon. Among them are sleeper sharks, which Wright says are not as docile as scientists think.

WRIGHT: "We're real interested in the increased number and size of sharks people are catching. Last year we looked at six sleeper shark stomachs and found that the sharks are eating salmon. That indicates that they are not docile, that they can be fast and aggressive predators."

Witnessing sleeper sharks easily catch fast-swimming salmon got Wright to thinking that maybe the sharks are capable of catching even larger, faster prey. He wondered if sleeper sharks might be at least partly responsible for the decline of Alaska's Steller sea lions and harbor seals.

WRIGHT: "My belief was that there is the potential for the Pacific sleeper shark to take seals and other marine mammals, and the reason I thought this might be the case is because the Greenland sleeper shark's primary prey are seals."

To find out, Wright joined researchers with the International Pacific Halibut Commission to conduct surveys last summer of halibut in the Gulf of Alaska. Researchers caught halibut on fishing lines, called longlines. Along with halibut, the researchers also caught sleeper sharks. It proved a perfect opportunity.

WRIGHT: "When the commission runs their surveys they catch a lot of sleeper sharks, and on the last leg of their survey they caught 592 sleeper sharks. These sharks ranged in size from six to seven feet, to up to 18 feet long, and there's been sleeper sharks caught in these waters that are 24 feet long. So these sleeper sharks can get almost as big as a small orca."

All but thirty sleeper sharks were released unharmed after being measured, weighed and fitted with tags. The sharks taken back to the lab allowed Wright to make a unique discovery.

WRIGHT: "Thirty sharks were sampled and of those, five of them had harbor seals and Dall's porpoise parts in their stomachs."

That's enough to make Wright wonder if maybe scientists have overlooked the sleeper shark as yet another key player in the North Pacific food chain. Wright says he hopes to obtain funding to learn more about this misunderstood predator of the sea.

WRIGHT: "For a scientist, it's like being a kid out there, because there's a million questions. Every day we were out there we were learning something new about these species, things that nobody knew at all."

OUTRO: This is Arctic Science Journeys Radio, a production of the Alaska Sea Grant Program and the University of Alaska Fairbanks. I'm Doug Schneider.

Audio version and related websites

Thanks to the following individuals for help preparing this script:

Bruce Wright, Ecologist
NOAA National Marine Fisheries Service
11305 Glacier Highway

Shark abundance increases in the Gulf of Alaska

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Juneau, AK 99081, U.S.A.
E-mail: Bruce.Wright@noaa.gov

Lee Hulbert
National Marine Fisheries Service
11305 Glacier Highway,
Juneau, AK 99081, U.S.A.
E-mail: Lee.Hulbert@noaa.gov

Bruce Wright and Lee Hulbert started the Alaska Shark Assessment Program in 1998, as part of the Alaska Predator Ecosystem Experiment (APEX) Project. They were interested in the ecological implications of increasing shark abundance in their study area. Several sources of information identified the increasing role of sharks in the northeast Pacific. Mr. Wright is now the Chief of the Office of Oil Spill Damage Assessment and Restoration, and the Chairman of the Jay Hammond Bald Eagle Research Institute. He graduated from San Diego State University in 1977 with a M.S. degree in ecology. Mr. Hulbert is the principal investigator of the Alaska Shark Assessment Project and is co-principal investigator of the APEX Forage Fish Assessment project. He graduated from the Humboldt State University in 1991 with a B.S. in fisheries biology.

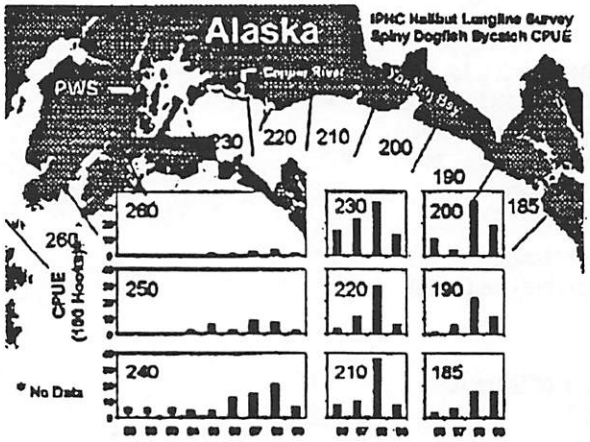


Fig. 1 Bycatch of spiny dogfish (Squalus acanthius) in the IPHC survey data in the Gulf of Alaska.

Shark abundance increases in the Gulf of Alaska (GOA) have been apparent to fishermen throughout the 1990s. The predominant shark species in nearshore Alaska waters, spiny dogfish sharks (*Squalus acanthias*), Pacific sleeper sharks (*Somniosus pacificus*), and salmon shark (*Lamna ditropis*), have dramatically increased in abundance in the eastern GOA and Prince William Sound (PWS). Spiny dogfish are commonly taken as bycatch in commercial fishing gear in Alaska. They are well represented in the pelagic trawl pollock fishery and in longline fisheries for sablefish, halibut, Greenland turbot, and Pacific cod.

International Pacific Halibut Commission (IPHC) longline survey data are the only available long-term source of spiny dogfish bycatch records. IPHC grid surveys were expanded in 1996 to include statistical areas east of area 240. The survey data indicate an increasing trend in relative abundance of dogfish along the eastern and central gulf coast of Alaska in the 1990s (Fig. 1).

Dogfish bycatch has presented a formidable problem for IPHC statistical analyses of halibut abundance in recent years (Dan Randolf 1999 pers. comm.). The increasing trend of dogfish abundance is supported by data from Paul Anderson with the National Marine Fisheries Service (NMFS) lab in Kodiak who conducts standardized small mesh trawl surveys in the Kodiak Island region (Fig. 2). The downturn in this trend in 1999 corresponds to a virtual absence of eulachon (*Thaleichthys pacifius*) in the Copper River, although fishermen in the Yakutat area continued to have problems with dogfish swamping salmon gillnets.

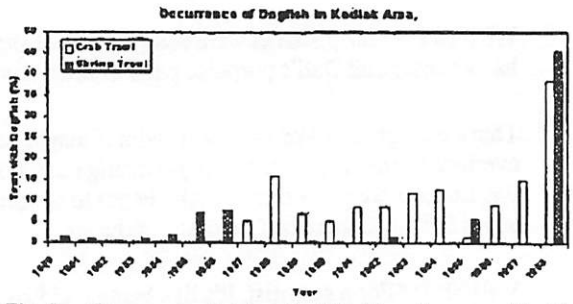


Fig. 2 Occurence of spiny dogfish (Squalus acanthius) in the Kodiak Island region.

Another shark species that has increased in abundance in recent years is the Pacific sleeper shark (Figs. 3 and 4). Sleeper sharks are one of the few sharks found in polar waters year-round. They are a large demersal species generally inhabiting deep water, although they occasionally come to the surface at high latitudes. NMFS and IPHC researchers in Alaska have caught specimens in the six meter range although they average 1.8-2.4 meters in length in PWS sablefish surveys. Sleeper sharks are opportunistic predators whose diet consists primarily of groundfish, squid, and salmon. They are also known to prey on marine mammals, including harbor seals and southern right whale dolphins.

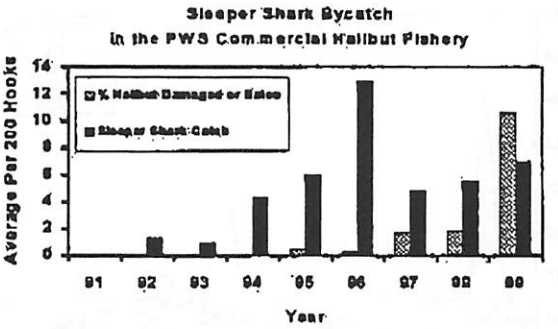


Fig. 3 Bycatch of Pacific sleeper shark (Somniosus pacificus) in the PWS commercial halibut fishery.

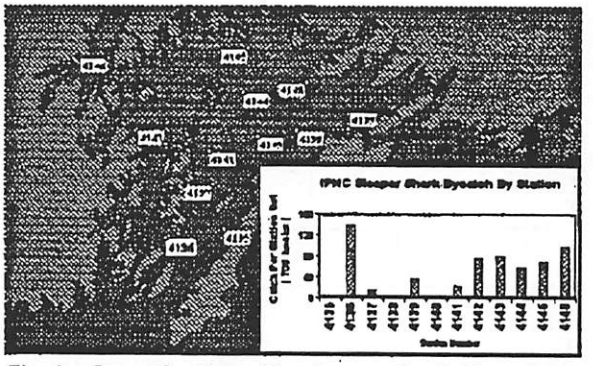


Fig. 4 Bycatch of Pacific sleeper shark (Somniosus pacificus) in the 1998 IHPC survey.

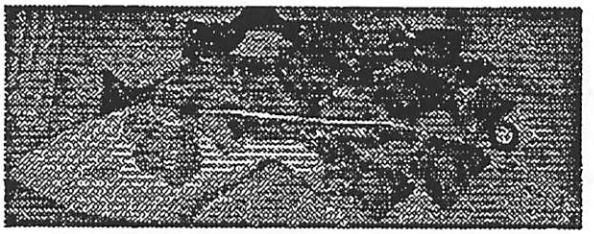


Fig. 5 Halibut damage.

Sleeper sharks are suspected of attacking halibut that has been caught on fishing gear (Fig. 5). Alaska Department of Fish and Game sablefish survey data also indicate an increasing trend in sleeper shark abundance since the survey began in 1996. While finding empirical data for relative trends in sleeper shark and dogfish bycatch in Alaska is difficult, it is particularly hard for salmon sharks.

Salmon sharks are rarely caught in commercial gear and information on trends in abundance is largely anecdotal. However, salmon sharks appear to be the predominant large predatory pelagic fish in the coastal GOA (Fig. 6). A member of the family Lamnidae, they are the Pacific congener of the porbeagle shark in the Atlantic and are closely related to white and mako sharks. Throughout the 1990s, salmon shark abundance in the northern GOA increased dramatically.

The vast majority of salmon sharks aggregating in surface waters of the GOA are adult females. They have been reported to reach 3m in length, although normal size range appears to

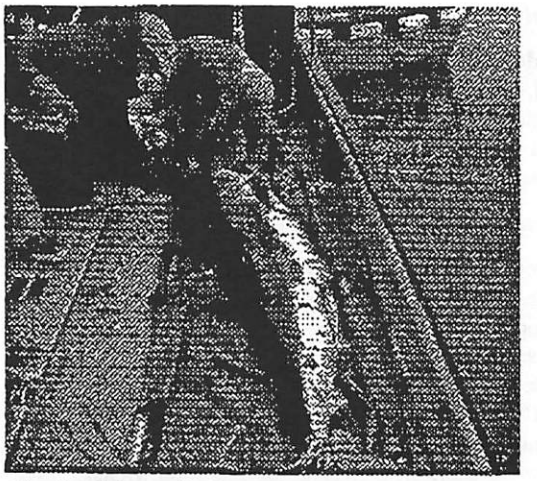


Fig. 6 Salmon shark (Lamna ditropis).

be between 1.8 and 2.4m. Salmon sharks maintain an elevated body temperature and studies have shown that they may have the highest body temperature of any shark, as much as 13.6°C above ambient water temperatures. Because of this, they likely possess a relatively high metabolic rate and daily ration. Their diet consists primarily of salmon, squid, and groundfish.

As part of the Alaska Predator Ecosystem Experiment (APEX) project (See PICES Press July 1999, pages 35-36), the NMFS Auke Bay Laboratory conducted a pilot salmon shark study in 1999, the first sampling effort ever directed at salmon sharks in the eastern Pacific. We collected non-lethal stomach contents, tissue samples for fatty acids, stable isotope, and population genetics analyses. The sharks were tagged with Floy tags, and three were released with "pop-up" archival satellite tags. Although large surface aggregations of salmon sharks have become common during summer months in PWS in recent years, data collected from the satellite tags, hydroacoustics, and underwater video indicate that the majority of the sharks present are below the surface at any given time. The pop-up archival satellite tag data from late July to late September indicates that the sharks spend the majority of their time between 10 and 50 meters depth. The sharks did not have clear diel patterns of depth preference. The hydroacoustics, and underwater video data support this finding.

What caused the increase in abundance of sharks in coastal GOA?

An ocean climate regime shift occurred in the winter of 1976/77. One of the major findings from the evaluation of historic data is that there has been a dramatic shift in the biotic communities in the GOA in the past two decades. A biota dominated by crustaceans and capelin in the early 1970s and before, shifted to a biota dominated by gadids and flatfish by the late 1980s (See PICES Press July 1999 pages 35-36). This shift coincides with a shift in temperatures (sea surface

(cont. on page 22)

Model experiments and comparisons

The MODEL Task Team plans to vary three factors: the model, the geographical location and corresponding sets of biological parameters, and physical forcing scenarios. The model comparison protocols will be used as a basis of comparison.

Recommendations for future work

- Perform a sensitivity/stability analysis on *NEMURO*.
- Test the sensitivity of production of small and large zooplankton, P/B ratio, and ecological efficiency to inclusion of the microbial food web.
- Develop a way to measure when a change in model output is "significant". The metric should consider time, space, and some absolute values of parameters.
- Future work should be coordinated by the MODEL Task Team Co-Chairmen, and participants encouraged to present their results at the next Annual Meeting of PICES. Cooperation and coordination with other CCCC Task Teams are very important.
- Issues related to model management need to be addressed to control the increasing number of different versions of model, including process equations, parameter files, physical forcing data files, and post processing programs. We propose to examine the ICES/GLOBEC experience to obtain guidance as to how best to proceed.
- Develop a *NEMURO*/Stella Box Model using the Stella software package.
- Make progress on making an executable version of the prototype model available on the WWW.
- Develop a means of staying in contact to continue unfinished work.
- Develop a project home page.

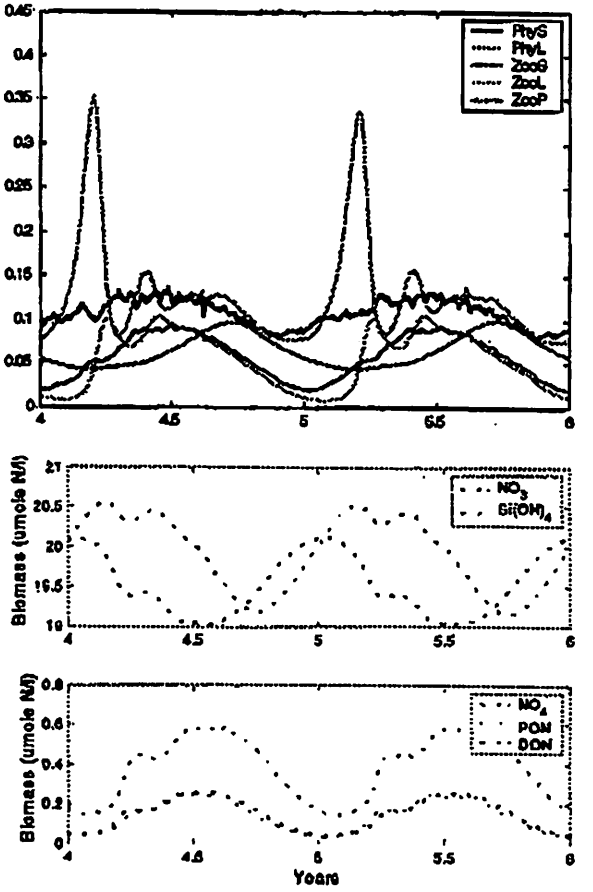


Fig. 5 Details of plankton fields for years 4 through 6 of the NEMURO/MATLAB Box model 20-year base run for Station P.

(Shark abundance – *cont. from page 17*)

temperature, air temperature, and ocean temperature at 250 meters depth) from cooler to warmer. Forage species began a rapid decline between 1977 and 1980 and high trophic level groundfish increased 250% in biomass by the 1990s. By the late 1980s the GOA saw dramatic declines in abundance indices of sea lions, fur seals, and harbor seals.

The forage base responds quickly to changes in climate regimes and is further impacted by predation as groundfish biomass increases. It may be that shark succession in trophic community structure is a natural response to the regime shift, but delayed due to low intrinsic rates of population increase. Has enough time elapsed following the trophic regime shift to justify an explanation of the trend to an increase in shark numbers? Little is known of salmon shark and sleeper shark life history parameters and dogfish age at maturity appears to vary greatly with region and environmental stressors. Considering low intrinsic rates of population increase for sharks in general, it may seem unlikely that the trend follows an increase in numbers. However, changes in reproductive potential due to favorable conditions is a factor that should not be ruled out. Until demographic parameters of these sharks in the GOA are described, the answer is highly speculative. Other reasons for the increase in shark abundance in the northeast Pacific may be the due to increased salmon production, both hatchery and wild salmon, reduced mortality from high seas gillnetting, or a shift in the shark populations in reaction to changes in water temperatures.

In conclusion, we believe that a combinations of factors has resulted in the increased shark abundance in the northeast Pacific and they are now one of the predominant apex predators in the region. The cause and consequences of this trend are unclear. Monitoring shark population trends through better shark bycatch data records and directed surveys, combined with research describing the sharks' spatial and temporal movements, diet, and demographics, will contribute greatly to the understanding of the role of sharks as indicators of, and their affects on, trophic community structure in the GOA.

Final Council Motion on SSL at 9:35 am - 12/9/00

A. That the Council not adopt the conclusions of the BiOp of 11/30/2000 with regard to Steller sea lions or the RPAs contained therein.

B. Call for a Council review and analysis of the proposed RPAs in the current biological opinion compared to the 1999 pollock and Atka mackerel RPAs, and RPA options in the 2000 draft EA for Pacific cod, to determine the potential benefits to recovery of SSLs versus the costs to the groundfish fishing industry.

C. Move that the Council conduct an independent peer review of the BiOp and experimental design and to evaluate other possible explanations for the decline of Steller sea lions and the ability of Steller sea lions to recover. The peer review should include independent scientists and a subset of SSC members.

D. Establish a committee to develop a proposal for RPAs and an experimental design that satisfies ESA mandates and is consistent, to the extent possible, with Magnuson-Stevens Act standards.

The Committee should be of a workable size, and include representatives for the Agency, the State, the SSC, Council, industry & conservation community.

In developing the experimental design, we task the committee with testing the fisheries impacts hypothesis, and the differential impacts of various gear types.

The Committee should begin work ASAP, bringing an initial report back to the Council in April and thereafter as needed, with final recommendations to be presented to the Council (family) no later than December 2001.

E. The Council announces its commitment to disregard 2001 catch history in any future rationalization plan, and

F. The Council requests NMFS to:

1. clarify coordinates of closed areas; and

2. allow vessels to participate in State Pacific cod fishery without surrendering Federal groundfish permits.

DATE	COUNCIL ACTION	RPA COMMITTEE ACTION	STAFF ACTION	STATUTE DRIVEN PROCESS
February Council meeting	1. Select RPA committee members 2. Receive SSC review of BiOp 3. Identify process and issues for for 2001 independent scientific review 4. Initial review of analysis onVMS monitoring			
Mid February	Secure contracts for independent scientific reviews	1. Meet to identify alternatives for June 10 open and closed CH areas and/or other modifications to 2001 ER	Begin Analysis of 2002 RPA	
March		1. Meet to review progress on staff analysis on modification of 2001 ER; select preferred alternative 2. Meet to receive public input on modification of 2002 RPA	1. Analyze alternatives for modification of 2001 ER 2. Prepare NEPA document for extension of 2001 ER	
April Council meeting	1. Adopt changes to 2001 emergency rule 2. Final action on VMS			

AGENDA C-3(B)(2)
FEBRUARY 2001

DATE	COUNCIL ACTION	RPA COMMITTEE ACTION	STAFF ACTION	STATUTE DRIVEN PROCESS
April - June		Continue to develop options for Alternative RPA. Coastal Community workshops?	1. Prepare rulemaking and final NEPA documents for 2001 ER extension and/or modification 2. Continue analytical work on 2002 RPA	
Late May-early June		1. Receive reports on independent scientific reviews 2. Finalizes options for modification of 2002 RPA	Continue analytical work on 2002 RPA	Implement emergency rule provisions that need to be effective June 10 or include any modifications in emergency rule extension effective July 17
June Council meeting	Receive presentation on independent scientific reviews Recommend options for modification of 2002 RPA		Continue analytical work on 2002 RPA	
June - August		Review analysis & provide comments to staff	Incorporate alternatives for modified RPA into 2002 RPA analysis	
September meeting	Initial review of 2002 analysis for public distribution			

DATE	COUNCIL ACTION	RPA COMMITTEE ACTION	STAFF ACTION	STATUTE DRIVEN PROCESS
Sept-October		Meet to recommend preferred alternative		
October meeting	Select preferred alternative for modified RPA			
Oct - Nov			1. Complete NEPA document supporting Council's action 2. Prepare draft emergency rule implementing modified RPA	Section 7 consultation
December meeting	Receive conclusion of section 7 consultation; follow-up action if necessary			
January 1, 2002			Emergency rule implementing RPA effective	
December 2002	Council receives NAS review of biological opionion.			

Summary of Initial Alternatives for Analysis of 2002 RPA

proposed by staff 2/1/01

Alternative 1 No Action. Regulatory measures implemented by emergency rule, and designed to protect Steller sea lions, would expire. *Note that this is not a viable alternative, as it is non-compliant with the ESA and P.L. 106-554.*

Alternative 2 Implement the suite of RPA measures that were in place for the 2000 pollock and Atka mackerel fisheries, and implement measures for the Pacific cod fishery that include seasonal apportionments and harvest limits within critical habitat (this assumes we will need to add measures for Pacific cod).

Alternative 3 Implement the measures detailed in Alternative 2, and prohibit all trawling within critical habitat (injunction).

Alternative 4 The RPA detailed in the November 30, 2000 Biological Opinion will be implemented in its entirety.

Alternative 5 The RPA developed by the Council and its Committees.

Details of Alternative 2

Applicable to all fisheries:

- No transit zones within 3 nm of 37 rookeries.
- Closure within 10 or 20 nm of 37 rookeries to all trawling year-round.

Applicable to pollock fisheries

- Closure to pollock fishing within 10 or 20 nm of 75 haulouts, seasonally or year-round based on use by sea lions.
- In the Bering Sea pollock fishery: four seasons with harvest limits within sea lion critical habitat foraging areas; and two seasons (40:60% allocation) outside critical habitat.
- In the Gulf of Alaska pollock fishery: fishery distributed over 4 seasons (30:15:30:25).
- Closure of the Aleutian Islands to pollock fishing.

Applicable to the Atka mackerel fisheries

- Atka mackerel fishery: two equal seasonal TAC apportionment, with restrictions on harvest within critical habitat, and a VMS requirement.

Applicable to the Pacific cod fisheries

- In the BSAI cod fishery: separate TACs would be established for the Bering Sea and Aleutian Islands, two seasons (A season Jan 20-April 30 at 40% of TAC; B season May 1-Nov 1 at 60% of TAC) with harvest limits within critical habitat based on best estimates of biomass. Using these estimates, the Bering Sea TAC limits within CH are 20% in the A season and 3.6% in the B season. In the Aleutian Islands, the TAC limits within CH are 20% in the A season and 48.3% in the B season.
- In the GOA cod fishery: two seasons (A season Jan 20-April 30 at 40% of TAC; B season May 1-Nov 1 at 60% of TAC) with harvest limits within critical habitat based on best estimates of biomass. Based on these estimates, the TAC limits within CH to start with are 20% in the A season and 31.8% in the B season.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

JAN 30 2001

Mr. David Benton
Chairman
North Pacific Fishery Management Council
605 West 4th Ave, Suite 306
Anchorage, Alaska 99510

Dear Mr. ~~Benton~~ Dave:

Over the coming months, the North Pacific Fishery Management Council (Council) will be reviewing the November 30, 2000, Biological Opinion that resulted from last year's Endangered Species Act Section 7 consultation on the authorization of the Bering Sea, Aleutian Islands, and Gulf of Alaska groundfish fisheries. Part of the review may include development of options to the reasonable and prudent alternative (RPA) contained in the opinion. I am writing to convey the commitment of the National Marine Fisheries Service (NMFS) to work closely with you to facilitate your review and analysis.

Section 11.8 of the opinion stated our intent to submit the opinion for scientific and public review and consult with the Council to determine the best schedule for their review. We also committed to the following actions:

1. Initiate discussion of a National Academy of Sciences (NAS) review;
2. Invite the five independent scientific experts who were retained to provide initial comments on the earlier draft of the opinion to review the completed document;
3. Invite the State of Alaska Steller Sea Lion Restoration Team to review the opinion and provide its recommendations;
4. Hold public hearings on the opinion in Dutch Harbor, Kodiak, Sand Point, Anchorage, and Seattle; and
5. Consult with the plaintiffs and others in the environmental community to determine the best schedule and mechanism for their review of the opinion.

Depending on the results of the reviews, we stated in our news release of December 1, 2000, our willingness to revise the opinion and regulations in light of new scientific information as early as the 2002 fishing season. Any such revision must be consistent with the Endangered Species Act. While NMFS will make the final decision regarding ESA consistency, we will work with, and advise the Council during this process so that any alternatives developed will meet ESA standards.

I am aware that the Council already has initiated its review of the opinion, primarily through its scientific and statistical committee and advisory panel, the NAS, and by external experts. The Council also may require analytical support to determine the efficacy of alternative management measures in protecting Steller sea lions, and to assess the economic and social impacts of the alternatives. By copy of this letter to the NMFS Alaska Regional Administrator, the Science Center Director, and the Director, Office of Protected Resources here at headquarters, I am requesting that they work closely with the Council, and provide, to the maximum extent practicable, analytical support for your review. They also should work closely with the Council in determining research priorities on Steller sea lions.

As former Secretary Mineta stated: "We can and we will continue to work with the fishing industry, the environmental community, state, local, and tribal governments, and the public at large to ensure that the goals of a vibrant economy and the protection of the natural world upon which much of our economy depends, remain in balance."

You have our commitment to follow through on the activities listed above, and I offer my assistance should you need help in coordinating the NAS review, or finding experts here and abroad to help you in your review of the opinion.

Sincerely,

Clarence G. Pautzke, Ph.D.
Acting Deputy Assistant
Administrator for Regulatory
Programs

cc: James Balsiger, Ph.D.
James Coe
Donald Knowles

Funding Landscape

FY02 Steller Sea Lion Research and Management: **$43.15 million**

$850 K - NMFS

$12.3 million:
- $7.0 million – NMFS
- $2.5 million – State of Alaska
- $1.0 million – University of Alaska
- $1.0 million – Alaska SeaLife Center
- $0.8 million - NPUMMRC

$10.0 million:
- $6.0 million – OAR
- $2.0 million – NOS
- $2.0 million – NPFMC

$20.0 million:
- $5.00 million – ASLC
- $5.44 million – NMFS mgt. (Region/HQ)
- $5.00 million – FY02 Contingency Fund
- $4.56 million – Unspecified research and management

22-LS0339\J

HOUSE JOINT RESOLUTION NO. 10

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWENTY-SECOND LEGISLATURE - FIRST SESSION

BY THE HOUSE RESOURCES COMMITTEE

Introduced: 1/31/01
Referred: House Special Committee on Fisheries, Resources

A RESOLUTION

Relating to the management of the Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries and the protection and restoration of the Steller sea lion.

BE IT RESOLVED BY THE LEGISLATURE OF THE STATE OF ALASKA:

WHEREAS the population of Steller sea lions has substantially declined over the past 25 years; and

WHEREAS the National Marine Fisheries Service has listed the western Alaska population of Steller sea lions as endangered under the Endangered Species Act of 1973; and

WHEREAS the reasons for the decline in the population of Steller sea lions are poorly understood; under one theory, the decline is associated with high levels of groundfish (particularly pollock), Pacific cod, and Atka mackerel harvest; and

WHEREAS the National Marine Fisheries Service, as the result of litigation and criticism by a federal district court, has undertaken a series of increasingly strict restrictions on groundfish fishing in areas where Steller sea lions congregate; and

WHEREAS the National Marine Fisheries Service lacks an adequate scientific basis for such restrictions on groundfish fishing and has not explained why the restrictions are scientifically or legally necessary; and

WHEREAS regulations promulgated by the National Marine Fisheries Service in July 2000, banned all trawlers from fishing within 20 miles of 122 rookeries and haul-outs and three large "at-sea foraging areas" in the Bering Sea and Gulf of Alaska from Prince William Sound to the Aleutian Islands chain; and

WHEREAS these regulations had the effect of closing the majority of the groundfish fishery; and

WHEREAS the economic loss to the groundfish fishing fleet in the Bering Sea and Gulf of Alaska is estimated to exceed $170,000,000 if the regulations remain in effect through the first half of 2001; and

WHEREAS additional immeasurable economic losses would be suffered by businesses, families, and individuals who rely on this fishery for economic support and by state and local governments that receive taxes from this fishery; and

WHEREAS the United States Congress, through the efforts of Senator Ted Stevens, has been able to delay to some extent the full impact of these regulations and new measures proposed in the biological opinion of November 30, 2000; and

WHEREAS, during 2001, the United States Department of Commerce and the National Marine Fisheries Service are to cooperate with the North Pacific Fishery Management Council and the National Academy of Sciences in conducting an independent scientific review of the November 30, 2000, biological opinion for the Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries; to prepare proposed conservation and management measures for the Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries; to develop and implement a coordinated comprehensive research and recovery program for the Steller sea lion; and to provide funds for payment to communities, businesses, groups, and individuals to mitigate the economic losses caused by Steller sea lion protection measures;

BE IT RESOLVED that the Alaska State Legislature expresses its support for the efforts of the United States Congress and Senator Ted Stevens to place restrictions on the implementation of the alternatives contained in the November 30, 2000, biological opinion prepared by the National Marine Fisheries Service; and be it

FURTHER RESOLVED that the Alaska State Legislature also expresses its support for the independent scientific review of the November 30, 2000, biological opinion for the

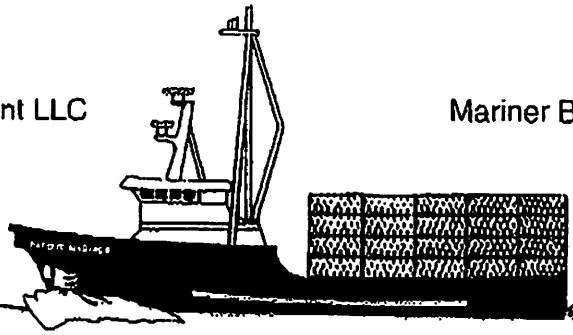
Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries; and be it

FURTHER RESOLVED that the Alaska State Legislature respectfully requests the United States Department of Commerce and the National Marine Fisheries Service to work with the North Pacific Fishery Management Council to develop a scientifically sound and legally sufficient management program for the Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries that harmonizes the pollock, Pacific cod, and Atka mackerel fisheries with the requirements of the Endangered Species Act of 1973 for the protection and restoration of the Steller sea lion in western Alaska by December 31, 2002.

COPIES of this resolution shall be sent to the Honorable Donald L. Evans, United States Secretary of Commerce; the Honorable Penelope D. Dalton, Assistant Administrator, National Marine Fisheries Service, United States Department of Commerce; and to the Honorable Ted Stevens and the Honorable Frank Murkowski, U.S. Senators, and the Honorable Don Young, U.S. Representative, members of the Alaska delegation in Congress.

Kaldestad Management LLC

Mariner Boats



5470 Shilshole Ave. N.W. #410 • Seattle, WA 98107 • (206) 783-3018 FAX (206) 783-3145

January 30, 2001

North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK. 99501-2252

Re: C-3 Steller Sea Lion Measures

Dear Council Members,

Our company operates vessels which participate in the Bering Sea pot cod fishery. I am concerned about the possible restrictions which are being proposed for the pot cod fishery by NMFS and their effects on the fishery. One of these possible restrictions include no pot cod fishing inside the RPA's. Beside the general feeling that pot cod fishing does not cause disruption of aggregated stocks, there are other factors I feel are important to consider.

The Bering Sea pot cod fishery primarily operates in the Unimak Pass area. Since our deliveries are shoreside and are limited by a 72 hour window for fish quality, we need to operate as close to the markets as possible. This is especially vital as fuel prices are at or near an all-time high. In a very marginally profitable fishery , drastic increases in fuel (which is what we are facing compared to last year), an expected decrease in ex-vessel prices along with increased observer and bait costs, could cripple the fishery to where no one could operate profitably. At a time when other pot (ie.crab) fisheries are severely depressed, no vessel can afford to operate in the red fishing for cod.

More importantly, the pot cod fishery as it has existed in the Unimak Pass area, has virtually no bycatch, according to observer reports. Cod pots (which are often converted crab pots) can, by the fact that they are on the bottom and use the same bait as crab fisheries, catch and retain crab as bycatch in certain areas. Moving the fishery away from a clean fishing area such as Unimak Pass to other areas of traditional crab grounds, makes no sense from a management standpoint. This is especially true at a time when all Bering Sea crab stocks are ether considered overfished by definition or are severely depressed. While no one has an exact rate for handling mortality, common sense tells us it is not good to increase bycatch and handling of crab in any fishery.

I would urge the council to allow the pot cod fishery to operate in the RPA'S and, at a minimum, allow the fishery to occur in the Unimak Pass area where it traditionally occured.

Sincerely,

Kevin L. Kaldestad

Kevin L. Kaldestad

January 30, 2001

Mr. David Benton
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK. 99501-2253

Re: Agenda Item C-3

Dear Mr. Benton,

Western Gulf of Alaska Fishermen is an association of groundfish fishermen who operate trawl, longline, and pot vessels out of Sand Point, Kodiak, and Homer, Alaska. We believe that the localized depletion hypothesis that is central to the RPA in BiOp3 is fundamentally wrong. We support efforts to refute the hypothesis and over rule the conclusions of BiOp3. We do not support any new plan amendments or RPAs that attempt to reallocate p-cod in the Gulf of Alaska to any specific class of vessels, or gear types. Any such efforts to reallocate fish to different users based on vessel size or gear type will lead to further escalation in the race for fish, and will exacerbate an already volatile situation.

Although Western Gulf of Alaska Fishermen rejects the localized depletion hypothesis, we do believe that there are too many vessels chasing fish in smaller and smaller areas. If the trend continues of compressing the fishing seasons spatially and temporally, the localized depletion hypothesis could become a self-fulfilling prophecy.

We know that we are lucky to be fishing at all right now in the Gulf. Our industry got a stay of execution by the last Congress, thanks mostly to the huge efforts of Senator Stevens. We also know that all we got was a delay, BiOp3 is still alive. Congress gave us the delay, but they also gave the Council directions to design a suitable Comprehensive Rationalization Program for the groundfish fisheries in the Gulf of Alaska. We believe that rationalization is integral to any long-term survival of groundfish fisheries in the Gulf of Alaska. Even BiOp3 endorses the implementation of such a program.

We hope that the NPFMC will emphasize the importance of rationalization in any management changes that it develops. We must achieve a system that will allow our fleets to simultaneously; operate efficiently, and react to environmental changes and problems. New RPAs that fail to rationalize our groundfish fishery will not satisfy increasing environmental concerns and at the same time provide for a vibrant fishing community.

Please, do not let rationalization of our current fishing industry, be overshadowed and side tracked by efforts to reallocate the resource during the months ahead. Rationalization provides a solution to the dilemma; reallocation will only intensify the race.

Good luck with the work ahead,

Joe Childers
Director
Western Gulf of Alaska Fishermen

OCEAN STORM FISHERIES INC.
2273 66TH Avenue South East
Mercer Island, Wa. 98040
(206) 232 6647

January 31, 2001

Chairman Dave Benton
NPMC
605 4th Avenue
Suite 306
Anchorage, Ak. 99501

Dear Chairman Benton,

My name is Mike Alfieri and I am the owner operator of the 58 foot Fishing Vessel Ocean Storm. The boat operates out of Sand Point, Alaska where I have been Salmon fishing since 1979 and trawling since 1992. First of all I wish to applaud the Council for the action you took at the December council meeting. It was about time somebody stood up to NMFS to try to make some sense out of all the recent actions to shut down the Pollock and Cod fisheries in the Gulf.

Believe me I do mean that under any part of Biop 3 Pollock and Cod fishing in the Gulf will become financially impossible and will cease to exist. I was fishing in area 610 in August, September and October for Pollock in the C and D seasons. Out of 16110 available Tons only 8237 Tons were harvested, roughly 50% of the available quota. That was fishing in the relatively calm summer and fall months. That 50% figure will only decrease if we are forced to fish that way in winter and spring. Right now trawling accounts for roughly 80% of my income for the year, as Salmon is severely depressed and there are no promising outlooks for that fishery. Under any part of Biop 3 you will cause financial ruin to myself and my wife and 2 children. There is no other fishery this boat or I can move on to.

One fact I would like to point out is Biop 3 is being touted as a 6 year study to see if there is any improvement in Stellar stocks. Since the Fall of 1998 there has been no harvest of Pollock or Cod in area 620 of the Gulf due to the Haul Outs at Mitrofania and Kak Island. That is a 2 1/2 year study already in place. What the last Sea Lion count supposedly shows is a continued downward trend in their numbers. When I go to the Council meetings and sit and listen to the Scientific community come up with explanation after explanation of why fishing is not harming the Stellar and then it is proven out with a mini Biop 3 around Mitrofania and Kak Island I am even more dumbfounded as to why I am being put out of business for absolutely no reason at all.

I am also the President of a non profit group called Western Gulf of Alaska Fishermen, WGOAF, that represents a group of fishermen that fish in the Sand Point and Kodiak areas. Our main reason for forming this association is to promote rationalization in the Gulf. We feel that with rationalization we can be more flexible as fishermen to address some of the concerns of the environmental community. What we want most of all is to secure our history in the Gulf and be given an opportunity to harvest that history.

Somebody has to be accountable for all of these harmful actions being brought against fishermen and I beg of you and the Council to please do everything you can to let the Gulf trawl fisheries to continue to be one of the best managed fisheries in the World.

Sincerely;

Mike Alfieri

January 10, 2001

Ms. Penny Dalton
Assistant Administrator, NOAA-National Marine Fisheries Service
1315 East-West Highway
SSMC3
Silver Spring, MD 20910

Dear Ms. Dalton,

On behalf of World Wildlife Fund (WWF)'s Bering Sea ecoregion program, I'd like to thank you for your efforts to address conservation of the endangered Steller sea lion in Alaska's marine waters. I heard your address to a nervous audience at the Fish Expo in Seattle, and appreciate the challenge you are facing to balance fishing and wildlife needs through ecosystem based management reform.

As the National Marine Fisheries Service now prepares regulations to implement changes in fisheries management in response to the Biological Opinion Reasonable and Prudent Alternatives (RPAs), WWF encourages you to consider the future of the rich biodiversity of the Bering Sea. WWF encourages NMFS to consider using this opportunity not only to protect Steller sea lions, but also to ensure adequate protection for seafloor habitat, seabird foraging areas, and other fish and wildlife.

WWF has identified the Bering Sea as one of 60 marine areas that are globally significant for harboring the world's biological diversity. We selected this ecoregion based on its central role in harboring some of the largest seabird colonies in the world; some 25 species of marine mammals; diverse marine invertebrate populations; and of course, one of the most productive fisheries in the world. The high productivity of the sea can be attributed to rich benthic environments and upwellings.

We feel it is essential to ensure conservation of these important values while determining future regulations in the Bering Sea fishery. Toward that end, we urge NMFS to take all measures possible to prevent harm to benthic habitats, seabird colonies, coral formations, and all marine mammals, including Steller sea lions and sea otters, whose populations are now plummeting.

One area of particular concern is the Aleutian Island archipelago. On recommendation of the North Pacific Fishery Management Council, this area was closed to pollock trawling in 1998. Yet the RPAs in the Biological Opinion outline a plan to reopen part portions of the waters surrounding the Aleutian Islands to pollock trawling. Marine waters surrounding the Aleutian Islands harbor some of the Bering Sea's most important and vulnerable habitats. It would be counterproductive to place these habitats and species in jeopardy by reopening the area to trawling.

About half of the western Steller sea lion population once lived in the Aleutian Islands; thus, this area is important to the recovery of the species. Sea otters, harbor seals, and other species are also in decline in the Aleutians, and may warrant increased protection. Increasing trawling pressure on this region does not seem prudent or adequately precautionary in light of these other species and habitat vulnerabilities.

World Wildlife Fund
1250 Twenty-Fourth St., NW Washington, DC 20037-1132 USA
Tel: (202) 293-4800 Fax: (202) 293-9211
www.worldwildlife.org
Affiliated with World Wide Fund for Nature

The Aleutians Islands encompass some of the ecoregion's richest coral formations as well as foraging areas and nesting habitat for numerous seabirds, including the endemic red-legged kittiwake. Most of these seabirds also depend upon the same forage fishes that sea lions and seals subsist upon. The region also supports large populations of long-lived rockfish, which may suffer new pressures as they are taken as bycatch.

We appreciate your team's efforts to design and implement an experimental design which will help us better understand impacts of fishing on sea lion foraging areas. However, this design could be improved through minimizing all harvest of prey species within the "red zones." This will likely provide a clearer signal of impacts of fishing than closed areas which allow harvest of prey species as bycatch.

In light of these concerns, we urge you to consider the following measures:

- Maintain the pollock trawl closure in the Aleutian Islands put in place by the Council;
- In order to provide greater protection for sea lions, close the entire Aleutian Islands to trawling for pollock, Aka mackerel, and Pacific cod and other fisheries which harvest those species as bycatch;
- Work closely with USFWS seabird biologists to curtail potential impacts of the RPAs on seabird nesting and foraging areas;
- In finalizing management measures for the Bering Sea, establish a standard of no net increase in seafloor habitat impacts.

In 1999, working with experts throughout Russia, Alaska, and other parts of the US, WWF and The Nature Conservancy (TNC) of Alaska led an ecoregion-wide effort to identify key areas for biodiversity in the Bering Sea. I enclose our final report for you here. WWF is now using this information to guide the development of a conservation program directed at biodiversity conservation in the Bering Sea ecoregion. (We recently established a field office in Anchorage, now being directed by David Cline.) We hope this will be a useful reference for you also. We urge NMFS to consider the importance of conserving the biodiversity and broad ecosystem functions in these areas while implementing the RPAs.

Finally, I was very impressed by your presentation in Seattle, yet was unable to absorb all of the technical information you provided. I would be grateful if you would send a copy of your power point presentation to me in print or via email.

Thank you very much, and best wishes in your endeavor to improve marine resource management in the Bering Sea.

Sincerely,

Margaret D. W

Margaret Williams, Director
Bering Sea Ecoregion Program
E-mail: margaret.williams@wwfus.org

cc. Governor Tony Knowles, State of Alaska
dd. Dr. Michael Payne, Protected Resources Division, NMFS
ee. Dr. Jim Balsiger, Regional Administrator, NMFS

RECEIVED
DEC 21 2000
N.P.F.M.C

F/V Irene H
Mark Vickstrom
PO Box 318, Kodiak, AK 99615

Mr. Dan Coffey, Chair
Alaska Board Of Fisheries
Juneau, AK 99802-5526

December 19, 2000

1. For the Special Meeting of the Board on December 21, 2000
2. For the Regular Meeting of the Board in January, 2001

Dear Mr. Coffey,

I am opposed to Proposals 95 & 96 which limit the length of vessels that are allowed to operate with pots in the state waters of Kodiak, Chignik and the South Peninsula state management areas during the open federal fishery for p. cod. I can see no justification to kick out vessels that are over 60' from the South Peninsula area and part of the Chignik area, or vessels that are over 75' from the Kodiak area and part of the Chignik area. I am LLP qualified to fish during the federal fishery in these areas. I have traditionally fished for p. cod with pots during the federal fishery in the state waters of these areas with the F/V Irene H, an 83' vessel. I also harvest p. cod with pots in the state-waters fishery. I am also opposed to the 60 pot limit in the state waters of these areas during the federal fishery. I do not believe that it is possible to efficiently enforce a 60 pot limit in state waters during the federal fishery, and the 60 pot limit is unnecessarily limiting. I do not think that it is cost effective for the state to be spending their limited enforcement funds on enforcing this regulation. I do not object to the existing 60 pot limit during the state waters p. cod pot fishery.

I am the operator of and a partner in the F/V Irene H. I am an Alaskan resident, and I have two sons and one daughter who live and attend school in Kodiak. I employ approximately 4 persons on my vessel. I believe that my fishing business is important to the employment, support businesses, economies and communities where I deliver my product, and where I live. I have been fishing p. cod with pots in the Kodiak area since approximately 1990. My partner and I were some of the very early participants in this fishery. We also were the early advocates of providing a special quota for a special state-waters p. cod pot fishery.

If you do decide to attempt something along these lines, I believe that you should grandfather those of us who have traditionally fished in these areas. Vessels that are LLP qualified for these areas should be permitted to continue to fish in these areas. I believe that an upper limit of 112' is the minimum length that should be considered, and would let traditional vessels continue to fish. I depend on these areas, and it is not reasonable or justifiable to kick me out because I am only 83'. 83' is considered a small vessel by most standards, and I need the opoprtunity to fish in the areas that are proposed to be closed. There are many vessels that are under 60' and 75' that are not Alaskan residents, and who do not have the history or dependence that many of us have in this fishery.

Sincerely,

Mark Vickstrom
Owner/Operator
F/V Irene H

phone, 907-486-7622
fax machine, 907-486-0418

F/V Ruff & Reddy, Inc.
P.O. Box 69, Kodiak, AK 99615
Tel: 907-486-4289; Fax: 907-486-4092
December 16, 2000

Mr. Dan Coffey, Chairman
Alaska Board of Fisheries
Juneau, AK 99802

Re: Proposals 95 and 96 for January, 2001, Board Meeting;
p. cod considerations at the December 21, 2000, Special Board meeting.

Dear Chairman Coffey,

I am opposed to Proposals 95 and 96, and any other initiatives that restrict the size of Alaskan resident vessels from harvesting p. cod in state waters during the federal fishery for p. cod, or during the "State Waters" p. cod fishery. Proposal 95 proposes to prohibit vessels over 75' LOA from harvesting p. cod in the state waters of the Kodiak, Chignik, Cook Inlet and Prince William Sound state management areas during the federal fishery for p. cod in the Gulf of Alaska. Proposal 96 proposes to impose a similar prohibition on vessels over 60' LOA in the state waters of the Chignik and South Peninsula state management areas during the federal fishery for p. cod.

I own and operate a 90' vessel (F/V Ruff & Reddy) that harvests p cod with pots in state waters in the Kodiak area during the federal fishery. I have been an Alaskan resident since 1974. My crew historically have for the most part been Alaskan residents, and currently are all Alaskan residents who need to support families who primarily live and attend schools in Kodiak. I was one of the first fishermen who developed the pot fishery for p. cod (approximately 1986), and one of the first proponents of the "state waters" concept for putting aside a quota for harvesting cod with pots in state waters. On December 10, 1990, the Anchorage Times did a story on my involvement in the development of the pot fishery for p. cod in the Kodiak area, and wrote that "Combined with Hill's ventures with pots, some are hailing the new allocation as a new method for smaller Alaskan based ships to gain a toehold in an industry dominated by factory trawlers, shore based trawlers, and factory longliners using baited hooks."

My vessel is a small boat by many standards. I have a substantial history harvesting p. cod with pots in state waters, both during the federal fishery, and during the "State Waters" fishery. I do not believe that it is right for the Board to arbitrarily expel me from what for me is a traditional fishery and a traditional area for the benefit of vessels who are less than 70' LOA, many of whom have no history (or only a recent history) of harvesting p. cod with pots in these areas, and many of whom are not Alaskan residents.

Sincerely,

Charles "Jack" Hill
Owner/Operator, F/V Ruff & Reddy

Dan Oliver
F/V Midnite Sun
P.O. Box 2356, Kodiak, AK 99615

December 23, 2000
Mr. Dan Coffey, Chair
Alaska Board Of Fisheries
Juneau, AK 99802-5526

Kodiak/Chignik/South Peninsula Proposals 95 & 96/Federal cod fishery restrictions

Mr. Coffey,

I am opposed to proposals 95 & 96. I am not only opposed to the 75' and 60' vessel size limits that are included in these proposals, but also to the 60 pot limit that is also proposed. I am the operator of and partner in the F/V Midnite Sun, which is an 85' vessel that fishes for cod with with pots in the state waters of Kodiak, Chignik and the South Peninsula during the federal fishery. My vessel has pretty much fished in these areas every year since the inception of the pot fishery for cod. These proposals pick arbitrary vessel lengths, and they are discriminatory against a segment of the small vessels that mostly fish out of Alaska. I am LLP qualified in the Central and Western Gulf of Alaska federal fixed gear groundfish fisheries, therefore, I should be allowed to fish in state waters during the federal fishery. An 85' vessel is a small vessel, and has fewer opportunities that many vessels that are under 75' or 60', and certainly fewer opportunities than much larger vessels. For example, although I have a history in the Bering Sea crab fisheries, it is difficult for me to effectively compete unless I get lucky with weather. Why not target the vessels who are not LLP qualified, and who have little or no history? Many vessels that are smaller than the F/V Midnite Sun can carry more product than my 85' vessel, and have similar or greater harvesting power, depending on the design of the vessel, and the operator of the vessel.

My fishing activities provide for 4 crewmen in addition to me. Most of my crew have generally been Alaskan residents. I have a wife and 3 kids who depend on my ability to provide for them. My children go to school in Kodiak. My crewmen and their families are as important as any crewman or family that is associated with a vessel that is less than 75' or 60'.

I think that you should look at the history of the boats that you will expel from the state waters before you kick us out. You should consider giving grandfather rights to those of us with a history. I ask you to realize that many vessels that are less than 75' or 60' do not have the history that I do in the state waters of the South Peninsula, Chignik and Kodiak areas. Why do the proposals discriminate against small vessels that are over 75' in the Kodiak and Chignik areas, and over 60' in the South Peninsula and Chignik areas? Why would the Board want to kick out a vessel with a history and dependence, in favor of vessels who may not have history or dependence, or who may not even be Alaskan residents? What is the justification for the vessel lengths that are used in these proposals? I need the opportunity to fish in state waters during the federal fishery for p. cod, and during the state waters cod fishery also.

Sincerely,

Dan Oliver
Owner/Operator
F/V Midnite Sun

phone 907-486-6924/fax 907-486-6924

F/V Irene H. Inc.

