MEMORANDUM

TO: Council, SSC and AP Members

FROM: Chris Oliver
Acting Executive Director

ESTIMATED TIME
8 HOURS

DATE: May 29, 2001

SUBJECT: Steller Sea Lions

ACTION REQUIRED

(a) Receive report on research funding.
(b) Receive report on independent review.
(c) Receive report from the RPA Committee.
(d) Finalize alternatives for analysis.

BACKGROUND

(a) Report on Research Funding

In May NMFS conducted reviews of proposed SSL research, including review by a Constituency Panel nominated through the Council, to be funded by the approximately $15 million available for such research. The results of that review process are summarized as Item C-1(a)(1). Also attached (C-1(a)(2)), is a summary of research being supported by NOAA OAR/NOS through the Cooperative Institute for Arctic Research (CIFAR). NMFS staff are available to provide additional details on these research initiatives.

(b) Update on independent reviews

Two reviews of the Biological Opinion and its underlying science have been contracted by the Council using our special SSL funding: the National Academy of Science (NAS) review and a short- term review by an independent team of scientists. Item C-1(b)(1) is a copy of the SOW for the short-term independent review, for which we expect an initial report at this meeting and a final report in September. Members of that review team are (1) Dr. Don Bowen (Chair) from the Bedford Institute of Oceanography, DFO, Nova Scotia; (2) Dr. Dan Goodman, Systems Ecologist, Department of Biology, MSU; (3) Dr. John Harwood, Sea Mammal Research Unit of the Gatty Marine Lab, University of St. Andrews, Scotland; and, (4) Dr. Gordon Swartzman, School of Fisheries and Center for Quantitative Science, UW. Dr. Swartzman and Dr. Goodman will be on hand at this meeting to report on the team's preliminary findings, attached as Item C-1(b)(2). The review team will continue to meet through this fall when we are scheduled to make a final decision on the RPAs and experimental design.

The National Academy of Sciences study is also underway. This study will examine interactions between Alaska groundfish fisheries and Steller sea lions (SSL) and the role of these fisheries in the evolving status of the SSL population. The focus of the study will be: 1) the status of current knowledge about the decline of the SSL population in the Bering Sea and Gulf of Alaska ecosystems, 2) the relative importance of food

competition and other possible causes of SSL population decline and impediments to SSL recovery, 3) the critical information gaps in understanding the interactions between SSLs and Alaska fisheries, 4) the type of research programs needed to identify and assess potential human and natural causes of SSL decline, and 5) the components of an effective SSL monitoring program, with yardsticks for evaluating the efficacy of various management approaches. We will receive a report from them in June 2002.

The SSC's final report on its review of the November 30, 2000 BiOp is also included as Item C-1(b)(3).

(c) RPA Committee

In January, the Council established an RPA Committee to make recommendations on sea lion protection measures for the second half of 2001 and develop an alternative RPA for the 2002 plan amendment analysis. The RPA Committee is composed of 21 members from the fishing community, the conservation community, NMFS, SSC, and State agencies.

The RPA Committee met several times to review SSL science, the Biological Opinion RPA, and fishery and survey information. Meetings were held on February 10, February 20, March 6-7, March 26-29, April 9, May 9-11, and May 21-24, 2001. Minutes from the last two meetings, including the Committee's recommendation for the EIS Alternative RPA for 2002 and beyond, are attached as Item C-1(c)(1). Committee Chairman Larry Cotter will report to the Council on their recommendations.

(d) 2002 Amendment package

A full amendment package is being developed for Council action in October 2001, which would propose a package of sea lion protective measures (RPAs) for implementation in January 2002. Staff has begun work on the environmental impact statement (EIS). We are contracting out much of the socioeconomic analysis, under the guidance of NMFS Region economists (Drs. Muse and Queirolo). A notice of intent to prepare an EIS was published on May 15, and comments will be accepted through June 22, 2001. A scoping document has been prepared, and is included as Item C-1(d)(1). The scoping document includes a notice of availability, including alternatives, an annotated schedule of milestones for analysis, and a list of issues raised to date. At this meeting, the Council will need to develop final alternatives for the analysis to be completed over the summer, with initial review in early September.

Item C-1(d)(2) is a letter from ADF&G Commissioner Frank Rue to Dr. Balsiger outlining the State of Alaska's perspectives on state water fisheries relative to SSL research and protection. Item C-1(d)(3) is a report on distribution and abundance of killer whales on the southeast Bering Sea shelf and slope during the summers of 1997 and 1999, submitted by Dr. Cynthia Tynan (NMFS). C-1 Supplemental contains additional written comments for this agenda item.

Summary of Proposals Recommended for Funding Under the SSLRI

Recommendations are subject to final approval by the Grants Officer who ensures compliance with all Federal laws, policies, and procedures (e.g., name checks, permit requirements, NEPA, etc.) Projects should not be initiated in expectation of Federal funding until notice of award document is received.

Proposal #:01-SSL-041
Name of Proposal: Nutritional Significance of Ephemeral High-quality Foraging Opportunities for Steller Sea Lions.
Applicant: University of Washington
Principal Investigator: Glenn B. VanBlaricom
Number of years:3
Proposed Funding Amount:$573,712
Brief Project Description: An evaluation of the hypothesis that ephemeral high-quality foraging opportunities on certain forage fish species may be more readily available to the eastern population of Steller sea lions than to the declining and endangered western population. They will examine the hypothesis by characterizing within and between region variation in the characteristic dietary fatty acid profiles of forage fish species; conduct studies of captive sea lions to determine the strength and persistence of fatty acid signatures, in sea lion blubber, that result from the feeding on forage fish; and conduct blubber sampling of free ranging sea lions to assess the frequency of occurrence of fatty acid signatures from forage fish in wild sea lion populations. Sampling of blubber from free ranging sea lions will be done in collaboration with scientists from the National Marine Mammal Laboratory, NMFS.

Proposal #: 01-SSL-018
Name of Proposal: High Resolution Foraging Behavior and Movement Patterns of Steller Sea Lion Juveniles in Regions of Increase and Decline
Applicant: University of Alaska Anchorage
Principal Investigator: Jennifer M. Burns PhD.
Number of years: 3
Proposed Funding Amount:$478,981
Brief Project Description: This project will determine the foraging range and behavior of 20 juvenile Steller sea lions in the Kodiak region (decline) and 20 in the Dutch Harbor/Unimak region (increase) using purpose designed high-resolution satellite relay date loggers (Sea Mammal Research Unit, St. Andrews, Scotland). From this, we will be able to construct fine-scale 3D habitat use maps, map juvenile movement patterns with respect to habitat characteristics (both physical and biological), assess movements relative to critical habitat, and examine differences in foraging effort and diving patterns (diel, seasonal, and regional patterns depth, duration, bout lengths), and characterize the relationship between foraging effort and physiological status. Cooperative activities with ADF&G and NMFS include coordinating tagging effort and design, sharing data on juvenile condition, placing project personnel on cruises within the study areas, and identifying a subset of juveniles captured by NMFS and ADF&G to be outfitted with our SRDLs.

Proposal #: 01-SSL-001
Name of Proposal: Implications of Varying Food Distribution For Fitness in Steller Sea Lions
Applicant: University of St. Andrews, UK
Principal Investigator: Ian Boyd, PhD
Number of years: 2
Proposed Funding Amount: $658,443
Brief Project Description: This proposal addresses the issue of what prey distributions are required to sustain Steller sea lions. It is based upon the application principles concerning the way in which body size interacts with energy expenditure and about how these animals are likely to maximize fitness by optimizing their time-energy budgets under differing environmental conditions. To describe and understand the functional response of Steller sea lions to variation in prey distribution and abundance. This will be done by linking models of sea lion behavior at different scales to examine how changes in prey encounter rates during individual dives is likely to scale up to influence fitness and, in turn, how this influences population dynamics. The study will integrate across most data sources for Steller sea lions and it will develop a new state-based approach to examining population dynamics. Thereby, it will create a tool for the synthesis of past, current and future empirical studies populations and also of the potential consequences of management actions for the recovery of these populations. It will also provide a framework within which to understand how changes in prey distribution and abundance, caused by climate change or by fisheries, are likely to effect sea lion populations.
Cooperative activities with NMFS will be required only in as much as access is requested to selected aerial photographs of Steller sea lion haul-outs and data will be required form historical hydroacoustic surveys to develop statistical descriptions of the prey field.

Proposal #: 01-SSL-010
Name of Proposal: Investigations of Steller Sea Lion Predation by Killer Whales in Southeastern Alaska
Applicant: University of Alaska Southeast
Principal Investigator: Janice M. Straley
Number of years: 3
Proposed Funding Amount: $210,774
Brief Project Description: Studies of killer whale predation on declining Steller sea lion populations have suggested that killer whales may have contributed to the decline and that predation is preventing recovery. However, a lack of information on killer whales exists for many areas of Alaska. Killer whale population numbers and the proportion of that population that eat marine mammals are needed to fully assess this situation,. We propose to study killer whale predation rates in southeastern Alaska, where Steller sea lion numbers are increasing. The population dynamics of Steller sea lions that live in southeastern Alaska may be similar to what existed historically in western Alaska, where Steller sea lion numbers have declined dramatically since the 1970s. The project goals will be to 1) provide observational data on killer whale predation upon increasing Steller sea lion population and 2) collect acoustic recordings to determine the structure and composition of killer whale calls at the time of kills. The primary objective will be to compare data collected during this study with data from concurrent studies in the Gulf of Alaska and Aleutian Islands conducted by the North Pacific Universities Marine

Mammal Research Consortium (NPUMMRC). NPUMMRC will use these data in mathematical models of killer whale predation by region in Alaska to better understand the role of predation in the decline and recovery of Steller sea lions.