Box 813 • Kodiak, Alaska 99615 • CHARLIE JOHNSON
907-486-4320 • 907-486-4445

Dec. 26, 2000

North Pacific Fishery Management Council

Proposals 95 and 96 to restrict the size of vessels in the federal fishery for p. cod with pots

Dear Mr. Sirs,

I respectfully request that you reject Proposals 95 and 96. I do not want to be excluded from a fishery and an area in which I have an historical presence with my vessels, and which I helped develop. I also believe that the 60 pot limit is too restrictive during the federal fishery, and that the state should be using their enforcement dollats to catch illegal activities that threated the resource, and that break other more important regulations. I am the owner and operator of two vessels (F/V Irene H. 83', and the F/V Midnite Sun , 85') that have harvested pacific cod with pots during the federal groundfish fishery in the state waters of Kodiak, Chignik and the South Peninsula. I also harvest cod with pots during the state waters cod fishery, and I helped promote the establishment of that fishery. My 83' and 85' vessels are small vessels, and we need as many opportunities as we can to contunue our traditional business. We have been using these vessels to harvest pacific cod with pots since the late 1980's. Vessels in this length class up to approximately 115' have been very important to the communties , economies, businesses and employment of Kodiak, and the other coastal communities in western Alaska. I ask you to consider that there are several vessel that are 58' that pack as much or more product than my 83' and 85' vessels, therefore, why not eliminate them also? Why is a vessel that is less than 75' or 60' any more important than a vessel that is larger than 75' or 60' ?

I am LLP qualified to fish during the federal fishery in these areas. I do not think that it is justified to eliminate pot vessels over 75' and over 60' who are LLP qualified to fish during the federal fishery. Possibly, the Board should look at eliminating vessels that are not LLP qualified during the federal cod fishery. Vessels that are LLP quallified for these areas should be permitted to continue to fish in these areas during the federal fishery and during the state waters fishery. Possibly, the Board should look at grandfathering in vessels that have traditionally fished in these areas. My business depends on these areas, and I do not think that it is fair to prohibit me from fishing with my small vessles in favor of other small vessels who may not be LLP qualified, who carry as much or more product, whc might not be state residents, or who have little or no history or past dependence in these areas.

Sincerely,
Charles Johnson
Owner/Operator
F/V Irene H. and the F/V Midnite Sun

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

AGENDA C-3(d)
FEBRUARY 2001

February 1, 2001

Dave Benton, Chairman
North Pacific Fishery Management Council
605 W. 4th Avenue, Room 306
Anchorage, Alaska 99510

Regard: NEPA Analysis for Amendments to the Alaska Groundfish FMPs to Respond to Comprehensive Section 7 Consultation

Dear Chairman Benton:

The Council is working toward a Reasonable and Prudent Alternative in response to the November 30, 2000, comprehensive biological opinion. We have determined that an Environmental Impact Statement is the appropriate National Environmental Policy Act (NEPA) analysis document for this action. Our determination is based both on the fact that significant impacts will result from implementation of the action and that the action is controversial. This letter contains information on this requirement for Council discussion under Agenda Item C-3 Steller Sea Lion Measures.

Our comments are arranged under these general topics: 1) Alternatives for analysis, 2) Planning the analysis, 3) Schedule for the analysis, and 4) Approaching the new workload.

1) Alternatives to analyze. The analysis should present the environmental impacts of the proposal and the alternatives in comparative form to assist with sharply defining the issues and providing a clear basis for choice among options. The Council already suggested several analytical alternatives for purposes of obtaining information necessary to distinguish and weigh the relative impacts and expected benefits to Steller sea lions of the reasonable and prudent measure contained in the November 30, 2000, biological opinion. The analytical team will work with the Council at the upcoming meeting, and throughout scoping, to flesh out the analytical alternatives.

2) Planning the analysis. The analytical planning process includes determining the scope of issues to be addressed and identifying the significant issues relating to the proposed action. Public comment at the December 2000 and January 2001 Council meetings, the draft Pacific cod analysis, and our genera

familiarity with this action can be utilized for planning the analysis. The next step in planning is to outline the EIS incorporating treatment of issues and other required EIS components. A draft table of contents will be brought to the April meeting.

3) Schedule of the analysis. The Council on Environmental Quality regulations direct agencies to integrate the NEPA process with other planning at the earliest possible time to insure that planning and decision making reflect environmental values, to avoid delays later in the process, and to head off potential conflicts. A very basic timeline of the major EIS milestones is enclosed. While fully acknowledging this is a demanding schedule, we are committed to working with the Council to attempt a schedule that meets 2002 fishery needs.

4) Approaching the new workload. NMFS affirms this analysis as one of our highest priority projects. Toward that end I have assigned my staff member Tamra Faris as co-project leader and writer, overseeing the analytical design and parts to be written by NMFS employees. I understand David Witherell is similarly assigned co-project leader and analyst. We will endeavor to contract out as much of the analysis as possible. Additional Regional and Center staff will be assigned as necessary. The agency is also heavily engaged in preparation of the programmatic supplemental EIS for the groundfish FMPs, the American Fisheries Act EIS, and numerous other analytical documents, all of which contain analysis that can be applied to this project.

I am prepared to discuss all of these topics further at the upcoming meeting.

Sincerely,

James W. Balsiger
Administrator, Alaska Region

January 31, 2001

Draft EIS Schedule in Major Milestones

Milestone	Date
Scoping Period Notice of Intent to Prepare an EIS Date(s) of Scoping Meetings	 February 2001 To Be Determined
List of Issues to Analyze	January-February 2001
Outline / Table of Contents	April 2001
Suite of alternatives to be analyzed	February-April 2001
Analysis and Writing	February-September 2001
DEIS complete	September 2001
Public Review of DEIS (45 day minimum)	October 2001
Response to comments on DEIS	November 2001
Final EIS (30 day minimum)	November 2001
Record of Decision (Approve Amendment or publish Rule)	December 2001

Note: The schedule given above is <u>technically</u> possible applying the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA. Such schedule may, however, be overly ambitious for an EIS process that consists of an action that is both controversial and contains numerous kinds of significant impacts on the human environment.

2/01

Fishery Interaction Study

Feasibility Study to Determine the Effect of Commercial Fishing on Walleye Pollock Distribution and Abundance

Anne Hollowed, Chris Wilson, Michiyo Shima, Paul Walline

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Fisheries Science Center
7600 Sand Point Way NE
Seattle, WA 98115

Key Questions

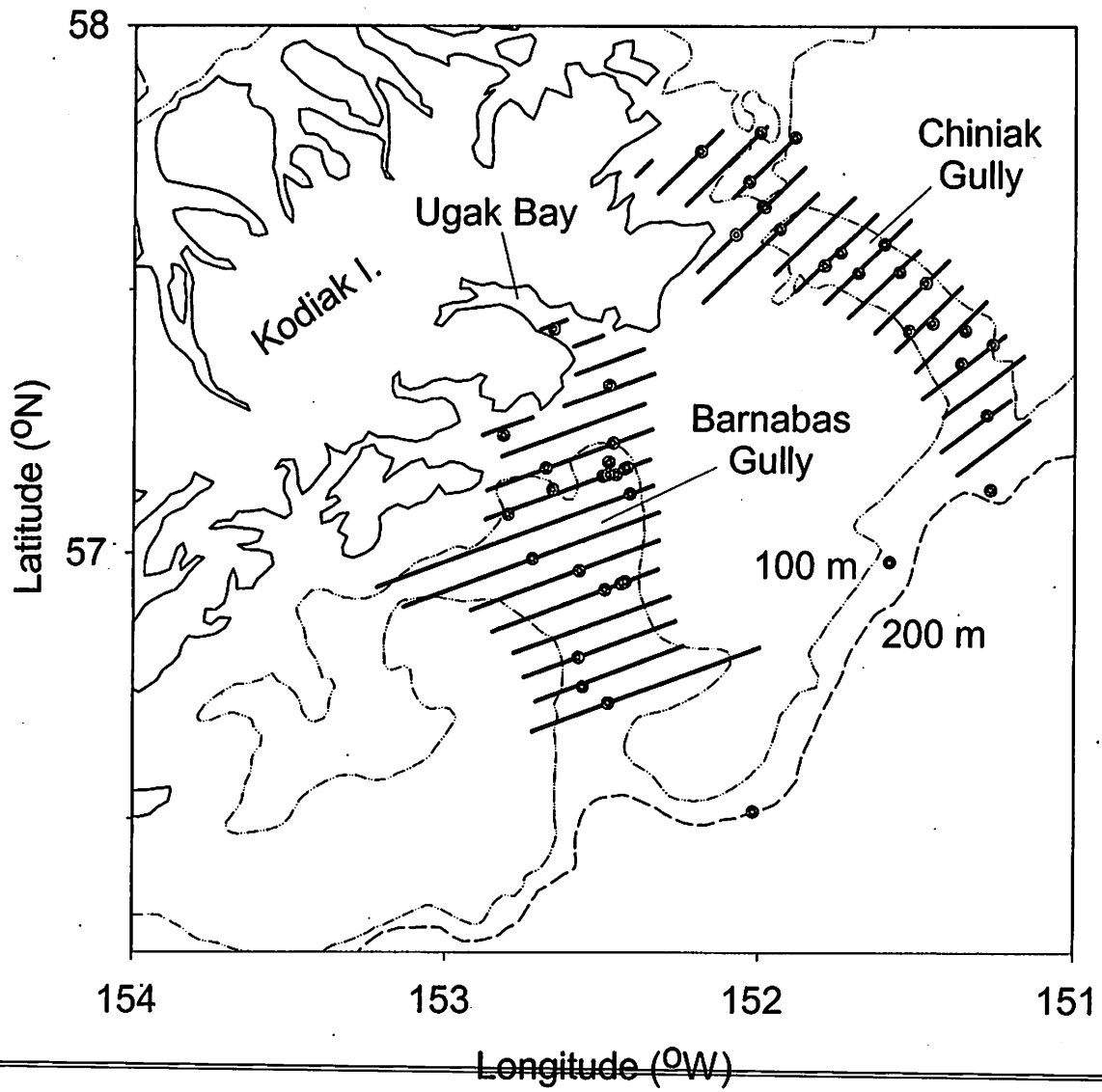
- Are proposed or current RPAs achieving their stated goals?
- What is the functional relationship between commercial fishing effort and foraging success of Steller sea lions?
- What natural factors influence the functional relationship between commercial fishing and foraging success of Steller sea lions?
- What human factors influence the functional relationship between commercial fishing and foraging success of Steller sea lions?

Marine Mammal Studies

- Monthly aerial surveys of sea lion habitats in vicinity of Kodiak Island
- Scat collections from selected sites in the vicinity of Kodiak Island on alternating months, to minimize disturbance
- Satellite tagging
- Branding
- Behavioral studies

Chiniak: 8-10 Aug (pass 1), 14-17 Aug (pass 2)

Barnabas: 11-13 Aug (pass 1), 17-19 Aug (pass 2)



Hypothesis

$$Ho: \quad \frac{B2 - B1}{B1} = \frac{C2 - C1}{C1}$$

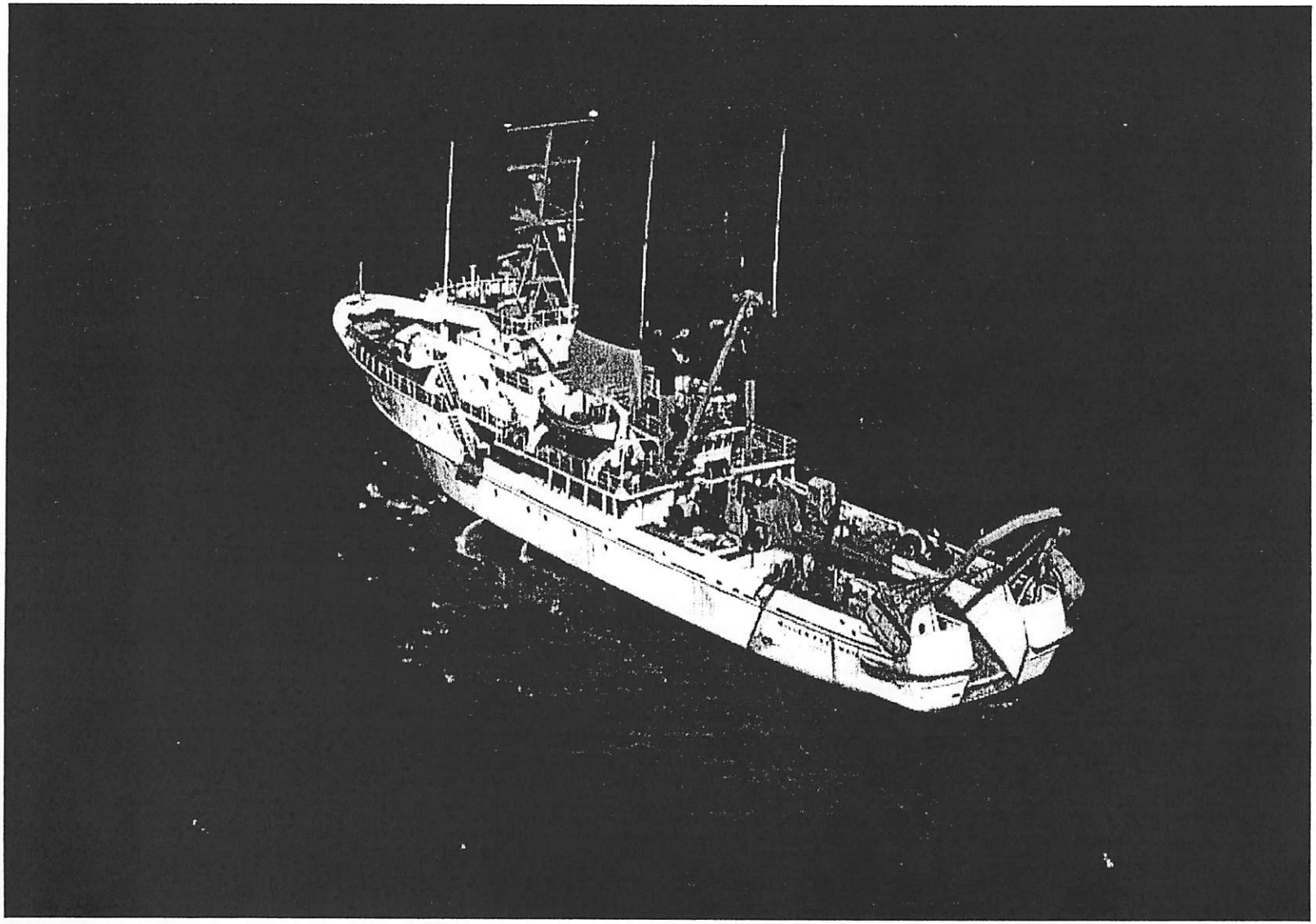
Ho: Commercial fishing does not produce a detectable change in the distribution or abundance of fish within gullies on the east side of Kodiak Island.

Objectives - 1st Year

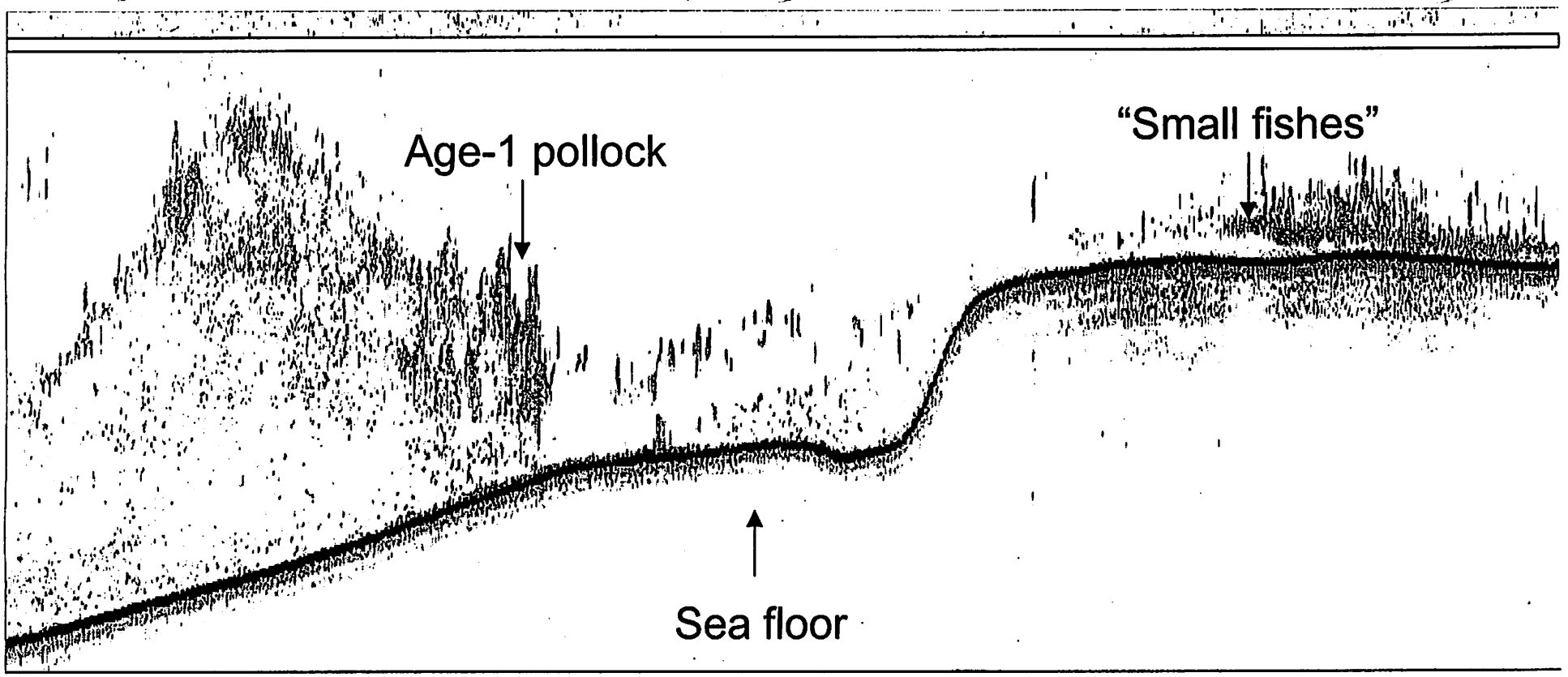
1) assess suitability of acoustic-trawl survey methods at study site in August

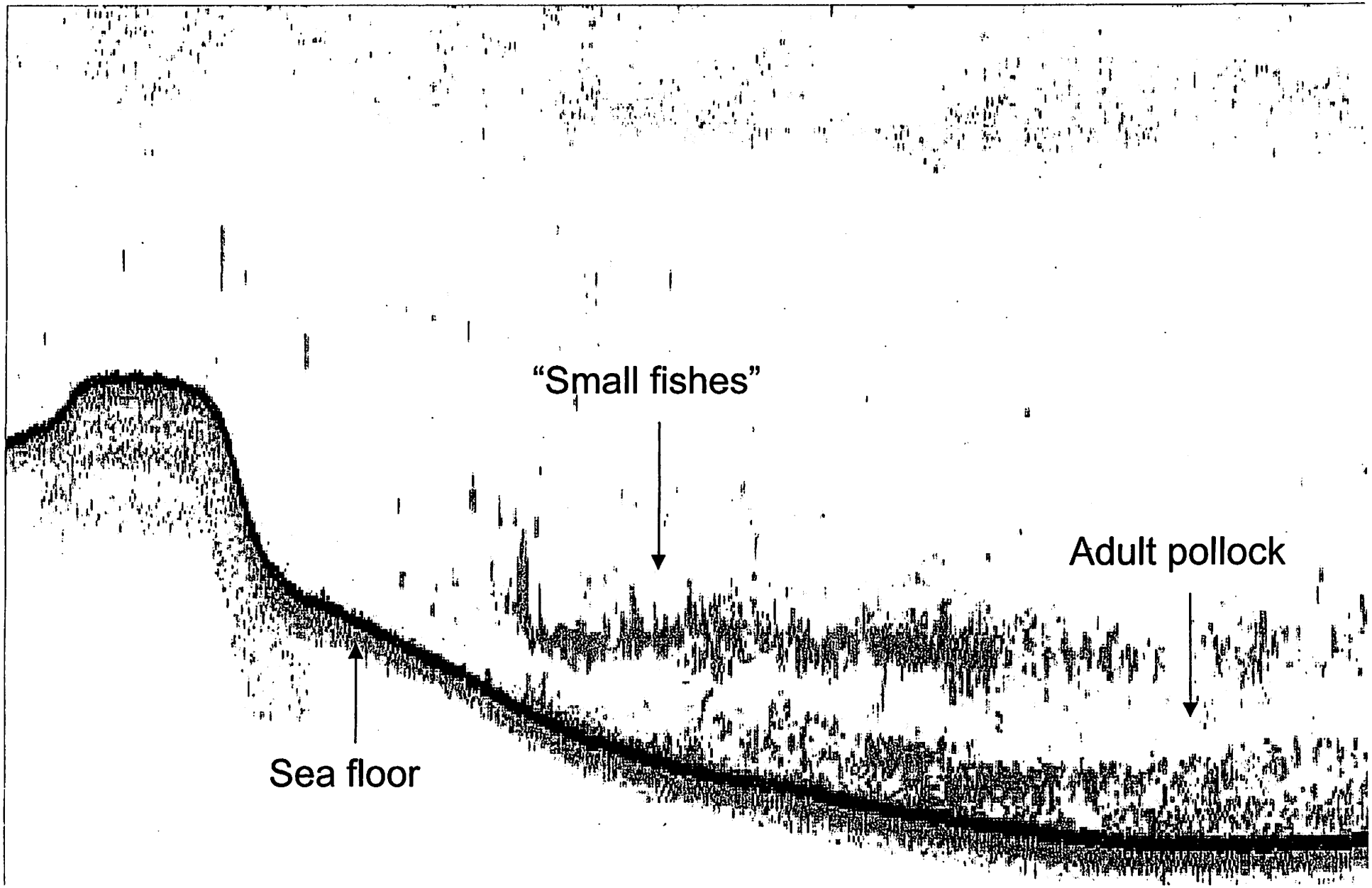
2) assess the temporal and spatial variability in pollock abundance and distribution over duration of field study (days to weeks)

METHODS



- SPECIES COMPOSITION
- POLLOCK SIZE COMPOSITION
- GEOGRAPHICAL DISTRIBUTION
- POLLOCK ABUNDANCE ESTIMATES
- POLLOCK VERTICAL DISTRIBUTION
- POLLOCK SCHOOL ANALYSIS
- FIELD WORK FOR AUGUST 2001


Age-1 pollock
"Small fishes"
Sea floor


"Small fishes"
Adult pollock
Sea floor

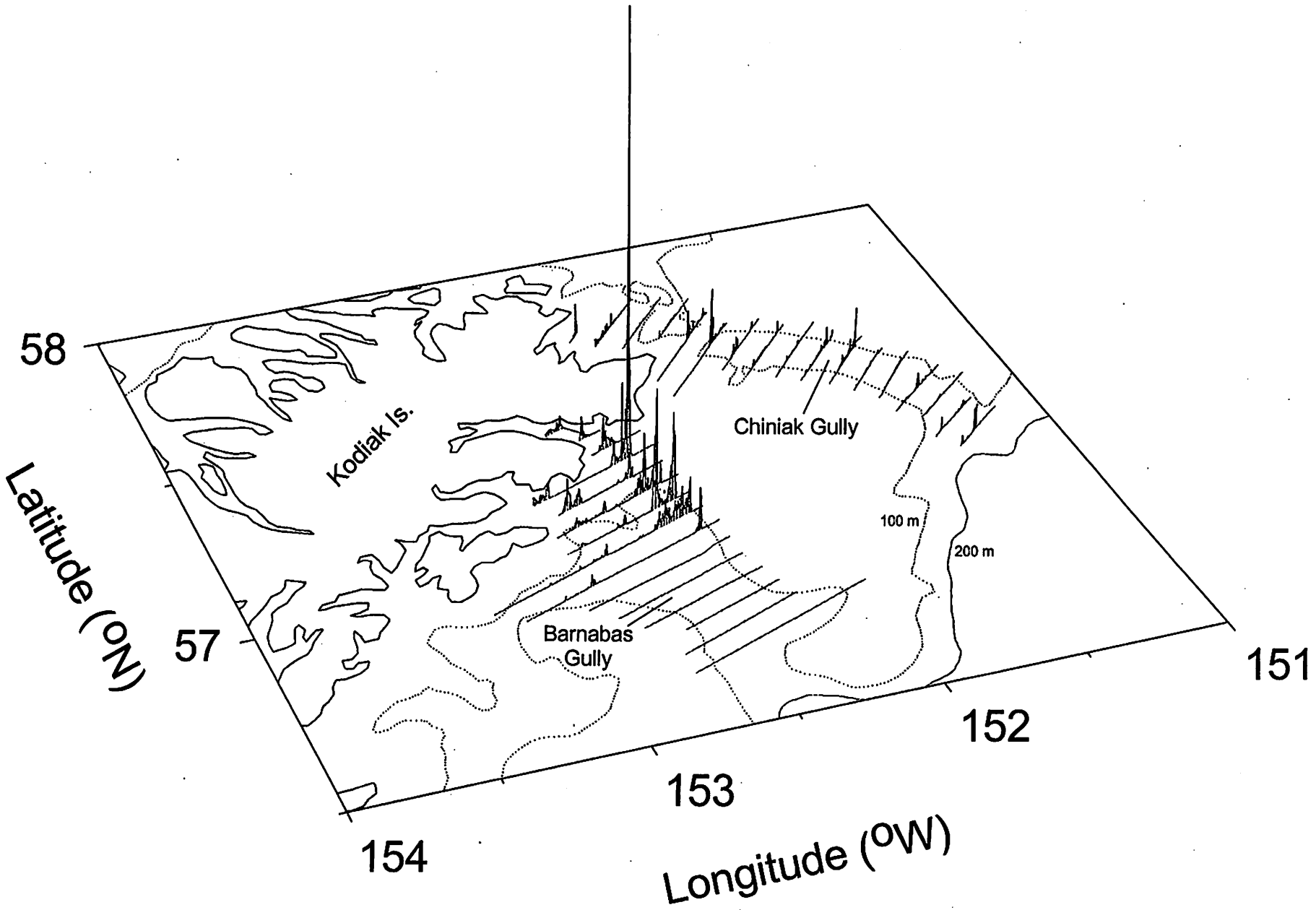


Figure . Acoustic backscatter attributed to "adult" pollock along trackline during pass 1 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

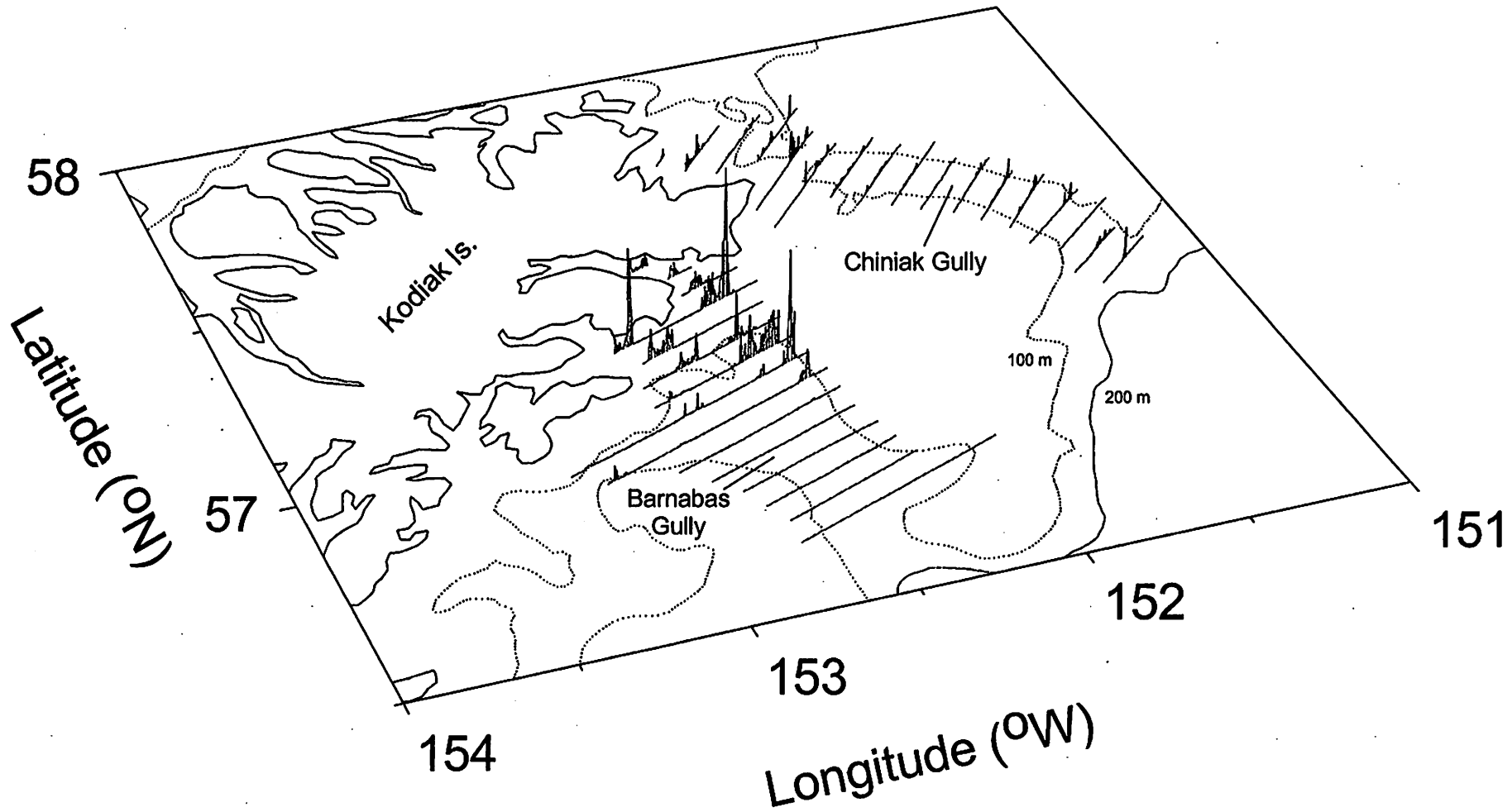


Figure . Acoustic backscatter attributed to "adult" pollock along trackline during pass 2 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

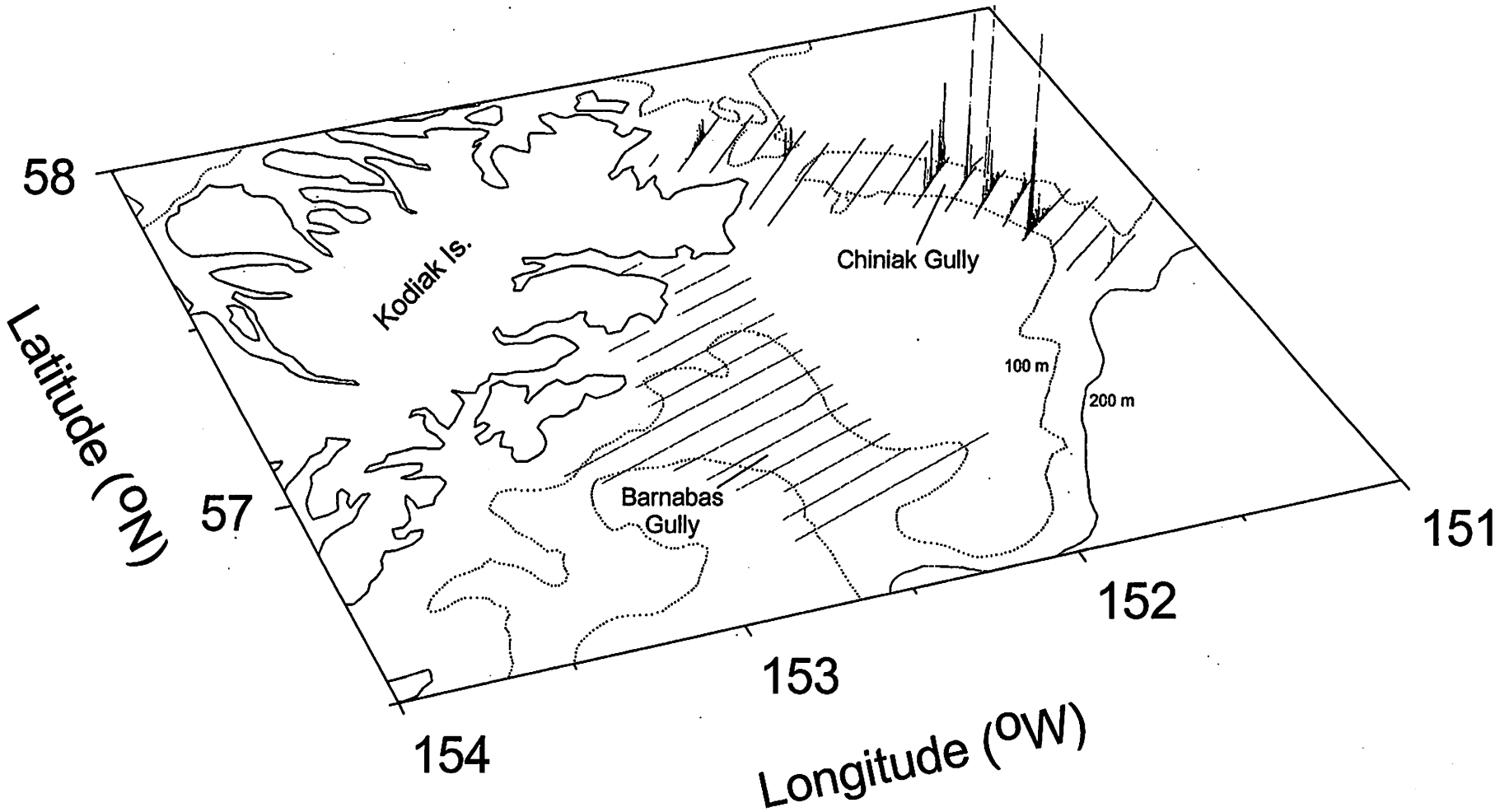


Figure . Acoustic backscatter attributed to "age-1" pollock along trackline during pass 1 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

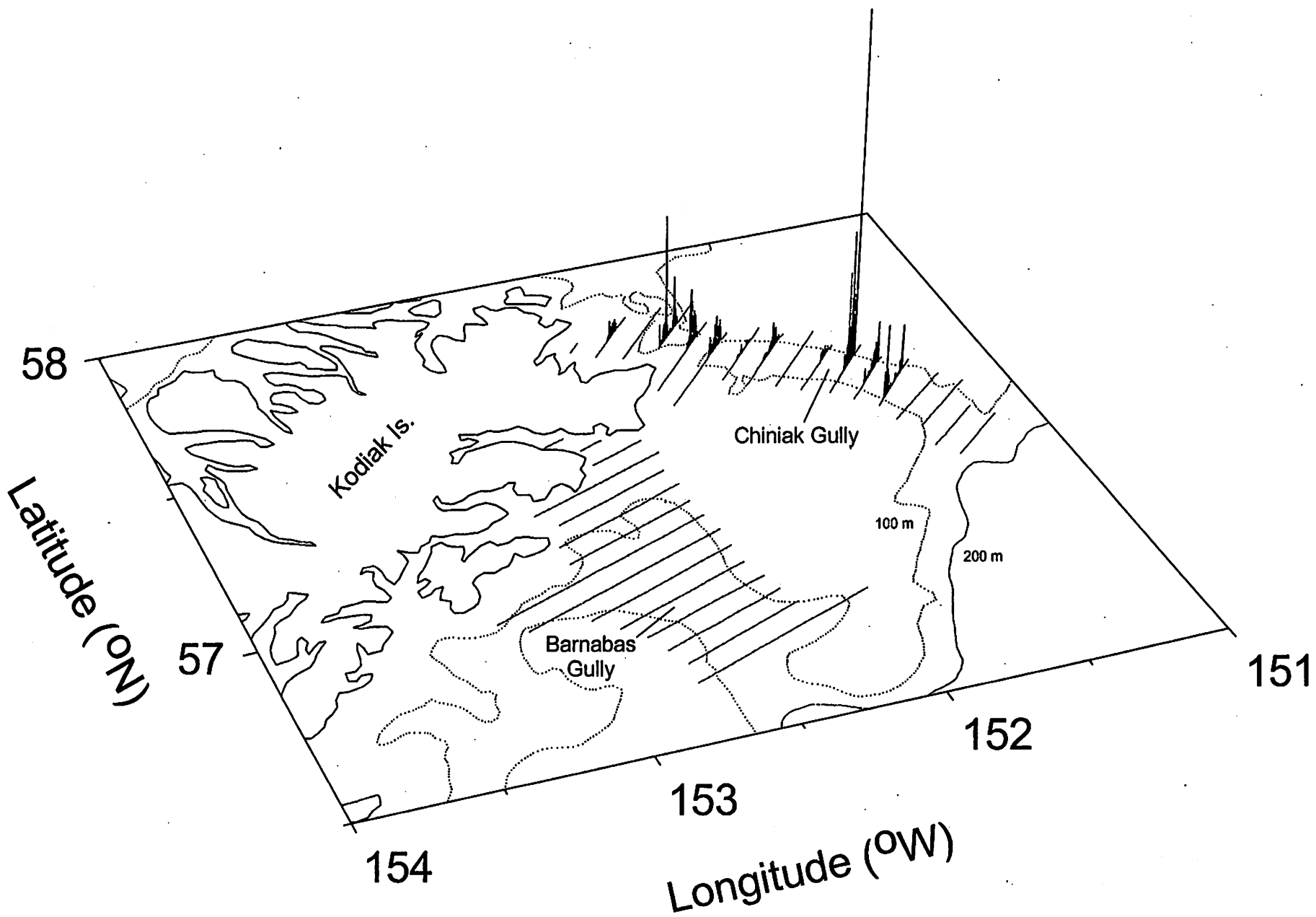


Figure '. Acoustic backscatter attributed to "age-1" pollock along trackline during pass 2 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

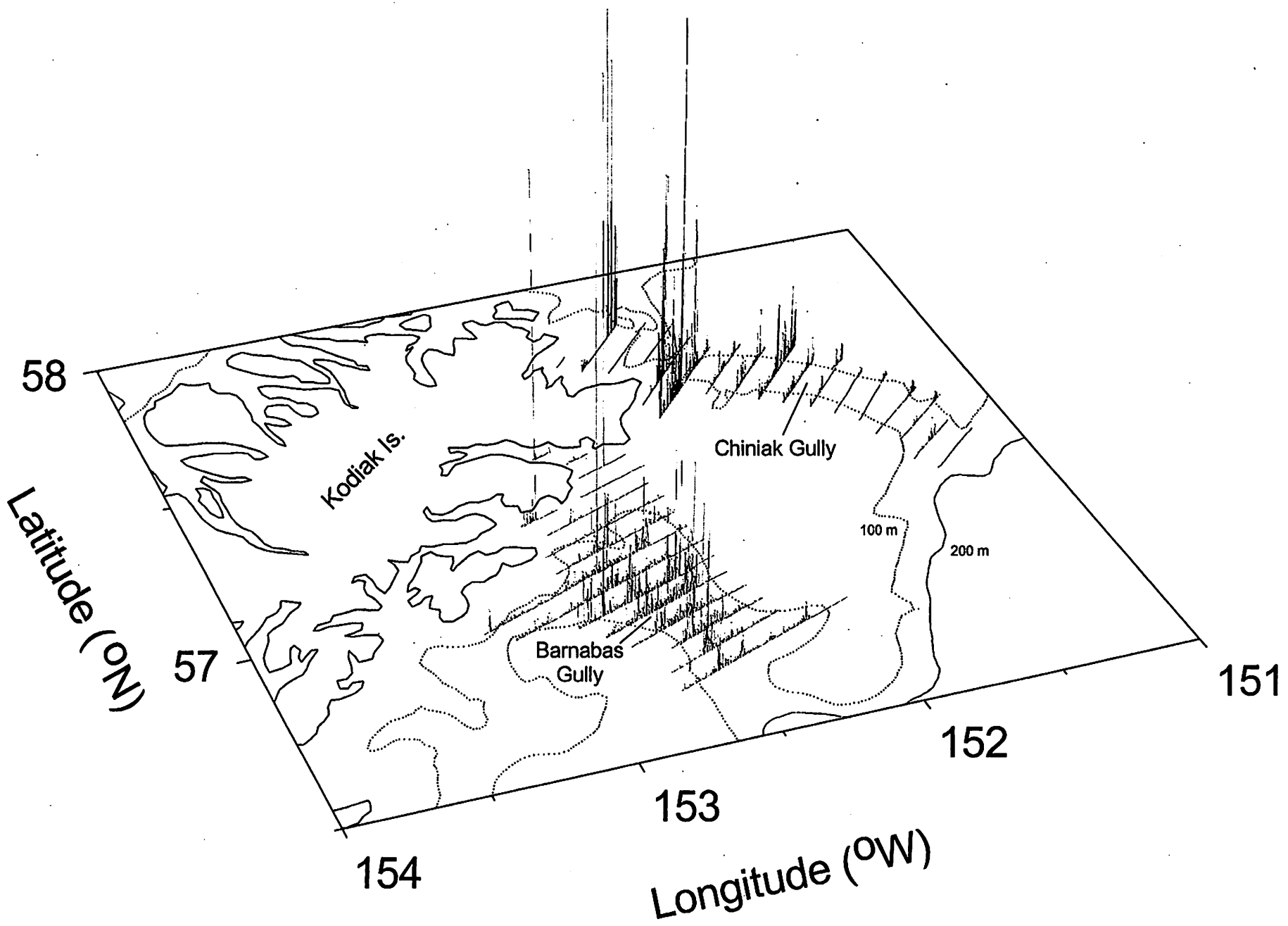


Figure 1. Acoustic backscatter attributed to "small fishes" (i.e., capelin, age-0 pollock) along trackline during pass 1 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

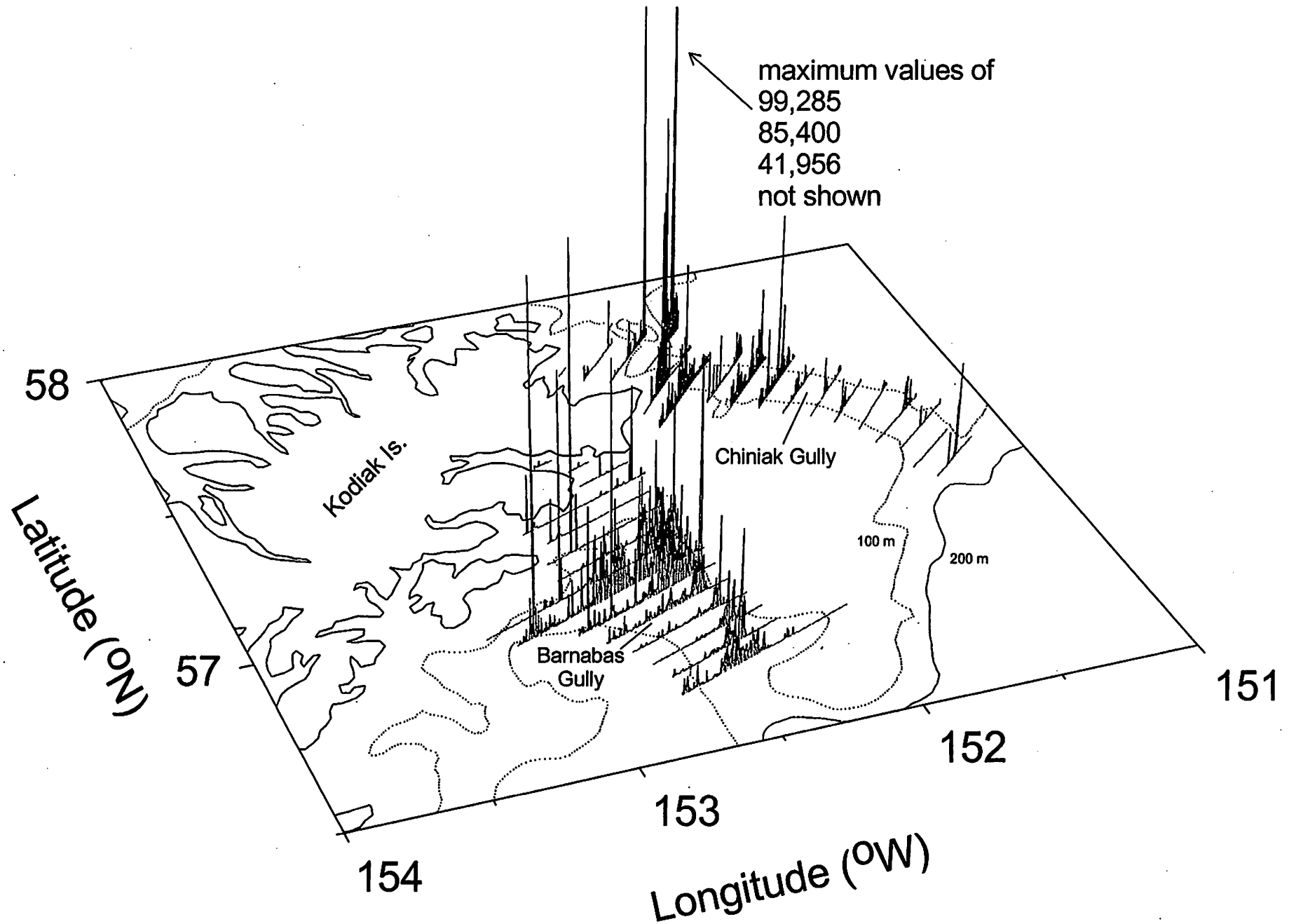
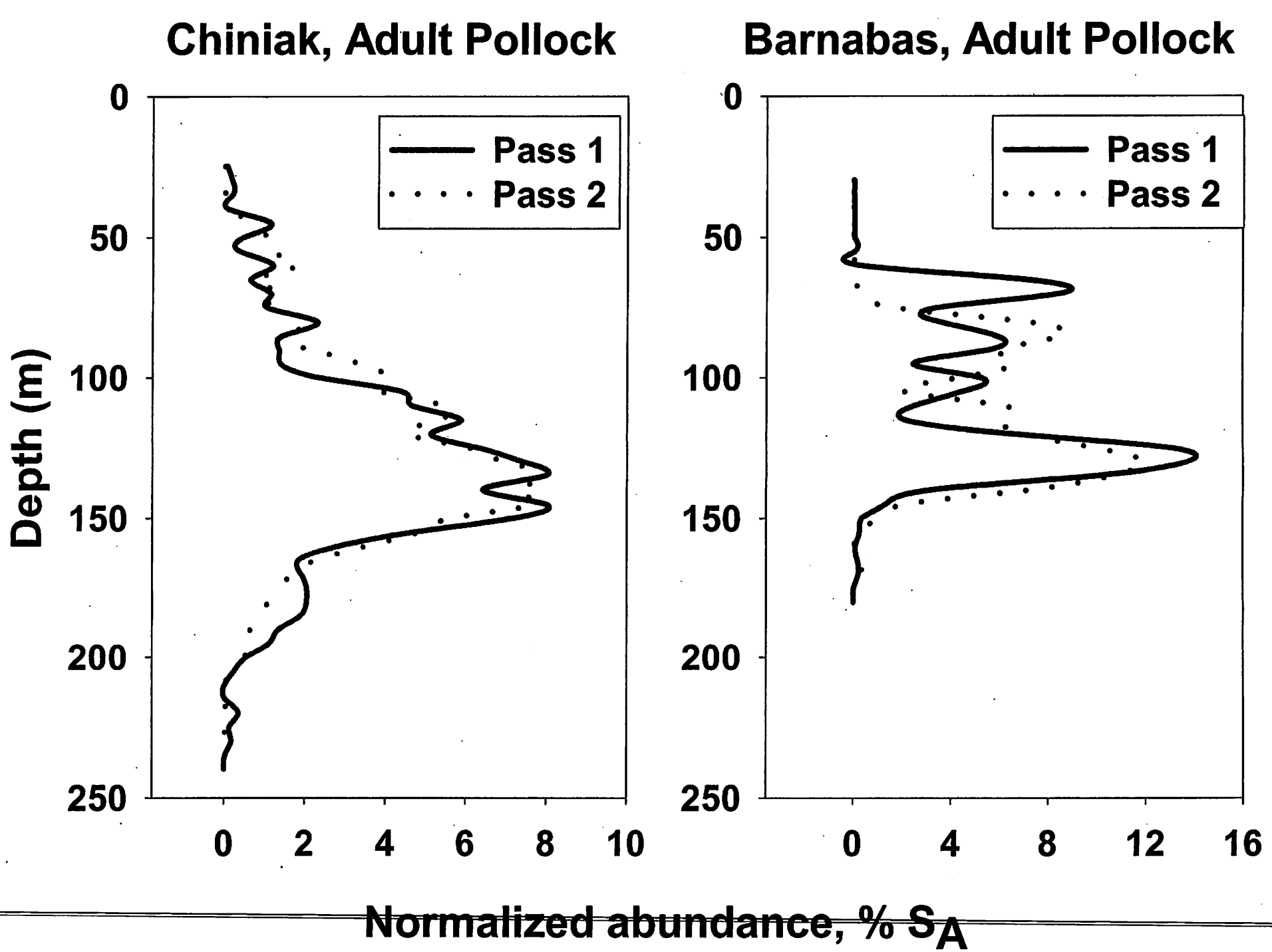


Figure . Acoustic backscatter attributed to "small fishes" (i.e., capelin, age-0 pollock) along trackline during pass 2 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

FISH CATEGORY	AREA	PASS 1			PASS 2		
		Biomass	95% CI	%	Biomass	95% CI	%
Adult Pollock	Chiniak	6700	785	12	6200	805	13
	Barnabas	13100	2387	18	10800	2627	24
Age-1	Chiniak	5900	1638	28	8000	2221	28
	Barnabas	0			0		
Capelin/Age-0**	Chiniak	38200			52000		
	Barnabas	34300			52700		

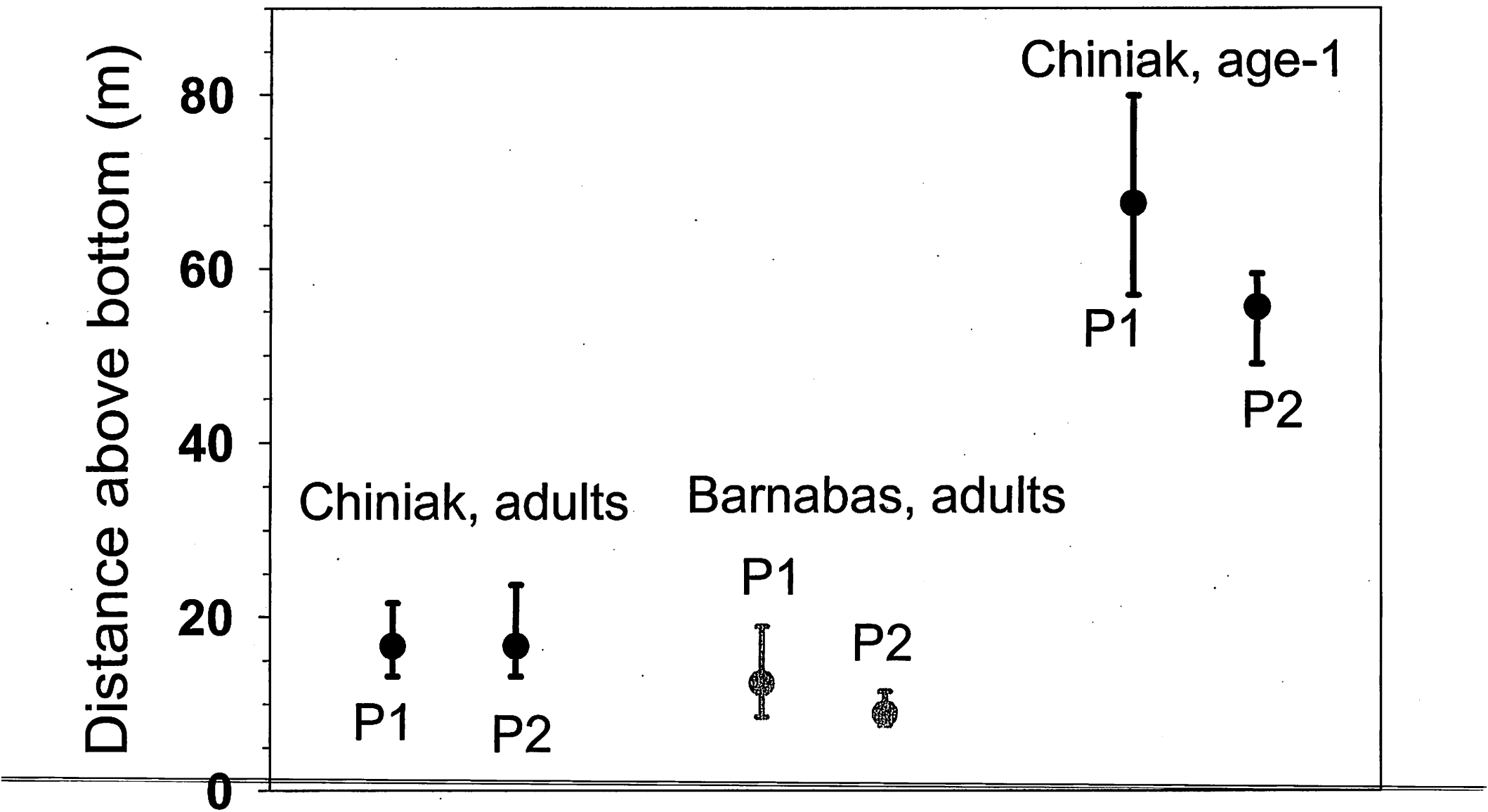
TOTAL ADULT POLLOCK	19800	17000
TOTAL AGE-1 POLLOCK	5900	8000
TOTAL POLLOCK	25700	25000
TOTAL POLLOCK+CAPELIN	98200	129700

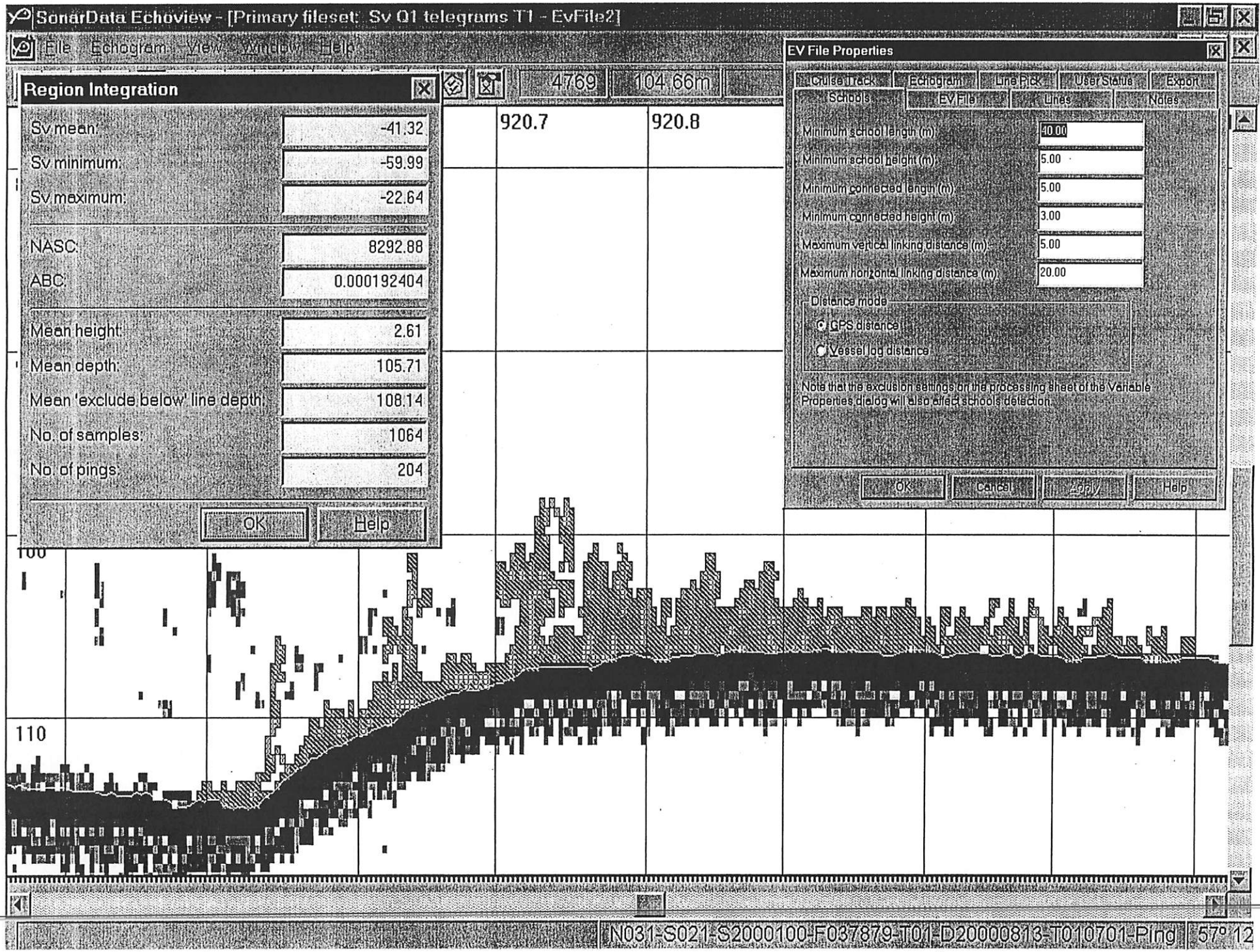
**BIOMASS OF CAPELIN/AGE-0 BASED ON DALEN & NAKKEN (1983)
THE CAPELIN BIOMASS WOULD DECREASE BY ~50% WITH ROSE (1998)


Chiniak, Adult Pollock
Barnabas, Adult Pollock
Pass 1
Pass 2
Depth (m)
0
50
100
150
200
250
0
2
4
6
8
10
12
16
Normalized abundance, % S_A

Weighted Mean Distance Off Bottom

with 95% C.I.