Proposal #: 01-SSL-007
Applicant: North Pacific Marine Science Foundation
Subproject #1: Bioenergitics Studies of Captive Steller Sea Lions **Principal Investigator:** Dr. Andrew Trites, Dr. David Rosen **Number of years:** 3 **Brief Project Description:** A series of bioenergetic and nutritional experiments will be conducted with captive Steller sea lions to determine how changes in the biotic and physical environment effect the energy needs, health and survival of sea lions. Feeding manipulations will document the biological value of different key prey species. Also to be consider will be the consequences for Steller sea lions of changes in the type, abundance, or distribution of prey. Determinations of key bioenergetic parameters, in association with a computer model, will clarify the relationship between (individual and population level) sea lion energy budgets, food availability, energetic demands, and survival. Open-water experiments with captive animals will be initiated for the first time to provide bioenergetic data across a wider range of conditions than can be obtained from inside an Aquarium. Our research program will also permit the testing and development of tools and techniques to evaluate sea lions in the wild.
Subproject #3: Steller Sea Lion Diet Quantification Studies **Principal Investigator:** Domonic Tollit PhD, Dr. Andrew Trites **Number of years:** 3 **Brief Project Description:** Controlled feeding studies of captive Steller sea lions and statistical modeling will be used to derive an integrated set of keys, correction factors, relationship, and validations to estimate the composition and size of prey consumed by Steller sea lions (with error terms). Captive feeding studies will focus on the remains of prey found in scat. A concurrent study will validate the use of blubber fatty acid signatures to determine diet composition. A biostatistician will derive appropriate statistical techniques for estimating the size and composition of prey consumed from bones found in scats, as well as address questions concerning the numbers of samples required to accurately quantify diet. Together, these studies aim to improve the accuracy of methods used to determine Steller sea lion diets.
Subproject #8, Title: Killer Whale Predation on Steller Sea Lions in Western Alaska **Principal Investigator:** Lance G. Barrett-Lennard, PhD. **Number of years:** 3 **Brief Project Description:** Predator studies will investigate the role that killer whales and sharks have played in the decline and lack of recovery of Steller sea lions.
Subproject # 9: Remote Passive Acoustic Monitoring of Killer Whales **Principal Investigator:** John Ford, PhD **Number of years:** 3 **Brief Project Description:** This proposal is to develop an innovative new system for passive acoustic monitoring of the movements of killer whale pods in coastal waters of Alaska. This system will take advantage of the unique vocal dialects used by killer whales, which allow acoustic identification of population and, in many cases, social group affiliation of vocalizing individuals. An instrumentation package will be developed which continually monitors the underwater acoustic environment and, upon detection of killer whale signals by an advanced voice recognition algorithm, automatically samples and digitally stores the vocalizations. A network of such acoustic monitoring devices deployed at strategic locations would provide important data on the year-round frequency of occurrence of specific killer whales groups and ecotypes, and an indication of the extent of predatory activities involving marine mammals at key locations. **Proposed Funding Amount:**

$2,807,000
Proposal #: 01-SSL-069
Name of Proposal: A Study to Evaluate Transmitter Implant Methodology
Applicant: Colorado State University
Principal Investigator: Albert Wendell Nelson, DVM
Number of years: 2
Proposed Funding Amount: $331,444
Brief Project Description: Study in sheep will develop a protocol to be used in sea lions for long term tracking of activities. After this study is complete the technology will be tested in non-endangered seals of sea lions before sea lion study is initiated.

Proposal #: 01-SSL-046
Name of Proposal: Installation of a Remote Census and Photogrammetry Network: Validation and Assessment of Seasonal and Individual Steller Sea Lion Body Condition and Population Trends
Applicant: Texas A&M Research Foundation
Principal Investigator: Dr. Markus Horning
Number of years: 3
Proposed Funding Amount: $1,056,139
Brief Project Description: Develop and validate the photogrammetric, remote estimation of body mass and condition of steller sea lions, using animals held at the Alaska Sea Life Center. Build and install two remote, Satellite Linked Data Aquisition and Photogrammetry systems (SLIDAP systems), currently under development, at locations in the Aleutian Islands. The two new SLIDAP systems will be used in conjunction with two more systems to collect detailed, year-round census data. We will estimate by three-dimensional photogrammetry, body mass and condition trends at monitoring locations, both cross-sectional and longitudinal, and throughout the year. Assistance is requested from the NMFS for the installation of two SLIDAAP systems in the Aleutian Islands, as well as for periodic servicing, via helicopter flights

Proposal #: 01-SSL-062
Name of Proposal: Early and Late Pregnancy Rates of Alaskan Steller Sea Lions and Examination of the Role of Maternal Condition
Applicant: The Regents of the University of California
Principal Investigator: Bill L. Lasley
Number of years: 3
Proposed Funding Amount: $774,564
Brief Project Description: This project will examine pregnancy status of Steller sea lion in an increasing (Kodiak Island) and decreasing (Unimak Pass) subpopulation during early and late gestation using reproductive hormone concentrations excreted in fecal material. Will also examine effects of maternal condition on reproductive status using a surrogate otiriid species (northern fur seals). Female fur seals will be captured, collect blood samples and from these specimens, generate a non-invasive method of determining lactational status of Steller sea lions (from fecal material). All field sampling will be conducted cooperatively between UC Davis and NMML to reduce research cost and greatly expand information obtained from these data. There is a paucity of information available during our sampling periods and they are life-history stages critical for reproductive female and juvenile Steller sea

lions.

Proposal #: 01-SSL-073
Name of Proposal: Improving Access to ADF&G's Lower Cook Inlet Pacific Herring Stock Assessment and Commercial Fishery Database, Including Observations of Steller Sea Lions
Applicant: State of Alaska
Principal Investigator: Edward Otis
Number of years: 1
Proposed Funding Amount: $66,499
Brief Project Description: Aerial surveys to assess the distribution, abundance, and spawning timing of herring stocks in Lower Cook Inlet (LCI) since 1978. Aerial surveyors also frequently noted the number and location of Steller sea lions and other marine mammals as indications that herring were in the area. Much of this geo-referenced information is available only as notations drawn onto paper maps surveyors used to document their observations during surveys. This project will synthesize ADF&G's LCI herring stock assessment and commercial herring fishery information into an ArcView GIS database that will be made available to other researchers via CD-ROM copies and map layouts. The resulting database is expected to have utility to other researchers attempting to better understand the relationship between Steller sea lions, commercial fisheries, and one of their shared prey species.

Proposal #: 01-SSL-050
Name of Proposal: Foraging Ecology and Hunting Behavior of Adult and Juvenile Steller Sea Lions
Applicant: Texas A&M Research Foundation
Principal Investigator: Randall Davis
Number of years: 3
Proposed Funding Amount: $711,112
Brief Project Description: Much of our knowledge about Steller sea lion diving and foraging behavior is based on dive depth and duration data, but information on actual foraging behavior and effort is circumstantial. We propose to study the hunting behavior and three-dimensional movements of SSL by attaching a small video system/data recorder to adults and juveniles. This system will record 80 hr of video and audio as well as depth, swim speed, compass bearing, ambient water temperature, dissolved oxygen, and ambient light level at one-second intervals. In addition, it will record swimming effort by monitoring fore flipper movement with a digital accelerometer. These data will provide fundamental information on foraging ecology of SSL and the foraging behaviors they use to locate and capture prey. We will examine the question of whether juvenile SSL are excluded from food resources available to deeper diving adults.

Proposal #: 01-SSL-025
Name of Proposal: Fish Assemblages Associated with Steller Sea Lion haul-outs
Applicant: UAF, School of Fisheries & Ocean Sciences
Principal Investigator: Brenda Konar
Number of years: 2
Proposed Funding Amount: $175,559
Brief Project Description: The proposal is to use SCUBA-based surveys to quantify juvenile and

adult fish species present in nearshore waters adjacent to two sea lion haul-outs. Seasonal prey availability and biological and physical parameters recorded at these sites will be used to describe nearshore habitat used by young sea lions for shelter, prey, and training. This will be compared to results of similar surveys we will conduct at two nearby sites not used by Steller sea lions as haul-outs as a means of assessing key components of traditionally used haul-out habitat. Our SCUBA surveys will be coordinated and scheduled to coincide with and augment ongoing research on Steller sea lions diets, foraging patterns, and offshore prey availability.

Proposal #: 01-SSL-065
Name of Proposal: Coastal Bathymetry within the Range of Steller Sea Lions in Alaska
Applicant: State of Alaska
Principal Investigator: Thomas S. Gelatt
Number of years: 1
Proposed Funding Amount: $44,101
Brief Project Description: High-quality digital bathymetry of the continental shelf, bays and fjords are sparse. Alternative digital bathymetry layers which cover the entire range of Steller sea lions in Alaska are of low resolution. The low resolution has made the extant data difficult to work with, especially in bays, fjords, and areas close to shore. This award is for the purchase of an existing digital bathymetric map of the Gulf of Alaska, Aleutian Islands, and Bering Sea. In addition, to hire a professional contractor to digitize those areas not included in the existing map, and for the equipment required to store and process these data. Once processed into a surface model of the seafloor, we will use these bathymetry to enhance the presentation and analysis of Steller sea lion movement and diving behavior.

Proposal #: 01-SSL-047
Name of Proposal: Satellite-Linked Mortality Transmitters in Steller Sea Lions: Assessing the Effects of Health Status, Foraging Ability, and Environmental Variability on Juvenile Survival and Population Trends
Applicant: Texas A&M Research Foundation
Principal Investigator: Dr. Markus Horning
Number of years: 3
Proposed Funding Amount: $1,689,406
Brief Project Description: This project is to implant satellite-linked mortality transmitters (SMX tags) into 60 free-ranging juvenile Steller sea lions, and an additional 12 animals temporarily held at the Alaska Sea Life Center. We will preform comprehensive assessments of the status of body condition, health and immune system, and pollutant levels. From the SMX tags we will determine: time & date of death and weekly cumulative foraging effort from implantation until death. In a new experimental paradigm, we will analyze differences between survivors and non-survivors in conditional and health status at time of release, as well as seasonal, interannual and ontogenetic dive effort. We will test the predictive power of health, condition and behavioral parameters measurable after weaning, on future survival and thus population trends. Assistance is requested from the NMFS for coordinating and conducting ship-based juvenile sea lion capture trips since NMFS is the organization most qualified to conduct this task. At the discretion of NMFS, this task can be subcontracted partially or entirely to the ADF&G. In addition, NMFS will be tasked with deploying and monitoring external SRDs on SMX

implanted sea lions.

Proposal #: 01-SSL-021
Name of Proposal: Seasonal Forage Patterns of Steller Sea Lions
Applicant: UAF, School of Fisheries & Ocean Sciences
Principal Investigator: Kate M. Wynne
Number of years: 2
Proposed Funding Amount: $111,464
Brief Project Description: Collection of potential prey species will be augmented by fish surveys conducted by NMFS during the course of this study.

Proposal #: 01-SSL-055
Name of Proposal: Metal Toxicity in Steller Sea Lion (Eumetopias jubatus) Tissues and Cell Lines
Applicant: Yale University, School of Medicine
Principal Investigator: John P. Wise, PhD.
Number of years: 3
Proposed Funding Amount: $1,096,715
Brief Project Description: This proposal investigates the role of contaminants as environmental factors in the decline of the western population of the Steller sea lion. It focuses on metals, particularly widespread and toxic class of environmental contaminants and measures of their accumulation in the tissues of the sea lions. Further, it investigates the toxicity of these metals in the major organ systems of the sea lions by establishing cell lines from these organ systems and determining the potencies of metals in these lines, so that a priority list can be developed for intervention measures.