SonarData Echoview - [Primary fileset: Sv Q1 telegrams T1 - EvFile2]
File Echogram View Window Help
Region Integration
Sv mean: -41.32
Sv minimum: -59.99
Sv maximum: -22.64
NASC: 8292.88
ABC: 0.000192404
Mean height: 2.61
Mean depth: 105.71
Mean 'exclude below' line depth: 108.14
No. of samples: 1064
No. of pings: 204
OK
Help
4769
104.66m
920.7
920.8
EV File Properties
Cruise Track
Echogram
Line Pick
User Status
Export
Schools
EV File
Lines
Notes
Minimum school length (m): 40.00
Minimum school height (m): 5.00
Minimum connected length (m): 5.00
Minimum connected height (m): 3.00
Maximum vertical linking distance (m): 5.00
Maximum horizontal linking distance (m): 20.00
Distance mode
GPS distance
Vessel log distance
Note that the exclusion settings on the processing sheet of the Variable Properties dialog will also affect schools detection.
OK
Cancel
Apply
Help
100
110
N031-S021-S200100-F037879-T01-D20000813-T010701-Ping
57° 12

Summary

1) It is possible to use acoustic-trawl methods to estimate pollock distribution patterns and abundance off the east side of Kodiak during the summer.

2) Pollock were present in both the Barnabas and Chiniak gullies.

3) The geographical distribution of pollock differed between gullies, but remained relatively stable within each gully.

4) Although adult pollock were more abundant in Barnabas than in Chiniak gully, changes in abundance within either gully during the 2 week period of the field study were in a similar direction.

5) Greater variability in estimates of abundance and mean fish depth occurred for age-1 pollock rather than adult pollock.

6) Quantitative descriptions of the fish aggregations using image analysis methods will enable objective comparisons of the pollock schools over time and space.

February, 2001
Agenda C-3(f)

Title: Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) for Amendments to the Regulations Implementing the Fishery Management Plan for Bering Sea and Aleutian Islands Groundfish and the Fishery Management Plan for Groundfish of the Gulf of Alaska - Requiring vessels that conduct directed fishing operations for pollock, Atka mackerel, or Pacific cod in the Bering Sea, Aleutian Islands, and Gulf of Alaska to install and use a vessel monitoring system (VMS).

Draft for Council Review

Date: February 2, 2001

Lead Agency: National Marine Fisheries Service
Alaska Regional Office
Sustainable Fisheries Division
P.O. Box 21668
Juneau, Alaska 99801
(907) 586-7228

Responsible Official: James W. Balsiger, Regional Administrator

For Further Information Contact: Nick Hindman, NMFS Alaska Region, (907) 586-7006

Abstract: This EA/RIR/IRFA analyzes the impact of alternatives requiring vessels that conduct directed fishing operations for pollock, Atka mackerel, or Pacific cod in the Bering Sea, Aleutian Islands, and Gulf of Alaska to install and use a vessel monitoring system (VMS).

Table of Contents

1.0 Introduction

The groundfish fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 miles offshore) of Alaska are managed under the Fishery Management Plan for Groundfish of the Gulf of Alaska and the Fishery Management Plan for the Groundfish Fisheries of the Bering Sea and Aleutian Islands Area. Both fishery management plans (FMPs) were developed by the North Pacific Fishery Management Council (Council). The Gulf of Alaska (GOA) FMP was approved by the Secretary of Commerce and became effective in 1978 and the Bering Sea and Aleutian Islands Management Area (BSAI) FMP became effective in 1982.

Actions taken to amend fishery management plans or implement other regulations governing the groundfish fisheries must meet the requirements of Federal laws and regulations. In addition to the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act), the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Executive Order (E.O.) 12866, and the Regulatory Flexibility Act (RFA).

This Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) analyzes the impact of regulatory amendments that would require vessels that conduct directed fishing operations for pollock, Atka mackerel, or Pacific cod in the Bering Sea, Aleutian Islands, and Gulf of Alaska to install and use a vessel monitoring system (VMS) while they are fishing for groundfish off Alaska.

1.1 Management Objective

Section 7 of the ESA requires Federal agencies to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. The entire population of Steller sea lions in the United States was listed as threatened in 1990. On May 5, 1997, NMFS reclassified Steller sea lions into two distinct population segments. The population west of 144° W (a line near Cape Suckling, AK) was reclassified as endangered; the listing for the remainder of the U.S. Steller sea lion population remained as threatened.

On November 30, 2000, NMFS issued a Biological Opinion that determined that the commercial fisheries for pollock, Atka mackerel, and Pacific cod, as carried out under the FMPs, are likely to jeopardize the continued existence of the western Steller sea lion population and adversely modify its critical habitat. In order to comply with the ESA, NMFS is required to:

- Monitor vessel compliance with no-entry and no-fishing zones adjacent to Steller sea lion rookeries, haulouts, and areas designated as critical habitat; and

- Monitor the harvests of pollock, Atka mackerel, and Pacific cod inside and outside of

Steller sea lion critical habitat in real time.

The objective of the proposed regulatory amendment is to improve the agency's ability to accomplish these objectives by requiring the use of a VMS.

1.2 Vessel Monitoring Systems (VMS)

Vessel monitoring systems consist of a transmitter, installed on the vessel, and a communications service provider that relays the transmitter's signal to NMFS. The transmitter determines the vessel's position using Global Positioning System (GPS) satellites and automatically transmits the position to the communications service provider. Vessel locations are transmitted several times per hour and the position information is forwarded to NMFS. Each vessel is assigned a unique number and tracking software at NMFS provides vessel name, position, speed, and heading. The VMS transmitters are designed to be tamper-resistant and automatic. Vessel personnel will be unable to determine when the unit is transmitting and will be unable to alter the signal or the time of transmission. In 2000, VMS units approved for use off Alaska cost approximately $1,800 each, installation costs ranged from $100 to $2,000 (NMFS assumes an average of $500), and data transmission costs were $5.00 per day.

Criteria for approval of VMS components was described by NMFS in a proposed rule to require VMS in the Atka mackerel fishery in the Aleutian Islands subarea (65 FR 36810, June 12, 2000). These criteria were based on national standards published in the Federal Register on March 31, 1994 (59 FR 15180). In the final rule requiring the use of VMS by vessels fishing for Atka mackerel (65 FR 61264, October 17, 2000), NMFS approved the ArgoNet Mar GE transmitter, for which North American Collection and Location by Satellite, Inc. (NACLS) is the sole communications service provider.

At this time NMFS believes that only one vendor produces VMS components that provide seamless and transparent communications from all areas off Alaska. However, other vendors that manufacture or distribute VMS components that meet the approval criteria set out in the national standards, are encouraged to contact NMFS. As additional components are approved, notification will be published in the Federal Register.

VMS data for groundfish vessels off Alaska will be monitored by NMFS in Juneau, Alaska. A system to share this data with the US Coast Guard 17th District will be implemented to insure that the Coast Guard has timely access to the information.

1.3 Management Background Information

The western population of Steller sea lions in the Bering Sea (BS), the Aleutian Islands (AI), and the Gulf of Alaska (GOA) has declined by more than 80% over the last 30 years and was listed as endangered in 1997 under the Endangered Species Act (ESA). The Biological Opinion issued on November 30, 2000, established a reasonable and prudent alternative (RPA) to mitigate the

effects of the pollock, Atka mackerel, and Pacific cod fisheries on Steller sea lions.

The following items summarize the Biological Opinion's RPA:

- Fishing for pollock, Atka mackerel, and Pacific cod will be allowed in some limited areas of critical habitat that had been closed under the previous RPAs and the Federal court-ordered injunction.

- Within critical habitat (CH-RFRPA) 13 management zones were established. Zones 1, 3, 5, 7, and 12 allow limited harvests of pollock, Atka mackerel, and Pacific cod within their boundaries. The remaining management zones are closed to directed fisheries for pollock, Atka mackerel, and Pacific cod (Figures 1a and 1b).

- The annual total allowable catch of pollock and Pacific cod will be divided among four fishing seasons for open areas that are inside critical habitat, and among two seasons outside of critical habitat.

- The annual total allowable catch of Atka mackerel for vessels in the Eastern Aleutians/Bering Sea District will be divided into four seasons for open areas that are inside critical habitat, and among two seasons outside of critical habitat. In the Central and Western Aleutian Districts fishing inside critical habitat will be prohibited, and the total allowable catch will be divided between two seasons outside critical habitat.

- Fishing for pollock, Atka mackerel, and Pacific cod with any gear type will be prohibited in critical habitat from November 1 through January 20.

- Fishing for pollock, Atka mackerel, and Pacific cod with trawl gear will be prohibited in all areas from November 1 through January 20.

- Closes waters adjacent to sea lion rookeries and many haulouts out to 20 nautical miles (nm) to directed fishing for pollock, Pacific cod, and Atka mackerel.

- Establishes 124 no-fishing zones for groundfish within 3 nm of haulouts and maintains 3 nm no-entry zones around rookeries.

- Reduces the percentage of pollock that may be taken inside sea lion critical habitat (as compared with 1998) from 80% to 40% in the GOA, from 45% to 14% in the eastern Bering Sea (EBS), and from 74% to 2% in the AI.

- Reduces the percentage of Pacific cod that may be taken inside critical habitat from 48% to 21% in the GOA, from 39% to 17% in the EBS, and from 79% to 17% in the AI.

- Reduces the percentage of Atka mackerel that may be taken inside critical habitat from

66% to 8% in the AI.

During 2001, Steller sea lion protection measures are established by an emergency rule (66 FR 7276, January 22, 2001) that provides a 1-year phase in of the RPA consistent with the ESA and other applicable law. The full RPA is scheduled to be implemented by January 2002. The Council may take action to modify the current RPA during 2001.

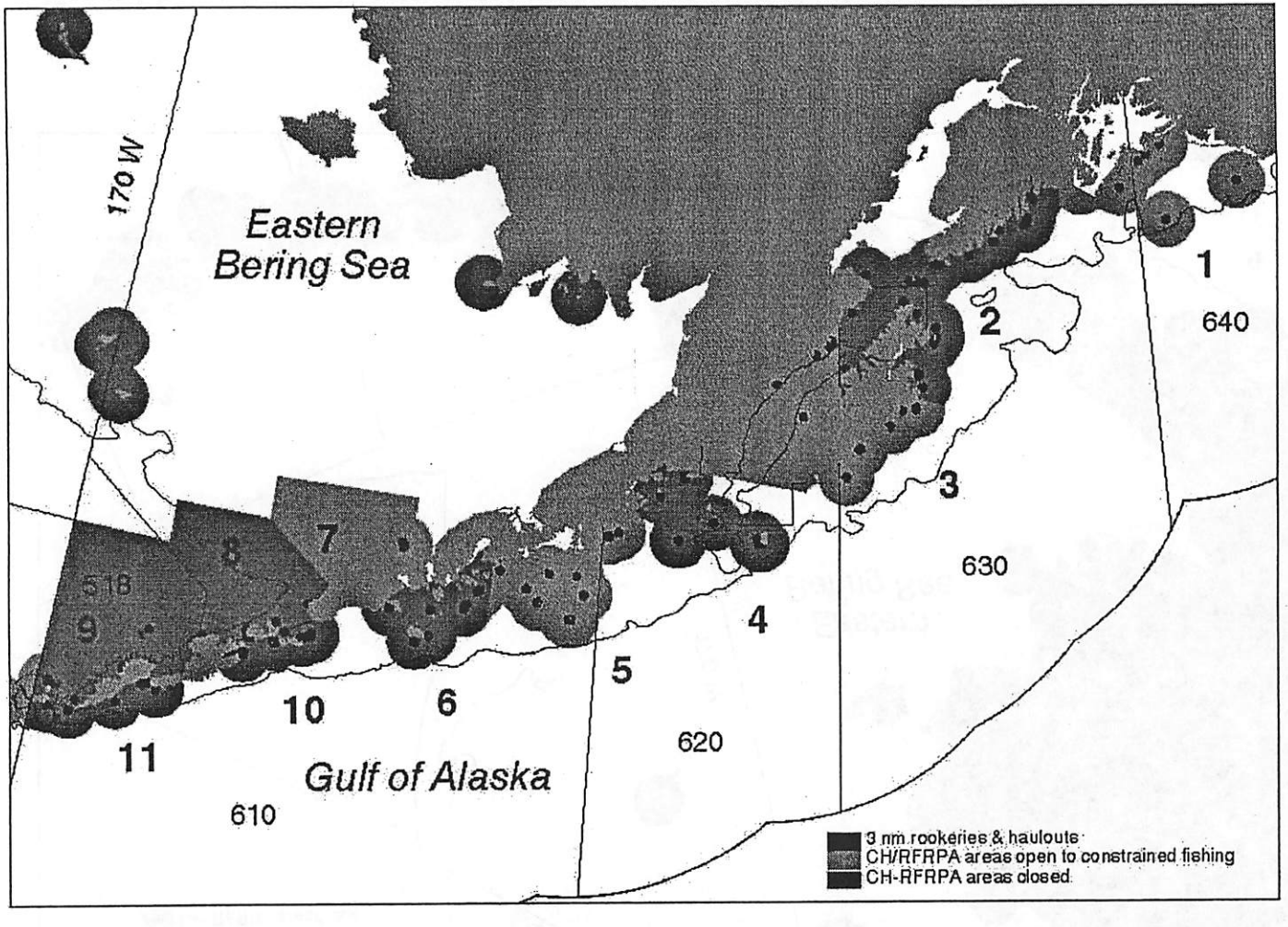


Figure 1.a. CH-RFRPA areas closed and open to constrained fishing for pollock and Pacific cod fisheries in the Gulf of Alaska. Areas 1-6, 10 and 11 are in the Gulf of Alaska groundfish fishery management region (areas 610-640). From NMFS Biological Opinion, November 30, 2000.

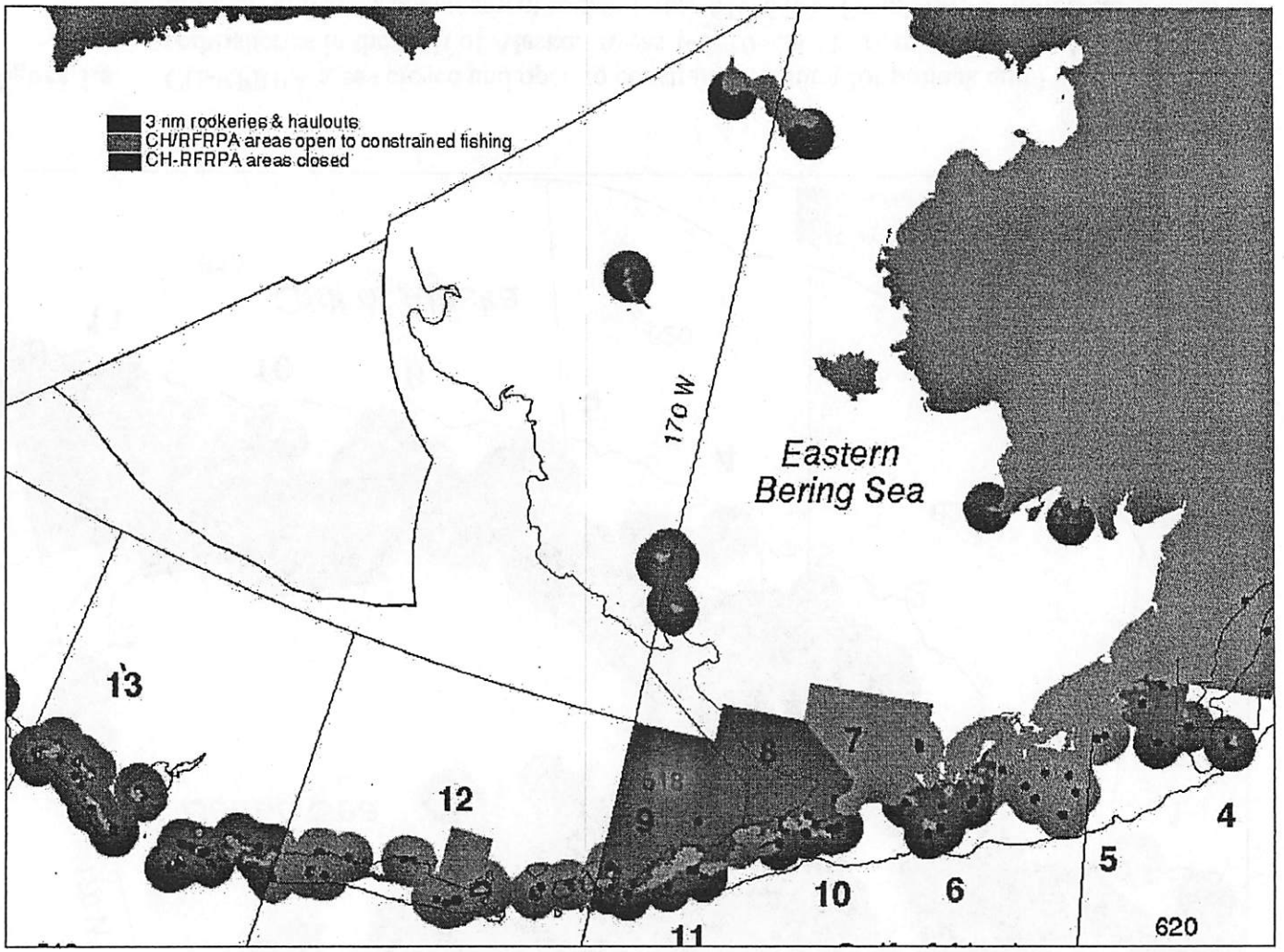


Figure 1.b. CH-RFRPA areas closed and open to constrained fishing for pollock, Pacific cod, and Atka mackerel fisheries in the eastern Bering Sea groundfish fishery management region. From NMFS Biological Opinion, November 30, 2000.

1.4 Problem Statement

Objective 1. Monitor vessel compliance with no-entry and no-fishing zones adjacent to Steller sea lion rookeries, haulouts, and areas designated as critical habitat.

Under the current system the US Coast Guard uses traditional methods to monitor compliance with Steller sea lion area closures. These include periodic Coast Guard overflights and ongoing Coast Guard cutter operations. These methods do not fully meet the Agency's need to monitor fishing activities in and around Steller sea lion rookeries, haulouts, and areas designated as critical habitat for the following reasons:

- The coverage area is quite large. Protected rookeries, haulouts, and critical habitat areas cover approximately 355,834 square kilometers in the Bering Sea, Aleutian Islands, and Gulf of Alaska (NMFS Biological Opinion, November 30, 2000).

- Overflights and cutter patrols serve as spot-checks only. Overflights are sporadic and are effective only during daylight hours when weather conditions are favorable. Visibility is a critical factor in identifying specific vessels from the aircraft. In 2000, Coast Guard aircraft spent approximately 720 hours patrolling Steller sea lion rookeries and haulouts in the BSAI and GOA.

- Cutter operations occur over a broader time frame but they are limited in how much area they can cover. In 2000, a total of 560 cutter days were spent patrolling the BSAI and GOA.

- Coast Guard overflights and cutter patrols serve multiple purposes. Fisheries compliance, search and rescue operations, and international boundary monitoring all share the same platform. Budgetary constraints and other critical missions impact how much time the Coast Guard can actually spend monitoring Steller sea lion closure areas.

When critical habitat areas are closed, NMFS expects that continued fishing will take place very close or adjacent to the closed critical habitat areas. The boundaries of these areas are complex and ensuring that no fishing is taking place inside critical habitat would be impossible using traditional methods of enforcement. Effective enforcement of these closures will depend on the use of a VMS that automatically and frequently transmits vessel position to NMFS so that vessels fishing near critical habitat can be monitored in real time.

NMFS-certified groundfish observers are present on a portion of the vessels that target pollock, Pacific cod, and Atka mackerel. Coverage levels vary according to the size and type of vessel; vessels greater than 125 feet length overall (LOA) require 100% observer coverage, vessels 60 to 124 feet LOA require 30% coverage, and vessels less than 60 feet LOA are exempt from observer coverage. Observers do not play a direct compliance role, their duties are to collect biological data on the fish and invertebrates harvested by commercial groundfish vessels. The

data they collect on fishing locations are based on what the vessel operator records in their logbooks and this data is not available in real-time. The accuracy of positions recorded in vessel logbooks cannot be verified by the observer. In addition, logbooks only record haul/set deployment and retrieval location, and even if accurate, are not sufficient to account for vessel activity near a closed area boundary because they provide no information on the vessel position between the haul/set deployment and retrieval locations.

Objective 2. Monitor the harvests of pollock, Atka mackerel, and Pacific cod inside and outside of Steller sea lion critical habitat in real time.

Monitoring critical habitat limits on the harvest of pollock, Atka mackerel and Pacific cod cannot be accomplished using current recordkeeping and reporting programs. Many critical habitat limits are small, making real-time effort information essential for estimating and projecting current harvest rates. Fishery managers need accurate information on fleet activity – how many vessels are currently fishing, and whether they are fishing inside or outside critical habitat. Critical habitat areas have complex boundaries. Fishing may occur very close to critical habitat boundaries, and verifying the location of catch would not be possible without the detailed position data provided by the VMS.

2.0 Description of the Alternatives

The alternatives are focused on requiring VMS for vessels participating in fisheries of concern for Steller sea lion protection; i.e., pollock, Atka mackerel, and Pacific cod.

NMFS believes that any vessels required to have VMS units should be required to use them at all times while they are fishing for groundfish in the BSAI or GOA. This position is based on the fact that vessels are usually free to change target species at any time, unless a seasonal closure or an inseason closure has occurred. In the Gulf of Alaska it is not uncommon for catcher vessels to target flatfish on one trip and switch to Pacific cod on the next. Similar activities take place on catcher/processors during a single trip; and in general, groundfish vessels adapt quickly to opportunities as they arise. From an management perspective trying to monitor and verify quotas inside critical habitat would become impossible if vessels turned off their VMS unit every time they switched from pollock, Atka mackerel, or Pacific cod to some other species. Not requiring VMS usage when vessels are fishing for other groundfish targets could potentially negate any gains made by requiring VMS.

Under the following alternatives, NMFS would require that the VMS units be operational at all times during the course of groundfish operations. If at any time the vessel operator becomes aware that VMS transmissions have been interrupted, or when notified by NMFS that automatic position reports are not being received, the vessel operator would be required to cease fishing until the VMS is operable.

In the event of a VMS failure on a mothership, the mothership would be required to stop

receiving deliveries of groundfish as soon as possible, i.e., any catcher vessels currently fishing would be allowed to finish their trip and deliver to the mothership. Additional trips and deliveries would not be allowed until the VMS is operable.

Alternative 1: No action

No additional vessels would be required to deploy VMS transmitters. The only vessels required to use VMS would be those participating in the directed fishery for Atka mackerel in the Aleutians Islands subarea, as currently required by 50 CFR 679.7(c)(3).

Current VMS requirements were implemented on November 11, 2000, which was after the directed fisheries for Atka mackerel closed for the remainder of 2000. Therefore, the current VMS requirements have not yet been in effect during an Atka mackerel fishery. Based on participation in the 2000 Atka mackerel fisheries, NMFS estimates that approximately 12 trawl catcher/processors would be required to install and use VMS while they are directed fishing for Atka mackerel in future years. Approximately 7 trawl catcher/processors installed a VMS unit in 2000 in anticipation of the VMS requirement.

Alternative 2: Catcher/processors and motherships

All catcher/processors and motherships that participate in a directed fishery for pollock, Atka mackerel, or Pacific cod in the BSAI or GOA would be required to deploy an operating NMFS-approved VMS transmitter at all times that the vessel is fishing for groundfish.

Option 1: Require VMS on all catcher/processors and motherships, not just on those participating in the three directed fisheries.

Under Option 1, requirements for processor check-in/check-out reports would be removed from the recordkeeping and reporting regulations. NMFS uses check-in and check-out reports to monitor effort in specific fisheries and obtain information on when and where catcher/processors and motherships are operating. These reports are often used in conjunction with Weekly Production Reports to determine closure dates. If all catcher/processors and motherships used a VMS during all groundfish operations, the check-in/out reporting system would be unnecessary.

Alternative 3: Catcher/processors, motherships, and catcher vessels

All catcher/processors, motherships, and catcher vessels that participate in a directed fishery for pollock, Atka mackerel, or Pacific cod would be required to deploy an operating NMFS-approved VMS transmitter at all times that the vessel is fishing for groundfish.

NMFS would use conservative catch accounting methods for any vessel whose location could not be determined by VMS transmissions (these methods are described below in Section 2.1).

Options for exempting certain categories of catcher vessels from carrying VMS units are:

Option 1: Do not require VMS on catcher vessels less than 60' LOA using any gear type or specific gear types (pot, jig, hook-and-line, trawl).

Option 2: Do not require VMS on catcher vessels of any size using a particular gear type (exempt specific gear types of pot, jig, hook-and-line, trawl).

Option 3: Do not require VMS on vessels less than 60' LOA using a particular gear type (pot, jig, hook-and-line, trawl).

2.1 Catch Accounting Procedures With and Without VMS

To ensure that critical habitat limits are not exceeded, directed fishery catch of pollock, Atka mackerel or Pacific cod by a vessel without a VMS will count against the critical habitat limit for the quota management area.

For vessels with VMS, catch will be counted inside or outside critical habitat as verified by the VMS data corresponding with the unit of catch accounting that applies to the vessel. For observed vessels, the unit of catch accounting is an individual haul or set. For unobserved vessels, the unit of catch accounting is the fish delivered to a processor at the end of a trip.

If an observed vessel fishes inside critical habitat at any time during a haul or set, the entire haul or set will count against the critical habitat limit. If an unobserved vessel fishes inside critical habitat at any time during a trip, the catch for the entire trip will count against the critical habitat limit.

2.2 Fishery closures for vessels without VMS

When critical habitat is closed to directed fishing for a species, vessels without a VMS will be prohibited from fishing for that species in the larger quota management area. In order to fish for pollock, Pacific cod, or Atka mackerel in a quota management area after directed fishing is closed in critical habitat, the vessel must carry a VMS to verify that fishing activity was outside critical habitat.

As an example: When the Pacific cod critical habitat quota is reached in CH/RFRPA area 3 (Figure 1a), vessels without VMS units will be prohibited from fishing for Pacific cod in reporting areas 630 and 620. VMS units will be a requirement for all vessels targeting Pacific cod outside critical habitat in areas 620 and 630 after the critical habitat closure.

Even if certain vessels are exempted from VMS requirements under the Alternatives and Options presented in this analysis, vessels without VMS will be affected by these closures.

3.0 Effects of the Alternatives

3.1 Alternative 1: Status Quo

Under Alternative 1 no additional vessels would be required to install and use a VMS. US Coast Guard overflights and cutter patrols would continue to be the main tools used to monitor compliance with no-entry and no-fishing zones adjacent to Steller sea lion rookeries, haulouts, and areas designated as critical habitat.

NMFS does not feel that Alternative 1 is acceptable because the number of sites and their complexity overwhelm the ability of overflights and cutter patrols to monitor critical habitat closures. Critical habitat catch limits cannot be monitored without VMS data. Catch by vessels without VMS will count against critical habitat limits and critical habitat limits may be so small that no directed fishing could be allowed in critical habitat if a large portion of the fleet lacked VMS. NMFS would lack the necessary real-time effort information to effectively manage small quotas. Without VMS, NMFS would be unable to verify compliance with directed fishing closures in critical habitat for pollock, Atka mackerel or Pacific cod; could not verify that vessels claiming to fish outside critical habitat had not fished inside; and could therefore not ensure that critical habitat limits were not exceeded.

3.2 Alternative 2: Catcher/Processors and Motherships

Alternative 2 would require VMS units for all catcher/processors or motherships that participate in either the Atka mackerel, pollock, or Pacific cod fisheries at all times while they are participating in a groundfish fishery off Alaska.

Option 1 would require VMS for all catcher/processors and motherships that participate in any groundfish fishery.

Table 1 summarizes the number of catcher/processors that participated in the 2000 BSAI and GOA groundfish fisheries, by gear type and target fishery and the estimated percent of catch by these catcher/processors. Following is a summary of this information.

- A total of 38 trawl catcher/processors participated in all BSAI groundfish fisheries in 2000, all 38 of these catcher/processors participated in at least one of the three directed fisheries (Atka mackerel, pollock, or Pacific cod).

- No catcher/processors participated in the GOA pollock fisheries and Atka mackerel is not a separate directed fishery in the GOA.

- Six trawl catcher/processors participated in the GOA Pacific cod directed fishery. An additional 12 trawl catcher/processors participated in other GOA groundfish fisheries, primarily rockfish and flatfish, but did not participate in the Pacific cod or pollock

fisheries.

- All but one of the 18 trawl catcher/processors that fished in the GOA also fished in the BSAI during 2000.

- Forty-two longline catcher/processors participated in the 2000 BSAI groundfish fisheries. Thirty-nine of them participated in the BSAI directed fishery for Pacific cod. Three additional longline catcher/processors participated in the BSAI sablefish/turbot directed fishery, but did not participate in the BSAI Pacific cod directed fishery (one of these three participated in the GOA Pacific cod fishery). These three longline catcher/processors ranged between 59' and 92' LOA.

- Thirteen longline catcher/processors participated in the 2000 GOA Pacific cod fishery. An additional eight longline catcher/processors participated in GOA sablefish fisheries, but did not directed fish for Pacific cod in 2000.

- All but one of the 21 longline catcher/processors that fished in the GOA also fished in the BSAI during 2000.

- Nine catcher/processors using pot gear participated in the 2000 directed fishery for Pacific cod in the BSAI. These catcher/processors harvested approximately 1% of the BSAI Pacific cod catch in 2000. One additional pot catcher/processor participated in the sablefish directed fishery, but did not directed fish for Pacific cod for pot gear. However, this vessel also participated in the BSAI Pacific cod fishery using longline gear.

- Five pot catcher/processors participated in the GOA directed fishery for Pacific cod in 2000.

Table 1. Number of Catcher/Processors that Participated in the 2000 BSAI and GOA Groundfish Fisheries, by gear, area, and target fishery. Total catch of the target species (Atka mackerel, pollock, or Pacific cod) in the directed fisheries for these species by catcher/processors and catcher vessels delivering to motherships. Percent figure (%) represents the percent of 2000 total catch of each species by the processor category in the BSAI or GOA.

	Bering Sea and Aleutian Islands							Gulf of Alaska			BSAI + GOA All Targets
	Atka mackerel		Pollock		Pacific Cod		All BSAI All targets	Pacific Cod		All GOA All Targets	
Gear	# Vessels	% of Catch	# Vessels	% of Catch	# Vessels	% of Catch	# Vessels	# Vessels	% of Catch	# Vessels	# Vessels
Trawl c/p	12	99%	16	39%	26	9%	38	6	2%	18	39
Hook-and-Line c/p	0		0		39	47%	42	13	9%	21	43
Pot c/p	0		0		9	1%	10	5	2%	5	12

Source: NMFS, Blend 2000.

The following BSAI catcher/processors also participated in the CDQ fisheries in 2000:

3 trawl catcher/processors for Atka mackerel CDQ
11 trawl catcher/processors for pollock CDQ
14 longline catcher/processors for Pacific cod CDQ

Motherships

In 2000, 12 processors reported operating as motherships, taking deliveries of groundfish from catcher vessels fishing in the GOA and BSAI. Three of these motherships are the EXCELLENCE, GOLDEN ALASKA, and OCEAN PHOENIX, processors eligible under the American Fisheries Act to participate in the BSAI pollock fisheries. The additional nine motherships take deliveries from catcher vessels using trawl, hook-and-line, and pot gear, primarily in the GOA and BSAI Pacific cod fisheries.

Table 2. Number of motherships and percent of pollock and Pacific cod catch delivered to motherships in the BSAI and AI in 2000.

	Bering Sea/Aleutians		Gulf of Alaska		# Motherships All Areas
Fishery	# Motherships	Catch (mt, %)	# Motherships	Catch (mt, %)	
Pollock	3	98,201 10%	0	0	3
Pacific Cod	8	10,570 (6%)	4	734 (1%)	9 1/

Source: NMFS, Blend 2000

1/ Five of these motherships are floating processors. Four of the motherships also are catcher/processors that were counted in the number of vessels presented in Table 1.

Comparison of Alternative 2 and Option 1 of Alternative 2

Alternative 1 would require VMS for catcher/processors and motherships that participated in the Atka mackerel, Pacific cod, or pollock fisheries in the BSAI or GOA. Option 1 would require VMS for all catcher/processors and motherships in the GOA and BSAI, regardless of what directed fisheries they participated in.

Option 1 would require VMS for:

- 1 additional trawl catcher/processor that participated in the GOA flatfish and rockfish fisheries, but did not participate in an Atka mackerel, Pacific cod, or pollock fishery.

- 2 additional longline catcher/processors that participated in BSAI and GOA sablefish and turbot fisheries, but did not participate in a directed fishery for Pacific cod in either the BSAI or the GOA.

There is no difference between the number of catcher/processors using pot gear or the number of

motherships that would be required to have a VMS under Alternative 2 or Option 1 because all of these vessels participate in one of the three directed fisheries at some time during the year.

3.3 Alternative 3: Catcher/Processors, Motherhips, and Catcher Vessels

Under Alternative 3 all catcher/processors, motherships, and catcher vessels that participate in a directed fishery for pollock, Atka mackerel, or Pacific cod would be required to deploy an operating NMFS-approved VMS transmitter at all times that the vessel is fishing for groundfish. All of the catcher/processors and motherships discussed above in Section 3.2 would be affected by Alternative 3.

Table 3 summarizes the number of catcher vessels and percent of catch by these vessels based on 1999 ADF&G fish tickets (complete 2000 fish tickets are not yet available).

In the Gulf of Alaska Atka mackerel has been closed to directed fishing since 1997 and will likely remain closed in the foreseeable future. In the BSAI 99% of the Atka mackerel harvested is taken by catcher/processors using trawl gear (Table 1). There is an annual allocation of up to 2% of the Bering Sea/Eastern Aleutians TAC to vessels using jig gear but no landings were made by vessels in this category in 1999 or 2000.

Because catcher vessels have not participated in an Atka mackerel fishery in recent years, Atka mackerel are not included in Table 3 or in the subsequent discussions of the catcher vessel alternatives, except to note that catcher vessels using jig gear could be considered for an exemption from VMS requirements under Alternative 3, options 1, 2, or 3.

Under Alternative 3 (all catcher vessels that fish for pollock, Atka mackerel, or Pacific cod), approximately 577 catcher vessels would be required to install and use a VMS. These vessels accounted for 32% of the Pacific cod and 58% of the pollock landed in the BSAI in 1999. In the Gulf of Alaska these vessels accounted for 77% of the Pacific cod and 100% of the pollock landed in 1999.

At this time NMFS is not recommending that VMS be required on catcher vessels that target groundfish other than pollock, Atka mackerel, or Pacific cod. If the requirement to use VMS were extended to all groundfish species an additional 448 catcher vessels would be affected. The majority of these are vessels targeting IFQ sablefish and rockfish with hook and line gear (401), jig vessels targeting rockfish (31), and trawl vessels targeting flatfish (3).

Option 1 would exempt catcher vessels less than 60 feet LOA from VMS requirements. Under this Option, 270 catcher vessels would be exempted, the remaining 307 would be required to use VMS. Vessels in this category are not required to carry groundfish observers.

In the BSAI vessels less than 60 feet LOA accounted for less than 2% of the total Pacific cod harvested in 1999, and less than 1% of the total pollock harvest.

In the Gulf of Alaska vessels less than 60 feet LOA accounted for 25% of the total Pacific cod harvest, and 13% of the total pollock harvest.

No appreciable amount of Atka mackerel was landed by catcher vessels less than 60 feet LOA in either the BSAI or GOA.

Option 2 would exempt catcher vessels of any size that use a specific gear type from VMS requirements. By gear type the exemptions would be:

Jig: A jig gear exemption would apply to 132 catcher vessels that harvested less than 2% of the Pacific cod in the BSAI and less than 4% of the Pacific cod in the Gulf of Alaska. No appreciable amount of pollock or Atka mackerel was landed by jig vessels in either the BSAI or GOA.

Pot: A pot gear exemption would apply to 138 catcher vessels that harvested approximately 8% of the Pacific cod in the BSAI and 20% of the Pacific cod in the Gulf of Alaska. No appreciable amount of pollock or Atka mackerel was landed by pot vessels in either the BSAI or GOA.

Hook and line: A hook and line gear exemption would apply to 120 catcher vessels that harvested approximately 2% of the Pacific cod in the BSAI and 3% in the GOA. No appreciable amount of pollock or Atka mackerel was landed by hook and line vessels in either the BSAI or GOA.

Trawl: A trawl gear exemption would apply to 187 catcher vessels that harvested approximately 20% of the Pacific cod in the BSAI and 50% of the Pacific cod in the GOA. Trawl catcher vessels harvested 58% of the pollock in the BSAI and 100% of the pollock in the GOA.

Trawl catcher vessels in the BSAI and GOA landed small amounts of Atka mackerel taken incidentally in other fisheries. In the BSAI 153 metric tons was landed, in the GOA 119 metric tons was landed.

Option 3 would exempt vessels less than 60 feet LOA that use a specific gear type from VMS requirements. By gear type the exemptions would be:

Jig: A jig gear exemption for catcher vessels less than 60 feet LOA would apply to 129 vessels that harvested less than 1% of the Pacific cod in the BSAI and 2% of the Pacific cod in the Gulf of Alaska.

(Option 3 - 129 jig boats exempted vs Option 2 - 132 jig boats exempted)

Pot: A pot gear exemption for catcher vessels less than 60 feet LOA would apply to 14 vessels

that harvested less than 1% of the Pacific cod in the BSAI and 4% of the Pacific cod in the Gulf of Alaska.

(Option 3 - 14 pot boats exempted vs Option 2 - 138 pot boats exempted)

Hook and Line: A hook and line gear exemption for catcher vessels less than 60 feet LOA would apply to 75 vessels that harvested less than 1% of the Pacific cod in the BSAI and 1% of the Pacific cod in the Gulf of Alaska.

(Option 3 - 75 H&L boats exempted vs Option 2 - 120 H&L boats exempted)

Trawl: A trawl gear exemption for catcher vessels less than 60 feet LOA would apply to 52 vessels that harvested less than 1% of the Pacific cod in the BSAI and 18% of the Pacific cod in the Gulf of Alaska. Trawl vessels less than 60 feet LOA harvested 1% of the pollock in the BSAI and 13% of the pollock in the GOA).

(Option 3 - 52 trawl boats exempted vs Option 2 - 187 trawl boats exempted)

Table 3. Number of catcher vessels that participated in the BSAI and GOA groundfish fisheries in 1999, by gear type, vessel length, area, and directed fishery and the percent of catch of the target species by each catcher vessel category.

Gear, LOA	Bering Sea/Aleutian Islands				Gulf of Alaska				BSAI + GOA # Unique Catcher Vessels	
	Pacific Cod		Pollock		Pacific Cod		Pollock			
	# Vessels	% of Catch	# Vessels	% of Catch	# Vessels	% of Catch	# Vessels	% of Catch	AM/Cod/ Pollock	Other Fisheries
Trawl, <60'	1	<1%	3	<1%	50	18%	27	13%	52	2
Trawl, 60'-124'	63	14%	76	27%	67	31%	78	78%	106	1
Trawl, ≥ 125'	29	5%	29	30%	4	<1%	23	9%	29	0
HAL, <60'	2	<1%			73	1%			75	335
HAL, 60'-124'	6	<1%			41	<1%			44	66
HAL, ≥125'					1	<1%			1	0
Pot, <60'	1	<1%			14	4%			14	3
Pot, 60'-124'	48	5%			77	15%			102	10
Pot, ≥ 125'	22	2%			5	<1%			22	0
Jig, <60'	10	<1%			121	2%			129	30
Jig, 60'-124'	1	<1%			1	<1%			2	1
Jig, ≥ 125'					1	<1%			1	0

Number of unique vessels in the target fishery in 1999, based on ADF&G fish tickets. Target was determined as catcher vessels that annually landed more than 5,000 pounds of the species in the BSAI and 1,000 pounds of the species in the GOA.

Percent of catch represents the percent of catch of the species by that vessel class in each area in 1999.

Percent of catch does not add up to 100% (except for GOA pollock) because catch also was landed by catcher/processors.

Includes all catcher vessels for which fish tickets were submitted, including those delivering to motherships.

Table 4 summarizes the number of vessels that would be affected under each of the alternatives and options as discussed above in Sections 3.2 and 3.3 and Tables 1 through 3.

Table 4. Summary of the alternatives and options for catcher/processors, motherships, and catcher vessels that participated in fisheries for pollock, Atka mackerel, and Pacific cod in the BSAI and GOA in 1999 and 2000.

			C/P	MS	CV	Exempt
Alternative 1		no action	12	0	0	na
Alternative 2		CP & MS (plck, Atka, cod)	90	8	0	na
	option 1	CP & MS (all groundfish)	94	8	0	na
Alternative 3		CV (plck, Atka, cod)	94	8	577	0
	option 1	CV (plck, Atka, cod): exempt < 60 ft	94	8	307	270
	option 2	CV (plck, Atka, cod): exempt jig	94	8	445	132
		CV (plck, Atka, cod): exempt pot	94	8	439	138
		CV (plck, Atka, cod): exempt H&L	94	8	457	120
		CV (plck, Atka, cod): exempt trawl	94	8	390	187
	option 3	CV (plck, Atka, cod): exempt jig < 60 ft	94	8	448	129
		CV (plck, Atka, cod): exempt pot < 60 ft	94	8	563	14
		CV (plck, Atka, cod): exempt H&L< 60 ft	94	8	502	75
		CV (plck, Atka, cod): exempt trawl < 60 ft	94	8	525	52

4.0 Affected Environment and Environmental Consequences of the Alternatives

The groundfish fisheries occur in the North Pacific Ocean and Bering Sea in the U.S. EEZ from 50° N to 65°N. The alternatives could affect groundfish fishing in all areas of the Bering Sea and Aleutian Islands. Descriptions of the affected environment are given in the Final Supplemental Environmental Impact Statement (SEIS) (NMFS 1998). Substrate is described at section 3.1.1, water column at 3.1.3, temperature and nutrient regimes at 3.1.4, currents at 3.1.5, groundfish and their management at 3.3, marine mammals at 3.4, seabirds at 3.5, benthic infauna and epifauna at 3.6, prohibited species at 3.7, and the socioeconomic environment at 3.10. Additionally, the status of each target species category, biomass estimates, and acceptable biological catch specifications are presented both in summary and in detail in the annual GOA and BSAI stock assessment and fishery evaluation (SAFE) reports (NPFMC 2000a; 2000b).

An environmental assessment (EA) as described by the NEPA is used to determine whether the action considered will result in significant impact on the human environment. If the action is determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact (FONSI) will be the final environmental documents required by NEPA. If the analysis concludes that the proposal is a major Federal action significantly affecting the human environment, an environmental impact statement (EIS) must be prepared.