Proposal #: 01-SSL-062
Name of Proposal: Investigation of retinol (Vit. A) and tocopherol (Vit. E) status in Steller Sea Lion: Contribution to Nutritional Stress in Declining Populations
Applicant: Sea Research Foundation, Mystic Aquarium
Principal Investigator: Dr. Lisa Mazzaro
Number of years: 2
Proposed Funding Amount: $421,690
Brief Project Description: Significant evidence supports the hypothesis that Steller sea lions are in decline because of an altered diet that does not meet their nutritional needs. Low lipid content has been identified as an important difference. This study will investigate a related aspect of diet quality- fat soluble vitamins. Vitamins A and E are required for normal growth, development and reproduction, yet there is little information on the vitamin content of the current diet of the Steller sea lion in areas of decline, the vitamin status of the animals in the wild, on the specific dietary requirements of the sea lions. The study will include analysis of samples collected by and/or archived by NMFS.

Proposal #: 01-SSL-049
Name of Proposal: Linking Animal-borne Data Records to Autonomous remote Imaging Systems: Implementing the RAT-Link
Applicant: Texas A&M Research Foundation
Principal Investigator: Dr. Markus Horning
Number of years: 2
Proposed Funding Amount: $281,446
Brief Project Description: This proposal is to develop the hardware and software specifications for a short-range, bi-directional radio data link between animal-borne data records, and satellite-linked remote, automated data collection and relay stations. This Roving Archival Tag Link (RAT-Link) will be adapted for use on and tested with a miniaturized Timed-Data Recorder (TDR), in cooperation with the leading manufacturer of TDRs, Wildlife Computers. The purpose of the RAT-Link is to facilitate the recovery of high-density data from implanted or external archival tags for use on Steller sea lions under typical conditions where recovery of high-density data is very difficult. The development of the RAT-Link concept has just been initiated by Texas A&M's Applied Biotelemetry Lab in conjunction with Wildlife Computers, under sponsorship by the National Science Foundation, Division of Polar Programs. This same NSF program is also sponsoring the development and application fo the SLIDAP system, a satellite-linked remote autonomous imaging and data collection system suitable for integration for the RAT-Link.

Proposal #: 01-SSL-022
Name of Proposal: Comparison of Prey Availability and Ecology in Steller Sea Lion Foraging Regions: A Coordinated Aerial Remote Sensing Study
Applicant: UAF, School of Fisheries & Ocean Sciences
Principal Investigator: Evelyn Brown
Number of years: 2
Funding Amount: $1,003,147
Brief Project Description: This proposal is coordinated with ongoing shipboard sea lion research programs in the three areas in Alaska (Kodiak, Lower Cook Inlet, and Southeast AK) during two time periods (late spring, late summer). The overall objective is to compare synoptic marine ecological information between two sea lion foraging regions over large spatial regions at three temporal scales (diurnal, seasonal, interannual), supplementing data from the existing surveys. One region (Southeast Alaska) has a healthy population and the other (Kodiak) has a population in decline. The secondary objective is to cover regions not accessible by ship in the extreme nearshore and upper surface (<5m) and to extend coverage beyond ship transects. Using airborne remote sensing instrumentation (including lidar, IR radiometer, ocean color video, high resolution digital video, and IR video) we will map ocean fronts, chlorophyll, zooplankton, fish prey resources, fish and marine mammal predators, predator/prey interactions (foraging bouts), and human activity in the upper 50m of the water column during the day and night. We will use shipboard results for signal validation, interpretation, and to estimate detection probabilities (sub-attenuation correction factors). We will produce 3-d visualizations of the results, link aerial to satellite data, and perform geostatistical analysis for interpretation. We require collaboration from the NOAA ETL lab in Boulder to provide instrumentation and personnel for

airborne surveys and signal processing.

Proposal #: 01-SSL-052
Name of Proposal: Acoustic Characterization of Steller Sea Lion Forage Species
Applicant: University of Washington
Principal Investigator: John K. Horne, PhD.
Number of years: 2
Proposed Funding Amount: $196,436
Brief Project Description: This proposal has four components, 1) Acoustic characterization of Steller sea lion prey species; 2) Quantify variance of acoustic backscatter within and among species; 3) Comparison of forage and other fish species to Bering Sea and Gulf of Alaska; and 4) Compare acoustic model results to acoustic survey data. Cooperative activities: access to data base, possible cruise participation.

Proposal #: 01-SSL-013
Name of Proposal: Traditional Knowledge of Steller Sea Lions and Community-Based Monitoring of Local Seasonal Haul-outs.
Applicant: The Alaska Sea Otter and Steller Sea Lion Commission
Principal Investigator: Lianna Jack
Number of years: 3
Proposed Funding Amount: $475,855
Brief Project Description: The Commission, in partnership with 10 Alaska coastal communities, will develop and implement a traditional knowledge of Steller sea lion health and abundance survey. From the survey, local seasonal haul-outs will be identified, protocols will be developed for community based monitoring of local seasonal haul-outs, and the testing of the protocols will ensure reporting of survey results.

Proposal #: 01-SSL-016
Name of Proposal: Subsistence Harvest Monitoring of Steller Sea Lions on St. Paul Island, Alaska
Applicant: Aleut Community of St. Paul Island
Principal Investigator: Michael T. Williams, Jesse A. Coltrane
Number of years: 3
Proposed Funding Amount: $210,957
Brief Project Description: This project objectives are 1) to design and implement a monitoring program for the subsistence harvest of Steller sea lions on St. Paul Island, Alaska; 2) to train samplers from other rural Alaska communities in tissue sampling techniques; and 3) to devise and implement a marine mammal tissue collection and distribution center for samples collected from marine mammals during subsistence harvests.

Proposal #: 01-SSL-053
Name of Proposal: Assessing Population Trends and Dietary Intake of Steller Sea Lion Populations Along the Western Alaska Peninsula and Eastern Aleutians.
Applicant: Aleutians East Borough
Principal Investigator: Kate Wynne
Number of years: 3
Proposed Funding Amount: $547,907
Brief Project Description: This proposal seeks to improve the accuracy and precision of the population indices through expanded aerial and vessel surveys in one portion of the endangered western stock of Steller sea lions. Also to provide additional information on seasonal prey consumption by Steller sea lions through scat collection at rookeries and haul-outs along the Alaska Peninsula and Eastern Aleutians. Provide additional platforms of opportunity to observe Steller sea lion behavior at haul-outs and rookeries, observe possible killer whale predation on Steller sea lions, and resight animals branded under National Marine Fisheries Service research programs. This proposal will require the issuance of marine mammal permits from NMFS.

Proposal #: 01-SSL-006
Name of Proposal: Identify Steller Sea Lion Rookeries; Gathering Traditional Ecological Information on Steller Sea Lions from Perryville, Alaska
Applicant: Bristol Bay Native Association
Principal Investigator: Helen Chythlook
Number of years: 1
Proposed Funding Amount: $80,844
Brief Project Description: Due to decline in Steller sea lion populations around Perryville, traditional subsistence hunting activities in some areas of the Alaska Peninsula has stopped. This proposal will fill the need for Steller sea lion research associated in identifying rookeries and gathering important traditional ecological information to build local research capacity of Alaska Natives in the Peninsula communities to enhance their subsistence way of life.

Proposal #: 01-SSL-023
Name of Proposal: Characterization fo Sea Lion Foraging Habitat in the Aleutian Islands. (Year one)
Applicant: University of Alaska Fairbanks
Principal Investigator: Kenneth O. Coyle, George L. Hunt Jr.
Number of years: 1
Proposed Funding Amount: $500,000
Brief Project Description: This project will quantify primary production, zooplankton distribution and abundance, seabird foraging as an indicator of prey concentrations, and killer whale distribution, and abundance in regions of the Aleutian Islands where sea lion populations are stable and where they are declining. The information will be related to measures of nutrient concentrations, water mass types and currents within the study areas, to clarify linkages between the effects of climate change in the North Pacific Ocean and physical responses in the critical habitat of the sea lions.

Proposal #: 01-SSL-042
Name of Proposal: Assessment of Fine-Scaled Interactions Between Steller Sea Lion Abundance and Trends of Local Fisheries
Applicant: University of Washington, School of Aquatic and Fishery Sciences
Principal Investigator: John R. Skalski
Number of years: 2
Proposed Funding Amount: $268,238
Brief Project Description: This project will examine the fine-scaled spatial-temporal trends in multispecies fisheries abundance and localized declines in sea lion abundance. Experimental trawl and NOAA survey data, along with NOAA fisheries stock assessment models, will be used in assessing localized trends in Steller sea lion abundance. Survey data and access to stock assessment models will be proveded by NMFS.

Proposal #: 01-SSL-031
Name of Proposal: Geographical Ecology of Steller Sea Lions and Ephemeral, High-quality Prey Species in Southeast Alaska
Applicant: University of Alaska Fairbanks
Principal Investigator: Mary F. Willson
Number of years: 2
Proposed Funding Amount: $136,575
Brief Project Description: This proposal will examine the geographical relationship of spring-spawning forage fish runs to Steller sea lion haul-out and foraging distribution in Southeast Alaska. This goes toward an ultimate goal of determining the fitness consequences of high-quality spring prey for sea lions. We will provide prey samples for caloric and fatty acid analyses with NMFS biologists and share information.

Summary of Projects to be Supported by NOAA OAR/NOS Through the Cooperative Institute for Arctic Research (CIFAR)

I. Projects Related to the Climate Regime Shift Hypothesis

Impacts of Climate Change on the Bering Sea Ecosystem over the Past 500 Years

PI: Bruce Finney, University of Alaska

Funding Amount: $198,516

A paleo-oceanographic study on sediment cores and marine mammal bones from the southern Bering Sea will be conducted to provide information on longer term changes in population levels of Steller's Sea Lion. Cores samples will be evaluated to provide reconstruction of ecological changes. Sea Lion bones will be studied to look for isotopic signatures indicative of changes in trophic position of prey. Results from this study will be evaluated along with other available data to achieve a new understanding of natural variability of marine organisms at several levels of the food web and their relationships to climate and oceanic change. This longer term perspective is necessary to evaluate recent changes.

Retrospective Studies of Climate Impacts on Alaska Steller Sea Lions

PI: Edward Miles, University of Washington

Funding Amount: $149,490

A compilation of physical and biological time-series data will be evaluated with proven and relatively novel analysis techniques to better understand the dynamics of western SSL population levels. Biological data for different species will be evaluated for coherent variations, and the biological data will be compared to physical data to evaluate climate impacts. The relationships between biological changes and physical changes will be evaluated over time, and also on a regional basis to explain differences between the eastern and western populations of SSL over the past few decades.

The Nature of North Pacific Regime Shifts and Their Impact on Steller Sea Lions

PI: Donald Percival, University of Washington

Funding Amount: $120,000

To understand the possible role of regime shifts on population levels of SSL, one must first describe the regime shift. This project will clarify the underlying character of North Pacific regime shifts. A 100 year time-series of sea level pressure will be evaluated using different models to determine which provides a better definition of regime shifts. Additional analyses will compare variability in North Pacific regime shift indices to trends in SSL populations, and if possible in recruitment, in the Kodiak-Aleutian region and the southeast Alaska region.

Ocean Climate Variability as a Potential Influence on Steller's Sea Lion Populations

PI: Thomas Royer, Old Dominion University

Funding Amount: $192,548

Historical oceanic and atmospheric data sets will be used to investigate the question of what drives the North Pacific gyre and its variability. Data sets to be evaluated include coastal hydrographic data, sea level, northern Oscillation Index, terrestrial climate data, altimeter measurements, and data on several marine bird and mammal species. The

temporal variability of physical driving mechanisms will be compared to changes in populations of SSL, harbor seals and northern fur seals. Past work in the Gulf of Alaska will be enhanced and extended into the Bering Sea. Evidence will be sought for any regional variability that may exist in addition to temporal variability.

North Pacific Climate Variability and Steller Sea Lion Ecology: A Retrospective and Modeling View – Part One

PI: Steven Bograd, Pacific Fisheries Environmental Laboratory

Funding Amount: $155,000

This research will explore the relationship between climate variability and the ecosystems of the North Pacific and Bering Sea. It will examine the hypothesis that bottom-up effects in these areas related to large-scale climate change have contributed significantly to the decline in the western population of SSL. The importance of this factor in relation to other possible causes, such as prey reduction as a result of commercial fishing, will be assessed. This research will be used to consider future population trends of marine mammals in the North Pacific based on recent observations climate patterns. This part of the project will compile the historical data sets, develop methods for their analysis, and participate in the overall evaluation of historical and model-based data.

North Pacific Climate Variability and Steller Sea Lion Ecology: A Retrospective and Modeling View – Part Two

PI: Bruce Cornuelle and Art Miller, University of California, San Diego

Funding Amount: $250,000

This component of the project will develop a coupled physical-biological model of the Gulf of Alaska and Bering Sea, interpret model results and participate in overall evalution.

North Pacific Climate Variability and Steller Sea Lion Ecology: A Retrospective and Modeling View – Part Three

PI: Michael Alexander, NOAA-CIRES Climate Diagnostics Center

Funding Amount: $58,190

This component will provide the coupled atmosphere-ocean model, conduct several model runs, analyze the results of these runs, and participate in the overall evalation.

Interannual Variability of Biophysical Linkages Between the Basin and Shelf in the Bering Sea – Part One

PI: Wieslaw Maslowski, Naval Postgraduate School

Funding Amount: $92,648

The coupled ice-ocean model developed at the Naval Post Graduate School will be used to identify interannual and interdecadal variations in the circulatory and mixing pathways by which nutrients are communicated from the deep ocean to the shelves in the Bering Sea and western Gulf of Alaska. This objective represents the foundation to understanding the biophysical coupling of physical processes to the food habitat that supports the higher trophic levels of fish, seabirds, and sea mammals, including the SSL. In contrast to previous field studies, which have investigated these processes in localized areas, this study will include a broad regional analysis into which altimeter and field data can be synthesized.

Interannual Variability of Biophysical Linkages Between the Basin and Shelf in the Bering Sea – Part Two

PI: Stephen Okkonon and Terry Whitledge, University of Alaska

Funding Amount: $113,340

This component of the project will emphasize comparison of eddy field variability derived from the model and from altimeter data. Nutrient and productivity data will be collected and compiled, and then used to evaluate model-based results.

II. Projects Related to the Predator/Prey Hypothesis

Predator-Prey Investigations of Killer Whales and Steller Sea Lions in Alaska

PI: Andrew Trites, North Pacific Marine Mammal Research Commission
Funding Amount: $200,820

This study will address a key question in the overall Steller sea lion issue – what role does killer whale predation play in the decline of Steller sea lions? Scientists from the North Pacific Universities Marine Mammal Research Consortium will involve the local mariner community to assess knowledge of the abundance and distribution of killer whales, and initiate a photo-census to keep track of whales in the region. This information will be used to estimate the numbers of killer whales, and compare western regions (where SSLs are in decline) to eastern regions (where populations are stable). Direct observations of killer whale predation will estimate the impacts of predation on recovery of SSL populations. Data derived will be incorporated into a model of killer whale predation, which is funded through the N. Pac. Marine Mammal Research Commission under the umbrella of SSL funding provided to them.

The Role of Physiological Constraint in the Acquisition of Foraging Ability: Development of Diving Capacity in Juvenile Steller Sea Lions

PI: Jennifer Burns, University of Alaska, Anchorage

Funding Amount: $153,924

One purported cause of SSL decline is a reduction in juvenile survival. This proposal addresses that issue directly by providing knowledge about how juveniles forage, and what constrains their feeding ecology. This work will examine the diving capacity of juvenile SSLs, and how that diving ability may change with development. As a juvenile SSL grows, their blood and muscle tissues are able to store more oxygen for longer dives. This means that during the juvenile stage, they are limited in their ability to forage, and may be operating close to their physiological limit. This in turn provides support for the hypothesis that changes in the prey base will affect juveniles first.

This study will collaborate with ongoing work by the National Marine Mammal Laboratory in the collection of animals for physiological measurements. The results should allow determination of when and why juveniles are most vulnerable to ecological disturbances (including prey removal), and should help identify those factors that have a high probability of impacting successful recruitment.

Seasonal Assessment of Prey Competition between Steller Sea Lions and Walleye Pollock

PI: Robert Foy, University of Alaska, Kodiak

Funding Amount: $202,308

The role of pollock as a competitor of Steller sea lions for prey has not been examined, yet the diets of pollock and SSLs overlap in forage fish and juvenile pollock. This study will determine the current importance of pollock in the diet of SSLs and adult pollock to predict the importance of pollock to the population status of SSLs as ocean conditions and fish communities change. Both commercial catches of pollock and directed research cruises will be used to assess pollock diet. Diet of SSLs is being evaluated by the Gulf Apex Predator study, and this study will provide interaction and collaboration with that program. Ultimately, the project could address the efficiency and effects of restricting pollock harvests inside SSL critical habitat areas.

Investigation of Foraging Behavior of Steller Sea Lions in the Vicinity of Kodiak Island, Alaska

PI: Richard Thorne, Prince William Sound Science Center

Funding Amount: $541,200

PI: James Churnside, NOAA Environmental Technology Laboratory

Funding Amount: $156,300

This project will locate and quantitatively assess the overwintering herring and SSL population in the vicinity of Kodiak Island. Their distributions in the west will be compared to those in the east (Prince William Sound, supported by other funds) during the crucial fall-winter feeding period. This will provide direct observational evidence of SSL foraging behavior, a current gap in knowledge about SSLs. Both acoustic (in water) and LIDAR and infrared (remote aerial) surveys will be used to provide synoptic information about SSL and herring distributions. Predator distributions will be overlain with prey in GIS format, with characteristics such as depth, species composition, and numerical density noted. Results can contribute to the understanding of the herring-limited hypothesis, especially during the winter season. This project is in collaboration with ongoing work by the Prince William Sound Science Center and the Alaska Department of Fish and Game.

III. Projects Relating to Both the Climate Change and Predator/Prey Hypotheses

Proceedings and Summary for the Public of a Workshop on "Is It Food II"

PI: Ronald Dearborn, University of Alaska

Funding Amount: $

Climate-driven Bottom-up Processes and Killer Whale Abundance as Factors in Steller Sea Lion Population Trends in the Aleutian Islands – Part One

PI: George Hunt, University of California, Irvine

Funding Amount: $405,634

This project is a large, integrated ecosystem study. It comprises measurements of primary production, zooplankton distribution and abundance, forage fish distribution, and seabird foraging as an indicator of prey concentrations, and killer whale distribution and abundance in regions where SSL populations are

stable and where they are declining. Collaboration with the National Marine Mammal Laboratory (funded with other sources) will allow determination of diet and foraging locations of SSLs, and abundance estimates and identification of killer whales in the region. These measurements will be taken in conjunction with ongoing physical and nutrient measurements taken by the NOAA Pacific Marine Environmental Laboratory (funded by OAR as part of the overall SSL funding). These integrated studies will be conducted both in an area where SSL populations are in decline (Seguam-Amukta Pass area), and where they are stable (Akutan-Unimak Pass area). Comparisons of the two regions will provide insight into the physical and biological factors affecting SSL population declines. This will provide the first comprehensive investigation of the ecosystem supporting SSLs in critical habitat areas. Research cruises will be undertaken in summer of 2001 and again in summer of 2002. This collection of studies will be the first multi-disciplinary, integrated study of the ecosystem in the critical habitat of western population of SSL.

Climate-driven Bottom-up Processes and Killer Whale Abundance as Factors in Steller Sea Lion Population Trends in the Aleutian Islands – Part Two

PI: Kenneth Coyle, University of Alaska

Funding Amount: $694,218

This is the zooplankton component of the overall study described above and also includes the funds required for a cruise on the R/V Alpha Helix in summer of 2002.

Statement of Task (Contract SSL-01)

for short-term BiOp Review/SSL Advisory Team
March 12, 2001

Background

The November 30, 2000 Biological Opinion (BiOp) prepared by National Marine Fisheries Service (NMFS) pursuant to the Endangered Species Act, resulted in a finding of jeopardy to endangered Steller sea lions (*Eumetopias jubatus*; SSL) relative to three fisheries under management jurisdiction of the North Pacific Fisheries Management Council (Council). A series of restrictive management measures (termed reasonable and prudent alternatives, or RPAs) were prescribed for implementation in 2001. Those measures are being implemented by NMFS under emergency rulemaking authority, and have severe economic and social costs associated with the pollock, Atka mackerel, and Pacific cod fisheries. However, there is considerable debate, including within the scientific community, regarding the findings of the BiOp, given the underlying information regarding food competition and other potential factors inhibiting SSL recovery.

The Council is contracting with the National Academy of Science to conduct a comprehensive, scientific review of the November 30, 2000 Biological Opinion (BiOp) and its underlying scientific information, assumptions, and hypothesis. This review is expected to take until late 2002 to be completed. In the meantime, the Council is faced with having to develop and analyze a wide range of potential management measures (reasonable and prudent alternatives, or RPAs) by October of 2001, for possible implementation in January of 2002. As such, the Council is seeking a separate, short-term independent review from a group of scientists with expertise in fisheries and marine mammal interactions.

This review is separate from the NAS review, is more limited in scope, and consists of two parts: (1) a review of the science associated with the BiOp and RPAs, by June of this year, with a focus on specified issue areas; and, (2) acting in an advisory capacity, between June and October, to the Council's RPA Committee and to a team of agency analysts to assist the Council process in arriving at a suite of RPAs that both protect SSL and allow fisheries to be appropriately prosecuted. The Council has intentionally sought expertise from a broad spectrum of international scientists, with no direct connection to our fisheries, with the goal of an objective review of the information at hand.