The environmental impacts generally associated with fishery management actions are effects resulting from 1) harvest of fish stocks which may result in changes in food availability to predators and scavengers, changes in the population structure of target fish stocks, and changes in the marine ecosystem community structure; 2) changes in the physical and biological structure of the marine environment as a result of fishing practices, e.g., effects of gear use and fish processing discards; and 3) entanglement/ entrapment of non-target organisms in active or inactive fishing gear. An analysis of the effects of groundfish fishing on the ecosystem, social, and economic environment is contained in the SEIS (NMFS 1998).

This EA tiers off the broader analysis of groundfish fishing under various levels of TAC specifications which was documented in the SEIS (NMFS 1998) prepared to supplement the original EISs for the GOA and BSAI FMPs. NMFS notes that in a July 8, 1999, order, amended on July 13, 1999, the Court in Greenpeace, et al., v. NMFS. et al., Civ No. 98-0492 (W.D. Wash.) held that the SEIS did not adequately address aspects of the GOA and BSAI groundfish FMPs other than TAC setting, and therefore was insufficient in scope under NEPA. In response to the Court's order, NMFS is currently preparing a programmatic SEIS for the GOA and BSAI groundfish FMPs.

4.1 Habitat Impacts

Inclusively all the marine waters and benthic substrates in the management areas comprise the habitat of all marine species. Additionally the adjacent marine waters outside the EEZ, adjacent

State waters inside the EEZ, shoreline, freshwater inflows, and atmosphere above the waters, constitutes habitat for prey species, other life stages, and species that move in and out of, or interact with, the fisheries' target species, marine mammals, seabirds, and the ESA listed species. This section contains analyses of fishing gear impacts on benthic substrate attributable to the proposed action.

None of the alternatives will change the commercial fisheries for pollock, Atka mackerel, or Pacific cod in the BSAI or GOA. Therefore, NMFS determines that this proposed action, in the context of the BSAI and GOA groundfish fishery as a whole, will not have an adverse impact on fish habitat, including Essential Fish Habitat as defined in the BSAI FMP.

4.2 Endangered Species Act Considerations

The Endangered Species Act of 1973 as amended (16 U.S.C. 1531 *et seq*; ESA), provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The program is administered jointly by the NMFS for most marine mammal species, marine and anadromous fish species, and marine plants species and by the U.S. Fish and Wildlife Service (USFWS) for bird species, and terrestrial and freshwater wildlife and plant species.

The designation of an ESA listed species is based on the biological health of that species. The status determination is either threatened or endangered. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine fish, plants, and mammals (except for walrus and sea otter) and anadromous fish species. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

In addition to listing species under the ESA, the critical habitat of a newly listed species must be designated concurrent with its listing to the "maximum extent prudent and determinable" [16 U.S.C. § 1533(b)(1)(A)]. The ESA defines critical habitat as those specific areas that are essential to the conservation of a listed species and that may be in need of special consideration. Federal agencies are prohibited from undertaking actions that destroy or adversely modify designated critical habitat. Some species, primarily the cetaceans, which were listed in 1969 under the Endangered Species Conservation Act and carried forward as endangered under the ESA, have not received critical habitat designations.

Federal agencies have an affirmative mandate to conserve listed species. One assurance of this is Federal actions, activities or authorizations (hereafter referred to as Federal action) must be in compliance with the provisions of the ESA. Section 7 of the ESA provides a mechanism for consultation by the Federal action agency with the appropriate expert agency (NMFS or USFWS). Informal consultations, resulting in letters of concurrence, are conducted for Federal

actions that have no adverse affects on the listed species. Formal consultations, resulting in biological opinions, are conducted for Federal actions that may have an adverse affect on the listed species. Through the biological opinion, a determination is made as to whether the proposed action poses "jeopardy" or "no jeopardy" of extinction to the listed species. If the determination is that the action proposed (or ongoing) will cause jeopardy, reasonable and prudent alternatives may be suggested which, if implemented, would modify the action to no longer pose the jeopardy of extinction to the listed species. These reasonable and prudent alternatives must be incorporated into the Federal action if it is to proceed. A biological opinion with the conclusion of no jeopardy will contain an incidental take statement if a likelihood exists of any taking occurring during promulgation of the action.[1] The incidental take statement is appended to a biological opinion to provide for the amount of take that is expected to occur from normal promulgation of the action. Further, if incidental take is expected, then reasonable and prudent measures are specified that are necessary or appropriate to minimize the impact of the take (50 CFR 402.14(i)). A biological opinion with the conclusion of no jeopardy may contain a series of conservation recommendations intended to further reduce the negative impacts to the listed species. These management alternatives are advisory to the action agency [50 CFR.402.14(j)].

Twenty-three species occurring in the GOA and/or BSAI groundfish management areas are currently listed as endangered or threatened under the ESA (Table 5). The group includes seven great whales, one pinniped, eleven Pacific salmon, two seabirds, and one albatross.

[1] the term "take" under the ESA means "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct" [16 U.S.C. § 1538(a)(1)(B)].

Table 5. Species currently listed as endangered or threatened under the ESA and occurring in the GOA and/or BSAI groundfish management areas.

Common Name	Scientific Name	ESA Status
Northern Right Whale	*Balaena glacialis*	Endangered
Bowhead Whale [1]	*Balaena mysticetus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Snake River Sockeye Salmon	*Onchorynchus nerka*	Endangered
Short-tailed Albatross	*Diomedia albatrus*	Endangered
Steller Sea Lion	*Eumetopias jubatus*	Endangered and Threatened [2]
Snake River Fall Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Snake River Spring/Summer Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Puget Sound Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Lower Columbia River Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Upper Willamette River Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Upper Columbia River Spring Chinook Salmon	*Onchorynchus tshawytscha*	Endangered
Upper Columbia River Steelhead	*Onchorynchus mykiss*	Endangered
Snake River Basin Steelhead	*Onchorynchus mykiss*	Threatened
Lower Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Upper Willamette River Steelhead	*Onchorynchus mykiss*	Threatened
Middle Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Spectacled Eider	*Somateria fishcheri*	Threatened
Steller Eider	*Polysticta stelleri*	Threatened

[1] The bowhead whale is present in the Bering Sea area only.
[2] Steller sea lion are listed as endangered west of Cape Suckling and threatened east of Cape Suckling.

Species listed under the ESA are present in the BSAI, and some are negatively affected by groundfish fishing. Section 7 consultations have been done for all the above listed species, some individually and some as groups. See section 3.8 of the SEIS for summaries of Section 7 consultations completed prior to December 15, 1998 (NMFS 1998). Section 7 consultations have since been completed for the Alaska groundfish fisheries take of ESA listed salmon species (NMFS, 1999b), and by the U.S. Fish and Wildlife Service for the longline fisheries take of short-tailed albatross.

In addition, a Section 7 consultation has been completed on the effects of the pollock, Atka mackerel, and Pacific cod fisheries on Steller sea lions (NMFS, 2000). This consultation concluded that the pollock, Atka mackerel, and Pacific cod fisheries in their current form jeopardized the continued existence of the western population of Steller sea lions and are likely to adversely modify Steller sea lion critical habitat. In response, NMFS developed a reasonable and prudent alternative (RPA) to ensure that these fisheries do not endanger Steller sea lions or adversely modify critical habitat. This RPA includes restrictions on the amount of pollock, Atka

mackerel, and Pacific cod that may be harvested in critical habitat areas in the BSAI and GOA during certain times of the year and apply to all sectors directed fishing for these species.

The proposed alternatives in this EA, with the exception of alternative 1 (no action), are intended to provide NMFS with better tools to monitor Steller sea lion no-entry and no-fishing zones; as well as harvests of pollock, Atka mackerel, and Pacific cod inside critical habitat. Any of the alternatives requiring vessels to use VMS will likely benefit the endangered western population of Steller sea lions by improving the enforcement and quota-monitoring capabilities of NMFS.

Therefore, NMFS determines that none of the alternatives is likely to adversely affect endangered species in any manner not previously considered in prior consultations.

4.3 Marine Mammal Protection Act Considerations

Under the Marine Mammal Protection Act, commercial fisheries are classified according to current and historical data on whether or not the fishery interacts with marine mammals. Two groups, takers and non-takers, are initially identified. For takers, further classification then proceeds on the basis of which marine mammal stocks interact with a given fishery. Fisheries that interact with a strategic stock at a level of take which has a potentially significant impact on that stock would be placed in Category I. Fisheries that interact with a strategic stock and whose level of take has an insignificant impact on that stock, or interacts with a non-strategic stock at a level of take which has a significant impact on that stock are placed in Category II. A fishery that interacts only with non-strategic stocks and whose level of take has an insignificant impact on the stocks is placed in Category III.

Species listed under the ESA present in the management area were listed in Table 5. Marine mammals not listed under the ESA that may be present in the BSAI and GOA management area include cetaceans, [minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), Dall's porpoise *(Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and the beaked whales (e.g., *Berardius bairdii* and *Mesoplodon spp.*)] as well as pinnipeds [Pacific harbor seal (*Phoca vitulina*), northern fur seal (*Callorhinus ursinus*), Pacific walrus (*Odobenus rosmarus*), spotted seal (*Phoca largha*), bearded seal (*Erignathus barbatus*), ringed sea (*Phoca hispida*) and ringed seal (*Phoca fasciata*)], and the sea otter (*Enhydra lutris*).

Take of the above listed marine mammals in groundfish fisheries has been monitored through observer programs. The subject fishery (BSAI and GOA groundfish) is classified as Category III. Steller sea lion, northern fur seal, harbor seal, spotted seal, bearded seal, ribbon seal, ringed seal, northern elephant seal, Dall's porpoise, harbor porpoise, Pacific white-sided dolphin, killer whale, sea otter, and walrus were recorded as taken incidentally in the Bering Sea and Aleutian Islands groundfish trawl fisheries according to records dating back to 1990 (Hill et al, 1997.)

The proposed alternatives in this EA, with the exception of alternative 1 (no action), are intended to provide NMFS with better tools to monitor Steller sea lion no-entry and no-fishing zones; as well as harvests of pollock, Atka mackerel, and Pacific cod inside critical habitat. Any of the alternatives requiring vessels to use VMS will likely benefit the endangered western population of Steller sea lions by improving the enforcement and quota-monitoring capabilities of NMFS.

Therefore, NMFS determines that none of the alternatives is likely to adversely affect marine mammals in any manner not previously considered in prior consultations.

4.4 Coastal Zone Management Act Consideration

Implementation of the preferred alternative would be conducted in a manner consistent, to the maximum extent practicable, with the Alaska Coastal Management Program within the meaning of section 30(c)(1) of the Coastal Zone Management Act of 1972 and its implementing regulations.

4.5 Conclusions or Findings of No Significant Impact

For the reasons discussed above, implementation of the alternatives requiring vessels that conduct directed fishing operations for pollock, Atka mackerel, or Pacific cod in the Bering Sea, Aleutian Islands, and Gulf of Alaska to install and use a vessel monitoring system (VMS) would not significantly affect the quality of the human environment. Therefore, the preparation of an environmental impact statement is not required by section 102(2)(C) of NEPA or its implementing regulations.

_____ _____

Assistant Administrator for Fisheries, NOAA Date

5.0 Regulatory Impact Review

The requirements for all regulatory actions specified in Executive Order (E.O.) 12866 are summarized in the following statement from the order:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environment, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

Executive Order 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." A "significant regulatory action" is one that is likely to:

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

A regulatory program is "economically significant" if it is likely to result in any of the effects described above. In part, the RIR is designed to provide information to determine whether the proposed regulation is likely to be "economically significant."

5.1 Expected Effects of the Alternatives

This section provides information to meet the requirement of E.O. 12866 that NMFS assess costs and benefits of the alternatives, including both quantifiable (when possible) and qualitative measures of the alternatives to require the installation and operation of VMS units on vessels

fishing in the BSAI and GOA groundfish fisheries.

Estimated Cost of VMS: The VMS units cost $1,800 each. Installation costs likely will range between $100 and $2,000 depending on whether the vessel owner installs the unit himself or hires a technician to do the installation. For purposes of estimating costs per vessel, NMFS will assume that the installation costs average $500 per vessel, for a total of $2,300 to purchase and install a VMS. The cost of transmitting the required data from the VMS unit is $5.00 per day.

Alternative 1 would not require VMS units on any additional vessels. Currently, approximately 12 trawl catcher/processors that participate in the directed fisheries for Atka mackerel are required to install and use a VMS. No additional costs associated with VMS would be incurred for these 12 vessels or any other catcher/processors or motherhips under Alternative 1. However, there likely will be costs associated with the catch accounting procedures and area closures requirements described in Sections 2.1 and 2.2. Earlier closures of critical habitat will occur if all catch by vessels without VMS accrues against the critical habitat catch limits, but some of this catch actually was made outside of critical habitat. In addition, the requirement that vessels without a VMS may not directed fish for a species anywhere in the quota management area after critical habitat closes will result in foregone catch for any vessel without a VMS that has the capability of fishing outside critical habitat.

Alternative 2 would require all catcher/processors and motherships that participate in a directed fishery for pollock, Atka mackerel, or Pacific cod in the BSAI or GOA to deploy an operating NMFS-approved VMS transmitter at all times that the vessel is fishing for groundfish.

Approximately 27 trawl catcher/processors[2], 43 longline catcher/processors, 12 pot catcher/processors and 8 motherships would be required to purchase and install the VMS units under Alternative 2. The estimated cost of purchase and installation would be $2,300 per vessel.

Annual costs of VMS data transmission will depend on the number of days the vessel fishes, which will vary depending on the gear, area, and directed fisheries in which the vessel participates. Table 6 provides a range of estimates of the number of days fished by catcher/processors in 2000 and the number of days deliveries were received for motherhips in 2000. These estimates are based on assuming that the catcher/processor fished or the mothership took deliveries every day during a week for which it submitted a weekly production report (WPR) to NMFS (number of WPRs x 7 days). An estimate of the annual VMS transmission costs for each category of processor vessel is made by estimating the number of days fishing or taking deliveries by $5.00. The following summarizes the estimated annual VMS transmission

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[2]The 12 catcher/processors that participated in the BSAI Atka mackerel fisheries already are required to have VMS units. Therefore, Alternatives 2 and 3 would not result in additional purchase and installation costs for these catcher/processors. They would, however, require additional transmission costs because these alternative require use of VMS during all groundfish fisheries.

cost estimates in Table 6:

- Annual costs for trawl catcher/processors range from about $400 to $1,600 and average about $1,000.
- Annual costs for longline catcher/processors range from $140 to about $1,700, and average about $1,000.
- Annual costs for pot catcher/processors range from $70 to $560, and average about $280.
- Annual costs for motherships range from $35 to $735, and average about $280.

Table 6. Estimated number of days fishing by catcher/processors in 2000 and days motherships took deliveries of groundfish in 2000, and the estimated annual VMS transmission costs for each processor vessel.

	Estimated Number of Days Fishing			Estimated Annual VMS Transmission Costs for Each C/P or Mothership		
	Minimum	Maximum	Average	Minimum	Maximum	Average
Trawl c/p	77	329	210	$385	$1,645	$1,050
Longline c/p	28	343	196	$140	$1,715	$980
Pot c/p	14	112	56	$70	$560	$280
Motherships	7	147	56	$35	$735	$280

Source: NMFS, Blend 2000
VMS transmission costs are $5.00 per day.

Alterative 2 - Option 1: Option 1 would require VMS on an additional 1 trawl catcher/processor and an additional two longline catcher/processors. These catcher/processors fished in the GOA or BSAI, but did not participate in an Atka mackerel, Pacific cod, or pollock directed fishery. The VMS installation costs for these three catcher/processors is estimated to be $2,300. NMFS estimates that the trawl catcher/processor fished approximately 160 days in 2000, and the two longline catcher/processors fished between 60 days and 175 days in 2000. Based on this information, NMFS estimates the annual VMS transmission costs for the one trawl catcher/processor would be approximately $800. The transmission costs for the two longline catcher/processors would range from $300 to $875.

In addition to the direct costs of VMS to the catcher/processors and motherhips, Alternative 2 also would result in indirect costs to any catcher vessel not carrying a VMS. These costs were described above under Alternative 1 are associated with the catch accounting procedures and area closures requirements described in Sections 2.1 and 2.2. Earlier closures of critical habitat will occur if all catch by vessels without VMS accrues against the critical habitat catch limits, but some of this catch actually was made outside of critical habitat. In addition, the requirement that vessels without a VMS may not directed fish for a species anywhere in the quota management area after critical habitat closes will result in foregone catch for any vessel that has the capability of fishing outside critical habitat.

Catcher/processors and motherships with a VMS would have reduced costs associated with removing the requirement to submit check-in/check-out reports.

Alternative 3: Catcher/processors, motherhips, and catcher vessels

Alternative 3 would require VMS units for all catcher/processors, motherships, and catcher vessels that participate in a directed fishery for pollock, Atka mackerel, or Pacific cod to deploy an operating NMFS-approved VMS transmitter at all times that the vessel is fishing for groundfish. Alternative 3 also includes options for exempting certain categories of catcher vessels, by vessel size or gear type.

- The estimated costs associated with requirements for catcher/processors and motherships and savings associated with removing the requirement for the check-in/check-out report are discussed in the previous section and would be the same under Alternative 3.

- The indirect costs of the catch accounting procedures and area closure requirements described in Sections 2.1 and 2.2 would be incurred by any catcher vessel exempted from VMS requirements under options to Alternative 3. Earlier closures of critical habitat will occur if all catch by vessels without VMS accrues against the critical habitat catch limits, but some of this catch actually was made outside of critical habitat. In addition, the requirement that vessels without a VMS may not directed fish for a species anywhere in the quota management area after critical habitat closes will result in foregone catch for any vessel without a VMS that has the capability of fishing outside critical habitat.

The estimated direct costs of VMS for catcher vessels are based on the same cost estimates that applied for the catcher/processors and motherhips. NMFS estimates that initial purchase and installation costs would be about $2,300 per vessel. VMS transmission costs would be $5.00 per day that the vessel is fishing for groundfish.

Table 7 provides a range of annual VMS transmission cost estimates for each category of catcher vessel, by gear and vessel length.

Table 7. Estimated minimum, maximum, and average number of days fished by each catcher vessel in 1999, and the estimated daily VMS transmission costs per vessel.

	Estimated Number of Days Fished in a Year for each Catcher Vessel			Estimated Annual VMS Transmission Costs for Each Catcher Vessel		
	Minimum	Maximum	Average	Minimum	Maximum	Average
Trawl, <60'	1	63	22	$5	$315	$110
Trawl, 60'-124'	1	219	40	$5	$1095	$200
Trawl, ≥125'	6	117	51	$30	$585	$255
HAL, <60'	1	120	13	$5	$600	$65
HAL, 60'-124'	1	128	25	$5	$640	$125
HAL, ≥125'	4	12	7	$20	$60	$35
Pot, <60'	1	175	24	$5	$875	$120
Pot, 60'-124'	1	153	25	$5	$765	$125
Pot, ≥ 125'	2	50	27	$10	$250	$135
Jig, <60'	1	79	13	$5	$395	$65
Jig, 60'-125'	1	26	8	$5	$130	$40
Jig, ≥ 125'	1	1	1	$5	$5	$5

Source: 1999 ADF&G fish tickets for all catcher vessels delivering any amount of groundfish.

VMS transmission costs are assumed to be $5.00 per day.

6.0 Initial Regulatory Flexibility Analysis

The central focus of the IRFA should be on the economic impacts of a regulation on small entities and on the alternatives that might minimize the impacts and still accomplish the statutory objectives. The level of detail and sophistication of the analysis should reflect the significance of the impact on small entities. Under 5 U.S.C., Section 603(b) of the RFA, each IRFA is required to address:

- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and the legal basis for, the proposed rule;

- A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate);

- A description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;

- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that would minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:

    1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;

    2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;

    3. The use of performance rather than design standards;

    4. An exemption from coverage of the rule, or any part thereof, for such small entities.

6.1 Definition of a Small Entity

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) and small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a 'small business' as having the same meaning as 'small business concern' which is defined under Section 3 of the Small Business Act. 'Small business' or 'small business concern' includes any firm that is independently owned and operated and not dominate in its field of operation. The SBA has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor...A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the US including fish harvesting and fish processing businesses. A business involved in fish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of $ 3 million for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business involved in both the harvesting and processing of seafood products is a small business if it meets the $3 million criterion for fish harvesting operations. Finally a wholesale business servicing the fishing industry is a small businesses if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established "principles of affiliation" to determine whether a business concern is "independently owned and operated." In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern's size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development

Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when (1) A person is an affiliate of a concern if the person owns or controls, or has the power to control 50% or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) If two or more persons each owns, controls or has the power to control less than 50% of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors or general partners controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint venturers if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small organizations. The RFA defines "small organizations" as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of less than 50,000.

6.2 Reason for the Proposed Action

Alternatives that would require a VMS on catcher/processors, motherhips, and catcher vessels are being considered to meet NMFS' responsibilities for monitoring fishing in and around Steller sea lion critical habitat areas. The preferred alternative would be implemented under the authority of the Magnuson-Stevens Fishery Conservation and Management Act and the ESA.

6.3 Estimated Number of Small Entities

The alternatives would directly affect up to 94 catcher/processors, 12 motherships, and 577 catcher vessels. These vessels and processors are identified by vessel type, gear type, and vessel length in Sections 3.2 and 3.3 and Tables 1 through 4.

- Catcher/processors: For an offshore catcher/processor to qualify as a small entity, it must be independently owned and operated, have no more than 49% foreign ownership, and have gross annual receipts of less than $3 million. None of the sixteen catcher/processors operating in the BSAI pollock fishery appear to meet the criteria for small entities, i.e., none qualify as "small entities." However, some of the catcher/processors participating in the Atka mackerel or Pacific cod fisheries may have annual gross receipts of less than $3 million, particularly the one trawl catcher/processors and the three longline catcher/processors that would be required to have a VMS under Alternative 2, Option 1. For purposes of this analysis, NMFS assumes that the additional 78 catcher/processors (94 - 16) could be small entities.

- Motherships: All three motherships operating in the BSAI pollock fisheries have ownership or business affiliations with large Japanese-owned processing companies, and are further affiliated with some of their delivering catcher boats. Taken together with their affiliated entities, none of these motherships meet the criteria for small entities. For purposes of this analysis, NMFS assumes that the eight motherships that participate in the BSAI and GOA Pacific cod fisheries could be small entities.

- Trawl catcher vessels: NMFS assumes that all 577 of the catcher vessels that could be affected by the alternatives are small entities. However, some of the trawl catcher vessels that participate in the BSAI pollock fisheries are owned, in whole or in part, by inshore processors or motherhips and, therefore, cannot be considered small entities, because none of the processors in the BSAI pollock fishery, themselves, are small entities for RFA purposes.

6.4 Recordkeeping and Reporting Requirements

Alternatives 2 and 3 require that the VMS transmit vessel location data to NMFS. Although the vessel operator does not have to actively collect and transmit data, the automatic transmission of data from the VMS is considered a reporting requirement under the Paperwork Reduction Act.

Under Alternatives 2 and 3, processor vessels transmitting vessel location data through a VMS would no longer be required to submit check-in and check-out reports currently required under 50 CFR 679.5.

6.5 Relevant Federal Rules that may Duplicate, Overlap, or Conflict with Proposed Action

NMFS is not aware of any other Federal rules that would duplicate, overlap, or conflict with any of the alternatives.

6.6 Description of Significant Alternatives

NMFS is not aware of any alternatives in addition to the three alternatives, with options, that are described in this analysis that would allow NMFS to monitor fishing in and around Steller sea lion critical habitat areas in an accurate and timely manner.

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UNITED STATES DEPARTMENT OF COMMERCE
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February 7, 2001

MEMORANDUM FOR: Members of the North Pacific Fishery Management Council

THROUGH: Lisa L. Lindeman for Lisa L. Lindeman
Regional Attorney, Alaska Region

FROM: Lauren M. Smoker
Lauren M. Smoker
Staff Attorney, Alaska Region

SUBJECT: Summary of standards to be followed under the ESA; interactions of the ESA with other statutory provisions

At the Council's January 2001 meeting, NOAA General Counsel was asked to provide the Council with information on several questions and issues concerning standards under and interactions between the Endangered Species Act, the Magnuson-Stevens Act, and Public Law 106-554, the Health and Human Services Appropriations Bill language at section 209 (i.e., the Stevens Rider). The material presented in this memorandum comes mainly from four sources: (1) the Endangered Species Act (ESA) and the regulations governing ESA section 7 consultations at 50 C.F.R. Part 402; (2) the U.S. Fish and Wildlife Service's (USFWS) and NMFS' ESA consultation handbook;[1] (3) decisions issued by the District Court for the Western District of Washington in the Steller sea lion litigation thus far; and (4) the November 30, 2000, FMP-level Biological Opinion (hereinafter "BiOp").

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[1]The ESA section 7 regulations (50 C.F.R. Part 402) have been in place since 1986. The regulations were promulgated jointly by NMFS and USFWS after much debate and controversy. Any changes to the regulations would require extensive internal review within and between NMFS and USFWS, as well as a public comment period. The policies in the ESA consultation handbook also were developed jointly by NMFS and USFWS. Although any changes to the ESA consultation handbook do not require a public comment period, difficulty could be encountered in reaching an agreement with USFWS on the changes.

1. Is the November 30, 2000, Biological Opinion a permanent document or does it change? If it can be changed, what will change it? How will new information be taken into account? What circumstances will reactivate consultation?

A formal consultation is required if NMFS cannot determine that a proposed action (e.g., authorization of groundfish fisheries based on the BSAI and GOA groundfish FMPs) is not likely to adversely affect a listed species or critical habitat. 50 C.F.R. 402.14(a). During a formal consultation, NMFS has several responsibilities, including the formulation of its biological opinion as to whether the action, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Biological Opinions are to include (1) a summary of the information on which the opinion is based; (2) a detailed discussion of the effects of the action on listed species or critical habitat; and (3) NMFS' opinion on whether the action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat (a "jeopardy biological opinion"); or, the action is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat (a "no jeopardy" biological opinion). A "jeopardy" biological opinion shall include reasonable and prudent alternatives, which are generally solutions to the problems inherent in a proposed federal action. If NMFS is unable to develop such alternatives, it will indicate that to the best of its knowledge there are no reasonable and prudent alternatives. 50 C.F.R. 402.15(h). A biological opinion will also include an incidental take statement if there will be takings of the species that result from, but are not the purpose of, the proposed action. An incidental take statement specifies the impact of any incidental taking of endangered or threatened species and also provides reasonable and prudent measures (which are different from reasonable and prudent alternatives) that are necessary to minimize impacts and sets forth the terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures. With the issuance of a biological opinion, the Federal action agency has a responsibility to determine whether and in what manner to proceed with the action in light of its section 7 obligations and the biological opinion. The Federal action agency must notify NMFS of its final decision on the action. 50 C.F.R. 402.15(a) and (b).

Section 12 of the BiOp states that issuance of the BiOp concludes formal consultation on the authorization of groundfish fisheries based on the BSAI and GOA groundfish FMPs. It also provides that, in accordance with 50 C.F.R. 402.16, reinitiation of <u>formal</u> consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

> (1) the amount or extent of taking specified in the incidental take statement is exceeded;
> (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
> (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or
> (4) a new species is listed or critical habitat designated that may be affected by the identified action.

ESA Consultation Handbook section 4.6, "Procedures for Modifying Biological Opinions and Incidental Take Statements," states the following:

> When the action agency determines that one or more of the four conditions requiring reinitiation of formal consultation has occurred, consultation must be reinitiated. . . . Documentation of a reinitiated consultation must be in writing, and must contain sufficient information to record the nature of the change in the action's effects and the rationale for amending analyses of anticipated incidental take or the reasonable and prudent alternatives or measures. Reinitiations involving major changes in effects analyses or changes in [NMFS'] biological opinion are addressed fully in a new consultation. A reinitiation based on a new species listing or critical habitat designation is treated as a new consultation, although data in the original opinion may be referenced when the action has not changed.

2. What are the standards used under the ESA for determining jeopardy and/or adverse modification and preparing reasonable and prudent alternatives?

The ESA imposes on all Federal agencies a duty to "insure" that action taken by the agencies does not jeopardize endangered species or adversely modify their critical habitat. 16 U.S.C. 1536(a)(2). Neither "jeopardy" or "adverse modification" is defined in the ESA but regulations at 50 C.F.R. 402.02 define the terms as follows:

> Jeopardize the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.
>
> Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.

During a formal consultation, NMFS is responsible for (1) reviewing all relevant information provided by the Federal agency or otherwise available; (2) evaluating the current status of the listed species or critical habitat; (3) evaluating the effects of the action and cumulative effects on the listed species or critical habitat; (4) formulating its biological opinion as to whether the action, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat; (5) discussing with the Federal agency and any applicant NMFS' review and evaluation conducted under (1) through (3), the basis for any finding in the biological opinion, and the availability of reasonable and prudent alternatives (if a jeopardy opinion is to be issued) that the agency and the applicant can take to avoid violation of ESA section 7(a)(2); (6) formulating discretionary conservation recommendations, if any, which will assist the Federal agency in reducing or eliminating the

impacts that its proposed action may have on listed species or critical habitat; (7) formulating a statement concerning incidental take, if such take may occur; and (8) in formulating its biological opinion, any reasonable and prudent alternatives, and any reasonable and prudent measures (considered necessary or appropriate to minimize impacts from incidental take of listed species), NMFS will use the best scientific and commercial data available and will give appropriate consideration to any beneficial actions taken by the Federal agency or applicant, including any actions taken prior to the initiation of consultation. 50 C.F.R. 402.14(g).

As noted above, the ESA requires that each federal agency insure that any action is not likely to jeopardize the continued existence of any endangered species or result in the destruction or adverse modification of habitat of such species. Although there is considerable overlap between these two standards, the ESA requires that they be considered separately or that the agency provide an explanation as to why the two can be considered and treated together. Greenpeace v. National Marine Fisheries Service, 55 F. Supp. 2d 1248, 1265 (W.D. Wash. 1999). Additionally, while the ESA requires that decisions concerning the existence of jeopardy or adverse modification be made on the basis of the best scientific and commercial data available, this standard does not require that the best scientific and commercial data available conclusively prove the agency's determinations. Id., at 1262. As the court noted in previous decisions in the Steller sea lion litigation, this standard requires "far less" than conclusive proof and, furthermore, that Congress intended that agencies give the benefit of the doubt to the species. Id. One of the express purposes of the ESA is "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." Id.

If jeopardy or adverse modification is found, NMFS shall suggest those reasonable and prudent alternatives which the agency believes would not violate ESA section 7(a)(2) and can be taken by the Federal agency or applicant in implementing the agency action. 16 U.S.C. 1536(b)(3)(A). Generally, reasonable and prudent alternatives are the solutions to the problems inherent in a proposed federal action which lead the consulting agency to find that the action will result in jeopardy. Greenpeace v. NMFS, 55 F. Supp. 2d, at 1264. "Reasonable and prudent alternatives" is defined at 50 C.F.R. 402.02 as "alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technically feasible, and that the Director [in NMFS' case, the AA for Fisheries] believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat." A more detailed discussion of the economically and technologically feasible component of an RPA is presented in response to Question 3 on page 8 of this memorandum. A successful RPA must meet all four of the requirements set forth in this definition. Additionally, when a reasonable and prudent alternative consists of multiple activities, it is imperative that a thorough explanation be provided of how each component of the alternative is essential to avoid jeopardy and/or adverse modification and how the proposed management measures fit together to accomplish the goal of avoiding jeopardy and adverse modification. NMFS' ESA Consultation Handbook, 4-41 to 4-42; Greenpeace v. NMFS, 55 F. Supp. 2d, at 1267.

Finally, in cases of uncertainty, agencies are to give the benefit of the doubt to the species. Greenpeace v. NMFS, 55 F. Supp. 2d, at 1262. In litigation concerning the endangered Hawaiian monk seal, the court found that NMFS has an affirmative obligation under ESA section 7(a)(2) to insure that agency action will not jeopardize the continued existence of listed species or adversely modify their habitat. Greenpeace Foundation v. Mineta, 122 F. Supp. 2d 1123, 1131 (D. Hawai'i 2000). The court agreed that data on the role of lobster in the monk seal's diet was admittedly sparse at the time the 1981 biological opinion was prepared, but held that when an agency concludes after consultation that it cannot insure that the proposed action will not result in jeopardy, and yet proceeds to implement such action, the agency has flouted the plain requirements of section 7. Id. The court found that NMFS had failed to fulfill its "rigorous" affirmative duty under section 7 to "insure" that implementation of the Crustacean FMP does not result in jeopardy or adverse modification. Id., at 1133. NMFS' speculation that no jeopardy to monk seals or adverse modification of their critical habitat will occur because the agency lacks enough information regarding the impact of the fishery on seals was found to be an arbitrary and capricious conclusion. Id.

3. What are the standards for determining when a jeopardy or adverse modification determination, or the development of fishery management measures through RPAs, are arbitrary and capricious under the ESA or the APA?

Challenges to biological opinions issued pursuant to ESA section 7 are reviewed under the Administrative Procedure Act (APA) to determine whether the biological opinion was arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law. Greenpeace v. NMFS, 55 F. Supp. 2d, at 1259.

> In determining whether an agency decision was arbitrary or capricious, the reviewing court must consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment. Normally, an agency rule would be arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise. An agency action is also arbitrary when it fails to articulate a satisfactory explanation for its action. In applying the arbitrary and capricious standard, the focal point for judicial review is the administrative record already in existence, not some new record made initially in the reviewing court. Id. (citations omitted).

A biological opinion is arbitrary and capricious and will be set aside when it has failed to articulate a satisfactory explanation for its conclusions or when it has entirely failed to consider an important aspect of the problem. Greenpeace v. NMFS, 80 F. Supp. 2d 1137, 1147 (W.D. Wash. 2000). When scientific evidence is equivocal, a court will defer to an agency's reasonable interpretation of that evidence and when specialists express conflicting views, an agency will be accorded its discretion to rely on the reasonable opinions of its own qualified experts even if, as an original

matter, a court might find contrary views more persuasive. Greenpeace v. NMFS, 55 F. Supp. 2d, at 1259. The deference a court must accord an agency's scientific expertise is not unlimited, however, and the presumption of agency expertise may be rebutted if its decisions, even though based on scientific expertise, are not reasoned. Greenpeace v. NMFS, 80 F. Supp. 2d, at 1147.

The following highlights several specific examples involving the court's application of the arbitrary and capricious standard to NMFS' past decisions in the Steller sea lion litigation and the court's evaluation of whether they were arbitrary and capricious.

Finding of jeopardy/adverse modification based on equivocal scientific data

In the December 1998 biological opinion on the pollock fisheries [hereinafter "1998 pollock biological opinion"], NMFS concluded that the BSAI and GOA pollock fisheries were likely to result in jeopardy to the Steller sea lion and adverse modification of their critical habitat. While lacking the direct evidence of localized depletion, the 1998 pollock biological opinion found that competition probably does occur between the pollock fisheries and sea lions "because the pollock fisheries: (1) operate in the same areas where sea lions feed; (2) operate during seasons when sea lions may be especially vulnerable to competition and reduction in availability of prey; (3) catch pollock at the same or overlapping depths at which sea lions feed; and (4) catch the same size pollock on which sea lions feed." Greenpeace v. NMFS, 55 F. Supp. 2d, at 1256.

NMFS' finding of jeopardy and adverse modification for the pollock fisheries was challenged by the industry as arbitrary and capricious on two grounds. First, it was argued that the Steller sea lion decline is caused by environmental changes and the resulting lack of appropriate prey, and that there is growing agreement in the scientific community that this general collapse is not associated with fishing activities but is due to a reduced "carrying capacity" of the North Pacific ecosystem as a whole. Therefore, NMFS' treatment of these issues in the opinion violated the ESA by reaching an arbitrary and capricious conclusion based on the available data. It was also argued that NMFS' conclusion was not based on sufficient scientific evidence, thereby violating the ESA by failing to use the best scientific data available.

The court found that the 1998 pollock biological opinion set forth the current scientific information about the sea lions, mackerel, and pollock and acknowledged the continued scientific uncertainty about competition between the fisheries and sea lions. Id., at 1256. The court held that although there is scientific testimony disagreeing with NMFS' conclusions, "an agency must have discretion to rely on the reasonable opinions of its own qualified experts." Id., at 1261. The court found that NMFS had considered and rejected other scientific theories and that NMFS' rejection of those theories was not arbitrary and capricious because NMFS had examined a number of other potential causes for the Steller sea lion decline; NMFS had evaluated a great deal of evidence indicating that the fishery was competing with sea lions for prey during critical times of the year, especially in light of three assumptions that the court found reasonable; NMFS had acknowledged that this scientific evidence was not "conclusive;" and NMFS had found that although the fishery may not be the sole cause of the decline, nor the sole factor preventing recovery, the fishery was nevertheless likely to jeopardize the continued existence of the Steller sea lion population. Id., at 1261-62. The court found that NMFS had provided a reasonable

interpretation of equivocal evidence, and that such an approach is not arbitrary and capricious. Id., at 1262. Second, the court rejected the contention that NMFS' conclusion was not based on sufficient scientific evidence. As noted earlier, the requirement that decisions be made on the basis of the best scientific and commercial data available is not a requirement that decisions be based on conclusive proof. Id., at 1261-62.

Development of RPAs in light of a jeopardy/adverse modification finding

The RPAs for the 1998 pollock biological opinion were challenged by both the industry and environmental groups as arbitrary and capricious. After reviewing the record, the court agreed with this claim, finding that NMFS had not established or explained how its RPAs fulfilled their purpose of avoiding the likelihood of jeopardizing the continued existence of listed species or the destruction or adverse modification of critical habitat or how the RPAs worked together to avoid jeopardy and adverse modification. Id., at 1267. As noted above, the ESA requires that each federal agency insure that any action is not likely to jeopardize the continued existence of any endangered species or result in the destruction or adverse modification of habitat of such species. Once a determination is made that a proposed action is likely to jeopardize the continued existence of a species or adversely modify its critical habitat, any available RPA must be crafted such that the agency is certain that the proposed action no longer is likely to jeopardize the continued existence of a species or adversely modify its critical habitat.

The court found that NMFS had failed to apply either the jeopardy or adverse modification standard in analyzing and approving the RPA for the 1998 pollock biological opinion. Id., at 1265. The court stated:

> For example, the [1998 pollock biological opinion] states that one specific goal of spatial dispersion is to reduce the level of catch taken from critical habitat. The ESA requires consideration of what catch levels would "reduce appreciably the likelihood of survival and recovery" of the Steller sea lions, or would avoid "appreciably diminish[ing] the value of critical habitat." The [1998 pollock biological opinion], however, only looks at what would be "consistent with past fishery practices and still provide a considerable reduction from the current" levels. The Court recognizes the difficult line-drawing issues presented in deciding, for instance, exactly what level of catch inside critical habitat would result in jeopardy or adverse modification. Nevertheless, NMFS must comply with the mandates of the Endangered Species Act, including asking the required questions.

Id., at 1265 (citations omitted). Based on these problems, the court reached the following conclusions:

> Because the [1998 pollock biological opinion] only related its proposed allocations to current practices rather than the standards for adverse modification and jeopardy, it is impossible for the court to evaluate the changes made by the Council and to review NMFS' approval of these changes. Similarly, NMFS' failure to analyze either the draft or final RPAs under the appropriate legal standards makes it impossible for this court to find that

the agency has "articulated a rational connection between the facts found and the choice made."

Id., at 1266. Given the above, an RPA must focus on and address the various bases for the jeopardy and adverse modification determination in the biological opinion and contain those measures that are necessary to avoid jeopardy and adverse modification of critical habitat.

Economically and technologically feasible RPA

Another arbitrary and capricious challenge to the RPAs implemented in response to the 1998 pollock biological opinion focused on the "economically and technologically feasible" requirement for RPAs. It was argued that NMFS had failed to establish that the RPAs are economically and technologically feasible because NMFS had not balanced the benefit to the species against the economic and technical burden on the industry before approving its RPAs. The court found that agencies are not required to balance environmental benefits against economic costs to meet this component of a reasonable and prudent alternative, and found such an interpretation to be fundamentally inconsistent with the purposes of the ESA and with case law interpreting the ESA. Id., at 1267.

The court noted that its rejection of this argument was not to be interpreted as meaning that NMFS cannot consider industry concerns when shaping RPAs. Id., at 1268. Reasonable and prudent alternatives must be consistent with the purposes of the underlying action and the action agency's authority, economically and technologically feasible, and avoid the likelihood of jeopardy and adverse modification. The court noted that, when faced with a range of possible measures that are consistent with this definition, NMFS can pick amongst them based on other factors, including the effects on the fishing industry. Id. However, the court identified these two determinations as separate steps that should not be combined. Id. It appeared to the court that NMFS had inappropriately combined these steps by approving changes in management measures based solely on an attempt to minimize impacts on the fishing industry, without explicitly considering what effect the changes would have on the Steller sea lions. Id. In other words, an action agency is to consider the endangered species first and determine what actions are necessary to protect it from jeopardy and adverse modification. If there is more than one way to provide the necessary and required protections against jeopardy and adverse modification, then an action agency may select the protective action that imposes the least economic costs.

4. What was the measurement the agency used for coming up with the conclusions and the RPAs contained in the BiOp?

In section 9 of the BiOp, NMFS states:

> The fisheries effects that give rise to these determinations [jeopardy and adverse modification] include both large scale removals of Steller sea lion forage over time, and the potential for reduced availability of prey on the fishing grounds at spatial and temporal scales of importance to individual foraging Steller sea lions. These determinations result

from available evidence of competitive interaction between the fisheries for pollock, Pacific cod, and Atka mackerel and Steller sea lions. Because this competitive interaction is the basis for both determinations of jeopardy and adverse modification of critical habitat, the RPA avoids jeopardy and adverse modification by requiring FMP amendments that protect both the population from the adverse competitive effects of the fisheries but also protect both the availability of an adequate prey field inside critical habitat.

The BiOp contains an RPA that includes management measures to protect sea lions on a global, regional and local scale and that eliminates, or appreciably reduces, the intensity of the interactions at all three scales where the competitive interactions occur. The overall approach of the RPA involves the following strategy: (1) protect a substantial number of the rookeries and haulouts used by Steller sea lions and the marine environment immediately offshore of these areas from disturbance associated with commercial fishing for the three primary prey species (pollock, Pacific cod and Atka mackerel); (2) protect a substantial portion of critical habitat from the effects of commercial fishing on the three primary prey species, (3) ensure that adequate forage resources are available to support a sustained and stable population of Steller sea lions, and (4) in areas where fishing is allowed, ensure that fishing does not create areas where Steller sea lions are not able to successfully forage. See BiOp, at pages 288-94.

As stated earlier, NMFS must insure that its action, the prosecution of the groundfish fisheries in the BSAI and the GOA, avoids jeopardy and adverse modification of critical habitat. The BiOp recognizes that there is currently scientific and commercial data that supports a finding of jeopardy and adverse modification but that uncertainty regarding fisheries impacts on Steller sea lions and critical habitat remains. As the court stated in the Steller sea lion litigation:

> Although scientists are unable to precisely determine the impact of the fisheries on Steller sea lion survival, several important facts are undisputed: (1) the primary scientific hypothesis for the decline in sea lion population is lack of food availability, resulting in "nutritional stress;" (2) the fisheries remove hundreds of millions of pounds of fish every year from the oceans that have traditionally supported the major sea lion population centers; (3) the fisheries operate at times and in areas where sea lions forage for food; and (4) many of the fish targeted by the fisheries are important sea lion prey. Greenpeace v. NMFS, 106 F. Supp. 2d 1066, 1070 (W.D. Wash. 2000).
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> * * * * *
>
> Although other factors may play a part, fisheries related effects cannot be excluded as a contributing factor in the sea lion population decline. Id., at 1076.
>
> * * * * *
>
> While acknowledging that the scientific data was not "conclusive," the Court noted that the standard is not to require conclusive proof, but only that decisions under the ESA be based on the best scientific data available. Id., at 1077.

As stated earlier, agencies are to act in a precautionary manner when effects of a proposed action on listed species and critical habitat are uncertain. Faced with just such a situation in the evaluation of fisheries effects on Steller sea lions and critical habitat, NMFS developed an RPA that insures the avoidance of jeopardy to the Steller sea lion and adverse modification of the Steller sea lion's critical habitat.

5. How do the MSA requirements fit into the process, given public law 106-554 (Stevens Rider)?

The provisions of the MSA are an important component in the development of Steller sea lion protection measures under section 209 of Public Law 106-554. Section 209(c)(2) states that "[t]he Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries shall be managed in a manner that is consistent with the [BiOp RPA], except as otherwise provided in the section. The [BiOp RPA] shall become fully effective no later than January 1, 2002, as revised if necessary and appropriate based on the independent scientific review referred to in subsection (b) and other new information . . . ." Section 209(c) requires that Steller sea lion protection be consistent with all law, including the ESA and the MSA. The MSA also requires that any action taken under the MSA be consistent with other applicable law, which includes the ESA. Any RPA developed for the 2002 groundfish fisheries, or any modifications to the measures established for the 2001 groundfish fisheries must meet the requirements of the ESA and also must be evaluated under the provisions of the MSA, including the national standards, and any other applicable law, such as the Regulatory Flexibility Act.

As stated earlier, an action agency is to consider the listed species first and determine what actions are necessary to protect it from jeopardy and its critical habitat from adverse modification. If there is more than one way to provide the necessary and required protections against jeopardy and adverse modification, then an action agency may select among those alternative actions to promote other objectives, for example, choosing an ESA-consistent action that imposes the least economic costs, minimizes bycatch to a greater extent than the other alternative approaches, or minimizes economic impacts to fishing communities to a greater extent than the other alternative approaches.

cc: Dr. James Balsiger
Craig O'Connor
Margaret F. Hayes; Samuel Chi

Review the NMFS November 30, 2000 Biological Opinion:

A Report Submitted to the North Pacific Fishery Management Council

Prepared by
Scientific and Statistical Committee
of the North Pacific Fishery Management Council

February 7, 2001

Table of Contents

1.0 Introduction

1.1 Purpose and History

Under Section 7 of the Endangered Species Act (ESA), the National Marine Fisheries Service (NMFS) is required to render a Biological Opinion (BiOp) on whether or not a proposed federal action jeopardizes recovery of a listed species. The November 30, 2000 Biological opinion (BiOp3), is the most recent evaluation of federal actions to regulate the Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands (BSAI) groundfish fisheries. In the opinion, NMFS concludes that proposed groundfish fishery regulations are likely to adversely alter designated critical habitat and thereby jeopardize recovery of Steller sea lions (SSLs). As a result, NMFS proposed Reasonable and Prudent Alternatives (RPAs) to the federal regulations.

The NPFMC regarded the findings in BiOp3 as controversial and rejected the findings at their December 2000 meeting. The Council tasked the Science and Statistical Committee (SSC) with providing a comprehensive review of the opinion. Specifically, the Council asked the SSC to 1) evaluate the underpinnings of the BiOp findings, 2) evaluate the RPAs for consistency with those findings, 3) comment on the experimental design elements of the RPAs and 4) make recommendations for further study and evaluation by a independent review committee. This report is the SSC's review of the BiOp. The responses to the Council's four questions are contained in the SSC minutes for the February 2001 meeting.

1.2 SSC Procedure for this Report

Between the December 2000 and February 2001 Council meetings, SSC members individually reviewed BiOp3 and sent their comments to SSC Chairman Rich Marasco, who sent these comments to all SSC members. Jeff Hartman attended the January 2001 Council meeting and recorded four items of interest that the Council wanted the SSC to address. At the February meeting, each commenter summarized his or her main points, and Mike Payne, Ed Richardson, Paul McGregor, and Thorn Smith then provided public testimony. The SSC synthesized these comments into this review document. This review is written as a stand-alone document. We note that despite the deficiencies listed in our review, BiOp3 satisfied Judge Zilly sufficiently that the SSL issue has returned to the Council arena. Our recommended course of action at this point is to extract and build upon the useful features in BiOp3, while using our review and other scientific reviews to indicate the deficiencies, excesses, and limitations in that document. We note that another scientific review by the State of Alaska's SSL Restoration Team should be finalized in April, and our reading of their minutes of three meetings held in the last three months suggests that their review is consistent with and complementary to ours.

1.3 Overview of the Findings of BiOp3

In a biological opinion, NMFS is required to show how the evaluated management actions are reasonably expected to appreciably reduce the likelihood of survival and recovery of a listed species. NMFS is expected to express a balanced professional opinion based on objective evaluation of the available data and their expert knowledge and interpretation of that data. They are not necessarily required to evaluate all possible impediments to recovery. Nevertheless, a rounded evaluation enhances the acceptance of the reasonableness of their findings. Surprisingly, standards for determination of jeopardy are vague. In BiOp3, the NMFS is also responding to a

court order to comprehensively evaluate groundfish regulations. To meet the obligations of the ESA and the court, successive biological opinions on Alaskan groundfish fisheries have progressively included more and more detail and evaluated an increasing number of alternative hypotheses to explain the state of recovery of the listed species.

BiOp3 differs from previous BiOps in that all groundfish fisheries, including State of Alaska fisheries, are more extensively evaluated, as are subsistence takes, water pollution, urbanization, tourism, and other human activities. The BiOp evaluates the potential for jeopardy for more than 20 listed species or populations; however, NMFS found jeopardy only for SSLs. The SSC is therefore focusing its comments on the SSL/fishery interactions.

NMFS jeopardy finding is based on the premise that fisheries compete directly and indirectly for food with SSLs. NMFS makes a prima facie case that SSLs and fisheries overlap in pursuit of similar prey. Sea lions eat pollock, cod and Atka mackerel, and fisheries catch and remove these species within designated SSL critical habitat. It is argued that the consequence of this competition is an increase in SSL energy demand for foraging, lowered growth and reproductive rate, increased exposure to predators and lowered overall survival. It is asserted that SSLs are most disadvantaged by temporally and spatially concentrated fisheries that provoke a local depletion of the SSL prey field. NMFS says that prior efforts to isolate SSLs from fisheries have not worked, and more stringent measures are required to overcome the competitive disadvantage suffered by SSLs.

NMFS arguments in support of their opinion are heavily dependent on uncorroborated critical assumptions. Opinions are frequently unsubstantiated and/or stated as facts, and there is a lack of scientific balance. Alternative hypotheses that could account for the explanation of at least part of the decline are summarily rejected because in NMFS opinion they are unable to *solely* account for the continued SSL decline in abundance. Analyses that could have informed the opinion makers were not undertaken. Recent, relevant research findings were not incorporated into the document. There is a demonstrated lack of understanding of basic fishery management. The overall tenor of the document is unduly negative toward fisheries. From the outset, NMFS fails to separately evaluate the historical causes of the decline in the SSL population from the current impediments to recovery.