The following questions are illustrative of issues of concern: 1) Does the evidence of the degree of overlap and potential adverse interaction of the Atka mackerel, pollock, and Pacific cod fisheries indicate that they impede SSL population recovery, given current and past levels of prey base? 2) Have natural environmental phenomena (eg. climate regime shifts) affected the diet of SSLs? 3) What is the relationship between the quality and quantity of prey fish in the diet of SSLs, and does the evidence support the nutritional stress hypothesis, given past and current prey base? 4) What is the extent of the area that is critical for SSL foraging based on updated foraging and migration observations? 5) Do the extrapolated rates of SSL decline represent the best available science? 6) What is the impact of shark and killer whale predation on SSL populations? 7) What are the enduring effects of past intentional kills and current subsistence takes? and 8) What are other potential causes of the decline in SSLs or impediments to their recovery? 9) Given the available evidence, what is the marginal benefit of the suite of RPAs (original RPAs, those from the November 2000 BiOp, and those which are being developed).

Specific Task, Deliverables, and Timelines

Part 1: Foremost among the concerns listed above is the importance of food competition, relative to other factors, given the available information. However, given the short time available for this review, it is

unlikely that definitive answers to this question, or other questions listed above, can be obtained. Therefore, the task of this team, drawing from information in the BiOp and other sources, is to address questions 1, 3, 5, and 9 listed above, to the extent practical in the allotted time frame. Further, the team is to focus on the following three tasks:

(1) Determine the types of information that should be collected and analyses necessary to demonstrate an unequivocal adverse affect of commercial groundfish fisheries on Steller sea lion mortality. Characterize the current availability of such information, the critical data gaps and the impact of data limitations on the determination of fishery/Steller sea lion competitive interactions.

(2) Recommend an appropriate experimental design to improve our understanding of the interactions between fisheries and Steller sea lions, and the efficacy of imposed management measures to promote recovery of the Steller sea lion population.

(3) Review reports of stressed pinniped populations worldwide and compare and contrast characteristics of those populations with conditions observed for Steller sea lions.

Effort is expected to total three to four weeks for each participant between now and June. Specific timing of this effort for each participant, and division of duties, is somewhat flexible and will be coordinated by a team Chairman. At least one meeting of the participants as a group is likely, at a time and location to be agreed by the team members. A written report from the team would be due to the Council by May 29. If possible, a member of the team would travel to the Council's June meeting in Kodiak, Alaska to speak to the written report. **The report for June could be a first draft, with a final report due by September 1. In this case work on the final report would overlap with Part 2 of the project, outlined below.**

Part 2: Between June and the end of September, the team would act in an advisory capacity to the Council's Committee process and its development of RPA alternatives. While specifics of this advisory capacity are still being resolved, and are somewhat flexible, it is expected to include review of ongoing analyses, review of new information brought to bear, and review of various management alternatives being considered. The goal is to arrive at an RPA (alternative) that provides adequate protection for SSL and allows fisheries to be appropriately prosecuted. The timing of this part of the task is also flexible to the team's schedule(s), but would include attendance at one or two meetings, likely to be held in Seattle and/or Anchorage. The time and location of these meetings is not certain, but can be scheduled to accommodate the team as much as practical. Total time expected for each team member is three to four weeks.

Participants

The following four individuals will comprise the team:

W. Don Bowen, Ph.D. (Tentatively has agreed to Chair the team)
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CANADA

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SCOTLAND

Daniel Goodman, Ph.D.
Professor of Biology
Department of Biology
Montana State University
Bozeman, Montana 59717

Other

The Council will be represented by its Director, Mr. Chris Oliver, in consultation with the Council's SSL Steering Committee, in all other matters regarding this project, including distribution of necessary materials to the team, coordination of necessary meetings, and receipt and distribution of any reports generated by the team. This will be accomplished through the team Chair who in turn will coordinate the specific review with other team members. The team is expected to operate as autonomously as possible, with only general direction and guidance from the Council Director. Materials to be provided for the Team review include: the November 2000 BiOp; Congressional language; SSC review; descriptions of range of RPAs; relevant maps; Alaska SSL Restoration Team minutes; other material as appropriate.

Agreed to:

Mr. Chris Oliver, NPFMC_____ Date_____

Dr. Daniel Goodman _____ Date_____

Review of the November 2000 Biological Opinion and Incidental Take Statement with respect to the Western Stock of the Steller seal lion

By

W. D. Bowen (Chair)
J. Harwood
D. Goodman
G. L. Swartzman

Interim Report

Prepared for

North Pacific Fishery Management Council

May, 2001

Background

The November 30, 2000 Biological Opinion (BiOp) prepared by National Marine Fisheries Service (NMFS) pursuant to the Endangered Species Act, resulted in a finding of jeopardy to the Endangered western stock of Steller sea lions (SSL; *Eumetopias jubatus*) relative to three fisheries under management jurisdiction of the North Pacific Fisheries Management Council (Council). The BiOp sets forth a set of management measures (termed reasonable and prudent alternatives or RPAs) intended to alleviate jeopardy in 2001. Those measures are being implemented by NMFS under emergency rulemaking authority. The RPAs carry considerable economic and social costs for the pollock, Atka mackerel, and Pacific cod fisheries. There is considerable scientific debate regarding the conclusions of the BiOp, and the RPAs, owing to the nature of the evidence regarding food competition between SSL and these commercial fisheries, and other factors that might be limiting the recovery of SSL.

Statement of Task

The North Pacific Fisheries Management Council tasked this panel of reviewers to review the BiOp and provide their generalized assessment of that document and its underlying science, assumptions, and hypotheses. More specifically, the team was to focus on the following three tasks:

1) Determine the types of information that should be collected and analyses necessary to demonstrate an unequivocal adverse affect of commercial groundfish fisheries on Steller sea lion mortality. Characterize the current availability of such information, the critical gaps and the impact of data limitations on the determination of fishery/Steller sea lion competitive interactions.

2) Recommend an appropriate experimental design to improve our understanding of the interactions between fisheries and Steller sea lions, and the efficacy of imposed management measures to promote recovery of the Steller sea lion population.

3) Review reports of stressed pinniped populations worldwide and compare and contrast characteristics of those populations with conditions observed for Steller sea lions.

In this interim report we have attempted to address partially each of the three tasks. We begin with an overall evaluation of the arguments put forward in the BiOp concerning the likelihood that the commercial fisheries for pollock, Atka mackerel, and Pacific cod are adversely affecting the abundance of western stock of SSL. Within this framework we assess current understanding of the population dynamics and foraging ecology of SSL, and the evidence that fishing results in reduced foraging efficiency of SSL through its effects on local prey abundance and levels of prey aggregation. We briefly also consider alternative hypotheses that have been proposed for the decline in SSL numbers. We then

discuss the kinds of data that ought to be collected, and the types of analyses that could be done, to provide insight into the factors affecting trends in SSL abundance. Comparative studies are often useful in providing insight when data on a population of interest are not available. In this interim report we examine other situations where changes in the abundance of pinniped species have been attributed to local depletion of their prey. We review the evidence that has been used to infer this relationship and the way in which the pinniped population responded to changes in prey abundance. In the final report we will extend this comparative review to include a wide range of case studies where pinnipeds face potential competition from commercial fisheries or have been negatively affected by other factors, such as disease or large-scale environmental variability. Finally, we conclude with comments about the kinds of studies, monitoring, and management experiments that might be conducted to test hypotheses regarding the impacts of fisheries on SSL.

Task 1 - Review of the BiOp

For the purpose of the interim report we have not provided a detailed evaluation of the arguments put forth in the BiOp. This will be done in the final report. Many of our comments in the final report will deal with statements that we feel are not well supported by evidence. However, for the most part, correcting these matters of fact or interpretation of the evidence will not alter our conclusion that there is great uncertainty about the effects of the groundfish fisheries on SSL. The evidence presented, so far, is almost entirely circumstantial. With respect to many of the key hypotheses, there are essentially no direct data bearing on specific mechanisms of the effects of fishing on SSL. For the most part, the arguments in the BiOp are constructed on the basis that such effects are possible, biologically imaginable, and are not contradicted by the available data. The weight that this argument of "plausibility" has carried in the decision process is a matter of legal and juridical interpretation of the Endangered Species Act and, perhaps secondarily, the "precautionary principle".

Biology of Steller sea lions

a) Population dynamics

There is no question that the number of SSL in the western stock has declined dramatically since the 1970s. The broad geographic extent of the decline and its duration over several decades are clearly causes for concern. However, there has been a marked change in the rate of decline and its spatial distribution over the past decade.

These changes in the rate and spatial extent of the decline in SSL numbers also suggests that the factors that contributed most strongly to the more rapid declines in the several decades prior to the 1990s may not be the most significant factors operating today. In fact, it is believed that directed take and incidental entanglement in active fishing gear played a large role in the earlier period, and both these factors are thought to be very minor now. Although the BiOp acknowledges the likely change in the nature of the causal factors, it does not develop this idea to help evaluate alternative hypotheses. We

believe that considerably more information could be extracted from the count data by developing spatially explicit models using both the pup and non-pup counts at the level of individual rookeries or haulouts. Such models could help us understand how demography has changed in different areas over the course of the decline. This information could be used to evaluate; for example, hypotheses concerning which components of the population have recently been affected.

The current view that some aspect of food availability or quality may be responsible for the declines in SSL has gained popularity based largely on inferences drawn from a comparison of measurements from samples of SSL taken during the 1970s and another sample taken during the 1980s. These samples indicated, or in some cases simply suggested, a reduction in body growth rate, in late-term pregnancy rates, and in juvenile survival that were consistent with food limitation hypotheses. But these inferences are based on vital rates that applied more than 15 years ago (see York 1994), when the oceanographic regime, the fishery activities, and the rate of decline of the SSL population were quite different from now. There are good reasons for suspecting that these earlier vital rates are not representative of those currently being experienced by the population. The lack of current estimates of pregnancy rates and survival rates for the various segments of the population compromise the current population projections. The absence of more current data also constitute a missed opportunity, since such data could be used to test alternative hypotheses about the factors responsible for the current trends in numbers. This sort of modeling would, of course, be much more revealing if substantial data on movement patterns, and site fidelity of reproduction were incorporated in it. Such data, at the moment, are largely lacking.

b) Foraging ecology

Apart from travelling from one haulout or rookery to another, it can reasonably be assumed that SSL go to sea to forage. Currently, the distribution of SSL at sea is not well understood but such knowledge is critical to understanding the potential effects of fisheries and environmental change on the foraging ecology of this species. Understanding the 3-dimensional use of the sea by SSL is also fundamental in identifying important habitats and in designing experiments and other studies to test hypotheses about the effects of local prey depletion by fisheries on SSL numbers.

NFMS and ADF&G had made good progress in instrumenting SSLs with satellite transmitters and data loggers. It is our understanding that to date some 80 SSLs (mainly adult females, pups, and juveniles) have been instrumented and that data have been collected from 53 of these individuals. However, despite the recognized importance of foraging distribution, there appears to have been relatively little analysis of these new data on SSL movements and diving behavior. In our view this is a serious limitation of the current BiOp. The data summaries from the satellite tagged animals given in the BiOp do not permit critical evaluation of how the analyses were done, and thus the conclusions drawn for current analyses cannot be properly assessed. The last published analysis of ranging behavior (Merrick and Loughlin 1997) was based on data collected during the period 1990-1993.

The BiOp repeatedly confuses the concepts of foraging and diet. Although clearly related, they are not the same and careless use of these terms can be misleading. Foraging refers to behaviors used in searching for, capturing and handling prey, and the ecological and prey characteristics that influence the decision to include a prey item in the diet. Diet is simply what was eaten. An example of the misuse of these terms is found in Table 4.2 where we are directed to foraging studies of SSL, but are presented with summaries of what was found in SSL stomach contents, i.e., diet. Although the confusion of these concepts may not seem important, it can be. Studies of what was found in the stomachs or scats of SSL (i.e., diet) are clearly important, but they provide little indication of where SSL forage, how often they dive, how deeply they dive, what fraction of the time they spend foraging, or how the composition in the diet relates to the spectrum of available prey items where and when the feeding took place. Each of these aspects of an animal's behavior could be used to shed light on how SSL might be affected by fishing, and by environmental change affecting prey availability.

There has been considerable effort to increase the understanding of the diet of SSL through broad-scale collections of scats. Diet estimation in pinnipeds is fraught with difficulties, and SSL are no exception. Nevertheless, the BiOp concludes that scats are a "reliable tool for monitoring seasonal and temporal trends in predator diets and eliminates the need to euthanize the animal." While the second point is true, the first is almost certainly not, in most situations. One of the many known problems with the use of scats is that one has little idea of the age or sex of the animals whose scats were collected. Thus, there is usually no way of knowing how representative the sample is with respect to different age and sex classes. The potential sources of bias in estimating species composition of the diet from scats are reasonably well understood in principle, although how they affect estimates of the diet of individual species is less well understood. NMFS and ADF&G scientists have used the split-sample frequency of occurrence (Olesiuk et al. 199) of different prey species in individual scats to characterize SSL diet, rather than other more sophisticated methods of diet reconstruction (e.g., Hall et al. 2000). This is understandable, since feeding studies of SSL have indicated that a high proportion of otoliths, which would normally be measured in order to reconstruct diet, are completely digested during their passage through the gut. However, it should be recognized that frequency of occurrence tends to over-emphasize the importance of rare prey species and is relatively insensitive to changes in the proportion of the most important prey species in the diet (Olesiuk et al. 1990). In addition, the statistical properties of frequency of occurrence estimates are not well understood (Merrick et al. 1997), which makes it difficult to detect significant changes in diet.

Another source of bias in the use of scats relates to the duration of foraging trips. VHF and SDR data indicate that female trips are relatively short during the summer, but can differ widely from 7.5 h to 39.1 h among rookeries (page 27, feeding ecology workshop 1999). Scat samples collected from females (or other age and sex classes) undertaking short foraging trips likely represent the diet of these animals in so far as such data can, but SSL undertaking trips longer than 24 h likely defecate at sea and thus scats collected at land sites may be biased towards the diet from the return trip in the immediate vicinity

of haulouts. Winter foraging behavior could exacerbate this bias. Merrick and Loughlin's (1997) analysis of data from 1990-93 indicates that average trip duration of 5 adult females in winter was on the order of 8.5 d. If these data are representative, then scats collected at rookeries and haulouts are unlikely to be representative of winter diet. These points further underscore the importance of understanding the spatial and temporal characteristics of SSL foraging behavior.

The BiOp attempts an integration and synthesis of the current understanding of SSL foraging in section 4.8.6.6. This synthesis is summarized in seven points. Our comments on these points are as follows:

Point 1 - "Steller sea lions are land-based predators but their attachment to land and foraging patterns/distribution may vary ...;"

This is a reasonable statement, evidence for which comes not only from studies of SSL, but from many other pinniped species.

Point 2 - "foraging sites relatively close to rookeries may be particularly important during the reproductive season when lactating females are limited by the nutritional requirements of their pups; "

Foraging sites close to rookeries are clearly important for lactating females, but all evidence to date suggests that during the first two months of lactation female SSLs are not food limited. The extent to which female foraging may be limited by the nutritional requirements of their pups during mid to late lactation is not known, but certainly pup fasting ability will place an upper limit on the duration of female foraging trips.

Point 3 - "Steller sea lions appear to be relatively shallow divers but are capable of (and apparently do) exploit deeper waters (e.g., to beyond the shelf break);"

This point clearly depends on what is considered "shallow". Shallow diving appears to mean < 200 m. By itself this statement is not terribly useful. Data on SSL dive depth would be more useful if they were linked to bathymetry such that one could then estimate the fraction of benthic habitat available to different age and sex-classes.

Point 4 - "at present, pollock, Atka mackerel appear to be their most common or dominant prey, but Steller sea lions consume a variety of demersal, semi-demersal, and pelagic prey;"

The importance of pollock and Atka mackerel in the diet of SSL seems accurate, subject to the caveats about the quality of frequency-of-occurrence data from scats (e.g., biases arising from differential or complete digestion of prey remains, and foraging range effects on prey remains) and the fact that variation of diet among age and sex classes is poorly known,

Point 5 - "the availability of prey to an individual sea lion is determined by a range of factors ...;"

This is a general statement that could be made about any pinniped species and therefore is not that useful from the point of synthesis about SSL foraging,

Point 6 - "diet diversity may also be an important determinant of foraging success and growth of Steller sea lion populations; and"

Diversity may indeed be important. However, this point is based on an observed correlation between diet diversity and rate of decline in different parts of the SSL range (Merrick et al. 1997). As noted in the BiOp, observed differences in diet diversity may simply reflect regional differences in prey availability that may have no direct effect on SSL demography. Thus, a more specific formulation and test of this hypothesis is needed before much significance can be attached to the observations.

Point 7 - "the broad distribution of sea lions sighted in the POP database indicates that sea lions forage at sites distant from rookeries and haulouts; the availability of prey at these sites may be critical ...".

It is certainly quite likely that more distant foraging is important. The lack of analysis of existing satellite data, and the paucity of such data in winter, represent significant gaps in knowledge. As a result, the arguments about food availability advanced in the BiOp are largely speculative.

c) Physiology

Captive studies - "The Steller sea lion captive research program at the University of British Columbia uses a bioenergetic paradigm to empirically test hypotheses related to the population decline." This is an overstatement. However, it is true that this captive program has contributed to our understanding of the energetic requirements of SSL. These data will be useful both in designing studies to test hypotheses and in interpreting the results of such studies.

Free-ranging studies - Essentially these studies have failed to yield any insights into the causes of the decline in Steller sea lion numbers, a point acknowledged in the BiOp. These studies have focussed on the first 30-60 d of lactation, when females and pups can readily be sampled. Studies during mid-late lactation, when the energetic demands of lactation have increased, might have shed more light on the causes of the decline. However, such studies would have been more difficult to undertake because of reduced access to lactating females once they leave the rookeries in mid summer.

Effects of fisheries on Steller sea lions

The BiOp argument for an effect of fisheries on SSL demography is summarized below:

1. **Fish abundance is finite. Fishery removals are substantial and spatially concentrated.** This can reduce, on a local scale and for short time periods, targeted fish biomass.

2. **The likelihood of depletion is higher for patchily distributed fish** (e.g., pollock and Atka mackerel), because fishing may reduce both the number of fish aggregations within a particular area, making them more difficult for SSL to locate, and the density of fish within an aggregation, making them less profitable for foraging SSL. The effect of this on SSL depends on the species foraging strategy. Although, SSL are probably adapted to foraging on the normal schooling behavior of pollock, it is also conceivable that SSL may be able to exploit fragmented fish schools more effectively. The proportion of fishing effort by the commercial pollock fishery within known SSL foraging areas has increased substantially since the 1970's.

3. Because so many fisheries have been conducted near SSL rookeries and haulouts **SSL may have had their foraging ability compromised.** Prey switching by SSL, which might be expected to occur with depletion of pollock, might be hampered by competition with other fisheries that also locally deplete their target stocks.

4. **These effects are** more significant the longer they last (i.e., they are cumulative) and **most significant during the winter for adult females and juvenile SSL**, for the following reasons:
   i. during winter SSL females have both the energetic demand of providing milk to their growing pup and of the developing foetus,
   ii. winter can be a time of harsh environmental conditions increasing daily metabolic requirements, particularly for small animals with thin blubber,
   iii. if pups are weaned during the winter they may be challenged energetically because their foraging skills are limited,
   iv. pups, being small, have greater metabolic and growth requirements per unit body mass.

   Spring may also be important energetically because it is just before pupping, and poor foraging conditions could affect pup birth weight and subsequent survival.

5. **SSL do not have large fat reserves** compared with other pinnipeds and require continuous access to food. Thus, they are susceptible to local depletion of prey by fisheries **and have shown the effect of food limitation through reduced growth and condition as well as a numerical response (i.e., declining numbers).**

6. Besides resource competition between SSL and fisheries **there may be *interference competition*.** The presence of vessels and gear can cause: disruption of feeding by SSL and abandonment of fishing areas by SSL.

7. **Indirect effects of fishing may reduce carrying capacity and effect the critical habitat** of SSL. In this context, critical habitat is defined as the geographic extent of environment needed for the recovery and conservation of a species, and carrying capacity is the maximum number of individuals that could be supported by available resources.

In this next section, we list and briefly review the evidence of the effects of fishing on SSL presented in the BiOp.

a) Evidence for depletion of pollock and Atka mackerel

1. Depletion of pollock – this has been cited from three areas: a) Bogoslof Island (AI), b) donut hole and c) Shelikof Strait – Fritz et al. (1995).

In Shelikof Strait, the fishery in 1970's developed to 300,000 mt/yr. By 1993, GOA pollock stock size was reduced from 3 million mt to 1 million mt. NRC (1997) stated that SSL counts on nearby rookeries declined dramatically and individuals showed signs of reduced growth (Calkins and Goodwin 1988, Lowry et al. 1989).

Uncertainties in these studies include the fact that prey density was rarely known in areas used by foraging SSL. This is because harvest rate is not necessarily a good indicator of prey availability. Using survey biomass estimates for a large region as an index of availability to SSL assumes a uniform distribution of prey in the area. in addition, the correlation between fish distribution and catch distribution is often poor (Fritz 1993).