The SSC believes that BiOp3 constructs an unreliable foundation for proposed RPAs. However, it would be incorrect to conclude that fisheries are exonerated from any responsibility for the current state of the SSL population. The fact of the matter is, we do not understand either the cause of the SSL decline or the continuing impediments to SSL recovery.

2.0 Key Topical Areas

In this section, SSC recommendations about the key considerations for the Council process in the next few years are summarized. Supporting information and examples are detailed below the main sections. For specific, line-by-line comments see the Appendix.

2.1 Scientific Credibility

BiOp3 is an attempt by NMFS' Office of Protected Resources to provide a comprehensive evaluation of whether Alaska's fisheries are "jeopardizing the continued existence of listed

species in the areas affected by the fisheries,"or "adversely modifying critical habitat of such species." Findings of jeopardy and adverse modification occurred only for SSLs. Therefore, a major goal of BiOp3 is to provide a comprehensive assessment of the effects of fisheries and their management on SSLs, in part to respond to a court directive. Consequently, BiOp3 differs from previous BiOps in that all groundfish fisheries, including State of Alaska fisheries, are under consideration, as are subsistence takes, water pollution, urbanization, tourism, and other human activities. A reevaluation of global effects of groundfish fisheries leads to a requirement that the control rule for pollock, cod, and Atka mackerel be modified to be more conservative at low stock levels. A reevaluation of regional and local effects focuses on local depletion as being the primary mechanism for interactions with SSLs and leads to a requirement that more stringent time and area closures be implemented. Finally, a "monitoring program" is developed to accommodate NPFMC's oft-stated goal of having an experimental design that allows for testing the efficacy of management measures.

As an ESA-driven document, BiOp3 has as its main focus the impact of human actions rather than the consideration of all factors that may affect the population. Much useful information is summarized in BiOp3, but it is clear that very little is understood about the SSL decline and the interaction of SSLs and Alaska's fisheries. In many ways, the document reads like a prosecutor's brief in a criminal trial. In common with the previous BiOps, the tenor of the document is unduly negative toward fisheries, opinions are frequently unsubstantiated and/or stated as facts, and there is a lack of scientific balance. The document contains errors and misunderstandings of the historical record, ecological and fisheries theory, and the regime shift. In many cases, subsets of data appear to have been selected to support the findings, and some recent literature, some of which supports alternative viewpoints, has not been presented. **Therefore, the SSC finds that BiOp3 is scientifically deficient.**

2.1.1 Unsupported/Unstated Assumptions, Unsupported Statements

As with previous BiOps, the SSC continues to be concerned that opinions are frequently stated as fact, statements that are known to be controversial are not substantiated, and there is a lack of scientific balance. In many instances the assumptions made by NMFS are an appeal to simple logic. For example, NMFS argues that the reduction in the hypothetical unfished population of groundfish due to fishing lowers the potential size of the prey field thus adversely affecting SSL survival and recovery. The logical appeal asks the reader to consider the size of the standing biomass with and without fishing: clearly without fishing, it is argued, the prey field would be larger and predators better off. Appendix 3 evaluates the assumption and concludes that the "global availability" of groundfish is more than adequate to meet the needs of the predators. In effect the assumption is tested and refuted. The appeal to "simple logic" often relies on a gross oversimplification of the fishery/SSL predator prey dynamics.

In several places it is stated that winter is a critical time because it is "cold and stormy" but no data are given to support this anthropocentric assertion.

Amendments to the GOA FMP to mitigate fisheries impacts (pp. 160 to 161).

> 'To reduce competition for prey and avoid localized depletion, the pollock was spread over three areas, ...'

> 'To reduce the potential effect of pollock fishing during the fall and winter months, a period that is critical to Steller sea lions.'

Evidence for these statements is not given, nor is there any peer-reviewed publication in a primary research journal that is given to support these statements.

2.1.2 Contradictions within the document

The discussion of indirect effects on SSL (p. 182, l. 21 to 25) states that:

> 'There is general scientific agreement that the decline of the western population of SSL results primarily from declines in the survival of juvenile SSL, although the available evidence also indicates that reproduction in these sea lions has been compromised. There is also general scientific agreement that the problems probably have a dietary or nutritional cause.'

The authors continue p. 182. l. 27 to 30:

> 'However, as explained below based on the best scientific and commercial information available, the BSAI and GOA groundfish fisheries have likely adversely effected SSL by (a) competing for sea lion prey and (b) effecting the structure of the fish community in ways that reduce the availability of alternative prey.'

On line 40 of the page it states that there is an absence of unequivocal data. Five articles and workshops are cited to apparently back up the contention that there are 'unequivocal data.' The older BiOps are also cited for their statements starting with the BiOp of 1991.

> 'Never-the-less, the 1991 Opinion concluded that the fishery was not likely to jeopardize the continued existence and recovery of the SSL.' (p. 183, l. 2 – 3).

The review continues (p. 183, l. 8 – 10)

> 'In the absence of definitive data or conclusive evidence, NMFS made the following assumptions to address the question of competition in the 1998 Biological Opinion on the walleye pollock fisheries."

Paragraphs labeled 1, 2, and 3 follow, stating that

> (p. 183, l. 14 – 15) local depletions must have been made because the fishery removes tons per day; that for fish species that are distributed in patches, 'the likelihood locally depleting a fish resource increases…' and that if these local depletions occur in SSL foraging areas the effect 'is likely to reduce the foraging effectiveness of sea lions.'

The only data cited were depletions of pollock in the Bogoslof Island Area and in the Donut hole. It would seem though that these are depletions of sub-stocks or separate stocks of pollock. The areas have been closed to fishing for some years in order to rebuild these stocks, and that

they are in no sense evidence for the kind of local depletions envisioned in p. 183, l. 14 – 15. Along similar lines of thought the authors also cited the article by Fritz et al 1995 describing the depletion and overfishing in Shelikof Strait in the late 1970s and early 1980s. Still this is overfishing that occurs over a large area and does not match the description of a local depletion offered earlier on the same page (p. 183, l. 14 – 15). The authors pointed out that sea lion counts on rookeries at the time declined, but failed to recognize that during the later part of the 1980s pollock increased to high levels and sea lions continued to decline, giving a relationship of increasing walleye pollock and decreasing Steller sea lions (the reference for the change in walleye pollock in the GOA is the 2000 GOA SAFE document of the NPFMC).

Section 5.5.6.2 Reviews carrying capacity again, and the relationship to oceanographic phenomena. The authors this time state (p. 188. l. 49 to p. 189. l. 1-2) that:

> 'One cannot distinguish the relative effects of natural (i.e., oceanographic) phenomena from human-related activities (i.e., fisheries) on the availability of prey for sea lions based on the scientific and commercial data available.'

This statement does not seem compatible with former statements (e.g., p. 182. l. 27 to 30) claiming that fishing causes declines in prey availability (also p. 189. l. 5 – 8).

2.2.3 Selective use of data

The BiOp selectively presents available data, using that which supports their prevailing point of view and either dismissing unsupportive studies or refusing to provide information that could weaken their position.

Data from the 1970s and 1980s are used with data from the 1990s without clearly differentiating them. Some older data support the nutritional limitation hypothesis (reduced reproductive success, mortality of juveniles and/or older ages). Recent 1990s data do not support the nutritional limitation hypothesis, at least for adult females and pups.

At the bottom of p. 134 the authors discard the validity of the studies showing that SSL need more than pollock to grow and be healthy:

> "Unfortunately, feeding studies of captive animals provide little more than a general index of consumption rates that are likely in wild populations because captive animals are given diets consisting of single species of fish and have activity patterns that do not reflect those of wild populations. In the wild, pinnipeds probably feed on species that are most abundant within their foraging range and are the most easily to capture. Therefore, no clear conclusion can be drawn from the dietary studies that have been conducted to date.'

Rather than discarding this information, some scientists working on SSL physiology look at this work by Trites *et al* (alluded to in the quote above with out the reference being cited) as a good start on an interesting hypothesis, and are consequently researching the diets of SSL in other ways. However, on page 135 the BiOp authors discuss some other approaches to the questions of dietary adequacy, including citing evidence that mixed diets are associated with healthy SSL (p

135, l. 6 to 18). The point that researchers (cited) are making is that there is evidence that the mix of prey is the key, and that the more pollock dominates the diet, the worse off the SSL seem to be. Still these preliminary conclusions need further substantiation and should not be discarded at this point in time. In several places in Section 5 the authors state that diet, nutrition and foraging are very important. But again they conclude after all this (p 135, l. 23):

> 'Given this information, it is difficult to reconcile suggestions that a diet dominated by walleye pollock could cause the decline of Steller sea lions...'

It seems in this part of the text that the BiOp authors chose to overlook a line of research and so draw a hasty conclusion.

Section 5.1.2 deals with biological productivity. Some of the statements are so general that they are not really interpretable, for example, l. 20 – 23, that

> the productivity of the Bering Sea was high from 1947 to 1976 and reached a peak in 1966, then declined to 1997. That the fish biomass declined by 50% during the later period.

On the contrary, stock assessment documents of the NPFMC indicate that fish biomass increased strongly after 1980 when the management measures brought in with extended jurisdiction brought about a marked decrease in Japanese and Russian fishing with a resulting increase in the biomass of Pacific cod and walleye pollock, and many species of flatfish and rockfish. The effect of the Americanization of the fisheries is totally missed by the authors of the BiOp. The decline in fishing effort due to the establishment of the U.S. Fisheries Extended Jurisdiction coincided with the regime shift of the late 1970s, allowing various stocks of fish to increase in productivity and biomass. The BiOp document says there is 'considerable disagreement' about the biomass changes, but it seems that the authors are merely confused by their readings, not that there is confusion in the publications cited.

The BiOp does allow that 'it is possible that overfishing was occurring' (p. 133, l 35) in the period before extended jurisdiction (before 1977).

At the bottom of p. 133 in stating that,

> 'NMFS believes it is reasonable to conclude that the regime shift created environmental conditions that produced very large year classes of gadids' the text seems to contradict p. 132, line 20 – 24, where the BiOp authors say that the 'productivity reached a peak in 1966.'

The conclusion on the top of p. 134 is erroneous, namely:

> "However because of the historically high catches of gadids before the regime shift occurred, NMFS cannot support the hypothesis that the regime shift favored gadids in a way which would allow them to out-compete other fish species and

> dominate the ecosystem, although the absolute level of biomass is not well known.'

The authors seem to discard the information that the stocks were heavily over fished by foreign nations, and that the high catches in no way represented sustainable catch, but caused a severe decline in many BSAI/ GOA stocks (for a summary of the stocks and their fisheries see Witherell 1999. Status and Trends of Principal Groundfish and Shellfish Stocks in the Alaska EEZ, 1999). That walleye pollock dominated the biomass in comparison to other fishes after the regime shift is shown in the NMFS trawl survey as well (for comparative trawl survey data in one figure, see Tyler, A.V. pages 367 – 385, Ecosystem approaches for fisheries management. Alaska Sea Grant College Program, AK-SG- 99- 01, 1999, L. Wakefield Fisheries Symposium).

It is not the whole truth to say simply (p134, l.10):

> 'From the information available, it seems to reasonable to conclude that gadids (i.e. pollock and Pacific cod) were abundant before the regime shift, and that sea lions relied on them for food before their decline.'

The statement ignores the documentation that the gadids as well as other species strongly increased following the events of the regime shift and the Extended Fisheries Jurisdiction in the late 1970s.

2.2 Alternative Hypotheses

NMFS fails from the outset to separately evaluate the historical causes of the decline in the SSL population versus the current impediments to recovery. Since the latter is the relevant concern with respect to the proposed federal action under review, it represents a significant omission.

BiOp3 finds that fisheries do affect the SSL population and that the most likely mechanism is reduced prey availability caused by local depletion. Alternative hypotheses that could account for the explanation of at least part of the decline are summarily rejected as being insufficient to *solely* explain the entire SSL decline. Therefore, BiOp3 concludes that the fisheries must be significant contributors to the decline. Hypotheses that may be important either in explaining the large decline in the 1980s or the failure to rebuild in the 1990s include:

1. reduced prey availability due to local depletion caused by current fisheries
2. direct removals by humans, such as harvests of adults, of pups, shooting, or entanglement (primarily in the past but subsistence hunts still occur)
3. removals by non-human predators such as orcas and sharks (the "predator pit" hypothesis)
4. changes in nutrition caused by
    a) changes in prey from fish such as herring and capelin to fish such as pollock and cod (the "junk food" hypothesis)
    b) prey changes resulting from the regime shift
    c) prey changes resulting from fisheries.

The SSC recommends that documents prepared by the Council in the future evaluate all of these hypotheses. SSL population abundance in the past, present, and future and the

efficacy of RPAs should be viewed in this light. The true cause(s) of the continued decline and lack of recovery are unknown and may involve more than one of the mechanisms above. The scientific information used for this evaluation should be clearly presented. An attempt should be made to determine the relative importance of these hypotheses, either individually or collectively, in explaining the dynamics of the SSL population in the 1980s and 1990s.

2.3 Global Effects

In its consideration of global effects, BiOp3 contains many criticisms about current fisheries management by NPFMC. The centerpiece of its argument is that "By design, fishing significantly reduces the spawning stock biomass from an 'unfished' level to a 'fished' level." (p.223) An analysis is conducted under a constant recruitment scenario in which historical biomass of groundfish species is reconstructed as if there had been no fishing. After comparing the unfished and fished series, NMFS concludes that prey availability of EBS pollock, cod, and Atka mackerel was reduced under the large reductions scheduled under a B40% policy (p. 225, 229). They further conclude that, "fisheries remove fish from the population before they are 'lost' to natural mortality (e.g. [to] other consumers of groundfish." (p.225). The sum of the unfished biomasses is compared to the sum of the fished biomasses to suggest that the fishery undoubtedly has had large effects on the ecosystem and its composition. The analysis, while interesting, is misleading in that it supposes that constant recruitment is a valid assumption at all biomass levels and that species interactions do not exist. In reality, density dependent effects are likely to occur, especially near the unfished level, so that unfished biomass would not be as large as estimated in the analysis. Indeed, the best available information suggests that density-dependence is a factor in regulating the BS pollock population through the mechanism of cannibalism.

In fisheries management, the use of a B40% policy is exactly the opposite of what the document suggests. Its use has been to maintain stocks at productive levels at or above the MSY level, rather than to significantly reduce spawning biomass to a low level. The historical "fished" record shown in Figures 6.16 and 6.17 supports the conclusion that NPFMC management has not substantially reduced spawning biomass over the historical record. On the contrary, most stocks have either increased or oscillated over the period, unlike many other fisheries in the world that have declined and not recovered. The operating paradigm is that recruitment is the most important factor in determining population trends and the fishery is generally following that trend rather than causing it. This conclusion is even supported by the multi-species analyses contained in section 6.5.3. The erroneous conclusions and misperception in the document are consequences of incorrectly trying to apply a single-species approach to understand multi-species interactions.

In Appendix 3, it is shown that fish biomass is of the order 50 times needed to satisfy SSL feeding. Rather than using that information to dismiss global concerns, BiOp3 torturously attempts to assert that a multiplier of that order is necessary to provide for SSL feeding requirements, even in an unfished environment. Ultimately, NMFS admits that "forage availability ...is adequate to support the recovery of Steller sea lions to optimal population levels"; and, that "..competition as the result of an overall prey removal as allowed by the FMP does not adversely modify critical habitat" (Appendix III, p 2-3). Yet, the conclusion they derive

from this exercise is that "fisheries do compete with non-human consumers" but the competition occurs at the local level (App. III, p 4).

Therefore, the document should have concluded that global catch levels do not seem likely to affect SSLs, and consequently, that there is no justification for altering the current control rule for pollock, cod, and Atka mackerel at present.

2.4 Prey Availability and Competition

There is no information supporting the conclusion that local depletion is now occurring in Alaska's fisheries. The only evidence presented in the document to support local depletion is the Atka mackerel depletion analysis of Fritz (unpublished) described on p.230. The conclusions from this analysis raised the possibility that local depletion had occurred but also acknowledged that other factors could explain the results as well. Nevertheless, the Council took action in 1998 to mitigate the possibility of local depletion and the subsequent BiOp concluded no jeopardy for this fishery. NMFS fails to articulate how their comprehensive view of fishery/SSL interactions invalidates the protective measures that they previously promoted. BiOp3 overreaches by incorrect inference in concluding that local depletion is likely to occur in other fisheries.

BiOp3 incorrectly concludes that competition between SSLs and Alaska's fisheries is occurring. Apparently, the document confuses competition with co-occurrence or propinquity. The fact that SSLs eat fish and the fishery takes fish is not evidence of competition. If sufficient resources are available, then competition is not occurring. Furthermore, contrary to BiOp3, one might even suspect a commensal relationship. The fact that SSLs are often found in vicinity of fishing vessels suggests that they are opportunistic as well as being generalists in diet. If the fishery disperses fish schools, that may make fish easier for SSLs to find. After all, one reason that fish school is to avoid predation. The tradeoff is one that involves the spatial distribution of the fish in relation to the encounter probability as a function of school size.

For direct competition to be present, SSLs and fisheries have to compete for the same prey resources in the same space and time. Next, fishing removals would have to reduce prey density to something less than that promoting efficient SSL foraging. Third, alternative prey would also have to be unavailable at efficient foraging densities. Only then, would we have reason to believe that the interaction deprived individual SSLs of prey. Even if the SSLs were so deprived, the impact to the SSL population would depend on the geographical breadth and duration of the limiting competition. The magnitude of adverse impacts to individual SSL foraging due to fishery removals would be proportional to the likelihood that SSLs encounter the diminished prey field patch. There would have to be a high probability of encounter with the diminished prey field, by a large number of SSLs; since the occasional encounter by few SSLs is unlikely to result in mortalities that cause the persistent decline of a population.

A general issue in this debate is the relative importance of competition (inter and intra specific and with fisheries) in marine ecosystems in relation to predation. The direct effect of one species eating another may contribute more than competition does to population regulation and community structure. Competition for food resources may be of lesser importance because food limitations seem to affect growth more so than survival. There is some evidence to suggest that growth of sea lions changed from the 1970s to the 1980s, so one might speculate that a reduction

in prey availability contributed to growth change. It is less clear that the growth change also translated into an increase in juvenile mortality.

If food limitation contributes to SSL population declines, it need not be through the mechanism of local depletion. Rather, it could be due to nutritional deficits caused by the lack of oily fish such as herring and capelin. Recent work by Andrew Trites suggests that diet diversity may be important as well. The food limitation hypothesis is difficult to accept as the cause of significant SSL mortality. To do so, one would have to envisage the Bering Sea and the Gulf of Alaska as being unproductive deserts from the point of view of SSLs, which is at odds with their opportunistic and generalist foraging behavior.

Resolution of issues related to prey availability and nutrition must await ongoing and new research. As stated above, such research needs to occur across several research fronts that address the competing hypotheses.

2.5 SSL Modeling

Fish population assessment has evolved to a sophisticated science, in which all relevant data sources are brought into the assessment and model parameters are developed to account for the major biological processes. Although multi-species processes are not regularly incorporated, alternative models such as Ecopath are being developed and used to investigate ecosystem trends. In contrast, modeling of the Steller sea lion population ranges from non-existent to minimal. Part of the reason for this is the lack of detailed and consistent age or size composition information and the lack of detailed information on removals. Nevertheless, BiOp3 is seriously deficient in modeling that might help to address the competing hypotheses about the decline. There is neither statistical analysis of the count data on rookeries or haul-outs nor any mention of the uncertainties in these counts or of their extrapolation to the total population. The last assessment by York (1994) is seven years old. It is hard to understand how a population of 40,000 animals can be considered at risk of extinction, and no attempt is made in the document to examine extinction risk. No attempt is made to forecast the population into the future under alternative hypotheses or to reconcile predation with food limitation.

A major flaw of the BiOp is failure to combine all sources of mortality to compare with the current rate of SSL decline. The lack of evidence for nutritional limitation among adult female sea lions and their pups in the 1990s is consistent with mortality-based hypotheses rather than a food-driven hypothesis involving competition with fisheries.

The decline of the SSL population of 15% annually during the 1980s has been brought down to 4% during the 1990s. It is proposed that killer whales and the subsistence kill contribute to this percentage, perhaps accounting for as much as 2% of the rate of decline (p 147. l. 32 to 38.). The analysis of killer whale predation is based on a minimum estimate of transient killer whale population size of 125 and be would be higher if more killer whales exist. Few surveys have been conducted to estimate killer whale abundance from Kodiak Island west. An increase in shark abundance in Alaska in the past decade, coupled to the documentation of shark predation on harbor seals, suggests that potential shark predation studies on sea lions may be worthy of study in the context of sea lion population declines. While the authors of the BiOp do not go further, it seems that they could say that there is only about a 2% mortality rate that is ascribable to other causes. This seems to be an important point that has been overlooked on p. 147. It would

seem that the RPAs are developed to reduce a 2% mortality rate possibly due to competition for food between the commercial fishery and the SSL.

The lack of comprehensive population modeling has hampered the ability to understand the decline in the SSL population and the prudence of additional actions to protect sea lions.

2.6 Experimental Design

One of the best features of BiOp3 is the consideration of an experimental design to test whether management measures are effective. Careful consideration was given to the selection of areas and the number of replicates, and power analyses were conducted to assess the ability of the data collection to test hypotheses. The major limitation of the design is the small amount of contrast between experimental units, because protected areas are so large and catches are limited. Consequently the power may be overstated. It is possible that an alternative design can improve those contrasts while simultaneously reducing some of the expected adverse impacts to fisheries. NMFS should work with the Council, its staff and technical advisors to determine if such a design can be implemented. At the present time, the experimental design is viewed as so draconian by the industry that it will have little acceptance in the fishing community.

The SSC believes that a revised experimental design can be developed within the context of the 2002 RPA. A concerted effort should be made by the Council family to come up with an alternative design that meets the goals of evaluating the efficacy of management measures in a reasonable amount of time, while allowing a viable fishing regime. **The alternative design must follow solid scientific principles, including testable hypotheses, evaluation of assumptions, and power to detect differences in trend.**

2.7 Precautionary Management

The above criticisms notwithstanding, there is simply inadequate knowledge available at the current time to conclude that the fishery is having no impact on the SSL population. Therefore, some level of precaution is warranted, and determining that level will be a crucial task of the Council in the next few years. The failure to use a precautionary approach is clearly evident in the description of the declines in endangered whale and salmon species in chapter 4. It is clear that humans can have large effects on ecosystems and that these effects can be direct (e.g., whale harvest) or indirect (salmon habitat loss from dams).

2.8 Support for RPA management measures

The SSL closures implemented in the early 1990s have not reversed the SSL decline despite having been in effect for a decade. But did they contribute to the reduction in the rate of decline seen in the 1990s? One could equally conclude that these closures were ineffective because they were too small or because the fishery has nothing to do with the SSL decline. The SSC has stated repeatedly that learning can only occur with a valid experimental design that includes contrast in the protection treatments. The failure to have done this a decade ago means that we still have learned nothing about the efficacy of the measures.

The lack of knowledge about the interaction of fisheries and SSLs hampers any reasonable attempt to develop precautionary measures. **Therefore it is impossible to evaluate the temporal and spatial dispersion component of the RPAs in BiOp3.** Unintended consequences

of management measures to disperse fisheries in time and space could easily occur without knowledge of fishery/SSL interaction mechanisms. Hopefully the additional monies made available by Senator Stevens will be wisely used to increase the knowledge base. The answers to difficult questions about indirect effects will not come easily in a short period of time. **Nevertheless, the need for a comprehensive scientific program that addresses multiple hypotheses has never been greater.**

Efforts should be made to better define critical habitat using ecological aspects of SSL life history. One focus should be to examine the seasonality of rookery, haulout, and foraging areas, so that management measures correspond to critical times and life stages in SSL life history. Seasonality of use of rookeries and haulouts is important to determining the potential for interactions with fisheries. Rookeries are usually used mid-May to fall but some are also winter haulouts. Some haulouts are used year-round, and some are occupied for very short time periods, such as during a seasonal fish run. The 1998 RPAs distinguished winter or summer use of haulouts, but BiOp3 does not distinguish seasonal use. Another focus should be to determine if the relative importance of some of these areas has changed and no longer need to be part of the protected and legally designated critical habitat.

2.9 Carrying Capacity

The debate about SSL declines frequently involves the notion of carrying capacity, which often is not well defined. BiOp3 incorrectly states that SSL carrying capacity is related primarily to prey availability (p.61-62). It seems to misunderstand that the cumulative changes in reproductive parameters, juvenile and adult survival, growth, prey availability, and predator populations may all contribute to changes in the SSL carrying capacity over time. Human activities may contribute to the changes in population parameters, and hence to fluctuating carrying capacity. **The SSC recommends that the best way to understand the changes in SSL carrying capacity is to concentrate on the individual processes such as prey availability, foraging behavior, and predation that are amenable to scientific study.**

2.10 Jeopardy

It has been quite difficult to follow the logic of any of the BiOps with regard to their jeopardy findings. **There is a need for scientifically-based and objective definitions of "jeopardy", "critical habitat", and "adverse." In addition, there should be unambiguous criteria for assessing when jeopardy and adverse habitat modification are occurring.** These criteria would presumably be a function of the size of the sea lion population, the size of the populations of important fish species, the fisheries management regime and its changes, and new knowledge or research findings related to the connection between fisheries and the SSL population.

2.11 Future Independent Comments and Reviews

The Council will have a short-term review team and the long-term NAS committee panel assisting it in the next year or two, as well as an internal RPAScommittee. The SSC suspects that one of the most beneficial duties of the short-term review panel would be to assist in the scientific aspects of developing the experimental design component of the Council RPA. Other valuable contributions could be made regarding the overlap between SSLs and fisheries in size, season, depth, and prey, a new population dynamics/prey availability model for SSLs, or developing biological criteria for critical habitat.

The NAS committee, being drawn from a large variety of disciplines, could also contribute substantially to the experimental design. However, its major role should be to provide a big-picture view of the factors affecting SSLs, including the role of human activities. This committee should provide a forward-looking report, that suggests the type of research programs and management measures that advance our understanding while avoiding unintended consequences of harm by human activities.

4.0 Preparers

The members of the NPFMC's SSC prepared this report.
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Appendix. **Specific line by line comments of BiOp3 by SSC, February 2001.**

Originally, the SSC did not intend to give line by line criticism of the document but finally did so (see appendix) because, as we have remarked several times, assumptions are being stated as fact, scientific opinions are expressed without sufficient support, and, in general, the content is so contradictory and unclear that it would be remiss for us to let them pass. In the historical record, there should be ample documentation of the flaws in BiOp3. In this context, we deplore the practice of uncritically lifting whole sections of this or past BiOps for use in council analyses (e.g., Cod sector apportionment) and subsequent BiOps. There were many examples in BiOp3 of citing and quoting previous BiOps which themselves had controversy and criticism.

The Biological Opinion follows an outline prescribed by ESA. Sections 1-3 provide introductory information on the purpose of the consultation, description of the proposed actions, and definition of the action area under consideration. Subsequent sections provide the meat of the arguments in support of the opinion. Section 4 provides a description of the listed species, including life history information, species distribution and population trends. Section 5 is a description of the environmental baseline, and includes historical catch, climate variability and impacts of fisheries. Section 6 describes the presumptive effects of the federal action under review. Within Section 6, NMFS presents the base hypotheses for adverse effects of fishing on SSLs. Section 7 looks at the ancillary impacts of state fisheries, Section 8 concludes the findings, and Section 9 introduces the Reasonable and Prudent Alternatives (RPAs) to the proposed action. Much very useful information is provided in the BiOp and NMFS should be applauded for their efforts to summarize diverse sources of data.

Section 2: Description of the Proposed Action

P. 26, lines 1-13.
It is incorrect to use survey CV to represent the uncertainty in stock assessment, which is a function of several other information sources.

P. 26, lines 17-23.
The use of the word "simulated" is unfortunate in that it suggests that the model is an inaccurate representation of reality and that the data are measured without error.

P. 29, line 33.
In spawner-recruit modeling, a density-independent process is one in which recruitment is proportional to spawning stock, because early-life survival is constant. Constant recruitment is an example of density-dependence, because survival must be inversely proportional to spawning stock (or egg production).

P. 29, line 41.
Recruitment is not the only process treated as stochastic in assessment models.

Section 3: Action Area

P. 60, line 9-12
There is no citation for statement that herring, salmon, Pacific cod and pollock are species found year-round in the diet of SSLs. Herring and salmon are more frequent in summer based on scat samples 1990-98.

P. 61, line 35-36
Loughlin and Nelson 1986, Perez and Loughlin 1991: Shelikof Strait is an important feeding site. This conclusion is based on the incidental take of SSLs during the mid to late 1970s when the pollock population had boomed and when fishing generated substantial discard of pollock carcasses. The significance of Shelikof Strait as a feeding area should be reevaluated with more recent sighting data. The Bogoslof and Sequam foraging areas utilization by SSLs should also be updated.

P. 61, line 38.
The implication that the Bogoslof area historically supported a large aggregation of spawning pollock is inaccurate. This aggregation was mainly the product of the 1978 year-class.

Section 4: Status of Species

P. 81, line 28-43
It is assumed that female nutritional stress is implied by the length of the nursing period. Note, the BiOp says "*the length of the nursing period is an important indicator of female condition*"; the criteria for indication of female condition are unstated. There seems to be an indication that unstressed or good condition animals will continue nursing juvenile SSLs, consequently, a shortened nursing period would indicate stress. Pups are normally nursed until March-April. There are no citations to indicate observation of shortened nursing periods.

P. 83, lines 37-44.
This paragraph shows that the hypothesis that juvenile survival has decreased is based on limited information on age distribution in the 1970s and 1980s. The life tables contain no information on statistical confidence of the estimates, and it is not apparent from the values that major changes occurred. There is a clear need for better information on age structure and juvenile survival. Apparently there is supporting information from a mark-recapture study, but no details are given in BiOp3.

P. 87, lines 1-13.
One of the figures was missing from the document (there is only a figure 4.2, not 4.2a and 4.2b), and the year range in text does not agree with the figure. Further comparisons of foraging range by decade might be useful here.

P. 90, line 23-28
Regarding SSL bathymetric distribution (see figure 4.3), the text emphasizes maximum dive depths, and makes no mention of mean or modal depth.

P. 91, line 20-29
Regarding stomach contents, the text cites an increase in the presence of gadids from the pre-1980s to the 1980s, based on 781 stomachs containing prey. Using information from Table 4.2 which summarizes studies citing SSL stomach analyses, 1) it is possible to account for 713 sampled stomachs rather than 781, one of the listed studies (Frost and Lowry, 1986) does not identify how many stomachs sampled actually had identifiable contents and two of the studies are from the extreme western end of the SSL range and outside the action area; 2) sample size is small in the pre 1980s in the EBS, but large for the GOA, 3) there are only 2 studies cited in the GOA in the 1980s and one looks as though it may be compromised by SSL either feeding in the trawl net or feeding on discarded pollock. While the inference of increased consumption of gadids may be correct, due to limited samples the stomach sample data represent weak support for this observation.

P. 91, line 41-42
NMFS assumes that scat remains under-represent the size of prey consumed since small items pass through the digestive tract much more readily than large items. It is unclear if this statement implies that the prey size distribution is biased high or low; furthermore, it implies bias in the frequency of occurrence calculation for the same reasons. For example fish with large versus small otolith may be differentially represented in the analysis. So, how are we to interpret scat analysis? How large does a body part have to be to become differentially represented in the scat analysis?

P. 91, line 47-48
NMFS assumes scat remains are "*a reliable tool for monitoring seasonal and temporal trends in predator diets*". Seasonal and temporal trends are inferred from the aggregated species composition of prey from samples taken over multiple sites. However, Fig. 4.7a,b reflects a site-to-site variability among primary rookeries sampled for scat in both winter and summer. Moreover, the site-to-site reliance on particular prey should be correlated with SSL population abundance, i.e, are the more dependent sites those with more or fewer SSLs. The question arises to what degree predation on Pollock, Pacific cod and Atka mackerel is localized to specific sites and seasons?

P. 92-93, line 48-49, line 1
Pacific cod are reported to be a significant prey item during winter in the GOA, and we are referred to Fig. 4.7. There are some inconsistencies between figure 4.7a, 4.7b and tables 4.5a and 4.5b. The tables report a much larger sample size than the figures. Doug DeMaster (personnal communication) reports that the Figures represent a select subset of scat. The subset represents primary rookeries where there was both summer and winter scat samples. Tables 4.5a,b reports observations from all sites regardless of whether on not that site had both summer and winter samples.

P. 93, line 33-34
Pacific cod was shown to be a top prey item (FO=12%) in stomachs collected in the GOA from 1973-75 (Pitcher, 1981). Actually, pollock, squid and herring were the top three prey items by FO, Pacific cod ranked 5th according to table 4.2.

P. 93, line 47-49, and P. 94, line 1.
Prey size for SSL is reported to overlap with size of fish taken in the fishery, but the "*overlap could not be quantified in a manner that resulted in a precise statement of overlap.*" However, Table 4.2 summarizing stomach analysis for SSL, reports at least 5 studies where size of pollock consumed by SSL was reported. Four of these studies had larger sample sizes (43-153 stomachs) Pitcher, 1981; Frost and Lowry, 1986; Calkins and Goodwin, 1988; and Calkins, 1998. Mean size of prey consumed was approximately 27 cm in these studies, with a CV of about 40%. Larger prey was reported for 2 stomachs sampled by Frost and Lowry (mean 47 cm, range 18-61 cm), and for 36 stomachs sampled by Loughlin and Nelson, 1986. The latter study appeared to be biased by SSL feeding in the trawl net or on pollock discard. Nevertheless, prey mean size was 41 cm with a range of 30-52 cm. These data could easily be compared with the mean size of fish caught in the current pollock fishery.

P. 95, lines 29-49.
This was a useful and balanced synthesis of foraging knowledge.

P. 96, line 15-17
The following quote concludes section 4.8.6 (Steller sea lion foraging behavior): "*Competition occurs if the fisheries reduce the availability of prey to the extent that sea lion condition, growth, reproduction, or survival are diminished, and population recovery is impeded.*" The only relevant conditions in the competition framework above are the reduction of SSL survival or reproduction. Impacts on condition and growth cannot be shown to have direct effects on recovery unless they are affirmatively correlated with survival and reproduction. Attributing the fishery as a causative factor in the change in survival and growth is nearly impossible to prove and equally difficult to dismiss. Regardless, claiming a link does not make the claim true.

P. 97-98, section 4.8.7.2: Free-ranging studies [of sea lion physiology]

> P. 97, line 31-36
> H_o [1]: "*Pups, less than one month of age, were nutritionally or physiologically compromised such that they may be unable to survive the nursing period.*" Result: Blood chemistry and body morphology show no indication of nutritional stress. (Rea et al, 1998).
>
> P. 97, line 48-49
> H_o: [Implied] Blood chemistry and morphometrics of sea lions from declining populations would be significantly different from those of the stable population. Results: Sea lions from the western population were rounder, longer and heavier than those in the east. Animals from the western population had greater body fat, and there was no evidence of nutritional stress from monitored blood chemistry.

[1] H_o is shorthand for hypothesis, H_a is additional shorthand for alternative hypothesis

P. 98, line 9-23
H_o: [Implied] New born pups from a declining and stable SSL population would show significant differences in milk intake and female milk content and energy would be significantly different. Result: No differences.

P. 98, line 34-38
H_o: [Implied] There is no difference in blubber thickness and heat loss between stable and declining populations of SSLs. Result: Preliminary results suggest that pup and adult female blubber thickness is lower in the west, however, heat loss was less distinct. This is the result of ongoing unpublished studies. The phrasing of these results makes them appear rather equivocal. *"Results suggest ...", "were not distinct"*. Sounds like, we think there is something there but can't tell for sure.

Overall, the physiological studies are overwhelmingly unsupportive of the nutritional stress hypothesis.

P. 97, line 1-27
1) Six-week old pups showed evidence of rapid metabolic adaptation to fasting, but were unable to sustain protein-sparing metabolism. The implication of this observation is that pups lowered their activity rate, but lost weight by oxidizing protein reserves.
2) Digestive efficiencies were positively related to prey energy content but unrelated to meal size or feeding frequency. The implication here is that given all they could eat, sea lions lost weight due to prey quality.

The ecological implications of these types of adaptations is that during a low calorie prey regime, SSL metabolic rate would drop, growth would decline, maturity could be delayed, spontaneous abortion rates increased, and age specific survival rates decline. The population would then seek a new equilibrium level of abundance consistent with their lowered productivity.

P. 99, lines 17-37.
This section attempts to rationalize the lack of significant results from physiological studies. The assertion is that only healthy animals arrive at the rookeries [where most sampling occurs], therefore, comparative studies are compromised; or that relatively few animals would be nutritionally stressed, so that the probability of sampling one would be remote.

If there are few compromised animals to sample, then the impact of the fishery if any would have to fall on those few. If the probability of encounter is small for physiology sampling, or if they represent a small fraction of the overall population, then their probability of interacting with the fishery should also be remote. It doesn't seem reasonable to argue that there are few affected sea lions and simultaneously argue that those animals are more likely to interact with fisheries.

P. 102, line 15-16
There is a reference to standardization of count data based on unexplained ratio-estimate corrections. The document cites Braham et al. 1980, and asserts that counts since the 1970s are most comparable. There is no explicit description of the standardization algorithm, or the

consistency of the ratio estimates used to correct missing data. Neither is there an explanation of the adjustment factor for animals in the water, its basis or test of validity.

P. 102-103, lines 45-49,1-3
The document summarizes the rate of decline in population numbers (non-pup counts). NMFS points to dramatic percentage drops in population, particularly from 1989 to present in some regions. Data presented in Table 4.6 can be transformed using natural logarithms and the rate of decline estimated with simple linear regression. By region the regression estimates are significant for all areas when using all data. The regional rate of decline for the western population averages about 7.7% and ranges from 4 to 11%. In the 1990s (1990-2000), the regression estimates are not significant (at 0.05 level) in the EAI and SEAK. For the overall western population (sum of all counts other than SEAK where count data were available for every region) that rate falls to 5% in the 1990s. The eastern population shows an increase of 1.6% annually for data from all years surveyed.

P. 103, line 5-12
There is a discussion of pup counts, but no tabular data provided. Why is there no time series of data on pup counts?

P. 103, lines 1-20.
The lack of a formal trend analysis using regression techniques is puzzling. How is uncertainty in repeated counts handled? Has there been any attempt to include covariates related to season, time of day, or tide? Recent work by ADF&G on harbor seals in Prince William Sound showed that trends in counts are inaccurate if covariates are not included. (In that case, the corrected trend was more negative than the uncorrected trend.)

P. 104, line 41-49, and P. 105, line1
Population projections: cite the work of York, et al 1996 and highlight the risk of continued stock decline. The problem here is that the population rate of decline is reduced by at-least a third and closer to a half of what it was when York did her study. Consequently, the risk of continued decline and ultimate extinction is substantively lessened. The Biop should have updated the population projections.

P. 127-128, line 47-49, line 1-3
Critical habitat extends out 0.9 km seaward of rookeries and haulouts in the eastern population of SSLs while it extends 20km in the western population.

P. 128, line 48.
Its arguable whether prey resources are the most important feature of marine habitat. The necessity of land habitat for breeding, molting, and birth seems as important as foraging.

P. 129, line 17-19
Regarding designation of critical habitat, the document says that "*areas around rookeries and haulouts must contain essential prey resources for at least lactating adult females, young-of-the-year, and juveniles*". Juveniles are cited elsewhere as SSLs <5 years of age; so, one can conclude that we must assure accesses to prey species in the preferred size range, bathymetric range, and

spatial distribution of juveniles, and lactating females. Juveniles feed predominately in shallow water, consume prey of small size and remain close to shore. This shifts the focus to lactating females, which nurse from July-April. Although data were not provided in the BiOp, supplemental figures (distributed to SSC members in December), from satellite telemetry suggest that monitored SSLs are found predominately within 20 nm of rookeries and haulouts. Furthermore, a cursory evaluation by eye, suggests that at least 50% of the time are they are within 10 nm of haulouts.

P. 129, lines 24-26.
The information on Shelikof Strait suggesting it as an important foraging area is dated. Given the declines in Gulf pollock, how important is it now?

Section 5: Environmental Baseline

P. 132, line 14.
This sentence is overstated: some researchers have suggested a regime shift in 1989 but it is by no means "indicated".

P. 132, lines 28-30.
This sentence is not quite right. While there is evidence that the regime shift has on average increased the recruitment of many groundfish species, it is also true that interannual variations are important, particularly for Bering Sea pollock.

P. 135, lines 14-26.
Analysis of diet composition based on proportions is limiting, in that the size of the species is not taken into account. The arguments about diet diversity do not appear to utilize recent information that diet for the western Aleutians population may not be very diverse. The approach taken here seems to be to accept the hypothesis that SSLs can survive on a pollock diet and to reject all alternate hypotheses (e.g., the junk food hypothesis).

P. 134, line 18-21
NMFS quotes Shima, et al 2000, "*...larger size and restricted foraging habits of SSLs, especially for juveniles that forage mostly in the upper water column close to land, may make them more vulnerable than other pinnipeds to changes in prey availability.*" NMFS apparently accepts Shima's point of view. In doing so, they implicitly acknowledge two things: juvenile SSL forage close to shore making shallow dives, and the availability of prey [during the regime shift] had changed. Still in dispute is what provoked the change in availability: natural environmental events or fisheries.

P. 135, lines 13-26
H_0: SSL diet is similar for western and eastern populations and dominated by Pollock.
Evidence: Table 5.2. This table is hard to review because the sources of the stomach contents data are not cited. It appears to rely on 4 papers: Pitcher, 1981, Calkins and Pitcher 1982, Calkins and Goodwin, 1988 and Merrick and Goodwin, 1996. Summary information from these papers, provided in Table 4.2 is not entirely consistent with table 5.2. The hypothesis promoted by NMFS relies on observations from 14 stomachs from SEAK to generically conclude that diet for

the two sub-populations is similar. NMFS has provided a service by summarizing available data, but they should have been more circumspect with their conclusions.

The logic of NMFS argument that similarity of diet between eastern and western SSL populations bolsters their case for negative fisheries interactions in the western population is very difficult to follow. If SSL diet is as similar as suggested and if the eastern population is prospering, then why isn't the western population also prospering? One cannot simultaneously protest that Pollock availability is inadequate and jeopardizing recovery of the western stock, while highlighting a thriving eastern SSL population that ostensibly consumes prey with the same species composition and frequency of occurrence.

P. 135, lines 43-48
A series of hypotheses to explain the disparity in population trends for eastern and western stocks of SSLs:

> H_o: Eastern and western SSL stocks have different physiologies resulting in different responses to diet. NMFS argues (P. 136, lines 1-8) this is "*unlikely given the overlapping digestive efficiencies of various pinnipeds on diets of Pollock, herring and other food items.*"
>
> The hypothesis asserts that physiology is different implying one stock assimilates adequate nutrition from the same diet that provokes increased mortality in the other. The argument suggests that there is a big overlap in digestive efficiency among species so; there must be overlap within a species. However, it does not dismiss the notion that even with overlap, there can be serious differences in the central tendency of the response.
>
> H_o: The western population diet has been differentially altered by the regime shift. NMFS says (P 136, lines 10-37) this is possible but unlikely due to 1) a historical dissimilarity in response to a prior regime shift, 2) the resilience of long lived species to normal environmental flux, and 3) evidence of similarity of diet implying other unknown factors contribute to the decline.
>
> The comparison of response to different regime shifts is completely spurious. One would not expect the same response to opposite environmental events (warm to cold versus cold to warm shifts). The resilience argument downplays an environmental change beyond the "normal" fluctuation. Regime shifts are notable by the dramatic change in state variables over a prolonged period of time. Ecologists are well aware of theory that suggests populations experiencing significant change in controlling domain variables can alter their equilibrium position toward a new higher or lower population steady state. SSls may be demonstrating such a response. Lastly, the evidence for similarity of diet is presented in the BiOp but it is weak.
>
> H_o: Undetermined environmental changes, provoked by regime shift, caused the decline of SSLs. NMFS argues (P 136, line 39-46) that it is unreasonable to expect large scale declines in population abundance of 80-90% as a result of oscillating environmental conditions.

> We really don't know the magnitude of the change in the SSL population from one environmental steady state to the next. For example, we don't know what the mean population size was during prior regime shifts. There are insufficient historical records to document a steady state SSL population of 200,000 animals. Therefore, the magnitude of population decline observed over the last 40 years does not necessarily represent the change in equilibrium dynamics that are considered so unreasonable. In the same way Pollock bloomed following the regime shift, SSLs may have bloomed prior to the regime shift, their "true" equilibrium population size could be lower than the number estimated for the population in the late 1960s. The fact of the matter is we just don't know this dynamic, so we have nothing upon which to scale our expectation.

P. 136, lines 10-14.
This argument seems to ignore that the transition of a warm to a cool phase could have benefited sea lions.

P. 137, line 12-14
"*NMFS believes that the cause of the continued decline of SSLs is not solely a function of the regime shift, and that other factors such as fishing, predation, and harassment are also likely contributors to the decline.*" This perspective is reasserted on P. 138, line 9-11, and elsewhere in the opinion.

P. 138, lines 5-13. The conclusion that "*it is highly unlikely that natural environmental change has been the sole underlying cause for the decline of SSLs*" is overstated. There is insufficient information to make this strong of a statement.

P. 138, line 24, 28-29
H_o: "*Killer whale predation on SSLs has likely been a considerable source of natural mortality for the species.*" Given the SSL population decline, "*it is likely that the impact of similar levels* [to those occurring in the 1970s] *of killer whale predation is more significant today and may be affecting the* [SSL] *species ability to recover.*"

When challenging the findings of Barett-Lennard on killer whale predation, NMFS admits the possibility that SSL carrying capacity has been reduced due to environmental change. NMFS says, "*the underlying population model for SSLs needs to be revised to account for the possibility of density dependent effects in seal lion dynamics* [presumably birth rates??] *due to a reduction in the carrying capacity of the environment for SSLs.*"

P. 138, line 25-26
The text reports that the SSL population was about 200,000 animals in the 1970s. Note, in section 4.8.12, P 102-3, there is no mention of absolute estimates of population size only counts at index areas. It is recorded that count data was only standardized in the mid-70s. So, the 200,000 animal figure is clearly an extrapolated estimate of abundance which tries to take into consideration the number of animals at sea compared with those counted on land.

P. 140, lines 16-37.
This was a good analysis of the effects of Orca predation on SSL mortality. This type of analysis should be blended into a comprehensive SSL population model that concurrently examines other sources of mortality.

P. 143, line 30-44
H_o: Commercial harvest of adult SSLs had no meaningful impact on decline, but harvest of pups from 1963-1972 did have local effects that persists through the 1980s.

The treatment of the pup mortality is brief. Glaringly absent is the impact this may have had on Calkins and Pitcher's demographic data from Marmot Is. These data are the basis for the often-cited modeling work of York et al. Pup harvests could have been a significant factor in the loss of juveniles noted by York. This should be evaluated and explained.

P. 147, lines 24-38
"*...taken together in time and location, a case can be made for significant effects* [in the decline of SSLs] *as a result of the pup harvest, shooting, and incidental take* [in commercial fisheries] *in the early years of the decline in the eastern AI and GOA*". This statement seems to be forgotten when effects of the fishery are discussed in Section 6.

P. 174, lines 11-22.
The statement that "*time may be essential to the survival of animals such as SSLs*" is overreaching. There is no evidence presented that the herring fisheries are precluding SSLs from foraging. Given the gregarious nature of SSLs around commercial and recreational vessels, the authors are probably barking up the wrong tree.

P. 175, lines 46-47
Intentional take between 1960 and 1990 is estimated at 34,000 animals (Alverson, 1992). NMFS says, "*The loss of that many animals would have an appreciable effect on the population dynamics of sea lions, but the effect would not account for the total decline of the western population.*" NMFS accounts for a loss of some 85,000+ animals by unintended incidental take, intentional take, sanctioned harvest of adults, and subsistence harvest, not to mention 45,000 pups lost through sanctioned takes, but none of these events singularly accounts for the decline in the population.

P. 176, line 6-7
NMFS says, "*Sea lion populations appear to be growing slowly in southeast Alaska, where considerable commercial fishing occurs.*" Missing from the BiOp is a contrast between the incidence of fishing in proximity to SSL haulouts and rookeries in the recovering population versus the pattern observable in the declining SSL population. How many fishing days are expended within specific distances of rookeries and haulouts in each locale? What is the fishing exploitation rate? What is the difference in standing stock biomass per unit area in the declining and stable populations? Why is one stock increasing and not the other? To date the principle hypothesis cited to explain these population differences is diet diversity.

P. 182, lines 28-30

H_o: "*BSAI and GOA groundfish fisheries have likely adversely affected SSLs by (a) competing for sea lion prey and (b) affecting the structure of the fish community in ways that reduce the availability of alternative prey.*" NMFS does not explain the mechanism that links the assumed competition to SSL mortality. Do they believe that SSLs are starving as a result of this competition, or are they simply more vulnerable to disease and predation?

P. 182, line 32-37

Questions related to competitive interactions between fisheries and SSLs (Lowry et al. 1982)

1. Does the fishery affect the diet of SSL?
2. Do any changes in diet compromise the condition of individual animals?
3. Are any changes in condition sufficient to reduce growth, reproduction or survival?
4. Are any changes in reproduction or survival sufficient to have significant population effects?

"*Unfortunately, the data required to answer these questions is unavailable or equivocal.*"

NMFS argues that the fishery affects availability of Pollock, Atka mackerel and P.cod. They show that Pollock was important in the diet in the 1970s and is important today, implying no change in feeding habits of SSL at-least based on frequency of occurrence. So, the fishery must not be sufficiently intrusive to change the diet of SSLs; Question 1 can be answered, No!

Tests for significant differences in SSL physiology between recovering and declining populations predominately indicate no detectable differences in those factors implying stress. Power of the test may be too low to accept the no difference hypothesis however. The answer to Question 2 is a qualified No, but could be a "Can't Tell". Minimally, the "best available scientific evidence" has been unable to corroborate the nutritional stress hypothesis.