2. Depletion of Atka mackerel: Fritz (unpublished ms.) showed that CPUE for Atka mackerel in some areas declined steeply during repeated trawling over relatively short periods (3 days to 17 weeks). He estimated that harvest rates ranged between 55% and 91%, suggesting that there was substantial local depletion of the exploitable biomass.

b) Evidence for potential competition between fishery and SSL

There are two lines of evidence here, competition by size and competition by depth. There is likely overlap in the size of fish taken in the pollock fishery and that consumed by adult SSL. However, not much is known about SSL feeding preferences and recent data on SSL diet does not include information on the size of prey eaten. There may be overlap in the depths used by foraging SSL and that trawled by fisheries. Some fish prey exhibit diel vertical migration, such that competition by depth between SSL and fisheries could occur at some times of the day but not others. Also, we still have a rather poor understanding of the foraging depths used by SSL of various age and sex classes at different times of the year.

c) Evidence for winter season competition

There are two lines of evidence bearing on this possibility. First, captive SSL increase their level of food intake in fall and early winter (Kastelstein et al., 1990). Second, although spawning aggregations of fish in late winter may provide higher energy and more reliable food source for SSL, the fishery, by trawling these aggregations, may reduce their availability. Neither of these arguments directly addresses whether or not competition does occur --only that it is possible.

d) Evidence concerning interference competition

The POP observation and observer program databases are equivocal on this issue. There are few observations of SSL from fishing ships in comparison to the amount of fishing activity. This could be because SSL are disturbed and avoid the vessels or because they are tolerant of fishing operations and just rarely sighted. The bycatch of SSL in the 1970's and 1980's implies that at least some SSL were tolerant of fishing activity in that era.

e) Evidence concerning an energetic response of SSL in addition to a numerical response

There are several lines of evidence that point to the effects of food limitation on the western stock of SSL:

York's (1994) analysis of samples collected in 1975-1978 and in 1985-1986 (Calkins and Goodwin 1988) showed:

- smaller animals in 1985
- later maturity in 1985
- fewer offspring of SSL in 1985
- SSL with pups were older in 1985
- SSL in 1985 with reported signs of anemia. (However, reported values were within the normal range for pups 2-3 weeks of age, NRC 1997),

In addition, juvenile survival apparently declined in eastern AI (Ugamak Is, Merrick et al., 1987) and in the GOA (Marmot, Is, Chumbley et al., 1999),

Pitcher, Calkins and Pendleton (1998) found an increased level of abortions and poorer condition for pregnant females collected during late gestation in 1985-86 compared with those collected in 1975-78 on rookeries, haulouts and coastal waters of the Gulf of Alaska. Successful gestation was directly proportion to condition (mass index).

On the other hand, studies that have compared SLL at rookeries in declining (western) and stable or increasing (eastern) populations have found little evidence of food stress:

- Rea et al., (1998) sampled 238 free-ranging pups < 1 month old during June and July 1990-1996 in the GOA, AI, and Southeast Alaska. They found no indication of nutritional stress in the declining populations;

- Castellini (unpublished data, SSL Research peer Review Physiology Workshop, Seattle, Feb, 1999) measured girth, length, and blood chemistry parameters of lactating female SSL between 1993 and 1997 from both increasing and declining populations. The results showed that individuals in the western population were rounder, longer and heavier compared with those from the eastern population,

- researchers at Texas A&M found no difference in energy intake of 40 pups at 5 rookeries in declining and stable populations sampled between 1993 and 1997 (unpublished data, SSL Research peer Review Physiology Workshop, Seattle, Feb, 1999).

Finally, the BiOp states that "The question of whether competition exists between the Steller sea lion and BSAL and GOA groundfish fisheries is a question of sea lion foraging success." This is a necessary but not sufficient basis upon which to draw conclusions. Poor foraging success may also be the result of environmental change; without additional information it is not possible to determine if fishing, the environment, or a combination of the two is the causal factor. Furthermore, as the evidence above clearly reveals, support for the BiOp argument is tenuous. Although local depletion of Atka mackerel by fishing has been demonstrated, a direct link between this and SSL foraging efficiency has not been established, let alone a link to the observed changes in SSL demography. The argument remains plausible but unsupported and the alternative hypothesis of climate changes has not been eliminated.

Task 2 - Design of Field Experiments

NMFS has proposed to establish a "well-designed monitoring program that would be used to ascertain the extent to which the implemented measures [to] promote the recovery of sea lions."

Experimental design to determine effectiveness of RPAs

It is our understanding that the design of the experiment(s) to test the effect of fishing on SSL is evolving and therefore somewhat of a moving target. Apparently, the design is being constrained by a number of considerations, which are not conducive to obtaining clear results. Among the apparent constraints is the desire to ensure that the design "alleviate jeopardy", as judged by the BiOp for all management units. This presumably accounts for the somewhat surprising expectation, expressed at the top of page 295, that SSL populations in both the open and closed areas will respond positively during the period of the experiment. Certainly if fishing is a significant factor affecting sea lion numbers then we would expect a non-zero response in the areas closed to fishing. However, the planned experiment is being designed so that conditions for SSL in the areas open to fishing are also expected to improve. In effect, the experiment has two treatments and no control. Given the high degree of uncertainty that the proposed RPAs really will actually alleviate jeopardy, we think it is worthwhile to contemplate an experiment that has a real control, at least locally. Given that the present size of the SSL

stock is over 30,000 animals and that the present rate of decline is small, there should be considerable scope for experimentation without undue risk.

The BiOp also states that both the experiment and other studies will be used to assess the efficacy of management measures, but there is no indication of the types of studies anticipated. Certainly tagging studies will be needed to determine to what extent the closed areas are actually used by foraging SSL. For example, if only 50% of animals use the treatment area intensively, the population response will only be about half that expected and one might incorrectly conclude that fishing was not a significant factor.

Design principles for ecological field experiments

Although the specific design of the proposed field experiments have yet to be determined, there are certain principles that should apply rather generally to any such experiment. We briefly discuss some of these below to help focus the discussion about the merits of field experiments.

All experiments are based on the following logical model -

Observations → Models → Hypotheses (Predictions) → Alternative or Null hypotheses → Experiments → Interpretation of results

This framework (Underwood 1997) emphasizes that good experiments can only be designed and undertaken if there are adequate quantitative observations from which to reasonably construct alternative models (i.e., explanations) and predictions. Given the current state of our observations with respect to SSL foraging behaviour and the effects of fishing on prey behaviour at fine to meso scales, it might be considered somewhat premature to undertake large scale manipulative experiments. On the other hand, the importance of finding out if fishing really is having an impact on SSL may outweigh the desire to make additional preliminary studies as a prelude to desiging the best possible large-scale experiment.

It cannot be overemphasized how difficult it will be to conduct large scale field experiments to test hypotheses about the effects of fishing on SSL. To our knowledge experiments in the open ocean at this spatial scale have not been previously attempted. But, on the positive side, if the enormous fishing power of the ground fish fisheries really were at the disposal of the experiment, this too would be unprecedented.

Some of the issues that need to be resolved include -

1) number of replicates of the treatment and the control,
2) size of the experimental unit (individual rookery, clusters of rookeries),
3) response variable to measure (pups, non-pups, both, others) and what level of change should we expect to be able to measure,
4) duration of the experiment (there will be lags in the response variable),

5) how is the treatment to be measured (fishing days, biomass removed, number of tows, others?),
6) other response variables to measure (diet, foraging trip duration, birth mass, pup growth rate, others), and
7) what are the alternative hypotheses (e.g., climate effects, predation) and how will they be evaluated (i.e., does the experiment make unique preditions about the effects of fishing?).

Table 1 is an attempt to determine the direction of change in a number of response variables that might be expected under the hypotheses that have been proposed to explain the declines in the western stock of SSL. For some response variables, the direction of change under specific hypotheses is debatable. For other response variables, it is not clear to us how, or even if, the variable would change under some of the hypotheses. Nevertheless, it seem clear from Table 1 that quite similar changes are predicted under the fishery effects, fish predator competition, and climate effects hypotheses. We have not considered space explicitly in Table 1, however, we might expect different spatial signatures associated with some response variables under these three food hypotheses and this should be investigated further.

Smaller Scale Experiments

We are moderately pessimistic about the prospects for resolving the critical uncertainties about the SSL decline from simply monitoring the response of the population to implementation of the RPAs (see Table 1). For this reason, we believe that the best hopes depend on a disciplined investment in specific smaller scale experiments to answer questions about the hypothesized mechanisms of the interaction between the fisheries and the SSL.

This will entail detailed measurements of the effects of fishing activities on the prey field and on the behavior of instrumented individual SSL. The spatial and temporal focus of such experiments should include the season and location that is thought to be the bottleneck for the SSL. Similarly, the sample of instrumented animals should include the age classes that are thought to be most severely affected. Although these experiments are smaller in scale than treating the RPAs as one grand experiment, they are still very substantial undertakings that will require a massive commitment of resources. It is our scientific judgement that this investment would be warranted.

Retrospective data analysis

The historical count data of SSL is of high spatial resolution and provides an opportunity, independent of any manipulation experiment, to examine the relationship between SSL demography and possible influencing factors, such as fishery activity. Nonparametric regression models could be used to investigate the relationship between the rate of change of SSL numbers on any and all rookeries over various historical time periods and high resolution, spatially-explicit data on catch and effort for pollock and Atka mackerel close to the rookery over that time period. Other potential factors, such as catch of other

species (e.g. herring), area of the rookery, and maximum historical SSL population on that rookery can also be used a covariates. Such analysis can also be done on haulouts or groups of rookeries over any time period for which high resolution fisheries data are available. The advantage of this approach over analysis of larger areas is that it affords larger sample size and more flexibility in the choice of spatial resolution and thus has a greater chance of identifying signals in the data.

Task 3 - Responses of Other Pinnipeds

Comparisons with other species in the action area

In assessing the causes of continuing declines of the western stock of SSL, the BiOp has made little use of data from other SSL populations, or from other pinniped species in the action area. Indeed, the BiOp pays little attention to the continuing and consistent increase in numbers of the SE Alaska stock of SSL. Many SSL foraging areas are also used by Northern fur seals, , at certain times of the year, and by harbour seals throughout the year in the case of the harbour seal. We believe that comparative data from these species could be used to help distinguish among alternative hypotheses, as we discuss below.

The BiOp notes on page 102 that the SSL population in the Russian territories had also declined to about one-third of historic levels by the late 1980s. Counts conducted in 1989, 1994, and 1999 indicate differing trends in different areas, but pup production overall has increased at about 2.7% annually over the 1990s. The sum of counts has increased, "but counts at repeated sites have declined indicating the trends in Russian cannot yet be described with confidence." We are not sure what this last sentence means. However, the important point here is that demography in the Russian population changed in the 1990s after a period of dramatic decline. Superficially, this would seem more consistent with a large-scale environmental effect than the effects of fishing, unless patterns of fishing within the Russian territories have changed or fishing effort was considerably reduced.