Clearly, some events in the lives of SSLs have changed growth; animals are reported to be smaller at age and leaner than in the past. There is no substantive link between the fisheries and the SSL reduced growth rates. Environmental changes in prey availability via the "junk food" hypothesis could account for the same observation. The answer to Question 3 is YES, but the specific cause of the growth change remains unknown.

Question 4 may be answerable, but not with data provided in the BiOP. It is a demographic question, and there has been little demographic data gathering or reporting.

P. 182, lines 42-43

Pivotal papers cited as evaluations of SSL and fishery competition:

Loughlin, T.R. and R.L. Merrick, 1989. Comparison of commercial harvest of walleye pollock and northern sea lion abundance in the Bering Sea and Gulf of Alaska. Proceedings of the International Symposium on the Biological Management of Walleye Pollock.

Alverson , D.L.1992. A review of commercial fisheries and the Steller sea lion (*Eumetopias jubatus*): the conflict arena. Rev. Aquat. Sci. 6:203-256.

Trites, A.W. and P.A. Larkin, 1992. The status of Steller sea lion populations and the development of fisheries in the Gulf of Alaska and Aleutian Islands. A report of the Pacific States Marine Fisheries Commission pursuant to National Oceanic and Atmospheric Administration Award No. NA17FD0177. Fisheries Centre, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z4

Ferrero, R.C. and L.W. Fritz, 1994. Comparisons of walleye pollock, *Theragra chalcogramma*, harvest to Stellar sea lion, *Eumetopias jubatus*, abundance in the Bering Sea and Gulf of Alaska, U.S. Dep. of Commer., NOAA Tech. Memo. NMFS-AFSC-43.

P. 232, line 17—add the following

Fritz, LW., R.C. Ferrero, and R.J. Berg. 1995. The threatened status of Steller sea lions, *Eumetopias jubatus*, under the Endangered Species Act: Effects on Alaska Groundfish Fisheries Management. Mar. Fish. Rev. 57:14-27.

Fritz, L.W. and R.C. Ferrero. 1998. Options in Steller sea lion recovery and groundfish fishery management. Biosph. Conserv. 1:7-20.

P. 183, lines 9-35

Key assumptions regarding fisheries and Steller sea lion competition: (from 1998 Biop)

1. Abundance of any species in space and time is finite.
    a. Fishing reduces the biomass of the targeted fish remaining in the ocean.
    b. Fishing induced reductions in biomass increase in area and duration as fishing effort increases.
2. Patchily distributed resources are more likely to be depleted.
    a. Walleye pollock and Atka mackerel populations are patchily distributed.
    b. Fishing diminishes pollock and Atka mackerel biomass at least temporarily.
3. Fishing removals of pollock and Atka mackerel within Steller sea lion critical habitat diminish the foraging effectiveness of Steller sea lions.
    a. The impact of the fishery increases with the duration of fishing
    b. Adult female and juvenile SSLs are most affected by fishing during winter.
    c. SSL food shortage is exacerbated by intense pulse fishing.

P. 183, line 45-49

Evidence of local depletion of walleye pollock "possibly " due to fishing: 1) Bogoslof Island; 2) the "donut hole", and 3) Shelikof Strait. Fishing at Shelikof Strait is highlighted as a strong example of localized depletion. The following facts are noted with respect to Shelikof Strait (P. 184, lines 1-9):

1. A large spawning biomass was discovered in the late 1970s
2. Catch increased from less than 100,000 mt to 300,000 mt
3. Exploitable biomass declined from 3 million to less than 1 million mt by 1993.
4. During the pollock biomass decline, sea lion counts on nearby rookeries showed dramatic declines.
5. Sea lions showed signs of reduced growth rate.

In the 1960s pollock catch in the GOA averaged about 7 kmt [2]. Catch began to rise in 1972 reaching 112 kmt in 1977. It averaged 100 kmt for the next 3 y, and then began to climb peaking at 307 kmt in 1984. From 1972-1976, utilization rate (catch/biomass) averaged 3.1%, from 1977-1980 it was 4.1%, from 1981-1985 it averaged 8.0% peaking in 1985 at 14.2%, and since 1986 it has averaged 7.6%. Total stock age 3+ biomass rose from 1 mmt in the 1970s to almost 4 mmt by 1981-82. Since that time, biomass declined remaining near 1 mmt through 1997. Since 1997, biomass declined to 0.6 mmt in 2000. The low fishery exploitation rates are not regarded as responsible for stock declines; natural mortality and poor recruitment were the driving demographic factors during the decline. Causes for the low recruitment seem to be environmental. SSL declines and low growth rates are coincidental to the biological events driving pollock abundance. As noted by the exploitation history, on average, more than 92% of the pollock biomass remained accessible to predators; moreover, exploitation on fishes less than 3 y old was nearly zero.

P. 184, line 37.
Size selection by SSL (juveniles?) and the degree of overlap in sizes taken by the fishery and SSL. Points out the numbers at a given size have to be converted to weight consumed.

P. 185, line 13.
Points out that there is a need to look at the depth of fishing compared to the depth of feeding by life stage of the SSL.

P. 185, line 27.
States that winter is a more difficult time because it is cold and stormy, which would cause greater metabolic demands. But there seems to be no data to support this. It is only a hypothesis, and so should be the subject of scientific inquiry.

P. 186 and 187
Hypotheses are developed regarding the needs of nursing, weaned pups, and the nutritional value of pollock by size and season. NMFS again states the hypothesis that winter may be more difficult for SSL but points out that spring and fall also produce stresses for survival of SSLs.

P. 187, line 4-8.
'Interactive competition ' is defined as interference and disruption of SSL activity by the fishery agency. NMFS concedes that interactive competition between the fishery and SSL '*can not be evaluated with the information currently available.*' (P. 187, line9-10)

This page again discusses the problem of detecting 'local depletion' in relation to fishing, but it also recognizes that trawling can waste fish and release large quantities of freshly killed fish into the water, giving the nearby SSL an opportunity to feed.

P 187, line 34-39
H_o: Trawling strategies likely alter schooling dynamics and important features of target schools: their number, density, size, and persistence. This is the so-called "gap in the prey field"

[2] kmt is thousand metric tons, mmt is million metric tons

hypothesis. NMFS points to the strategy of fishing as evidence that school density is altered by fishing.

There are no citations of studies of pollock, Atka mackerel, or Pacific cod school abundance changes resulting from fishing. It is logical to conclude at least a short-term, spatially isolated change in school density resulting from fishing. Nevertheless, we are ignorant of SSL feeding preferences, i.e., we don't know whether SSL prefer to feed on tightly schooled or dispersed fishes. We don't know what threshold density the prey base has to assume for successful SSL foraging. So, the hypothesis for indirect competition through disruption of fish schooling behavior is entirely speculative, without any supporting foundation. Anecdotal observations suggest that SSLs forage successfully around active fisheries. Loughlin and Nelson (1986) documented it.

P. 188, lines 3-16.
These two paragraphs are an illustration of the authors' acceptance of their null hypothesis that fisheries compete with SSLs despite the lack of any compelling information for competition.

P. 188, line 20-21.
Text again discusses availability of prey: "*The available evidence suggests that a significant part of the problem is the availability of prey.*" Yet, in chapter 5, evidence has not been well laid out and has not been critically discussed.

P. 188, line 26-28.
NMFS again brings up the importance of the increased juvenile mortality in explaining the population declines and cites references that substantiate juvenile decline.

Section 6: Effects of the Federal Action

P. 198-99, line 49, and line 1
Purpose of Section 6: "*This section will assess the FMPs and the FMP process* [by considering unsuccessful SSL predation on fish]". We have no idea what this means.

P. 198, lines 13-28
H_o: [Implied] Fishing induced localized depletion of the SSL prey field results in a competitive niche overlap between the fishery and SSLs adversely affecting SSL foraging.

NMFS alludes to sympatric distributions of predators separated in their niche overlap by selective preferences for prey. Sympatric populations occupy the same geographic space but can segregate themselves based on the species composition of their prey on the size composition of prey, or on the temporal/spatial distribution of feeding behaviors (night/day; upper water-column/lower water-column). None of these elements are objectively evaluated when contrasting fisheries and SSLs.

P. 198, line 13-14.
Definition: Localized depletion. "*A reduction in prey availability that adversely affects the foraging efficiency of a predator dependent on that particular prey field.*"

To implement this definition, we need to know 1) prey density supporting efficient predation, 2) the change in prey density as a consequence of fishing, 3) the likelihood that a) any SSL will encounter the diminished prey field, and/or b) that SSLs of a vulnerable age or size class will encounter the diminished prey field; and 4) adequacy and availability of alternative prey given the diminished prey field for the fished stock. Any adverse effects on SSL foraging would have to persist in time to result in increased SSL mortality.

Undefined (P. 198, line 20-21): Competitive niche overlap. An implied definition includes spatial, temporal, trophic and "other factor" overlap between competitors. The SSC asked NMFS to try to quantify competitive niche overlap in our September 2000 minutes when we raised the issue of the "Probabilistic Approach to Fishery/SSL Interaction." The BiOp makes no attempt to do so.

P. 202, line 26
There is a citation, NMFS (2000), that relates to the estimation of "*monthly average prey availability for SSL within Critical Habitat.*" The citation lists an unpublished report prepared in support of the BiOp. We should not be referred to unpublished reports. The methods employed and outcomes of this evaluation should be contained in the BiOp.

P. 202, line 31-34
"*...surveys conducted on finer scales such as critical habitat or even smaller would be needed to better assess whether there is sufficient prey inside critical habitat for Steller sea lions to forage without competitive niche overlap with commercial groundfish fisheries.*" The implication of this statement is that NMFS does not possess the means to know if the prey field is sufficient for SSL foraging.

P. 207, lines 45-48.
These two sentences are overstated. The picture painted of the limited ability of SSLs to adapt is belied by their generalist foraging behavior and gregarious nature. The limitations to the argument regarding the reduction of prey availability by adding fishing mortality to natural mortality are discussed in the "Global Effects" section above.

P. 207, line 21-24
"*...the present long-term harvest strategy minimizes the possibility of overfishing, and given the best available information would not present a significant problem for species listed under ESA in terms of the total stock size and recruitment. Although, it would not control specifically for localized depletions that could lead to unsuccessful foraging.*" This statement implies that the absolute volume of removals is not a problem for SSL. Yet, NMFS goes to great lengths to suggest that there has been a significant reduction in prey base due to fishing and that this reduction could compromise SSL.

P. 207, line 48-49
H_o: "*When* [prey] *biomass reaches a threshold, predators are no longer able to successfully forage for that prey, ...*" The implication is that prey populations can become so sparse that SSLs will be unsuccessful in foraging. In a similar fashion, there is likely to be a threshold density

above which foraging becomes no more efficient. Opportunistic feeders are expected to switch prey before prey density reaches the lower threshold, but they may remain predatory on the "easy catch" when prey density exceeds the upper threshold. This mechanism could explain the propensity for differences in SSL diet diversity.

P. 208, lines 31-40.
The typical difference in applying MSVPA models versus single-species models has been to increase estimates of historical fish biomass (e.g., Hollowed and Megrey on GOA pollock). This tends to further weaken hypotheses regarding prey availability because there were even more fish in the 1980s when the SSL population was in its period of greatest decline.

P. 211, lines 34-44.
The implication that the existing management strategy does not sufficiently protect stocks with declining recruitment is a misunderstanding of the current fisheries management process. Analysts are not required to use a constant recruitment assumption, and the annual process allows for changes in ABC recommendations if concern about declining recruitment is an issue. Indeed, there are numerous examples over the past decade of reductions in ABC due to declining recruitment, especially for Greenland turbot.

P. 212, lines 34-41.
The authors misunderstand the Tier 5 strategy. Fishing at 0.75 M is intended to be more conservative than an F40% strategy and was deliberately chosen to be more conservative for a tier based on less information. Fishing at a low constant harvest rate should not be labeled as a "non-precautionary" strategy. The Plan Teams and SSC have indicated in the past that improvements for this Tier would be desirable and it is slated for further consideration when overfishing definitions are reevaluated.

P. 213, lines 2-3, lines 32-34.
These sentences show that the authors have gone out of their way to be negative about the NPFMC harvest strategy and the assessment analysts.

P. 214, lines 1-11.
The conclusion that the compression of open-access fisheries leads to local depletion is premature. It is also possible that such a compression leaves the ecosystem free of human "interference" for long stretches of space and time.

P. 214, line 9-11
H_o: A compressed fishing schedule has the potential to locally deplete prey availability to foraging sea lions.

One can assume that SSL feeding efficiency is maximized at a yet to be determined prey density. Therefore, densities in excess of the maximization threshold would not improve foraging efficiency. If this assumption were true, fishing removals would have to reduce prey density below the maximum efficiency threshold before that removal could be regarded as potentially detrimental to individual SSL foraging. Moreover, the impact to individual SSL foraging, if any, would be dependent on the breadth of the depletion in physical space and on its duration.

Therefore, a secondary assumption follows that the magnitude of adverse impacts to individual SSL foraging due to fishery removals would be proportional to the likelihood that SSLs encounter the diminished prey field patch. The implications to the larger SSL population are that there would have to be a high probability of encounter with the diminished prey field, by a large number of SSLs since the occasional encounter by few SSLs is unlikely to cause the persistent decline of a population. The extent of adverse impacts on SSL foraging would also be dependent on, and could be mitigated by, the ready availability of suitable alternative prey.

P. 214, line 20-22
H_o: Pollock fishing cooperatives *"..resulted in a decrease in adverse impacts on the western population of Steller sea lions."* There is no evidence that the perceived benefit was realized. What is clear is that fishery removals were dispersed in space and time following implementation of fishing cooperatives. We don't know the impact to SSL abundance as a consequence of that change.

P. 216, lines 32-39.
Examining the proportion of catch in critical habitat tells little about the demand for common resources unless the biomass of the fish population is considered simultaneously.

P. 216, line 41-45
"Between 1995 and 1999, about 49% of the total groundfish harvest in the BSAI was taken from critical habitat... 14% of this catch was taken within 20 nm of sea lion rookeries and haulouts in the Bering Sea and 10 nm of rookeries and haulouts in the Aleutian Islands. The pot sector was most concentrated in CH (81%) followed by trawl then hook and line." First, note that the majority of the volume of groundfish harvested "within CH" in the BSAI is from special foraging areas beyond 20 nm from rookeries and haulouts (see Table 6.3). Second, total groundfish catch is irrelevant in the context of SSL competition. If the hypothesis is that catch of pollock, cod and Atka mackerel is the concern, then we should be looking at the catch of these species in CH, not total groundfish. Third, pollock trawling has been prohibited within 20 nm of key rookeries during the A season since 1992.

Presumptive competition occurs in winter between juvenile SSLs, nursing female adults and the fishery. While it may be argued that adult male SSL also compete with fisheries, NMFS has not argued that these SSLs are at risk due to that competition. Given the large size of the special foraging areas, the density of SSLs in these areas must be very low due to the fact that most SSLs forage within 20 nm of haulouts. All else being equal, it is assumed that the likelihood of SSL encounter with a fishery induced diminished prey field, declines with SSL density.

P. 224, lines 30-42.
The limitations of this analysis are described above. Using an inferential approach similar to that in BiOp3, a further hypothesis can be deduced by inspection of Figures 6.16 and 6.17. The flatfish populations show a rapid increase during the 1980s followed by a more modest increase in the 1990s. Similarly, the SSL population shows its greatest decline in the 1980s followed by a modest decrease in the 1990s, exactly the opposite trend of flatfish. Assuming that increase in juvenile mortality is the proximal cause of the SSL decline, one must conclude that flatfish are consuming SSL juveniles.

P. 225, line 45-47
NMFS says, "*For purposes of this consultation, the directions of biomass change shown by single-species models, remain the best determinant of groundfish stock status for this analysis and determining the effects on listed species*"

The following table shows the change in estimated biomass over time for pollock, cod and Atka mackerel. Current estimates of available biomass for the species in question are 1.6 to 2.3 times greater than the mean estimated biomass available in the 1970s. Given the 80% reduction in SSL numbers, the biomass change from the 1970s to 2000 translates to an 8-15 times increase in per capita availability of these select prey.

	Mean estimated biomass					SSL per capita
Species	1970s	1990s	2000	1990s/1970s	2000/1970s	change[a/]
Pollock	4,812,000	9,637,818	11,067,000	2.0	2.3	11.50
Pacific cod	1,097,500	2,387,545	1,785,000	2.2	1.6	8.13
Atka mackerel	319,233	865,236	549,200	2.7	1.7	8.60
	Mean estimated biomass-fishing removals					
Species	1970s	1990s	2000	1990s/1970s	2000/1970s	
Pollock	3,386,912	8,299,971	9,991,503	2.5	3.0	14.75
Pacific cod	1,041,357	2,126,541	1,575,272	2.0	1.5	7.56
Atka mackerel	279,740	804,628	506,653	2.9	1.8	9.06

a/ Assumes an 80% reduction in number of Steller sea lions.

What is odd about the argument presented by NMFS, is the fact that they demonstrate in Appendix 3, that given current fishing practices, available biomass is more than sufficient to meet the global needs of SSLs. They go on to say, removals outside of CH are not likely to jeopardize listed species. The significant adverse impacts to SSLs from fishing, NMFS argues, are at the scale of local depletion of prey (P 226, line 4-7). These arguments seem to render the single-species hypothetical moot.

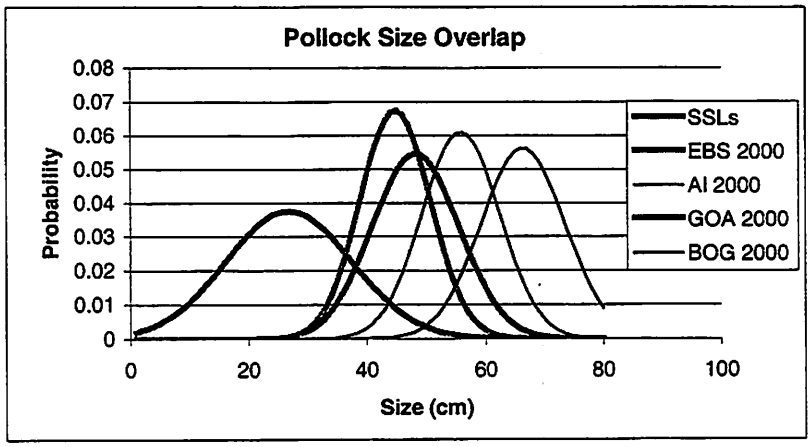
P. 226, lines 12-25.
Mean age is a poor way to characterize age structure of the pollock population. This analysis also fails to recognize that the selectivity of the fishery is highly variable and tends to vary depending on which strong year-classes are in the population.

P. 226, line 21-23
H_o: [Paraphrased] Fishing induced changes in the mean size of pollock cause SSLs to consume greater energy foraging per unit energy input.

This hypothesis seems to ignore the size range of preferred prey for SSLs, particularly for SSLs <5 y old, which are presumptively the more at-risk members of the population. The increase in biomass represented in Fig 6.1c is predominately for fish 7 and older (Mean size at age 6 in EBS is about 47 cm). SSLs appear to prefer fish of mean size 27 cm, and have less than a 3% expectation of size overlap with pollock >47 cm. It is hard to imagine that fisheries induced change in age composition provokes a detectable increase in SSL foraging energy.

Area specific pollock size data from Jim Ianelli 1/08/2001. SSL size data extracted from BiOp3 Table 4.2.

Variable	SSLs	EBS 2000	AI 2000	GOA 2000	BOG 2000
Mean	26.8	44.82	55.86	48.24	66.4
STD	10.63	5.92	6.54	7.32	7.11
n		238,993	186	7,657	40



P. 228, line 34-37

"*Combining this dietary overlap with the evidence of direct, local interactions between fishermen and Steller sea lions over almost three decades of fishing suggests that these two consumers—Steller sea lions and fishermen—actively demand a common resource.*" Direct local interaction is not made evident for pollock and Pacific cod. Local depletion has only been demonstrated for Atka mackerel, and then only for specific locales. The overlapping diet referenced is that inferred from the SSL stomach and scat studies. NMFS fails to scale the overlap based on size preferences reported for SSL, they do not speak to spatial/temporal distribution of the diet data, or to the sample size. Elsewhere, there are complaints that data contradictory to the food limitation hypothesis are unrepresentative. This unbalanced treatment of available data compromises NMFS interpretation of that data.

P. 226, lines 34-46.

The interaction between fishing and spatial distribution of pollock is an interesting point worth pursuing. Is it possible that the fishery could reduce the biomass of pollock in critical habitat through a reduction in the number of fish at older ages? Considering the effect of cannibalism, is a reduction in older ages a desirable or undesirable event?

P. 227, lines 1-15.

This discussion of effects on reproductive potential is superfluous. The previous information showing that most recruitment series have no apparent trend with biomass demonstrates that reproductive potential of groundfish populations has not been affected.

P. 228, lines 31-36.
The conclusion that SSLs and fishermen "actively demand a common resource" is overstated, as is the claim of evidence for it.

P. 229, line 15-16, lines 23-24
H_o: Fishing causes schooling fishes to disaggregate [adversely] affecting SSL foraging behavior. Repeated trawling by many vessels could make [fish] scatter and could affect SSL foraging at the local level. Evidence for this hypothesis is missing. NMFS cites Nunnallee (1991) on hake, but the effect is identified as short lived with schools recovering with tens of minutes.

P. 229, line 37-39
The BiOp presents the estimated spawning stock size of pollock relative to the unfished spawning stock size as though it is a fact that 1999 spawning biomass is 43% of the unfished spawning biomass. This illustrates how the assumption is converted to fact.

P. 229, line 28-31
H_o: [Implied] Localized depletion occurs when prey density falls below its "ecological threshold". The significance of this remark is the notion of a necessary prey threshold density. It further follows that densities greater than or equal to the threshold provide for adequate foraging. At issue then is what constitutes this threshold density? NMFS implies, through adoption of their control rule, that biomass densities > B20% provide for adequate foraging since they find fisheries permissible to this level of stock abundance. Should we then use fishing rates in excess of $F_{20\%}$ as an index of localized depletion?

P. 229, lines 9-25. As mentioned above, the dispersal of fish schools by fishing could easily be a positive benefit.

P. 229, lines 36-46. As mentioned above, the characterization of the NPFMC fishing strategy is incorrect and the estimates of unfished biomass ignore density-dependence.

P. 230, line 2-4
"... groundfish fisheries in the action area have depleted groundfish in large sections of the action area. One example is the Donut hole fishery for pollock." This is a prejudicial statement that condemns the domestic groundfish fishery for actions taken by unregulated international harvesters outside the EEZ!

P. 230, lines 1-15.
This paragraph infers that the reductions caused by an unregulated international fishery in the Donut Hole are applicable to a regulated domestic fishery in the Bering Sea. That's comparing apples with oranges.

P. 230, lines 40-47.
The conclusions about local depletion in the Atka mackerel fishery are overstated and fail to recognize the limitations of the analysis.

P. 232-233, lines 38-49 and 1-6
Seven questions which form the basis for judging adverse impacts of fishing and the likelihood of provoking jeopardy. (High point total means greater likelihood)

1. Do Steller sea lions forage on the target fish species? (1 pt)
2. Do Steller sea lions forage on the target fish species at a rate of at least 10% occurrence? (1 pt)
3. If yes to Number 2, does the size of Steller sea lion prey overlap with the size caught by commercial fisheries? (1 pt)
4. If yes to Number 2,does the fishery overlap spatially with the area used by Steller sealions to forage on this species? (1 pt)
5. If yes to Number 2, Does the fishery operate at the same time Steller sea lions are foraging on the fish species? (1 pt)
6. If yes to Number 2, Does the fishery operate at the same depth range that Steller sea lions are using to forage on the fish species? (1 pt)
7. If yes to 1-6, does that fishery operate in a spatially or temporally compressed manner in Steller sea lion critical habitat? (2 pt)

Scores from the seven questions represent NMFS attempt to rate the relative impact of a fishery, but the scoring demonstrates the absurdity of the scaling exercise. Infrequent overlap of SSLs and fisheries can be scored as high as frequent interaction. Had NMFS attempted to use available data to measure temporal, spatial, bathymetric and trophic overlap, they would show low levels of interaction. Moreover, the scaling factors used above fail to incorporate a dimension that evaluates the proportion of the SSL population that interacts with the fishery.

P. 230, line 30-32
H_o: "*...it became apparent that temporary reductions* [caused by fisheries] *in the sizes of local Atka mackerel populations could affect other Atka mackerel predators..*" This is an unverified assumption. It has never been confirmed by diet analysis, a demonstration of differential rates of presumptive mortality, or independent estimates of local population density.

P. 231, line 23-29
H_o: "*..concentration of fishing effort in short periods of time may increase the likelihood or intensity of* [SSL] *disturbance.*"
H_a: [Implied] Temporally dispersed fisheries do not adversely impact CH.
Again NMFS presents an unverified assumption. There are no objective data cited in support of this point of view.

P. 233, line 32-33
"*The high degree of overlap between fisheries and the foraging needs of Steller sea lions points to competitive interactions on a number of scales or axes.*" This statement isn't even qualified as, "given the high degree of overlap based on answers to the above questions". It is asserted that a high degree of overlap occurs based on the best available science, but the scientific basis for scaling the data has been left in the closet; NMFS doesn't even try to put an objective measure of the degree or extent of interaction.

P. 233, line 44-49
NMFS rejects the prior RPAs proposed for Atka mackerel citing the single species nature of those proposals and implying that multi-species impacts now require further revisions to RPAs. They don't explain how the prior RPAs breakdown, or what their perception is of the synergistic impacts of fishing by fleets targeting different species. Why does a comprehensive look at the fisheries necessarily imply that previous measures developed for individual fisheries are now invalid?

P. 234, lines 1-7
NMFS remarks that efforts to isolate fisheries from SSLs haven't worked to date; therefore, it is necessary to impose more stringent measures to further isolate fisheries and SSLs. An alternative conclusion that can be drawn from this observation is that fisheries are not the problem. The document should acknowledge the possibility that the reason the measures have been ineffective could be that the fishery is not the problem.

P. 234, lines 31-46
NMFS acknowledges a concept that more intensively used SSL habitat should be protected, presumptively affording less protection to little used habitat, but they fail to provide scientific data on the relative use of designated critical habitat by SSL.

P. 235, lines 20-40
NMFS discusses the propensity of SSLs to remain within 20 nm of rookeries and haulouts based on telemetry data. It would have been helpful to provide frequency distributions of the telemetry "hits" with respect to distance from land.

P. 237, lines 40-41
NMFS cites "*numerous recent (1990s) sightings ...on the outer continental shelf, north and west of the SCA.*" References like this beg for an objective reporting of the data: how many sightings, in what specific areas, and how are these sighting similar or different from earlier observations?

P. 238, lines 45-49
Atka mackerel and Pacific cod are reported to be important food items in the AI, however cod is predominately consumed in winter and has less than a 10% FO in summer. The seasonal preference for cod follows the biology of this species in as much as they move toward shallow gravel substrates in winter to spawn and then disperse. The observed predation pattern demonstrates the opportunistic nature of SSL feeding behavior.

P. 239, lines 22-26
NMFS cites NMFS (2000) as a reference for monthly estimates of pollock, cod and Atka mackerel biomass. The citation is not listed in the Literature cited section of the document, but is further described in Appendix III (P 2, line 1). The methods employed should have been discussed in the document. Furthermore, Appendix III cites Winship (2000) but this reference is not listed in the document either.

P.239, lines 28-41.
As mentioned above, the idea that total biomass should be some large multiplier times the amount needed for sea lion forage is specious; the results in Appendix 3 show clearly that global issues are not important. The results mentioned in the paragraph (shortage in at least one month) do not appear to be presented. Furthermore, the document seems to reject this analysis anyway, because it does not deal with local depletion.

P. 240, lines 11-45
Contrasts SSL and California sea lion interactions with fisheries. There is no relevant information in this section. More useful would have been a discussion of the expanding eastern population of SSL and fishery interactions in the range of this population, particularly in British Columbia where SSLs have no special protection and where there are active commercial fisheries.

P. 241, line 6
Cite Garrison and Link, 2000 but the citation is not found in the Literature cited.

P. 243, lines 1-24.
The discussion of effects on benthic habitat overemphasizes the negative and ignores recent research that suggests that benthic impacts are unclear (Heifetz et al., Auke Bay Lab; Collie et al. 2000, J. Anim. Ecol.69:785).

P. 243-250, Section 6.5.3, Effects on the ecosystem
The balanced perspective and conclusions presented in section 6.5.3 appears to have been ignored in the rest of the document. Most of the discussion here is so speculative it seems of little use to the discussion of jeopardy. One particularly egregious comment is made on genetic diversity (P. 250, line 10) that says we can infer that heavy exploitation will lead to a reduction in genetic diversity. Among other things, genetic diversity is a function of the effective population size, which for marine fishes is particularly large. In fact lack of genetically distinguishable subpopulations within marine fish communities is often attributed to their large effective population size. With such a large number of spawners, marine populations can more easily overcome changes due to genetic drift and therefore remain genetically more homogeneous over broad areas. Marine populations would have to be severely diminished over a broad geographical range before genetic diversity was likely to be compromised and even then, routine mixing within the limited population may still overcome drift.

P. 250, line 40
References Fig. 6.20 which shows a hypothetical proportional reduction in SSL carrying capacity with declines in fish biomass. This figure could have been used to illustrate an alternative hypothesis as well. One that comes to mind is a non-proportional response where carrying capacity remains constant above some threshold prey biomass, and then declines when biomass drops below the threshold.

P. 251, lines 25-36.
Here is another reference to the incorrect "reduction in spawning biomass." The sentence on lines 30-33 implying ecosystem impacts was contradicted in the previous section.

P. 251-254.
Section 6.6.1 contains a summary of the arguments used in BiOp3 concerning the decline of the SSL population. The lack of information available to support many of these arguments is overwhelming.

P. 251, lines 33-34
NMFS implies fisheries reduce the survival of juvenile SSLs, yet on page 250, lines 46-49, they say, "*We find no significant .. evidence that the current exploitation strategy... adversely affects listed species by reducing their likelihood for survival and recovery in the wild.*"

P. 251, lines 45-48
NMFS says that females are vulnerable to reductions in prey availability, and may be required to commit more energy to foraging where, it is implied, prey resources are locally depleted by fishing. NMFS fails to cite work by Ono et al. (on reproductive behavior) and Andrews et al. (comparison of foraging ecology) that seem to contradict the food limitation hypothesis for declining populations.[3] Ono reports no difference in the period of absence for females on Lowrie (stable population) and Marmot Is. (declining population). Andrews found 11x more groundfish biomass in the CAI population compared to that around the SEA population, SSLs spent less time at sea, and had lower field metabolic rates in CAI compared to SEA.

P. 252, line 1-4
NMFS claims clear evidence that the reproductive rate of SSL has been compromised. That evidence is presented on P 81, lines 17-40, and relates to changes in pregnancy rates between the 1970s and 1980s. The observation has not been updated in recent years, and NMFS has no idea what the long term mean pregnancy rate of the population is. So, while the observation is relevant the inference has to be qualified.

P. 252, line 30-36
NMFS reviews the viability analysis of York and Merrick. There has been a change in the rate of decline in the western population during the 1990s. Why isn't the viability analysis updated for this BiOp?

P. 253, lines 1-7
There is a discussion of pup count data. The BiOp reports pup counts on Table 9.5, but does not indicate the pup to female ratio, show changes in pup counts over time, contrast eastern and western pup counts and pup/female ratios. In short, there is a significant lack of demographic information that would be useful to the reader.

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[3] References cited from ASSLRT, Research Synopsis jan 2001.
Ono, K., T. Loughlin, R. Merrick. Comparison of the reproductive behavior of steller sea lions at three sites—
Andrews, R., D. Calkins, R. Davis, T. Loughlin, B. Norcross, K. Peijnenberg, and A. Trites. A comparison of the foraging ecology of Steller sea lions from a declining population and a stable population.

P. 253, line 17-18
H_o: Fishery induced SSL mortality is significant, its removal will enhance SSL recovery, but not necessarily reverse the decline.

There is no demonstrable proof that fisheries as currently managed cause SSL mortality, let alone, an objective measure of magnitude of any such mortality. It is therefore, grossly presumptive to categorically assert that fishery induced SSL mortality is significant! Furthermore, if NMFS believes that RFRPAs are unlikely to reverse the SSL decline, then NMFS must also believe that factors other than fisheries must be significant in their contribution to SSL decline. NMFS has repeatedly dismissed the contribution of factors other than fishing as having any substantive impact on SSL population trends. How do they reconcile the pervasive tone of this BiOp with the statement that "*removal of fishery contribution*" may not reverse the decline in SSL populations?

P. 253, lines 48-49, P. 254, line 1-2
NMFS cites NRC [4] conclusion that groundfish fisheries may adversely affect SSLs through competition for food, and impacts to fish population structure. The NRC report on P. 222 says, "*For the most part, we do not have the data to assess the relative importance of fishery effects (both direct and indirect) and environmental effects on food availability, but both have likely been involved in the decline of sea lion numbers over the several decades.*" On P. 236 after citing a lack of evidence on ecosystem overfishing of pollock, the reports says, "*..it is then impossible to see how reduction of the total rate of exploitation of pollock would be helpful in the short term, it is even possible, although highly speculative, that some mammals and birds would be helped by a temporary increase in the exploitation of pollock.*" Then after remarking that mammals and birds may have been impacted by the distribution of fishing effort in space and time, the report says, "*..it is by no means certain that* [spreading out the fishery in space and time] *would be effective enough to reverse or even halt* [SSL] *population declines.*"

P. 254, lines 35-43.
This paragraph once again paints the picture of species interactions taking place in a fierce competitive jungle, confusing co-occurrence or propinquity with competition. The demonstration of competition requires a limited resource, substantial overlap in utilization of that resource, and the connection of that resource to population growth and mortality. This has not been shown for the species interactions listed in the paragraph

P. 255, lines 3-5 and lines 33-34.
NMFS claims that they have demonstrated fisheries capacity to locally deplete the resource, thereby inditing the entire groundfish fishery. Their evidence for local depletion comes from the Atka mackerel fishery alone, and that evidence was strictly limited to specific locales, and could not be shown to be a cosmopolitan event. Attempts to show local depletion for the cod fishery failed. Furthermore, the effect of the identified local depletion on SSL was never established, i.e., as demonstrated so convincingly in this BiOp, the adverse impacts of local depletion cited for Atka mackerel are entirely presumptive; there is not one shred of direct evidence indicating a competitive fishery interaction leading to increased SSL mortality.

[4] National Research Council, 1996. The Bering Sea Ecosystem. National Academy Press, Washington D.C.

P. 258, lines 28-33.
Not only are the conclusions overstated and not backed by factual information, but by this point the allegation of adverse competitive interactions between SSLs and fisheries have become stipulations, asserted into the text as if they were facts.

P. 259-260 Section 6.6.3
Summary conclusions of the "Effects [of fishing] on Steller Sea Lions": 1) effects due to biomass change, 2) effects due to disturbance, 3) effects due to temporal concentration of fishing, and 4) effects due to special concentration of fishing. The first effect is a non-effect, since the opinion demonstrates ample biomass to meet the global needs of SSLs (Appendix III, P 3, line 22-23: "*...competition as the result of an overall prey removal as allowed by the FMP does not adversely modify critical habitat.*"). Effects of direct disturbance are moot in as much as fisheries are prohibited within 3 nm of all rookeries and haulouts, and for an extensive number of rookeries and haulouts, in critical periods, fisheries are now and have been for at least 2 years, restricted within 10 to 20 nm of these locales. Moreover, research surveys on rookeries and haulouts are more likely to have adverse affects due to disturbance than the impact of a passing vessel. With respect to the spatial and temporal effects, the advertised adverse impacts are all assumed. The only SSL mortality NMFS confirmed through analysis is the potential mortality due to killer whale predation. They are otherwise unable to attribute the decline in abundance of SSLs to any specific affect. This means that they have absolutely no idea whether RFRPAs will have any beneficial affect on SSL abundance, and that reality makes their proposed actions an extraordinarily expensive gamble.

P. 259, line 21-22
The estimates of hypothetical loss of groundfish population biomass (B_{99}/B_0) are now stated as factual losses! This practice is all too common in Section 6, the authors state assumptions as though they are fact, and routinely fail to qualify opinion or beliefs as such.

P. 259, lines 25-28.
Here is another reference to the incorrect "*reduction in spawning biomass.*" I disagree that fishing created reductions in biomass that led to declines in the SSL population. Rather, the available evidence shows that the biomass levels of groundfish have for the most part increased or at most oscillated. Population trends are for the most part recruitment-driven, and the primary factor affecting recruitment seems to be the environment. For one of the major exceptions, GOA pollock, it is unlikely that the low 5-10% exploitation rate it has experienced throughout its history explains the decline in its population.

P. 259, line 30-38
NMFS complains that the harvest control rules used in the FMP allow fishing to proceed when stock biomass is very low. NMFS should report on the actions the NPFMC has taken, rather than the allowances prescribed in their harvest control rules.

P. 259-260, lines 44-49, and 1-10
Having failed to demonstrate local depletion for P.cod and pollock, and having demonstrated local depletion for Atka mackerel in a subset of locales studied, NMFS lumps all directed fishing into a single hopper and alleges adverse impacts due to disturbance from fishing. Moreover, they

now dismiss their own recommended remedies in the Atka mackerel and pollock fisheries as ineffective because they ostensibly were not comprehensive enough. There is no attempt to say what was missing in the former remedies. NMFS twisted logic is too difficult to follow.

P. 260, lines 15-25.
NMFS asserts that fishery exploitation rates are excessive because of the seasonal concentration of fishing effort. The realized, i.e., actual rate of exploitation in space and time is unknown, the global estimates of the exploitation rates for the three species of concern are all less than the rate allowed by NMFS proposed harvest control rule. The best scientific data available does not support the allegations in this BiOP.

P. 260, lines 27-41
NMFS asserts that best available scientific and commercial data presented in this opinion indicates that fisheries are generating "*..high local harvest rates.*" No such finding was produced in this opinion. They go on to cite chapter 4 of the opinion as noting that SSLs rely on certain prey densities to forage effectively. They imply a known effective foraging density, and by their action, imply that fisheries lower prey density to something less than effective. Saying that it is so does not make it so; NMFS knows neither the effective foraging density for SSL prey, nor the affect of fisheries on prey density.

Section 7. Cumulative Effects

P. 264.
This page continues to confuse co-occurrence with competition. The last sentence on this page is a gross overstatement.

P. 264, lines 33-46
A repeat of the practice of stating assumptions as fact.

P. 271, line 18-19 (RPAs)
Fisheries are described as reducing prey availability "*at scales of importance to individual foraging Steller sea lions,...*". There is no discussion of what this scale is. If fisheries are literally snatching prey before the eyes of individual SSLs, and those SSLs are so deprived, why are there no reports of massive SSL starvation? Why don't scat studies on rookeries and haulouts adjacent to significant fishing grounds show an absence of fisheries targeted prey?

P. 273, line 28-29
NMFS says that their proposed harvest control rule should "*..ensure that adequate levels of each prey species are maintained for Steller sea lions.*". The control rule allows fishing to continue provided stock biomass is greater than $B_{20\%}$., does NMFS mean to imply that biomass greater than or equal to $B_{20\%}$ is adequate for SSL foraging?

P. 273, section 9.2.1.
At a minimum, an analysis should have been conducted to show yield, biomass, and rebuilding times of the proposed control rule compared to the current one. This is an example of

conservation one-upmanship: in the view of the authors, any recommendation that is more conservative must be better.

P. 279, section 9.3.
Nowhere in BiOp3 is it explained why it presents a single set of management measures, without any consideration of alternatives.

P. 304, section 11.1.
The recommendation to improve stock assessment by considering finer spatial and temporal scales is well-taken and several efforts are being made in this direction. Nevertheless, the data sources themselves are constrained in space and time (e.g., summer surveys), meaning that this may be no small task. The statement that stock assessment does not take into account the needs of listed species (lines 27-34) is overstated. The analysts bring forward concerns in their stock assessments regarding listed species, and these are examined by the Plan Teams and SSC as well. Further, the Ecosystems Chapter has evolved into dealing with such issues more explicitly. Nevertheless, improving stock assessments in this regard is clearly desirable.

P. 306, section 11.3.
The recommendation to reduce fishing mortality to account for uncertainty has been discussed by the Plan Teams and SSC in recent assessments, and we have encouraged such efforts in the new consideration of overfishing definitions. The approach suggested in this section, however, is invalid, because survey biomass is just one data source that affects assessment uncertainty. It was fairly naïve of the authors to include this recommendation without understanding the stock assessment process and the enormous amount of energy that has been devoted to this topic by the Council family.

ALASKA STELLER SEA LION POPULATION STATUS

Prepared for the Alaska Steller Sea Lion Restoration Team
(29 November 2000)

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Steller sea lions in Alaska belong to two biological stocks as distinguished by genetic evidence (mitochondrial DNA) (Bickham 1997) and observations of marked animals (ADF&G and NMFS unpublished data) which showed extremely low rates of interchange of breeding females. Rookeries in the eastern stock occur in Southeast Alaska while those in the western stock range from Prince William Sound westward through the Aleutian Islands. The two stocks have shown disparate populations trends. The eastern stock has nearly doubled since 1978 and there are probably more sea lions in Southeast Alaska than at any time in recorded history (Calkins et al. 1999). Over a similar time span numbers of sea lions in the western stock have declined precipitously (-90% at some sites) and the stock is classified as "endangered" (Sease and Loughlin 1999). The most recent survey data (June 2000) indicate a continued increase (+4% since 1998) in Southeast Alaska and a continued decline (-8% since 1998) in the western stock (ADF&G and NMFS unpublished data).

The primary causes of the original decline (1970s and 1980s) are thought to have been low survival and low birth rates due to nutritional stress. Evidence of undernutrition included reduced growth (Perez and Loughlin 1991, Castellini and Calkins 1993, Calkins et al. 1998) and high rates of reproductive failure (Pitcher et al. 1998). Modeling efforts

by York (1994) suggested that low rates of juvenile survival were probably the driving force behind the decline although there were likely also episodes of high adult mortality. An unpublished ADF&G analysis of survival rates, based on mark/resight models of 1987 and 1988 cohorts of branded animals from Marmot Island in the Central Gulf of Alaska, suggested that survival of all ages was low and that a linear model with survival increasing with age provided the best fit.

Three basic explanations have been proposed to explain the cause(s) of nutritional stress: (1) competition for prey with large-scale commercial fisheries, particularly those on walleye pollock and Atka mackerel; (2) changes in prey abundance, composition, and distribution resulting from changing climatic conditions (regime shift); and (3) the "cascade effect" where a pollock dominated ecosystem resulted from large-scale human harvests of predators such as whales and certain fishes (National Research Council 1996). While the relative contributions of each of these factors is unknown, there is growing appreciation for the profound influence of climatic variability (regime shifts) on the biological communities of the North Pacific Ocean (Hayward 1997, Francis et al. 1998).

Research was conducted during the mid-1990s to evaluate the nutritional limitation hypothesis. The approach was a comparative study, primarily of adult females and neonatal pups on rookeries, between the declining western stock (experimental population) and the increasing eastern stock (control population) of various biological parameters thought to reflect nutritional status. Following is a summary of the findings of that research.

- While pup masses at birth were similar between populations, pup growth rates were higher in the west (Brandon and Davis in prep)
- Pup masses at one month of age were greater in the west (Merrick et al. 1995, Rea et al. 1998)
- Foraging effort, as defined by foraging trip length and time spent ashore, for females with pups on rookeries was less in the west (Brandon et al. in prep)
- No significant difference in milk energy content between east and west (Adams and Davis in prep)

- No evidence that pups < 1 month of age from the west were nutritionally compromised based on blood chemistry and hematology (Rea et al. 1998)
- Masses of adult females greater in west (Adams and Davis in prep) and perhaps fatter in west (Castellini in prep)
- Behavioral observations of maternal attendance patterns and activity budgets were not consistent with the hypothesis that animals from the western stock were having greater difficulty obtaining prey compared to those from the eastern stock (Milette 1999)
- The blubber layer appeared thinner, heat flow greater, and insulation of poorer quality for adult females from the west when compared to the east (Williams in prep)

All but the last of these findings suggest no difference or in some cases superior nutritional status for adult females and pups < 1 month of age from the western stock in comparison to those of the eastern stock. The significance of these findings has been discussed as follows.

- The western stock is not currently nutritionally limited. The original decline may have been precipitated by nutritional stress but as the environment changed and relative densities between sea lions and their prey populations changed the western stock is no longer food limited. The recent (current) decline is caused by non-nutritional factors.
- The findings cannot be extended beyond the sex and age classes studied (adult females and young pups), the season when the research was conducted (summer), nor the sites where the research was conducted (only a few of many rookeries). Nutritional stress may still be limiting the population through other age classes (e.g. newly weaned juveniles and non-reproductive females), or during other seasons such as winter, or at other sites.
- Much of the research lacked "power" because of small sample sizes, limited number of study sites, and lack of replication. Some comparisons between genetically distinct populations may be invalid.

Currently there are three general hypotheses (or variations thereof) put forth to explain the continued decline of the western stock.

- Food limitation is resulting in low survival and perhaps low reproductive rates. Newly weaned juveniles are likely most severely impacted because of inexperience and limited foraging ability. Commercial fishing near rookeries and haulouts (localized depletion) and the prevalence of low energy prey such as pollock, cod, and flatfishes may play a role. This hypothesis provides the basis for fishery management recommendations limiting fishing effort near rookeries and haulouts.
- Nutritional limitation because of a diet dominated by pollock and other low energy (low fat) prey has been referred to as the "junk food hypothesis". This premise which was developed by Alverson (1992) correlates the decline of sea lions in the western stock with a decline in fatty forage fishes and increases in pollock, cod, and flatfishes following a regime shift in the late 1970s (Anderson and Piatt 1999, Meuter and Norcross 1999). Supporting this concept was an analysis by Merrick et al. (1997) which found a strong correlation between diet diversity and population decline. Those populations whose diets were dominated by a single, low fat prey such as pollock or Atka mackerel showed the highest rates of decline. A study where captive Steller sea lions lost body mass when fed ad-libitum amounts of pollock in contrast to gaining mass when fed herring (Rosen and Trites 2000) also supports this hypothesis.
- The "predator pit" hypothesis postulates that the western stock is not currently nutritionally limited but because of small population size the decline is perpetuated by low survival due to a combination of mortality factors. These include predation by killer whales and sharks, illegal shooting, entanglement in marine debris, incidental mortality associated with fisheries, intra-specific aggression, pup abandonment, diseases, and subsistence harvests. Factors such as predation may not respond to reduced sea lion abundance in a linear, density dependent manner. Predators such as killer whales probably learn the locations of the traditional rookeries and haulouts and may cause significant levels of mortality, even at low sea lion abundance.

Current research is focused on various aspects of juvenile life history. Studies are being conducted to determine when young animals are capable of independent foraging,

locations of foraging habitats, and at what age weaning occurs. Growth and condition (body composition) of pups and juveniles are being compared between the eastern and western stocks to evaluate the nutritional limitation hypothesis. Complementary research on diseases, pathology, health indicators, immune function, contaminants, and population dynamics is also being conducted.

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SSL - AR

Industry Perspective on Steller Sea Lion Research
(Second Draft — February 9, 2001)

The following list of research topics identifies by priority the deficiencies in research information that should be considered by the NMFS and other science suppliers with funding for SSL related research. The list has two tiers, a MUST HAVE tier of highest priority research, and an INTERESTED IN list of lower priority research.

The MUST HAVE list includes four topics: (1) field studies to assess the SSL "prey field" in known local areas; (2) research to improve the measurement of the numbers of SSLs; (3) the development of a probabilistic assessment of the simultaneous pursuit of prey by juvenile sea lions and the fisheries; and (4) the development of a population-dynamics (i.e., virtual population) model for the western stock of SSLs. These topics are described further below.

(1) Field studies to assess the SSL "prey field" in known local areas, e.g., within 10 or 20 nm of important rookeries, or within aquatic forage areas. The objective of the studies would be the development and implementation of field research protocols to guide the assessment of the SSL forage base. Such protocols would also be required to implement a monitoring program (design of a fishing experiment) to investigate the effects of fishing on the density of SSL prey in the water as opposed to the number of SSLs in the area. Important aspects of the research include:

- a focus on assessing the natural levels and variability (flux) in prey availability (abundance) over time throughout the annual cycle, with emphasis on the winter period (e.g., the frequency of assessments would be higher [monthly] during the winter and lower [quarterly] during the other seasons);
- assessment activities would include, at minimum, acoustic and bottom trawl surveys of groundfish species in selected local study areas, and an expansion of coordinated SSL migration studies using satellite-tag monitoring methods;
- the design of the assessment activities would include areas where SSLs are known to forage and fishing is restricted, and areas where SSLs are known to forage and fishing is allowed. In areas where fishing is allowed, assessments would occur before, during, and after fishing occurs;

(2) Research to improve the measurement of SSL numbers is important as a way to judge the variance that would be expected to accompany the historic data on SSL numbers, and also the variance that might accompany any future measurements of SSL numbers in areas where experiments that investigate the effects of alternate levels of fishing are conducted. This research would also provide information on which to base a population-dynamics model for the western stock of SSLs. Important aspects of the research include:

- Multiple aerial survey counts annually to estimate the variability associated with observations on pups and non-pups;
- the deployment of video surveillance systems at important rookeries;
- the development of a sampling protocol that extends beyond the index sites in such a way as to provide a total population count with associated variance.

(3) The objective of research activities to develop a probability assessment of the simultaneous pursuit of prey by juvenile sea lions and the fisheries would be to assess the overlap between the commercial fisheries and SSLs in a systematic way. Such an effort is necessary to generate a perspective on the relative significance of potential interactions, both by season and by important SSL prey harvested by the fisheries. Important aspects of the research include:

- close analysis of all existing data on SSL movement patterns (foraging), including especially those of females and juveniles when located on rookeries;
- an emphasis on documenting the depths and locations at which feeding occur, both for females and juveniles when located on rookeries;
- the collection of new data on SSL movements, especially movements by female and juvenile SSLs when located on rookeries;

(4) The development of a population-dynamics model of the western stock of SSL would involve research to estimate an age-structured model for the SSL population. Important aspects of the research include:

- the ability to simulate and thus evaluate alternative hypothesized causes of the observed declines in SSL numbers (i.e., killer whale and-or shark predation)
- the ability to investigate the cumulative effects of known sources of mortality (past shooting around fishing gear, organized pup kills) on the western stock of SSLs.

An INTERESTED IN list of important, but lower priority research includes:

- studies to estimate killer whale and shark predation of SSLs;
- studies to investigate the effects of environmental degradation, toxic substances, and-or other factors that may impair SSL endocrine, reproductive, and-or immune system functions;
- studies to investigate the effects of diet on SSL fitness and survival.

Hughes and Rice Nelson
NPFMC - 2/10/01

Industry Recommended SSL Research Priorities

1) Expand and Intensify Prey Field — Forage Biomass Assessments

- Similar to Kodiak Experimental Design
- Document SSL Prey Field Biomass Temporally and Spatially with Emphasis on Winter Season
- OPEN to Fishing Areas Assessed Before-During-After Fishing CLOSED to Fishing Areas Represent Experiment Control Areas
- Employ BOTH Hydroacoustic and Bottom Trawl Methods
- Local Study Areas Selected from 10 and 20 Nautical Mile Rookery Closure Areas and At-sea Forage Areas
- Integrate Contemporaneous SSL Forage and Movement Studies

Industry Recommended SSL Research Priorities

2) Expand and Intensify SSL Census — Numbers Measurement Efforts

- Improve Accuracy and Precision of Estimates of SSL Numbers

  1) Include Areas Beyond Index Sites in Aerial Surveillance

  2) Repeat Aerial Surveys Within-Year

  3) Increase the Use of On-Site Video Surveillance

Industry Recommended SSL Research Priorities

3) Construct Probability Model of Fisheries and SSL Interactions

- Provide Systematic Comparison of SSL Diving Depths and Locations with Locations and Depths of Commercial Fisheries
- Provide Systematic Comparison of SSL Prey Size and the Size of Fish Removed by the Fisheries
- Include Observations of SSL Movements and Forage Behavior Not Included in the November 2000 Comprehensive FMP BiOp
- Use Analysis Results to Motivate New Data Collection Efforts During the 2001 Research Program

Industry Recommended SSL Research Priorities

4) Construct a Population Dynamics Model of the SSL Stocks

- Provide a Model to Study the Cumulative Effects of Known Sources of Mortality (organized pup and non-pup kills, shooting around fishing gear, subsistence harvests) on the Western Stock of SSLs.

- Provide a Model to Simulate and Thus Evaluate Alternative Hypothesized Causes of the Observed Declines in SSL Numbers (i.e., killer whale and-or shark predation)

Minutes of the Third Meeting of the Alaska Steller Sea Lion Restoration Team, January 5, 2001

Participants

The third meeting of the Alaska Steller Sea Lion Restoration Team (ASSLRT or Restoration Team) was held in Anchorage on January 5, 2001. The following members of team were present: Gordon Kruse (chair), Earl Krygier, Denby Lloyd, Lorrie Rea, Bob Small, Jay Stinson, and Kate Wynne. Members Ken Pitcher, Morgen Crow, and Michelle Ridgway were absent, although they had opportunity to comment on these minutes.

Preliminaries

Minutes from the second ASSLRT meeting were discussed and approved with a few revisions to reflect team comments. Bob Small, who was absent from the second meeting, noted several issues in the minutes from the second meeting that he believed needed clarification and revision. The team agreed that these issues would be discussed in greater detail when the team prepared a more thorough written evaluation of the BiOp. A draft agenda for the current meeting was revised to focus on the following primary items: (1) discussion of current events, (2) revisit role of ASSLRT in the current process, (3) review of sea lion critical habitat designations and their implications on reasonable and prudent alternatives (RPAs), and (4) development of Restoration Team advice to ADF&G's Deputy Commissioner apropos to the special North Pacific Fishery Management Council (NPFMC) meeting held January 11-12, 2001.

Discussion of Current Events

The team briefly revisited the rider by Senator Stevens that earmarked $15 million in new federal funds for sea lion research and that established a Council-related process that leads up to full implementation of the RPA management measures in 2002. Given the Council's upcoming special meeting on January 11-12 to discuss the schedule for implementing sea lion protective measures and given progress made by ASSLRT on these issues, the Restoration Team felt that it was important to provide some advice to the ADF&G Deputy Commissioner in advance of the Council meeting. Accordingly, the team set aside time at the end of the meeting to draft their recommendations.

Lorrie Rea provided additional information on ongoing and recently completed sea lion research. Lorrie has now compiled an excellent review of 38 research projects plus an overview of the research being conducted by the North Pacific Universities Marine Mammal Research Consortium.

Lorrie clarified the work of Leah Gerber of the University of Washington that was briefly discussed by the Restoration Team at its second meeting. Gerber's Ph.D. thesis evaluated risk and the use of population models to determine the status of marine mammals relative to the Endangered Species Act. She examined different population viability analysis

models and compared them to models of York et al. (1996) for Steller sea lions. In general, York's estimates of probability of extinction were smaller initially but increased more rapidly than other models that Gerber examined. A manuscript, stemming from her thesis, is being revised for publication in a peer-reviewed journal.

The team discussed funding of sea lion studies. Apparently, there is approximately $12.5 million for ongoing sea lion research for federal fiscal year 2001. This includes about $7 million for the National Marine Fisheries Service, $2.5 million for the ADF&G sea lion research program, $1 million for the Sea Life Center, $800,000 for the North Pacific Universities Marine Mammal Research consortium, and $1 million for the Gulf Apex Predator study. Additionally, Senator Steven's rider established a one-time appropriation of $20 million for sea lion research. Of this, $5 million was earmarked for the Sea Life Center and the remaining $15 million is to be administered by NOAA for sea lion and related research (e.g., sea lion predation, fishery interactions). NOAA is planning a meeting on January 24th in Seattle when they will discuss a coordinated research planning approach with researchers from other organizations.

Role of ASSLRT in the Current Process

The Restoration Team discussed how best to contribute to the current process associated with sea lions and fishery management. Broad distribution of meeting minutes and other written documents is one mechanism. Earl agreed to provide minutes to the Council office, and Gordon maintains email distribution lists of minutes to others upon request. Other team members were encouraged to widely distribute the meeting minutes. The team agreed that, once completed, the review of the Biological Opinion (BiOp) should be provided to the National Academy of Sciences and the Council family including the Scientific and Statistical Committee and the newly forming Council's sea lion working group, and interested members of the public. The team set a deadline for a full draft BiOp review by April. The team discussed other documents, including a discussion of the team's advice on alternative RPAs. It was proposed that the team's collection of final written documents would include Lorrie's review of current sea lion research, Ken's white paper on causes of sea lion declines, and other team documents.

Endangered Species Act and a Chronology of NMFS Critical Habitat Designations for Steller Sea Lions

Kate Wynne presented a review of the Endangered Species Act (ESA) of 1973. She also summarized critical habitat designations and outlined a chronology of critical habitat designations for Steller sea lions including critical habitat considerations in the BiOp. Kate provided a handout on these topics.

Section 3(5)(A) of the ESA defines critical habitat as *"...specific areas with physical and biological features (1) essential to the conservation of the species and (2) which may require special management considerations."* Conservation means recovery to the point where the species can be down-listed. Section 4(2) says that *"...the secretary shall*

designate critical habitat and make revisions thereto (1) on the basis of best scientific data available and (2) after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat." Since 1978, the Secretary has been required to consider economics and non-biological information and has discretion to exclude any or all of the qualifying area (as defined) from designation as critical habitat. Section 4(5) of the ESA says that *"With respect to any regulation proposed by the Secretary to implement a determination, designation, or revisions ... the Secretary shall... publish a general notice and the complete text of the proposed regulation in the Federal Register, and give actual notice of the proposed regulation ... to the State agency in each State in which the species...occurs..."* Finally, Kate pointed out that Section 4(3)(D)(i) indicates that any person can petition the Secretary to revise the critical habitat ruling.

In 1990 when Steller sea lions were first listed as threatened under the ESA (prior to critical habitat designation), 3-mile buffer zones were created to prohibit vessel entry around all rookeries west of 150° W. Also, in 1990, the following modifications were made to the groundfish fishery management plans: (1) 10 nm no-trawl zones around rookeries year-round, (2) 20 nm no-trawl zones for 6 rookeries in the eastern Aleutian Islands for the pollock A season, and (3) the pollock total allowable catch (TAC) was split in time and space.

In 1993, NMFS proposed to designate critical habitat that includes a zone that extends 3,000 feet (0.9 km) landward and vertical of all Steller sea lion rookeries and major haulouts and 3,000 feet seaward for sites east of 144° W and 20 nm for sites west of 144° W 50 CFR Part 226). Also included were three critical foraging areas within the core of the sea lion's geographic range.

In their comments on the proposed designation, the State of Alaska Division of Governmental Coordination (ADGC) and ADF&G urged adoption of a seaward boundary of 3,000 feet throughout the sea lion's range in order to provide a buffer zone that could be used to prevent disturbance and other possible impacts, as proposed by the Steller Sea Lion Recovery Team (50 CFR part 226). ADF&G recognized the need to designate certain important foraging areas as critical habitats, such as the three large marine areas proposed, in addition to the 3,000 ft buffer zone. ADF&G and ADGC suggested the 20-nm zones around rookeries and major haulouts were inappropriate because they were based on satellite telemetry data from few locations, and that NMFS did not supply sufficient documentation to justify the 20-nm designation. ADF&G recommended that foraging areas in coastal and offshore waters be defined as critical habitat where they contain the appropriate environmental and biological characteristics to provide important feeding habitats for sea lions.

In addition to ADF&G's recommendation for establishing critical aquatic habitats, the Sea Lion Recovery Team proposed that further recommendations should be developed, as additional data became available. However, NMFS adopted the 20-nm buffers in their Final Rule (50 CFR part 226). NMFS stated *"It is important to emphasize that in*

designating these extended aquatic zones, NMFS is not attempting to justify or prove that these areas, in fact, actually do need special management or special regulation, but rather that these areas may be in need of management." NMFS went on to say *"This final rule does not include specific management measures ... as a result of the designation of these extended aquatic zones as critical habitat. If and when specific management measures are proposed, it is anticipated that the proposed rule will explain the scientific basis and justification for the measures."* Regarding the need for scientific justification, NMFS pointed out that new research was planned on sea lion foraging behavior including satellite telemetry studies and that *"Modification of critical habitat designation or specific management measures may be considered based upon this research."* In the rule, it stated that *"NMFS has determined that Alaskan groundfish fisheries are not likely to jeopardize the continued existence of Steller sea lions or essential habitat."* Moreover, the rule declared that *"If, at some future time, it is determined that further restrictions are necessary to protect Steller sea lions or critical habitat, NMFS will initiate the rulemaking process which provides opportunity for public review and comments."*

In the RFRPAs defined in the December 1998 BiOp, critical haulouts were defined seasonally as winter-only, summer-only, or year-round. Sites were designated as critical if, at least once since 1979, an annual count exceeded either 75 animals in winter or 200 animals in summer. This BiOp also established pollock trawl exclusion zones within 10 nm of critical haulouts in the Gulf of Alaska (GOA) and 20 nm of critical haulouts in the Bering Sea and Aleutian Islands.

ASSLRT discussed the merits of alternative classification rules for determining critical haulouts. The team discussed whether it might be more appropriate to use, for example: (1) the last 10 years of counts, rather than counts since 1979; (2) sites that met the criteria in more than one year, rather than just one year; and (3) other designation criteria for minimum counts. On the one hand, some concern was expressed that a site could be designated as critical even if no sea lions have been associated with it for decades. On the other hand, the team wants to be careful that measures do not solely reflect current sea lion distributions that could change once the population begins to recover. The team discussed the idea that all sites meeting the criteria remain designated, but that protective measures apply only to the occupied sites until the sea lion population trends are reversed. The team did not reach any conclusion on these issues, except that the criteria are extremely important and deserve further consideration.

In the November 2000 BiOp, NMFS proposed major changes in management measures associated with sea lion critical habitat designations. The primary changes included: extension of exclusion zones in the GOA to 20 nm around rookeries and major haulouts, seasonal closures were extended to year-round, and a pattern of 13 open and closed management zones were proposed. It was also noted that the list of rookeries and major haulouts has been modified.

The team discussed these revisions in light of previous NMFS statements (50 CFR part

226) that future changes will be scientifically justified, that new foraging data including satellite telemetry studies will form the basis for modifications, and that a rulemaking process will be established for public comment.

The increase in radius of the GOA trawl exclusion zones from 10 to 20 nm is described in a single paragraph on page 234 of the November 2000 BiOp. This change is based primarily on two considerations. The first is that the 1999 RFRPAs were to establish no trawling zones that encompassed important shelf waters adjacent to rookeries and haulouts. The second is a new GIS analysis of depth contours in an unpublished NMFS report that is cited to indicate the need to increase the radius from 10 to 20 nm to satisfy the original intent of the 1999 RFRPAs. Additional supporting evidence cited was descriptions of foraging behavior (no citations given), "what little satellite data is available ... as presented in Section 4" on pages 87-88, and the broader consideration of the FMP process. The extension of closures from seasonal to year-round is described on pages 236-237 of the BiOp. In essence, NMFS recognizes that the sensitivity of sea lions to competition from fisheries may vary seasonally, yet that especially for adult females with pups and recently weaned pups *"... food availability is surely crucial year-round."* In reviewing the BiOp's justification for the increase in radius of trawl exclusion zones from 10 to 20 nm and their extension from seasonal to year-round, the Restoration Team believes that all pertinent new information, especially on foraging behavior, should be reviewed and evaluated for major modifications in regulations pertaining to sea lion critical habitats as planned in the 1993 Final Rule. The Restoration Team concluded its discussion by noting that ADF&G's comments on critical habitat designations, made at the time of the 1993 Final Rule, should be revisited, hopefully in light of any recent data that may become available.

Team Discussion about the Ecological Basis of Critical Habitats and their Management Implications

Following the review of the ESA and the chronology of NMFS designations of Steller sea lion critical habitats, the team discussed the biological and ecological basis of habitats needed by sea lions to perform specific activities. The team felt that considerations of management actions should be directly linked to the biology and ecology of the species to be protected. The team identified two critical sets of sea lion activities: (1) breeding and resting on land, and (2) foraging at sea. The team considered spatial and temporal aspects in these activities. Then the team developed a set of related recommendations pertaining to management and research needs.

Critical Habitat by Activity

1. Breeding, resting, etc. on land

Breeding and pup rearing occurs on rookeries during May through September. Resting and nursing occurs on winter haulouts during October through April, and resting occurs on summer haulouts during May through September. Regulations should be set in place

to prevent disruption of these activities.

In the BiOp, NMFS proposed continuation of the 3-nm no-transit zones around rookeries year-round, and additional 3-nm no-fishing zones around major haulouts for all federally permitted vessels.

Restoration Team recommendations – The team had extensive discussions on the distance needed to avoid disturbing shore-based animals and the appropriate size of no-transit zones. The team noted that 3,000 ft was the aquatic zone originally proposed by the Sea Lion Recovery Team as a sufficient "buffer" area to minimize disturbance or harassment. As an initial alternative to the 3-nm no-fishing zones around major haulouts proposed in the BiOp, the Restoration Team recommends 3,000 ft no-transit zones around major haulouts only during the season occupied. The team focussed on no-transit zones in this discussion, because the presence of vessels can lead to disturbance of animals on land. The team discussed whether 3,000 ft was larger than needed for no-transit zones. Most team members felt that 3,000 ft was probably appropriate, as long as some accommodation was made, where needed, for required human activity, such as areas where the radius includes harbors or routes needed for safe navigation. Some members felt that a 3,000 ft no-transit zone is larger than needed to avoid disturbing animals on rookeries and haulouts, and that a smaller no-transit zone would suffice. The team was uncertain about the basis for the NMFS proposal for the new 3-nm no-fishing zones, as well as whether a distinction between no-transit and no-fishing zones is needed around major haulouts. The team agreed to further discuss these issues, as well as the appropriate size of no-fishing zones, in a future meeting at which all team members are present.

2. Foraging near rookeries and haulouts in summer

The time period of May through September is critical for feeding in the vicinity of rookeries, and likely for summer haulouts, as well. Data available to determine the foraging distance is limited. The team noted that the 20-nm designation was based on the average of the maximum distances from rookeries for individual foraging trips in summer by only 6 females with pups. Whereas the team agreed that these are places and times of the year to be conservative, these data deserve more scrutiny than simply averaging the maximum distance for the 6 data sets. Foraging data, collected since 1993, should be analyzed for relevance to the interpretation of critical habitat by depth and by distance from the rookeries. As indicated earlier, these data should be brought to bear to the considerations of the radius around rookeries (and haulouts) in need of extra protection currently discussed on p. 234 of the BiOp. The goal is to provide adequate prey of appropriate species and size to sea lions while they are occupying the rookeries and haulouts in summer. As indicated in the minutes of the December 15th meeting, the Restoration Team interprets the preponderance of data from the western population in the 1990s to indicate that females and their pups were not nutritionally compromised during early lactation (pups up to approximately 5 weeks of age) under the protective management strategies that were in place at the time of study. Concern centers on the

juveniles for which data are presently lacking.

Restoration Team recommendations – The appropriate radius around rookeries and summer haulouts that should be considered for management is a function of sea lion ecology, and depends on factors most critical to sea lions that are likely to be related to depth or some other bio-physical factors that determine prey distributions. The radius should depend largely on the spatial and temporal use patterns within the foraging areas used by females with pups and by juveniles. In addition to the average of 6 maximum foraging ranges currently used as the basis for the 20 nm radius, the team recommends conducting an analysis of foraging depth and distance from shore, including data collected since 1993. A frequency distribution of distances from the rookery should also be considered in order to: (1) evaluate habitat use and relative importance; and (2) design precautionary management actions based on relative risk associated with different fishing activities. However, it should be recognized that the distribution of satellite-recorded distances from a rookery might not be directly related to the proportion of time spent foraging at each location. Available information on bathymetry and ecological factors such as migration patterns of forage fishes and their availability to sea lions (and vulnerability to fishing gear) and should be considered in the analysis.

3. Foraging near haulouts in winter

Winter haulouts are used seasonally, approximately from October through April. The team noted that this also is an important time for pregnant females to support their pups, a developing fetus, and themselves. However, the team generated a number of questions that should be answered. Is foraging success tied to distance from haulout? Do sea lions forage further away from haulouts than rookeries and do foraging distances change seasonally? If the area is larger in winter, does that mean a larger area needs to be protected or does it mean that foraging activity is more dispersed, less susceptible to specific instances of localized depletion, and therefore fishery restrictions can be lessened at this time?

Restoration Team recommendations – The team offers the following advice: (1) annual count data, in addition to maximum counts since 1979, should be compiled and used to define the rookeries and important haulouts as critical habitat; (2) some criteria should be developed in addition to whether abundance exceeded a subjective threshold once in the history of observations since 1979; (3) the application of management restrictions to individual rookeries and haulouts should consider whether the haulout has been occupied in recent years as well as in previous years; (4) recent foraging ecology data collected on 6-12 month old pups in the eastern population should be analyzed; (5) there is a high priority for research on juveniles (age 1-3 years) year-round and on pregnant females supporting pups in winter, and (6) consideration should be given to initiating seasonal surveys of sea lion distribution and abundance to fine-tune critical habitat designations in the western stock in areas where major fisheries occur. Winter data are particularly lacking.

4. Critical foraging areas

Three critical foraging areas have been defined: Shelikof Strait, Sequam Pass, and the Sea Lion Conservation Area. The team focussed most of its discussion on the Shelikof Strait area. Jay noted that the current domestic fishery occurs primarily at 110-170 fathoms on spawning pollock, and that juvenile sea lions tend to be found at shallower depths. He mentioned that fish migrate diurnally, and that recent studies by the Prince William Sound Science Center indicated that sea lions can forage at night. The team discussed that the foreign pollock fishery in Shelikof Strait in the 1980s was a roe-stripping fishery in which large amounts of pollock carcasses were discarded at sea. The Team discussed whether those discards may have attracted sea lions to the area and contributed to increased sea lion bycatch and other interactions. Jay mentioned that codends were towed at the surface to pack the net prior to transfer and that this activity may have inflated the bycatch of sea lions near surface. The team noted that the five rookeries and major haulouts in the Shelikof Strait area have low counts, 4-136 sea lions per site, based on data presented in the 1998 BiOp.

Restoration Team recommendations – Given this discussion, the team offered the following recommendations: (1) current pollock fishery observer data should be analyzed for depth of operation, bycatch of sea lions, and other attributes; (2) the seasonal use of these foraging areas by sea lions should be analyzed; (3) the rate of sea lion declines in the Shelikof Strait area could be analyzed relative to other areas; and (4) foraging ecology studies using telemetry should be conducted at the 5 Shelikof sites and adjacent sites in the Kodiak Island area. The team noted that, of the 5 Shelikof sites, one is winter-only and one is summer-only.

Development of Restoration Team Advice Pertinent to the Special Council Meeting

The Restoration Team noted that the NPFMC scheduled a special meeting for January 11-12, 2001 to discuss a schedule for implementing regulations associated with sea lion protective measures. Given the Restoration Team's work on these issues to date, the team decided that it would be prudent to provide some advice to the ADF&G Deputy Commissioner in advance of that meeting. The team discussed the following main points:

1. Given our initial review, the Restoration Team feels that the Reasonable and Prudent Alternative (RPA) defined in the BiOp is not justified based on the data and analysis provided.

2. The Restoration Team recommends that NMFS should plan to develop a new BiOp that addresses subsequent reviews by the state's Restoration Team, National Academy of Sciences, and the Scientific and Statistical Committee and Council family.

3. Given the imminent reviews by several groups, the Restoration Team recommends that the Council put into place new regulations for fishing in 2001 with the realization

that those regulations will not constitute the ultimate management regime associated with sea lion restoration.

4. The Restoration Team recommends delaying the implementation of the proposed experimental management plan until a more refined plan has been developed.

5. The State should consider the need for complimentary actions in the state waters Pacific cod fishery.

6. The Restoration Team is developing recommendations about specific research needs, but we wish to convey the following broad advice at this time:

a. Develop a research approach that is well coordinated among organizations and among disciplines, especially given major increases in funding for sea lion-related research.

b. New appropriations should be designed as multi-year expenditures to create a research program with a greater degree of stability.

c. Although, as indicated above, the Restoration Team advises against commitment to a long-term experimental design at its present stage of development, the team recommends initiating some intensive small-scale manipulative experiments designed to maximize opportunity to resolve key unknowns about sea lion biology and fishery and ecosystem interactions.

This advice, with additional justification, was provided in a memorandum dated January 9, 2001 from the Restoration Team chair to Deputy Commissioner Duffy.

Action Items

Aside from the memorandum to Deputy Commissioner Duffy, the team discussed the following action items:

- Team members should continue their review of the BiOp. Gordon will start the draft BiOp review as a stand-alone document, and team members will be asked to add their comments to the document. The document will highlight major comments; minor comments will be tabulated in an appendix.
- Lorrie and Bob were asked to draft a letter to Jim Coe for team review. The letter would outline the team's recommendations about priorities for coordinated research on sea lions.
- Gordon will finalize minutes of the December 15th meeting and draft minutes of the January 5th meetings as soon as possible.
- With assistance from Denby, Kate will draft a review of sea lion critical habitat designations. The review should include a description of justification provided for the 3-nm no-transit zones. This review will be coupled to the team's recommendations on critical habitat discussed at this (1/5/01) meeting.

Next Meeting of ASSLRT

The next Restoration Team meeting will be convened sometime during the week of February 26th on a day to be scheduled later. However, the team has scheduled a considerable amount of work to accomplish prior to this next meeting. The team agreed that much work could be accomplished by email.

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5 February 2001

Chairman David Benton
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, Alaska 99501-2252

Dear Chairman Benton:

Please consider the importance of taking immediate and decisive action to protect the integrity of the "prey field" for Steller sea lions. I urge you to support the Biological Opinion released by the National Marine Fisheries Service in order to insure that an adequate "prey field" is ALWAYS available for sea lions. Don't hesitate to LOWER the allowable catch level when populations of prey species are declining or scarce.

Please continue to urge the National Marine Fisheries Service to analyze the effects of different gears on the availability of prey for sea lions. The NPFMC should also support research to analyze gear-specific differences in sea lion prey fields. As stated in the BiOp: "In terms of effects on Endangered Species Act-listed species, the slower and more dispersed nature of the hook and line and pot fisheries make localized depletion less likely than would be possible with trawl gear."(p.215, BiOp, November 30, 2000) To protect the integrity of the prey field in critical habitats, increase vessel monitoring and observer coverage. Trawlers in flatfish fisheries should be restricted in critical habitats to only 5% maximum retainable bycatch rather than the 20% that is now allowed.

To obtain a better understanding of how to develop future sea lion conservation measures, list current sea lion research that includes approximate dates of when these research results will be available. Include in that listing the State of Alaska Steller Sea Lion Recovery Team. Organize a NPFMC Steller sea lion committee.

I conclude my pleas to mitigate the plight of sea lions with a quotation from Nancy Lord's "Green Alaska: dreams from the far coast."(pp. 113-114):

> My friends ... notice that when the pollock season opens in the Bering Sea, unusual numbers of sea lions pass through the strait /_ False Pass_/ ...heading south, away from the fishery. The animals, now listed as an endangered species, appear to be either fleeing the disruption caused by the huge fleet of factory trawlers sweeping the area, or searching for food to replace the pollock removed so precipitously by the fleet. It is a fact that sea lions and other sea-feeding animals have fared poorly in recent years in areas of heavy trawling. It is another fact that today's scientists – specialists all - are reluctant to draw any conclusions. Each expert studies his own little piece of the ever more complicated ocean environment, and no one ever knows enough.

This is my sober thought: ...Our gain in specialization is also our loss, until perhaps only small scale fishermen and their kind are left as the generalists who see things whole – and who will defend not their disciplines but our lives.

Sincerely,

Marga Raskin

Marga Raskin

#	PI	Agency	Cost	Availability	Duration	Connect	Fisheries	Environme	Predation	Anthropoger	Disease	Contaminants	Monitoring	Title
1	Stauffer/Ma	AFSC	1.800	18 mo	3 yrs	2	V2	V3						Localized depletion of cod, pollock, atka mackerel
2	Loughlin/De	AFSC	0.400	12 mo	3 yrs	1	V3 & V4							Satellite tagging
3	Loughlin/De	AFSC	0.400	12 mo	3 yrs	1		V3						Food habits studies foraging behavior
4	Stauffer/Rig	AESC	0.600	18 mo	3 yrs			V3						~~Forage fish assessment and biology~~
5	DeMaster	AFSC	0.400	1 yr	1 yr	3		V1 & V2						AI Pass study and GLOBEC GOA
6	Rigby	AFSC	0.400	1 yr	3 yrs				V2					Shark biology and food habits
7	DeMaster	AFSC	0.400	1 yr	3 yrs	6			V1					Killer whale studies
8	Loughlin/De	AFSC	2.600	1 yr	5 yr	All	V3	V3					x	Monitoring surveys branding food habits
9	Payne / Sal	AKR	1.500	N/A	1 yr	All								Management compliance
10	Payne	AKR	0.000	N/A	1 yr	All				V1	V2	V2		Subsistence monitoring and biosampling
11	Stauffer/Ma	AFSC	0.000	6 mo	ongoing		V1 & V2	V3					x	Fish stock assessment
12	Krahn	NWFSC	0.000	6 mo	2 yr							V1 & V2	x	Contaminant status
13	Baird	OAR	0.500	8 mo	8 mo		V1 & V2 & V3							Comprehensive analysis of existing environmental data related to Steller sea lions, Report 2001, NOAA and external experts
14	Baird	OAR	5.000	2 yrs	2 yrs		V1 & V2 & V3						x	2 year field and modeling program leading to updated analysis in summer 2003, NOAA and external scientists, RFP process
15	Baird	OAR	0.500	1 yr	1yr		V1 & V2 & V3							Coordination, communication and outreach
16	TBD	NOS	2.000	2 yrs	1 yr		V2 & V4		V1 & V2					Competitive process for directed research on predator prey relationships
17	Rea/Gelatt	ADF&G	2.000	1 yr	1 yr		V1 - V4						x	Identification of sensitive life history stages of SSL, ability to monitor changes in body condition, PTT deployments
18	Rea/Gelatt	ADF&G	0.300	4 yr	1 yr		V1 & V2 & V3							Collection of SSL vital statistics in collaboration with NMML
19	Rea/Gelatt	ADF&G	0.150	4 yr	1 yr					V1				Modeling population responses of SSL to incidental take
20	Rea/Gelatt	ADF&G	0.025	1 yr	1 yr						V1 & V2			Surveys of blood borne disease
21	Rea/Gelatt	ADF&G	0.025	1 yr	1 yr							V1 & V2		Measurment of contaminants of SSL tissues
22	Bechtol/Jac	ADF&G	0.000	6 mo	ongoing		V1 & V2	V3					x	PWS Cook Inlet and Kodiak bottom trawl surveys
23	Bechtol/Tho	ADF&G/PW	0.000	6 mo	ongoing		V1 & V2	V3					x	PWS hydroacoustic pollock survey collaboration with PWSSC
24	Larson	ADF&G	0.000	6 mo	ongoing		V1 & V2	V3					x	SE Alaska herring assessment
25	Eggers	ADF&G	0.000	6 mo	ongoing		V1 & V2	V3					x	Salmon enumeration
26	Wynne	UAF	0.200	1 yr	1 yr		V2	V3						Kodiak seasonal diets of SSL
27	Foy	UAF	0.300	1 yr	1 yr		V2	V3						Kodiak seasonal prey availability for SSL
28	Foy	UAF	0.100	1 yr	1 yr		V2	V3						Kodiak seasonal prey quality for SSL
29	Wynne/Foy	UAF	0.200	1 yr	1 yr		V2 & V3	V3						Kodiak diet of SSL competitors
30	Wynne	UAF	0.200	1 yr	1 yr				V1 & V2					Kodiak killer whale and shark diets
31	Rosen	NPUMMRC	0.250	1 yr	1 yr		V1 - V4	V1 - V4	V1					Bioenergetics of SSL
32	Tollit	NPUMMRC	0.035	1 yr	1 yr		V1 - V4	V1 - V4						Bias in scat analysis
33	Andrews	NPUMMRC	0.040	1 yr	1 yr								x	New technologies implantable VHF
34	Rosen	NPUMMRC	0.011	1 yr	1 yr		V1 - V4	V1 - V4						Effects of Atka mackerel and SSL condition
35	Trites	NPUMMRC	0.013	1 yr	1 yr		V2	V3						SSL scat collection and diet studies in SE Alaska
36	Winship	NPUMMRC	0.019	1 yr	1 yr		V1 - V4	V1 - V4	V1					Bioenergetic modeling of SSL
37	Trites	NPUMMRC	0.012	1 yr	1 yr								x	Timing of molt
38	Barrett-Len	NPUMMRC	0.017	1 yr	1 yr				V1					Killer whale predation model
39	Springer	NPUMMRC	0.103	1 yr	1 yr					V1			x	Pribilof Is. & Kodiak Is. monitoring subsistence harvest
40	Springer	NPUMMRC	0.050	1 yr	1 yr			V3						Long-term variability in forage fish abundance
41	Van Blarico	NPUMMRC	0.050	1 yr	1 yr								x	Monitoring diet and demongraphics of SSL in Washington State
42	Sampson	NPUMMRC	0.120	1 yr	1 yr								x	Trends in diet and population of SSL in Oregon
43	Calkins	ASLC	1.000	18mo	3 yrs		V1 - V4	V1 - V3				V1 - V2	x	Feeding and metabolic studies on captive animals and diet analysis of wild animals. Inhouse studies and RFP
44	Burdin	ASLC	1.500	1yr	5 yr		V1 - V4		V1 - V2	V1			x	Remote video cameras and branding/monitoring in collaboration with NMML.
45	Calkins/Atk	ASLC	1.500	18mo	5yrs		V1 - V4				V2	V2		Capture and short-term holding of SSL. Collection of pups
46	Atkinson	ASLC	0.300	1yr	5yrs						V1-V2	V1-V2		Endocrine and immune function, RFP or contract for a portion of this work.
47	Atkinson	ASLC	0.500	18mo	3yrs		V1 - V4							Chiswell Is. seasonal prey availability for SSL
48	Atkinson	ASLC	0.200	18mo	5yrs		V5		V2				x	Chiswell Is. Shark predation studies
49	Atkinson	ASLC	0.500	2yr	5yrs			V1-V3			V1-V2	V1-V2	x	Reproductive biology of SSL and effects of disease in collaboration with NMML
50	Atkinson	ASLC	0.500	18mo	5yrs		V1 - V4	V1-V3					x	New technologies for implants and instrumentation
51	Oliver	NPFMC	1.300	NA	1yr	All								Management legal compliance
52	NAS	NPFMC	0.700	18mo	18mo									Academy review of the BiOP
53		NMFS	15.000	NA	NA									Unspecified research, RFP grants etc.
			43.720											

DeMasters NMFS
SSL - Ar2

Alaska Marine Conservation Council

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February 7, 2001

David Benton, Chair
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK 99501-2252

RE: Item C-3, Steller Sea Lions

Dear Chairman Benton,

The Alaska Marine Conservation Council submits these comments in regard to the North Pacific Fishery Management Council's (NPFMC) task of providing direction to the Steller sea lion Reasonable and Prudent Alternative (RPA) Committee. We remain committed to the dual goals of Steller sea lion recovery and maintaining community-based, clean fisheries at appropriate levels. We are concerned about the efficacy of the November 30, 2000 Biological Opinion (BiOp) RPA in meeting these two goals.

The red/green pattern of open and closed areas to groundfish fishing is flawed in terms of the following:

- Value as an experiment to monitor the effects of fishing
- Value as a conservation measure
- Community impacts

Value as an Experiment to Monitor the Effects of Fishing

National Marine Fisheries Service (NMFS) will not be able to scientifically measure the impacts of removing the sea lion prey species (Atka mackerel, Pacific cod, pollock) from critical habitat if only the directed fisheries are restricted. Other fisheries that have high cod bycatch occur inside the current NMFS red areas and therefore render the red area not a real closed zone. The red zones are not true "control" areas, and the green areas do not represent true areas of normal fishing activity.

We have concerns that the pattern of alternating red and green areas will not result in useful data because of the unpredictable or unknown movements of sea lions and of fish. We also question whether or not 1) NMFS has the capacity to actually monitor effects of fishing on the prey field in so many large locations, and 2) if data from Steller sea lion research would result in useful or clear findings even after multiple years.

Problems with the Appropriateness of Red/Green Areas as a Conservation Measure and Impacts on Communities

The red/green pattern has inherent allocative consequences, apparently without any objective consideration of the differences in gear impacts and fishing practices. Placement of the red areas disproportionately restricts gear types that have the lowest bycatch rates, least impact on habitat, and slowest catch rates from participation in the cod fishery. Some communities, which are predominantly fixed gear towns, are entirely surrounded by a red zone leaving no one anywhere to fish. For other communities, red areas preclude the entire fixed gear sector from participating at all, but allow trawl vessels that take cod as bycatch to operate inside critical habitat. In yet other communities, grounds generally used by fixed gear vessels are closed and areas used primarily by trawl vessels are open. This means pots and jigs will be forced to compete with trawl vessels in smaller areas for fewer fish. These vessels will not be able to operate outside the critical habitat because of the distance from shore and points of delivery.

Sea lion measures are at odds with conservation directives in the Magnuson-Stevens Act to minimize bycatch and protect habitat because the sea lion measures effectively remove the lowest impact fishing practices from the cod fishery while allowing the whole quota to be available to bottom trawl vessels with higher bycatch rates, greater impact on habitat, and higher harvest rates. In addition to working against the Magnuson-Stevens Act's conservation requirements, the RPA is also in violation of Magnuson-Stevens Act National Standard 8 to consider fishing communities in management.

Recommendations

AMCC recommends the RPA Committee use an alternative approach to achieve Steller sea lion conservation, useful monitoring of fishery impacts on the prey field, and modified fishing that supports Alaska's coastal communities and lower impact fishing gears and practices. Our suggestions for the RPA Committee are outlined below.

Conservation Measures

1. Continue using the global control rule as a mechanism to set appropriate catch levels for stocks that have fallen below the threshold abundance.

2. Use gear specific impact analysis to measure the effects of various fishing gears and practices on the Steller sea lion's prey field. An analysis will give the RPA Committee an objective tool to help identify creative ways to adjust fisheries according to their impact on the prey field.

3. Reduce the rate and level of catch, as needed, through tools such as:
    - Time/area restrictions;
    - Gear limits;
    - Vessel length;
    - Horsepower limits;
    - Vessel rotations;
    - Weekly delivery limits;
    - Allowing gear conversions from trawls to pots.

Monitoring and Experimental Design

1. Identify several discreet red areas that could serve as controls for a monitoring effort that seeks to measure impacts of fishing on the Steller sea lion's prey field. In these red areas, AMCC recommends that no take of Pacific cod, Atka mackerel and pollock be allowed, either as a target species or as bycatch.

2. Use vessel monitoring systems (VMS) to monitor fishing activity within and outside of critical habitat areas. VMS should not only be required on vessels participating in the directed cod, mackerel and pollock fisheries, but also other groundfish vessels that take Steller sea lion prey species as bycatch.

Community Meetings

AMCC strongly supports the incorporation of community meetings into the RPA Committee's schedule (as described in the NPFMC February meeting materials). We recommend that the timing be reconsidered and the meetings scheduled earlier than April-June, since most coastal community residents will be preparing to fish or already fishing. We also recommend that Homer be included on the list of target communities.

Thank you for considering our recommendations. We look forward to working with the RPA Committee and the NPFMC in the coming months to ensure progress in Steller sea lion conservation and maintenance of fishing opportunities for community-based fleets and low-impact fishing practices.

Sincerely,

Dorothy Childers
Executive Director

Karen Wood DiBari
Program Director

attachment

Comments from Alaskan Fishermen about
Conservation Problems Related to the Proposed Red and Green Areas
February 2001

- In nearly 15 years of fishing I have never noted an active sea lion haulout on Gore Point. Under the red/green zone concept, this area becomes a closed zone, robbing fixed gear fishermen of the productive areas of the Nuka Bay approaches in the 60 fathom to 100 fathom range. Yet trawling may occur on the banks six nautical miles offshore in an area that at one time were fished by fixed gear vessels until gear loss to trawl vessels became too great.

- Many of us who have fished in the Seward Gully from forty miles offshore to the continental shelf are aware of certain depths which contain productive cod stocks, even when the cod have outmigrated during (what is now) the "B" season from traditional inshore areas. (In the inshore areas), smaller vessels with low extraction rates are able to consistently bring small amounts to shore on an every-other-day basis and service markets for a higher per-pound ex-vessel value.

- Closure of the near shore waters under a red/green scenario would eliminate smaller vessels with slower rates of extraction due to two factors: 1) Distance from shore eliminates the vessels and fishing methods which are the least harmful due to safety factors (i.e. too far out); 2) Depth of accessible biomass eliminates the least harmful harvesters (in terms of catch rates, bycatch and habitat impact) due to inability of jig and pot vessels to fish at the necessary depth. In addition, trawl vessels will begin targeting these offshore areas particularly during the B season. Many of the areas are relatively undisturbed benthic habitat which are home to multiple species of coral. Benthic destruction will occur, bycatch will be excessive, and these areas will be accessible to trawl vessels which are currently only required to meet 30% observer coverage.

- The RPA does not use the range of available management methods to spread out the fishery in time and space to maintain the density of the prey field over all areas throughout the year.

- Use of gear type zones, trip limits, pot limits, and guideline harvest levels for smaller sub areas could maintain prey densities and could also be allocation neutral.

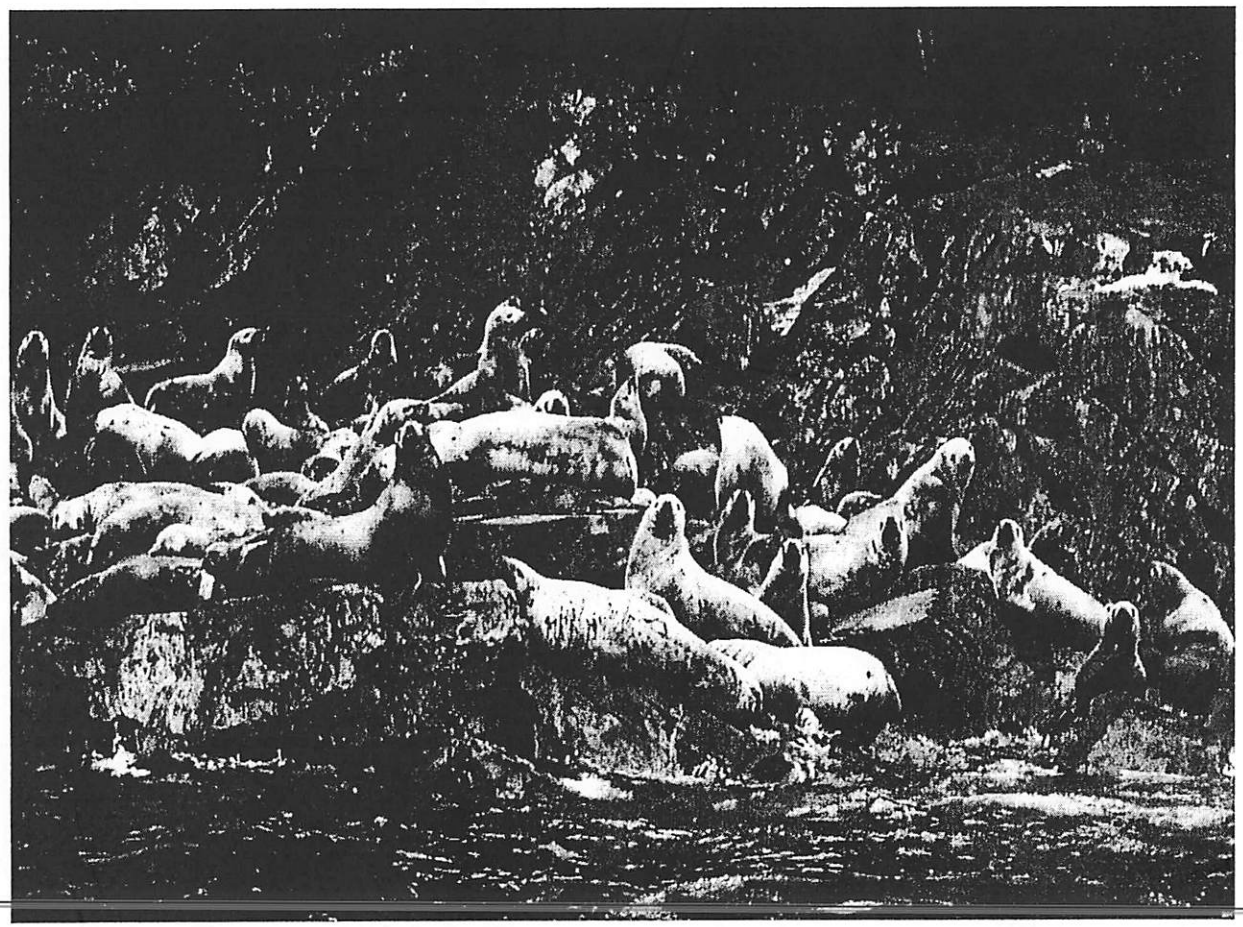
- Areas very close to certain major rookeries in the red zones will have almost no limit on catch other than the global control rule and the 60/40 seasonal split while some inshore areas which are actually much more distant from rookeries will be totally closed. For example, Portlock Bank is just outside the 20-mile line and will be more heavily exploited under the RPA for cod than it has been in the past even though two of the larger central Gulf rookeries (Marmot Island and Sugarloaf) are very close by. The west side of Kodiak Island and Afognak Island north and east of Uyak Bay would be closed even though the sea lion population is much lower than the area close to outer Portlock.

- Sudden prey field depletion is more likely in trawl catches which have recently run as high or higher than 750,000 pounds for many vessels in just five days of fishing (fall 1999, also common during late winter spawning season). Yet impact of the red zones falls most heavily on non-trawl vessels.

Doug Demaster
NMFS/NMML
SSL AIR

FY01 Steller sea lion-Groundfish Budget

$43.15 million



Studies Identified in Steven's Rider

- Available prey
- Predator/prey
- Predation by other marine mammals
- Fishery-SSL interactions
- Regime shift
- Disease
- Survival rates

- Population counts
- Nutritional stress
- Foreign harvests
- Residual impacts of former eradication programs
- Intentional lethal takes
- Non-lethal measures to protect SSL from predators

"Endowed Organizations"

Organization	*Funding Level in FY01*
NMFS	$7.85 million
Alaska SeaLife Center	$6.0 million
ADFG	$2.5 million
Univ. of Alaska	$1.0 million
NPUMMRC	$0.8 million
OAR/PMEL	$6.0 million
NOS	$2.0 million
NPFMC	$2.0 million
Commerce	$15.0 million
Total	$43.15 million

National Marine Fisheries Service
FY01 Budget-$7.85 million

Study (*Preliminary*)	Cost (000s)
Localized depletion (cod, pollock, Atka mackerel	1600
Satellite tagging SSL	400
Food habits/foraging behavior	350
Forage fish assessment	550
Regime shift- AI passes (with PMEL)	400
Implement Recovery Plan	2300
Predation studies	750
AKR Management Activities	1500

Alaska SeaLife Center
FY01 Budget-$6 million

Study (*Preliminary*)	Cost (000s)
Feeding behavior	1000
Remote monitoring/branding	1500
Collection of pups-short term hold	1500
Endocrine and immune function	300
Chiswell Island prey study	500
Chiswell Island predation study	200
Disease and reproductive biology	500
Instrumentation (e.g., implants)	500

Alaska Dept. of Fish and Game
FY01 Budget- $2.5 million

Study (*Preliminary)*	Cost (000s)
SSL body condition and life history	2000
Estimation of vital rates	300
Model response to incidental take	150
Survey of blood borne diseases	25
Measurement of contaminants	25

University of Alaska
FY01 Budget- $1 million

Study (*Preliminary*)	Cost (000s)
Seasonal diets of SSL at Kodiak	200
Prey availability at Kodiak	300
Prey quality at Kodiak	100
Diet of SSL competitors	200
Killer whale/shark diets at Kodiak	200

North Pacific Universities Marine Mammal Research Consortium FY01 Budget- $0.8 million

Study (*Preliminary*)	Cost (000s)
Bioenergetics of SSL	250
Bias in scat analysis	35
Telemetry (implants)	40
Amack food quality/SE scat collection	24
Bioenergetic modeling/timing of molt	31
KW predation model/subs. Harvest	120
Diet in Oregon/WA/forage fish abund.	22
SSL vital rates and condition indices ?	120

North Pacific Fisheries Management Council FY01 Budget- $2 million

Study (*Preliminary*)	Cost (000s)
NAS Independent review	700
Management and legal compliance	1300

Oceanic and Atmospheric Research FY01 Budget- $6 million

Study (*Preliminary*)	Cost (000s)
Analysis of existing environmental data	500
2-yr field study and modeling- combination of PMEL and RFP (CIFAR)	5000
Coordination, communication, outreach	500

National Ocean Survey
FY01 Budget- $2 million

Study (*Preliminary*)	Cost (000s)
Competitive process for directed research on predator/prey relationships (CIFAR)	2000

Dept. of Commerce
FY01 Budget- $15 million

Study (*Preliminary*)	Cost (000s)
Competitive process for directed research on predator/prey relationships	15,000

% of Funds in FY01 Budget to inhouse research, contracts, management and reviews $43.15 million

- 36% in-house research
- 56% contractual studies (research determined by competitive process)
- 6% management related to ESA/NEPA
- 2% external reviews
- Possible Problem- FY02 budget currently has $7-10 million assigned to SSL-groundfish research and management
- Possible Problem- Contractual studies may not provide information in time for October 2001 review

2/01

SSL AR

Fishery Interaction Study

Feasibility Study to Determine the Effect of Commercial Fishing on Walleye Pollock Distribution and Abundance

Anne Hollowed, Chris Wilson, Michiyo Shima, Paul Walline

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National Marine Fisheries Service
Alaska Fisheries Science Center
7600 Sand Point Way NE
Seattle, WA 98115

Key Questions

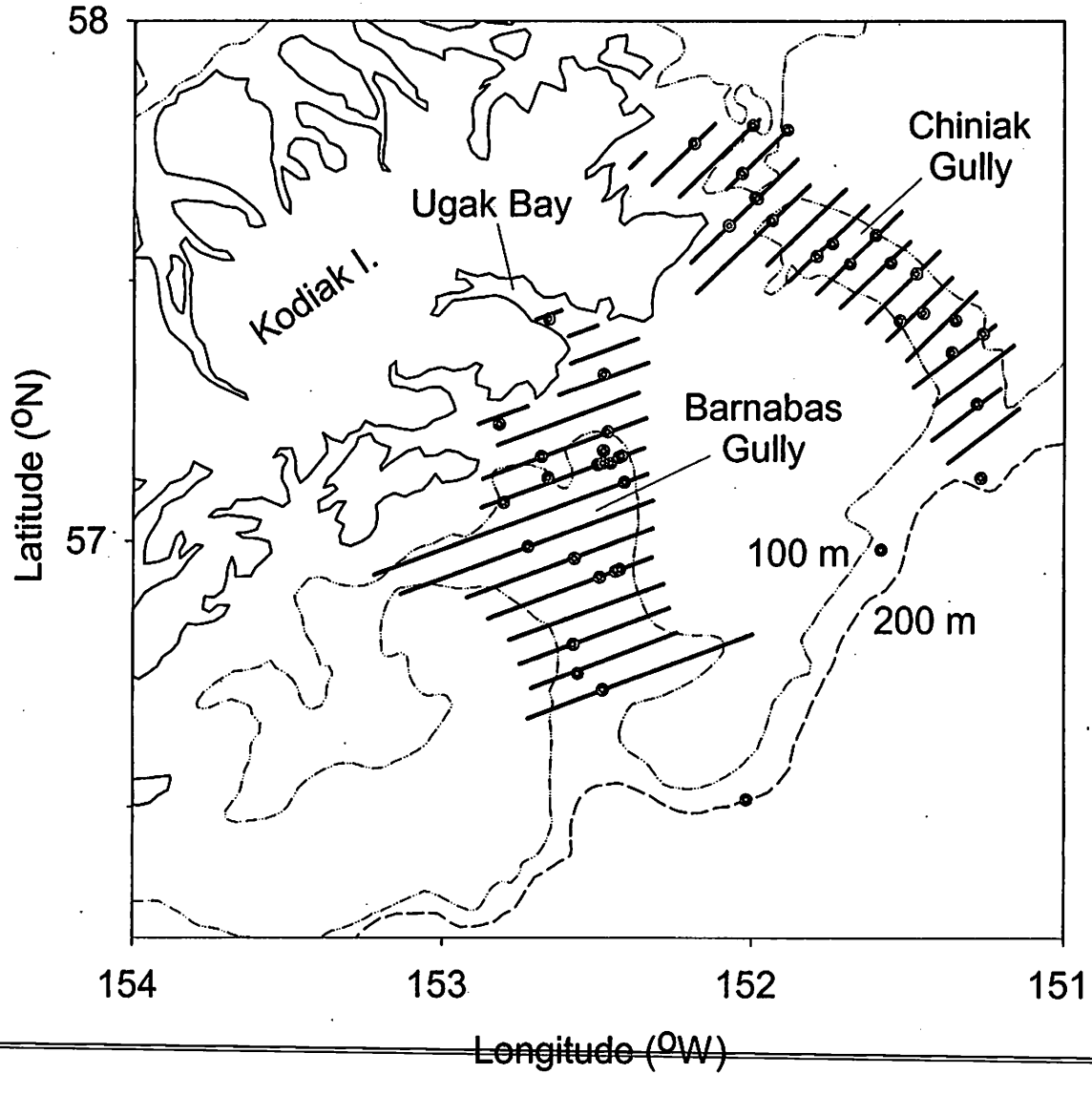
- Are proposed or current RPAs achieving their stated goals?
- What is the functional relationship between commercial fishing effort and foraging success of Steller sea lions?
- What natural factors influence the functional relationship between commercial fishing and foraging success of Steller sea lions?
- What human factors influence the functional relationship between commercial fishing and foraging success of Steller sea lions?

Marine Mammal Studies

- Monthly aerial surveys of sea lion habitats in vicinity of Kodiak Island
- Scat collections from selected sites in the vicinity of Kodiak Island on alternating months, to minimize disturbance
- Satellite tagging
- Branding
- Behavioral studies

Chiniak: 8-10 Aug (pass 1), 14-17 Aug (pass 2)

Barnabas: 11-13 Aug (pass 1), 17-19 Aug (pass 2)



Hypothesis

$$Ho: \quad \frac{B2 - B1}{B1} = \frac{C2 - C1}{C1}$$

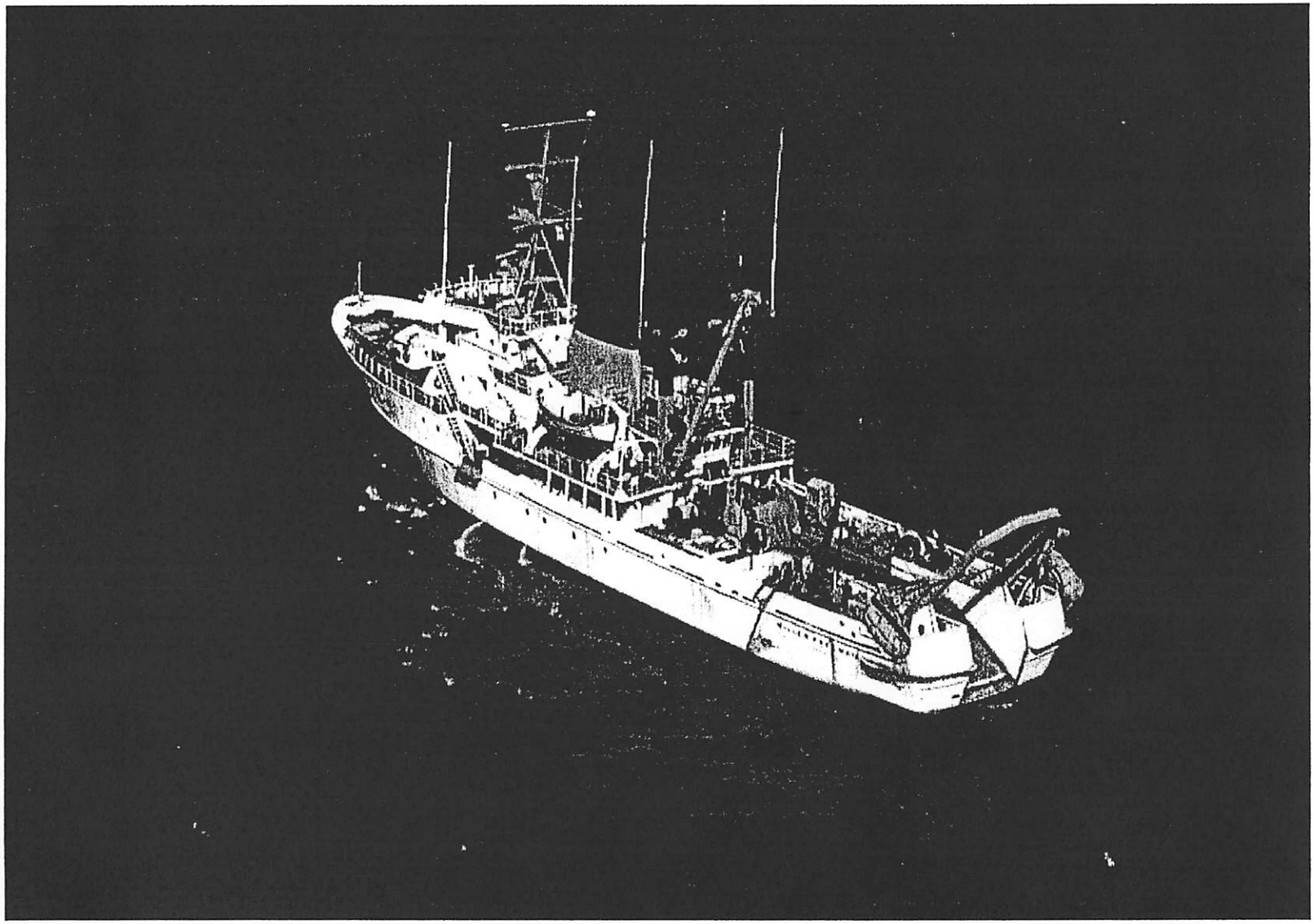
Ho: Commercial fishing does not produce a detectable change in the distribution or abundance of fish within gullies on the east side of Kodiak Island.

Objectives - 1st Year

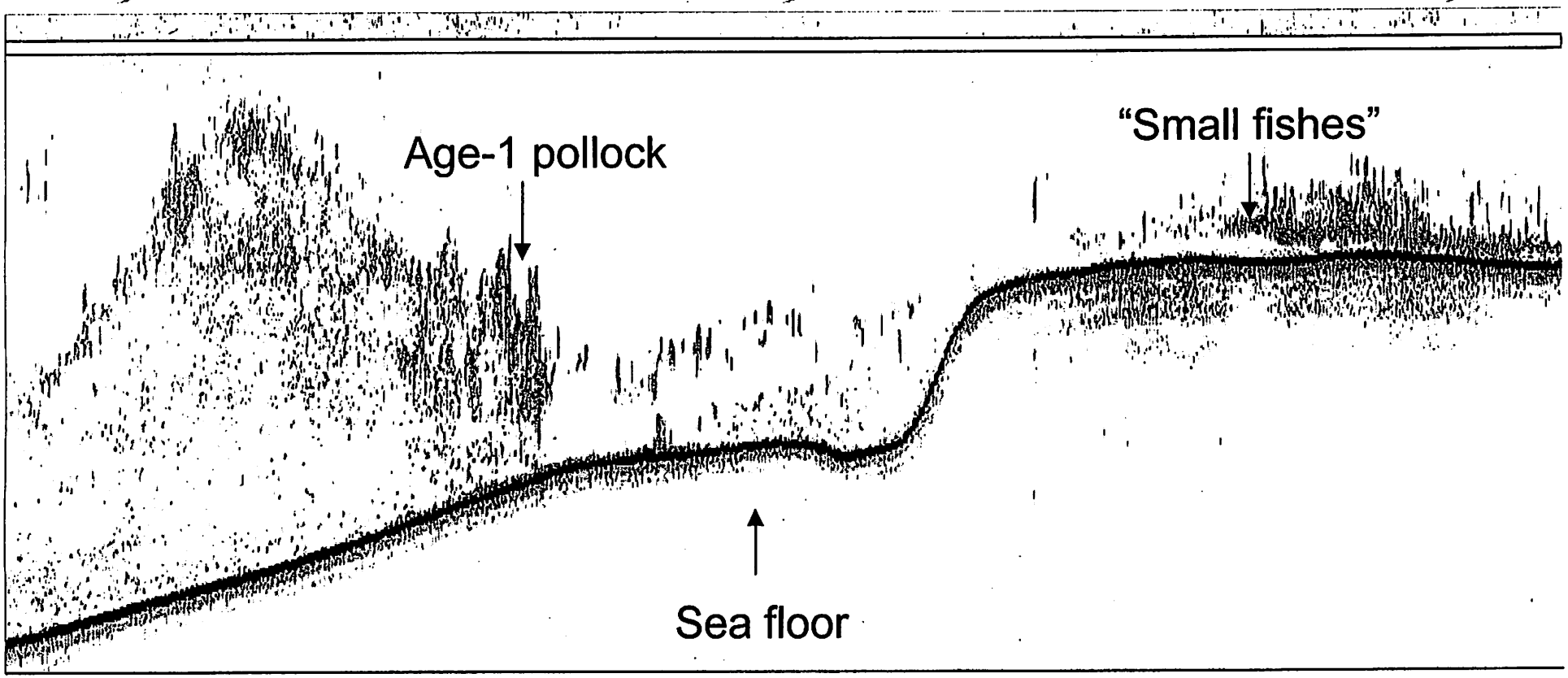
1) assess suitability of acoustic-trawl survey methods at study site in August

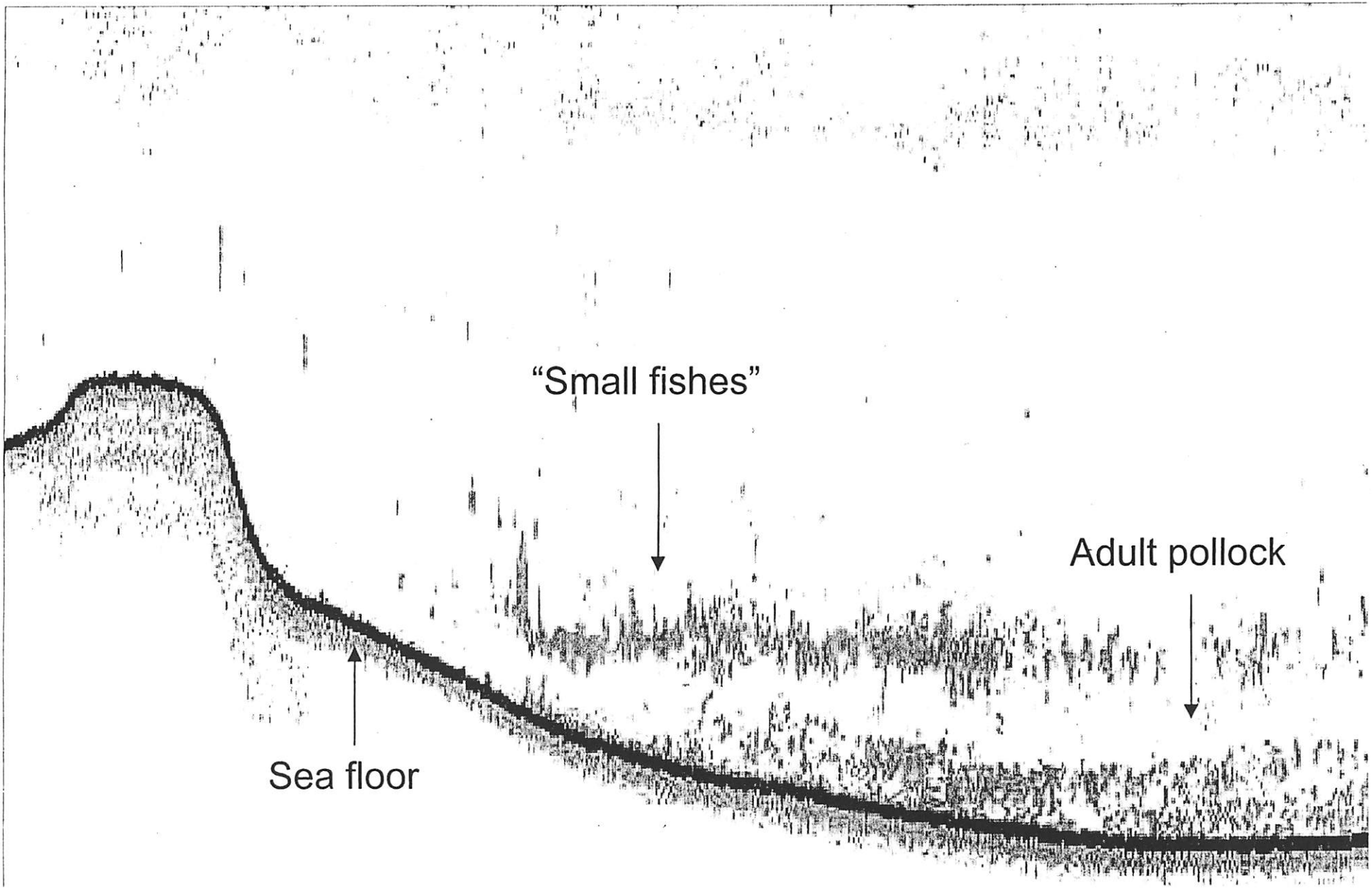
2) assess the temporal and spatial variability in pollock abundance and distribution over duration of field study (days to weeks)

METHODS



- SPECIES COMPOSITION
- POLLOCK SIZE COMPOSITION
- GEOGRAPHICAL DISTRIBUTION
- POLLOCK ABUNDANCE ESTIMATES
- POLLOCK VERTICAL DISTRIBUTION
- POLLOCK SCHOOL ANALYSIS
- FIELD WORK FOR AUGUST 2001


Age-1 pollock
"Small fishes"
Sea floor


"Small fishes"
Adult pollock
Sea floor

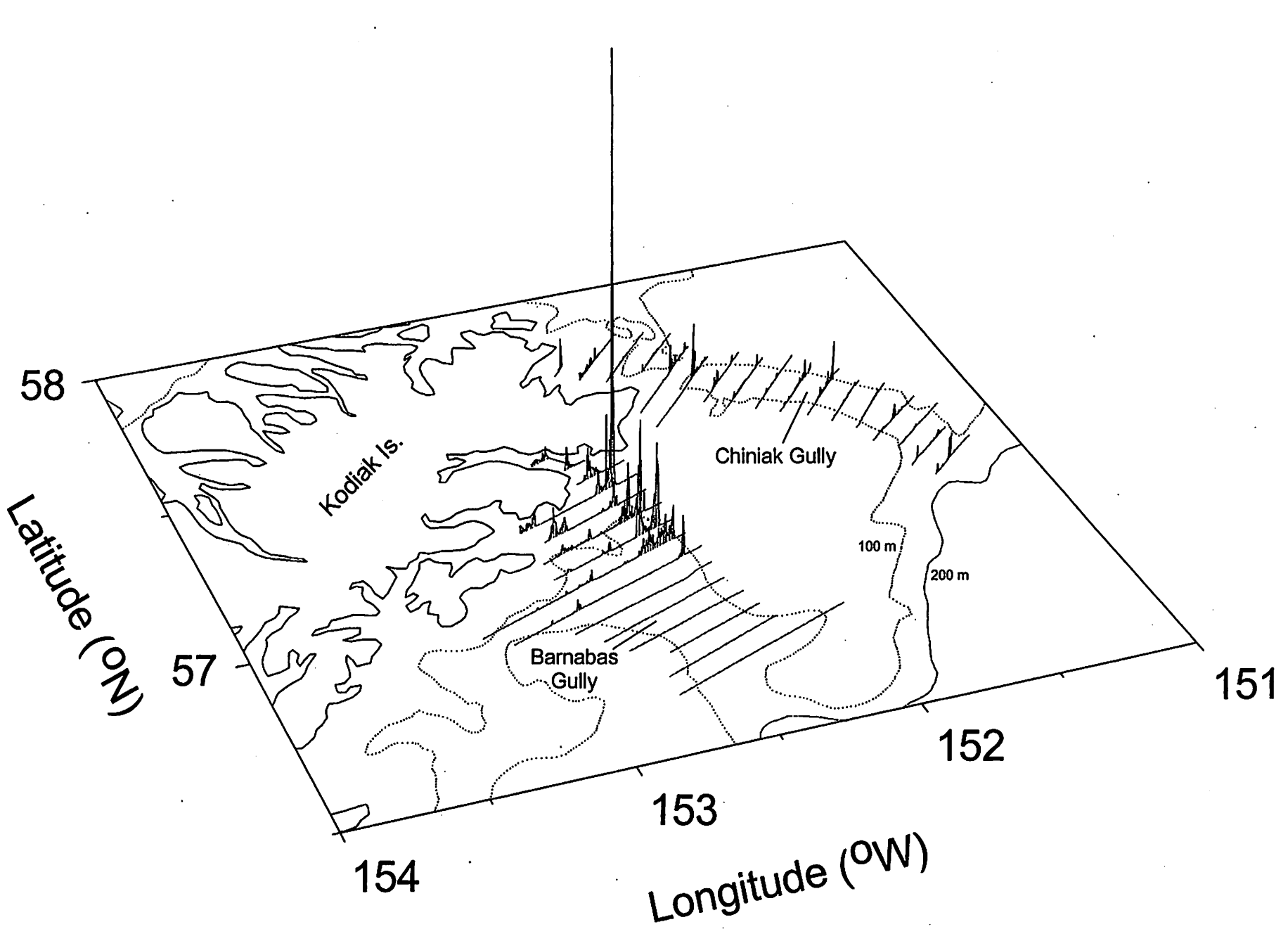


Figure . Acoustic backscatter attributed to "adult" pollock along trackline during pass 1 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

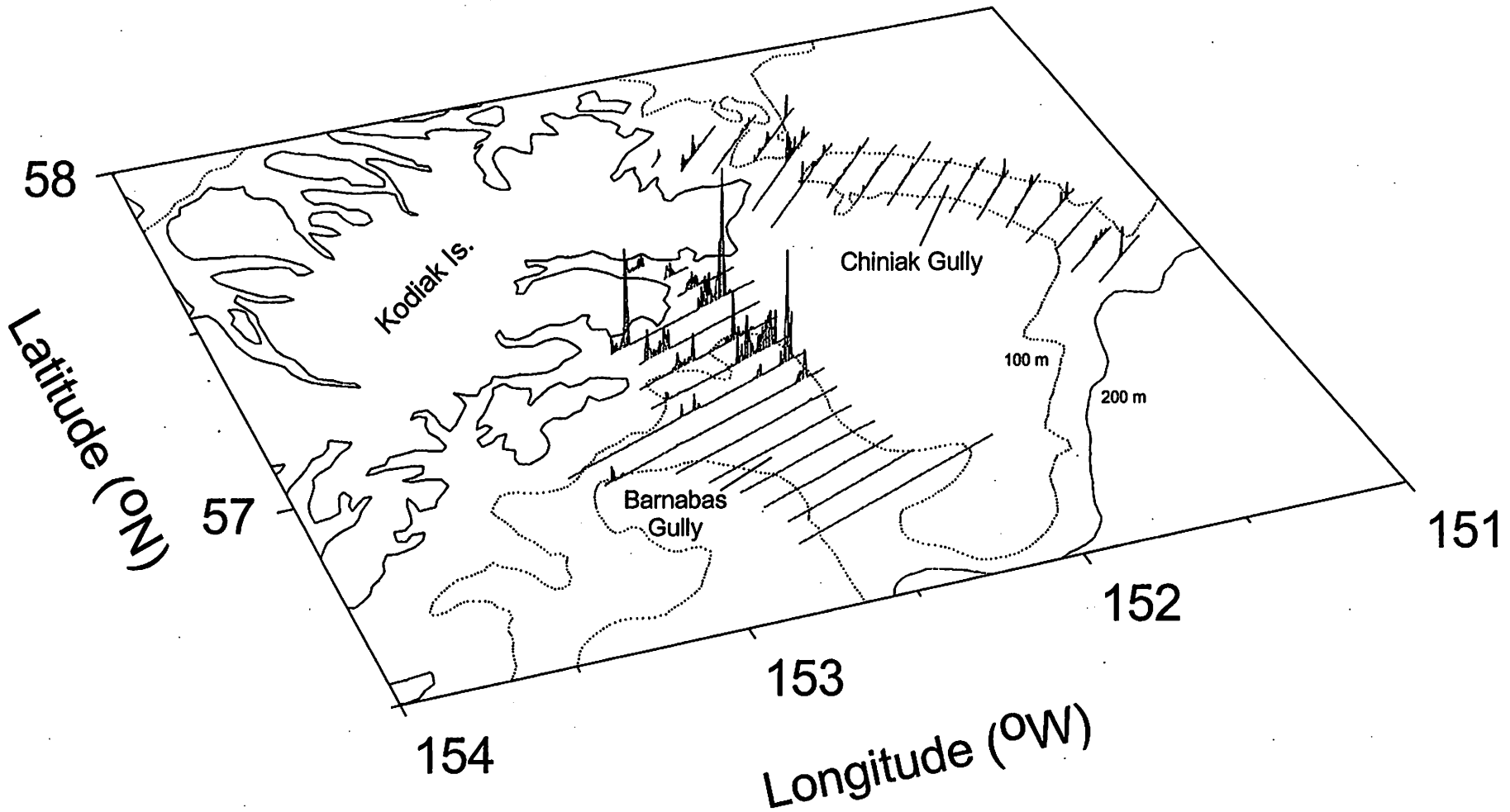


Figure ~~, Acoustic backscatter attributed to "adult" pollock along trackline during~~ pass 2 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

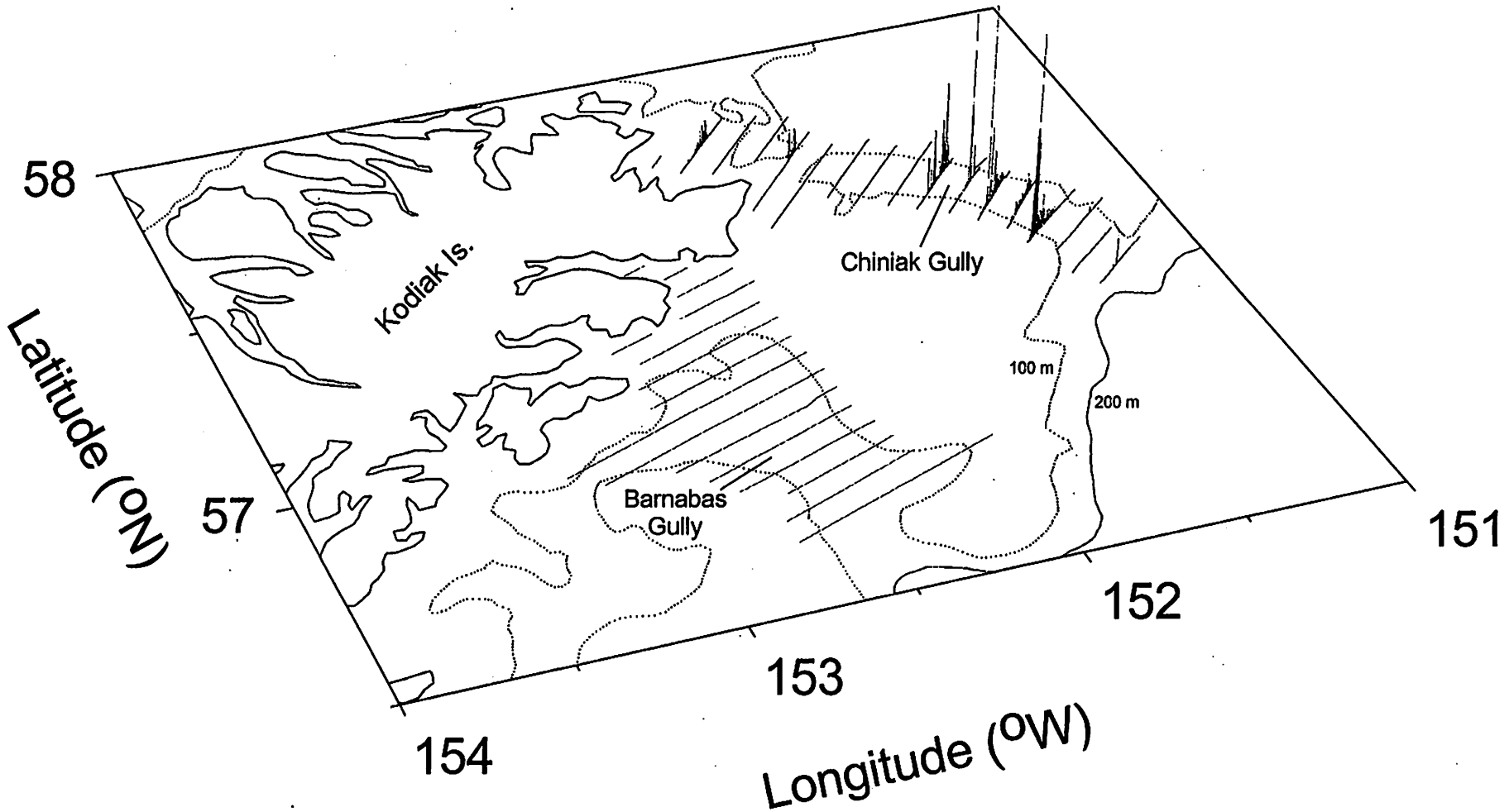


Figure . Acoustic backscatter attributed to "age-1" pollock along trackline during pass 1 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

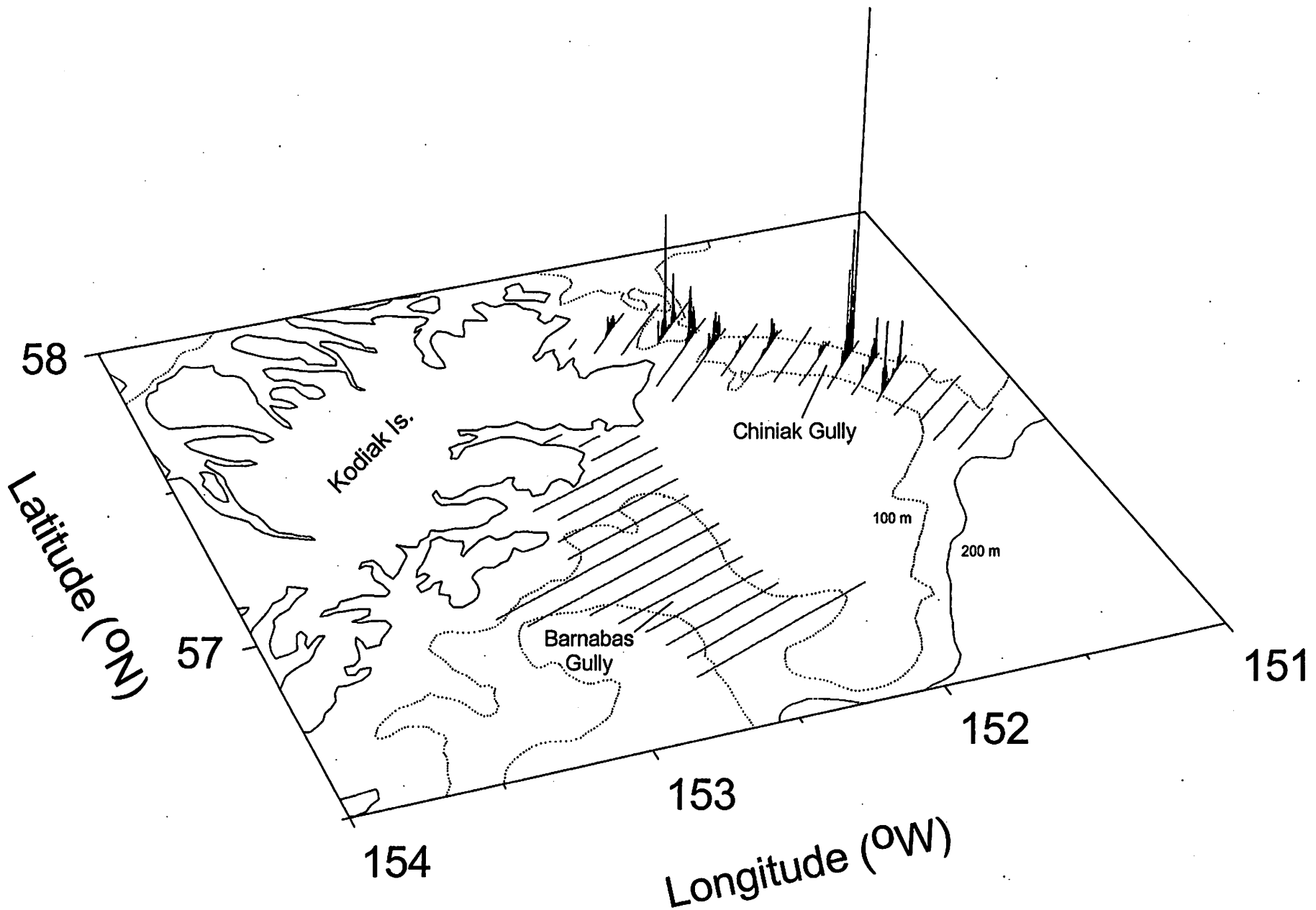


Figure '. Acoustic backscatter attributed to "age-1" pollock along trackline during pass 2 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

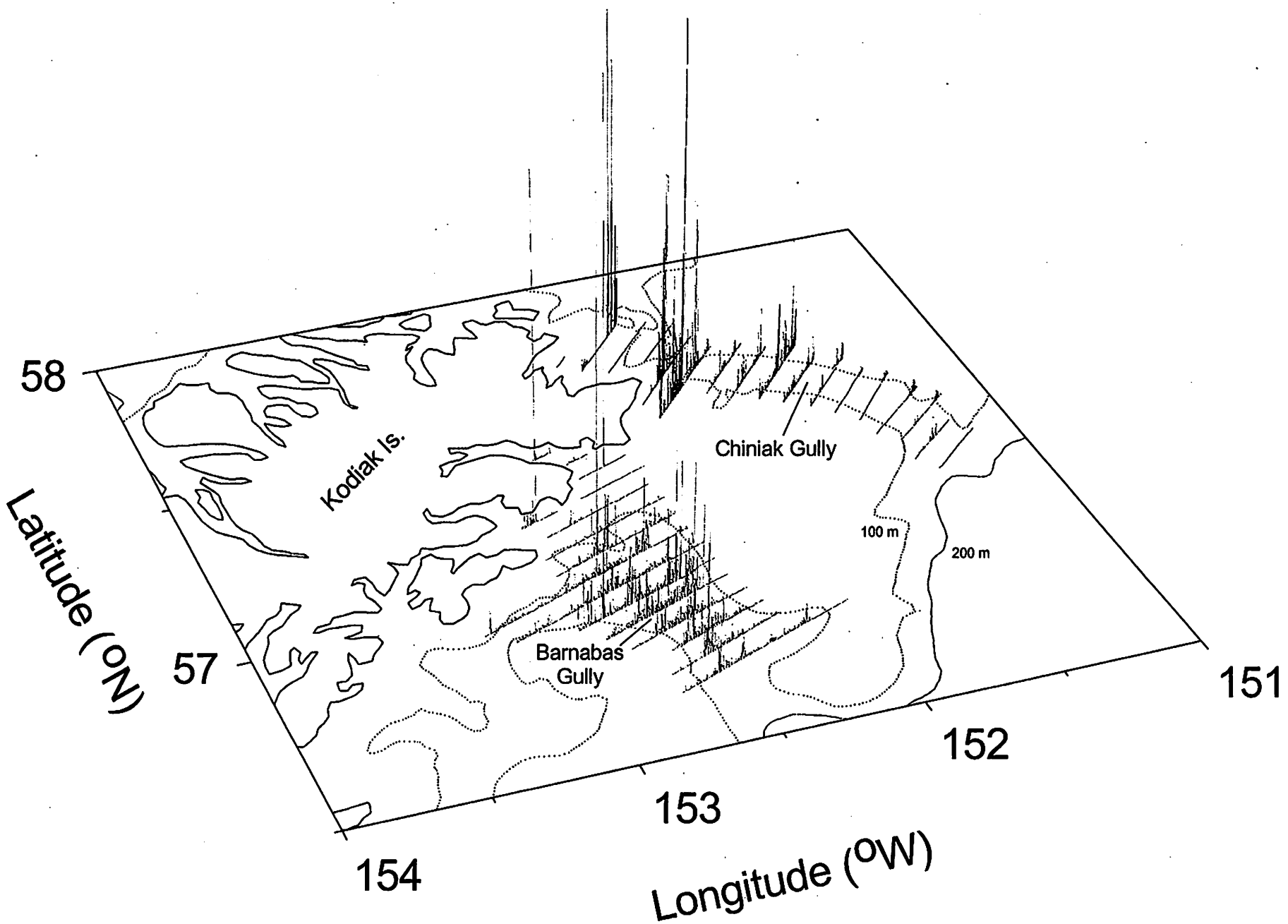


Figure 1. Acoustic backscatter attributed to "small fishes" (i.e., capelin, age-0 pollock) along trackline during pass 1 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

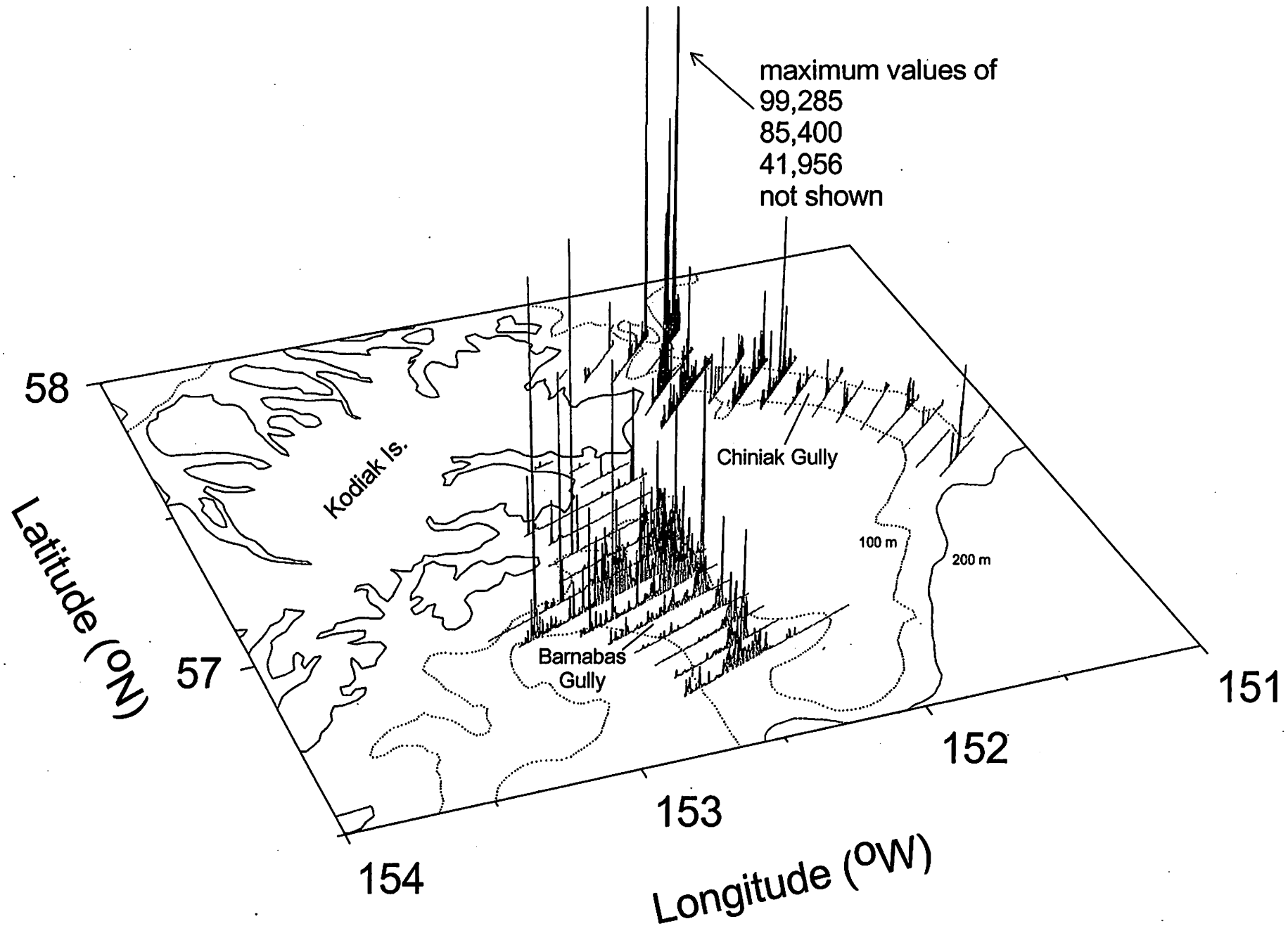
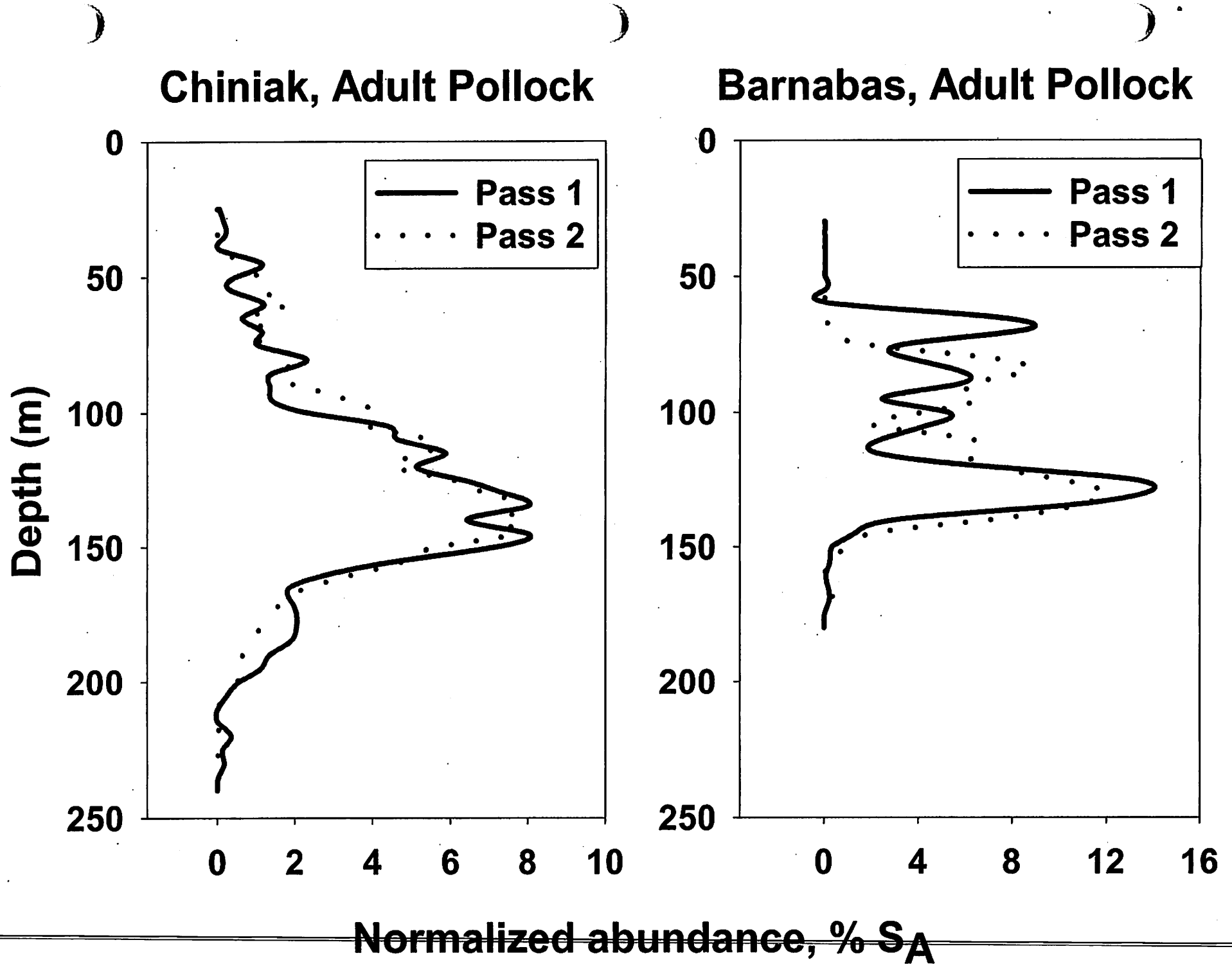


Figure . Acoustic backscatter attributed to "small fishes" (i.e., capelin, age-0 pollock) along trackline during pass 2 of the August 2000 acoustic-trawl survey of walleye pollock off the east side of Kodiak Island, Gulf of Alaska, MF2000-10. Z axis = 35,000.

FISH CATEGORY	AREA	PASS 1			PASS 2		
		Biomass	95% CI	%	Biomass	95% CI	%
Adult Pollock	Chiniak	6700	785	12	6200	805	13
	Barnabas	13100	2387	18	10800	2627	24
Age-1	Chiniak	5900	1638	28	8000	2221	28
	Barnabas	0			0		
Capelin/Age-0**	Chiniak	38200			52000		
	Barnabas	34300			52700		

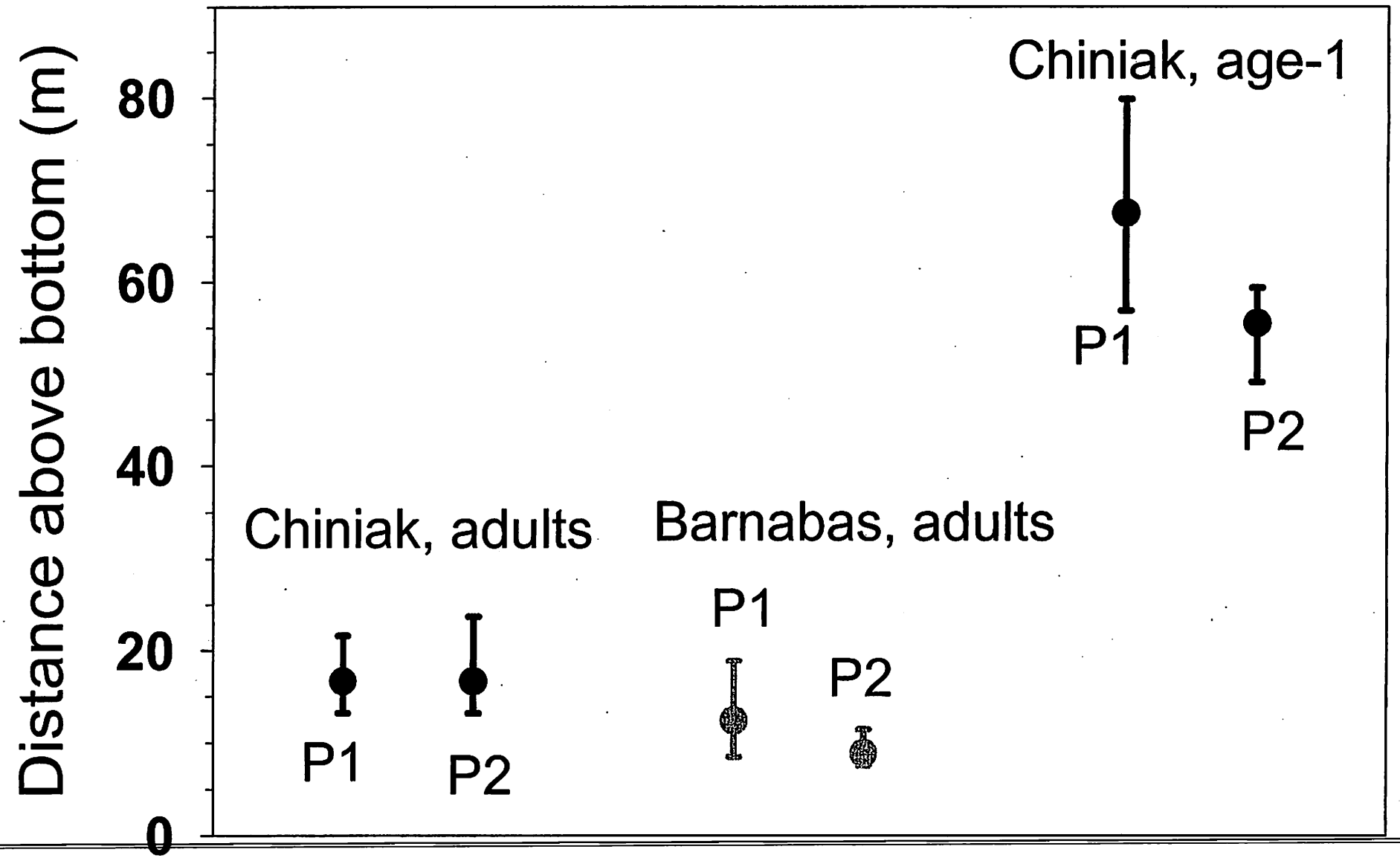
TOTAL ADULT POLLOCK	19800	17000
TOTAL AGE-1 POLLOCK	5900	8000
TOTAL POLLOCK	25700	25000
TOTAL POLLOCK+CAPELIN	98200	129700

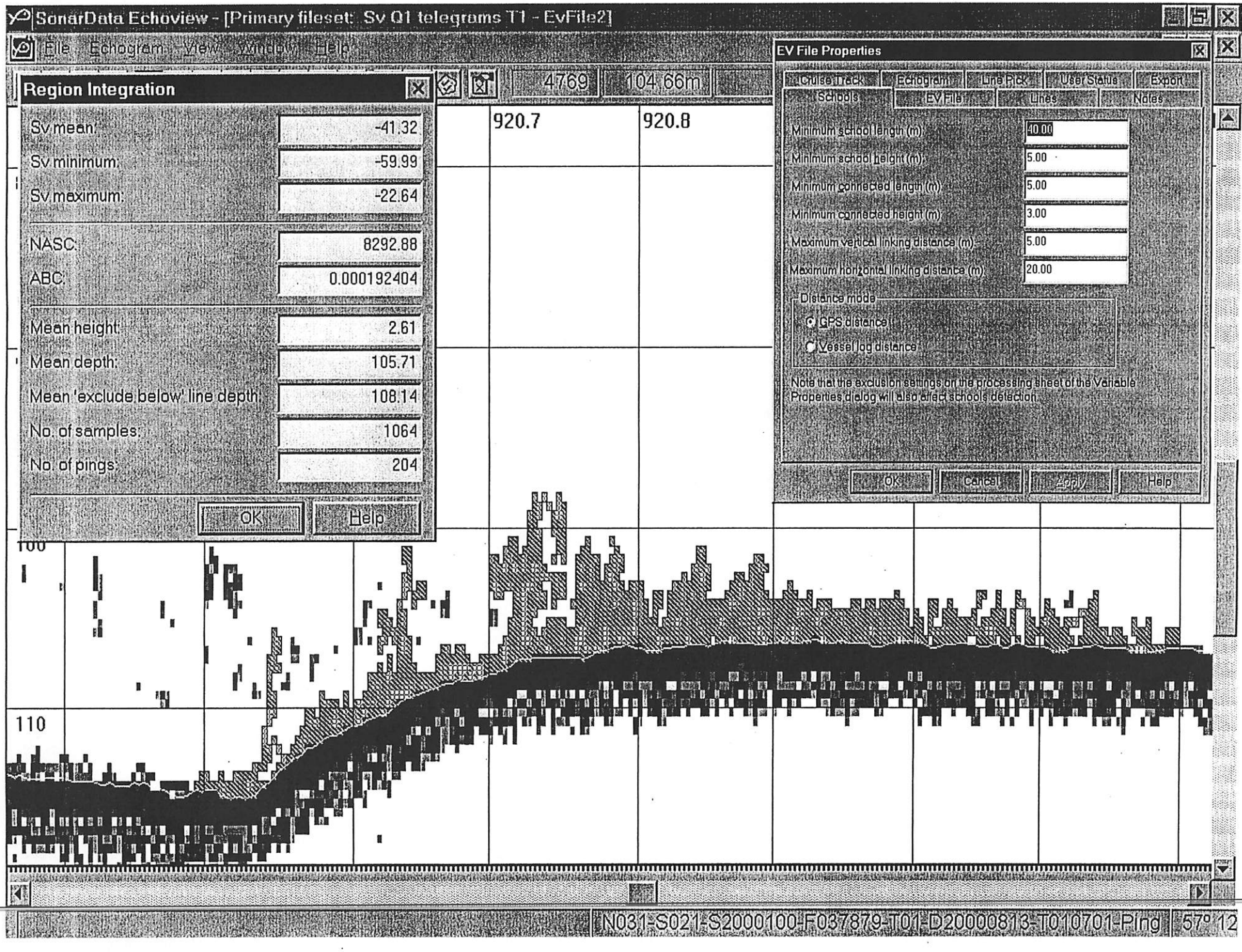
**BIOMASS OF CAPELIN/AGE-0 BASED ON DALEN & NAKKEN (1983)
THE CAPELIN BIOMASS WOULD DECREASE BY ~50% WITH ROSE (1998)


Chiniak, Adult Pollock
Barnabas, Adult Pollock
Pass 1
Pass 2
Depth (m)
0
50
100
150
200
250
0
2
4
6
8
10
12
16
Normalized abundance, % S_A

Weighted Mean Distance Off Bottom

with 95% C.I.

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Sv maximum: -22.64
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No. of pings: 204
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Help
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920.8
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Cruise Track
Echogram
Line Pick
User Status
Export
Schools
EV File
Lines
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Maximum horizontal linking distance (m): 20.00
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GPS distance
Vessel log distance
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OK
Cancel
Apply
Help
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57° 12

Summary

1) It is possible to use acoustic-trawl methods to estimate pollock distribution patterns and abundance off the east side of Kodiak during the summer.

2) Pollock were present in both the Barnabas and Chiniak gullies.

3) The geographical distribution of pollock differed between gullies, but remained relatively stable within each gully.

4) Although adult pollock were more abundant in Barnabas than in Chiniak gully, changes in abundance within either gully during the 2 week period of the field study were in a similar direction.

5) Greater variability in estimates of abundance and mean fish depth occurred for age-1 pollock rather than adult pollock.

6) Quantitative descriptions of the fish aggregations using image analysis methods will enable objective comparisons of the pollock schools over time and space.