The dramatic decline in harbour seal numbers at Tugidak Island in the central GOA also seems to have halted during the 1990s and there is evidence of an increase in this population through 1999 (ADF&G personal comm.). There are population estimates of harbour seals elsewhere in the action area that could also be examined.

Fur seals use the action area only seasonally. Nevertheless, the number of pups born at St. Paul Island and St. George has been rather stable over the past decade, in contrast to earlier declines.

The point here is that by looking more broadly and considering the population trends of similar species in the action area, it may be possible to distinguish among competing hypotheses about the causes of decline in SSL.

Lessons from other seal populations

In this section we review some case studies for other seal species in which the effect of local prey depletion on demography has been investigated, or changes in demography have been attributed to local prey depletion. For convenience, we divide the causes of prey depletion into three categories: fisheries-induced changes, environmentally-induced changes, and predator-induced changes.

a) Fisheries-induced prey depletion

There is, as far as we know, no direct evidence that prey depletion by fisheries has affected the demography of any seal population, whereas there are a number of cases in which seal populations have continued to increase exponentially following the complete collapse of an important prey stock as a result of overfishing (e.g., grey seals and Atlantic cod in the Northwest Atlantic and North Sea).

The only detailed study known to the panel of the effect of local depletion concerns the North Sea "industrial" fishery for small pelagic species, which are used as animal feed or to produce fish meal and oil. This includes a fishery for sand lance (mainly the lesser sand lance, *Ammodytes marinus*). Sand lance catches rose sharply from 1960 onwards and have varied between 540,000 and 970,000 tons since 1984 (Pedersen et al., 1999); they now account for nearly 50% by weight of all fish landings from the North Sea. Sand lance are an important prey species for many predatory fish, seabirds, and marine mammals. The sheer scale of this fishery has led to concerns about its impact on the entire North Sea ecosystem (e.g., Aikman, 1997). In particular, there is substantial spatial overlap between the fishery and foraging by seals and breeding seabirds on a series of major sandbanks off the Firth of Forth in Scotland. Sand lance fishing began in this area in 1990 and catches rose rapidly to more than 100,000 tons in 1993. They then fluctuated around 40,000 tons until the area was voluntarily closed to sand lance fishing in 1999. In most years, over 90% of the catch was taken in June, and most of that within a 10 day period. The effects of this local depletion on foraging and breeding performance of three seabird species (kittiwake, shag and common murre) and grey seals was investigated during 1997 and 1998 (Harwood 2000).

The total biomass of sand lance in 1998 was 15% less than in 1997, and there was a marked change in the age distribution of sand lance between the two years. Acoustic surveys indicated that the biomass of 0-group sand lance in June 1998 was less than half that in 1997 and individual fish were smaller. Total removals were similar in both years (69,000 tonnes in 1997 and 65,000 tonnes in 1998). Fish were the most important natural predator in both years. The fishery was responsible for 68% of all removals in 1998, compared to 34% in 1997.

Sand lance (mainly 1 year old and 3 year old fish) made up nearly 50% of the diet of grey seals in 1997, but only around 10% in 1998 (and in this year they were mostly 2-year-old fish). More cod and whiting were consumed in 1998. The proportion of sand lance in the diet of murres declined by 70% in 1998, with the alternative prey being clupeids. The diet of shags and kittiwakes showed much less change and was dominated by sand lance in both years. Both murres and shags spent more time diving and proportionally less time at the surface in 1998. In contrast, the surface feeding kittiwakes did not, or could not,

change their foraging behavior. Kittiwakes suffered an almost complete breeding failure in 1998, whereas the productivity of guillemots and shags was only slightly reduced.

The proportion of female grey seals not breeding in a particular year at the nearest rookery, and the number of breeding failures amongst marked animals at that colony was negatively correlated with sand lance CPUE in the southern North Sea over the period 1990 to 1997. Female body condition was positively correlated with CPUE for the North Sea and the local stock area. None of these relationships had a measurable effect on the total number of pups born at the colony, which increased steadily over the study period.

The conclusion from this study is that the impact of local depletion by fisheries depends intimately on the foraging strategy of the predators that may be affected. Grey seals murres and shags were able to make behavioural changes to compensate for the rapid reduction in the biomass of 1+ sand lance by the commercial fishery in June 1999, whereas surface feeding kittiwakes were not. As a result, the observed response of most predators was relatively subtle and had no immediate effect on their demography.

Similarly, the relationships between grey seal breeding parameters (female condition, missed pregnancies, failed breeding) and sand lance abundance (as measured by CPUE) were also rather subtle and were only detectable because there was a sub-population of permanently marked females at the rookery whose performance was monitored each year. It should be noted that the year-to-year variations in sand lance abundance appear to be primarily a result of fluctuations in recruitment and not of the action of the fishery itself.

b) Environmentally-induced depletion of prey

The effects of ENSO (El Niño Southern Oscillation) events on the demography of a range of fur seal, sea lion and seal populations along the western seaboard of South and North America are well known (Trillmich and Ono 1991). However, there have been similar events in other parts of the world. For example, the intrusion of warm, low-oxygen content water into the northern Benguela system off the Atlantic coast of Namibia in late 1993 and early 1994 resulted in the virtual disappearance of many pelagic and epipelagic fish species from the continental shelf. This had a dramatic effect on Cape fur seals at Namibian colonies during the 1993/94 breeding season, summarized in Anon (1998). The initial effect was seen in a reduced growth rate of pups at Cape Cross (the northernmost colony of the Cape fur seal). This was followed by a mass mortality of pups at Cape Cross in the austral summer of 1993/94, and colonies further south were affected after a short delay. From February/March 1994 onwards, all colonies north of Lüderitz (in southern Namibia) experienced the highest levels of pup mortality ever observed, due to abandonment and starvation. By the end of May approximately 120,000 pups, out of a normal production of around 300,000, had died. Beginning in June and worsening through July, surviving females aborted their pups. It is estimated that 40,000 foetuses were aborted at Cape Cross alone. At the same time large numbers of emaciated adults of both sexes washed up along much of the Namibian coast. Pup production in 1994/95 was 50-70% lower than in 1992/93 and 1993/94. Mass of pups at birth and early pup survival in 1994/95 was the lowest ever recorded.

Capelin (*Mallotus villosus*) are normally the most important prey species for the harp seal population which breeds in the White Sea and feeds in the Barents Sea, making up more than 90% of the diet in some years. The Barents Sea capelin stock collapsed in 1985/87 and remained at very low levels until 1990. At about the same time, large numbers of harp seals began appearing off the northwest coast as Norway, and by 1987 they were reported as far south as the southern North Sea. Very large numbers of harp seals (up to 60,000 in 1987) were taken as bycatch in gillnets along the coast of Finnmark, Troms and Nordland during this period. These "invading" harp seals, particularly in the subadults, were reported to be thin and in very poor condition (Øritsland 1990 and Wiig 1988 in Haug & Nilssen 1995). These events must have resulted in large scale mortality of young animals because the 1986-1988 year classes are virtually absent from the age structure of Norwegian samples of molting harp seals taken since 1990 (Kjellqwist et al. 1995). Despite these dramatic changes, Haug and Nilssen (1995) are cautious about attributing the 1980s invasions of harp seals to local depletion of capelin in the Barents Sea, partly because the capelin stock collapsed again in 1992/93, but there was only a relatively small influx of harp seals into Norwegian waters at that time.

Antarctic fur seals breeding on the islands around South Georgia feed almost entirely on krill (*Euphasia superba*). Breeding performance of fur seals and a number of seabird species on Bird Island which also prey on krill has been monitored annually since 1980. Performance of all krill predators increased up to the late 1980s but has declined steadily since then. Reid and Croxall (2001) interpret these changes as a response to decreasing availability of krill, possibly as a consequence of ocean warming and reduced sea-ice extent. The main responses by fur seals have been a decrease in the mean birth weight of pups and an increase in foraging trip duration (Boyd et al. 1994) during a year of particularly low krill abundance.

c) Predator-induced depletion of prey

The numbers of southern elephant seals breeding on Macquarie Island in the southern Indian Ocean have been declining steadily since the early 1970s. Hindell (1991) demonstrated that this was, at least in part, due to a dramatic decline in first-year survival from around 45% in the 1950s to less than 2% in the 1960s. He concluded that the population had temporarily exceeded the carrying capacity of the local environment and was demonstrating signs of delayed density-dependence. However, although first-year survival has now recovered to levels similar to, if not higher than, those observed in the 1950s, the population at Macquarie has continued to decline (McMahon et al. 1999).

On the basis of changes in the size structure of krill caught off South Georgia during the 1990s, and estimates of local krill mortality that were 50% higher than those recorded elsewhere in the species' range, Reid and Croxall (2001) concluded that Antarctic fur seals and seabirds from South Georgia were now "operating close to the limit of krill availability". As a consequence, there has been an "increase in the frequency of years where the amount of krill is insufficient to support predator demand", and abundance of all krill predators on Bird Island has declined since 1990.

d) Lessons for SSL management

Two major lessons emerge from this brief review: 1. Changes in seal demography in response to a reduction in prey abundance are either so dramatic that they can be detected even without scientific study (Cape fur seals in Namibia, harp seals in Norway) or relatively subtle, requiring time series of monitoring data (North Sea grey seals, Antarctic fur seals, southern elephant seals); 2. A reduction in first-year survival was involved in all the examples listed above. A reduction in pup birth mass or growth rate was also often observed. The second point supports NMFS' contention that a reduction in juvenile survival is probably involved in the continuing decline of the western population of SSL. However, it should be recognized that no decline in SSL juvenile survival has been adequately documented, it has only been inferred from York's (1994) analysis of age-structure data which are now quite dated, and on observations of low survival from a very small sample of marked animals.

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Other references used in this interim report are given in the BiOp.

Table 1. Predicted direction of change in response variables under various hypotheses to explain the decline of SSL.

	Hypothesis								
Response variable	FE	CE	FPE	PRED	IT	SH	DI	PO	EN
Birth mass	R	R	R	?	?	NC	R	R	?
Juvenile growth rate	R	R	R	NC	NC/I	NC	R	R	NC
Weaning mass	R	R	R	NC/R	NC	NC	R	R	NC
Body condition	R	R	R	NC	NC	NC	R	R	NC
Foraging trip duration	NC/I	NC/I	NC/I	NC/R	NC	NC	?	NC	NC
Milk production	R	R	R	NC	NC	NC	R	R	NC
Diving behavior	I	I	I	NC/R	NC	NC	?/R	?/R	NC
Foraging areas	C	C	C	C	NC	NC	NC	NC	NC
Yearlings nursing (%)	?	?	?	NC	NC	NC	?	?	NC
Dispersal	I	?	?	NC	NC	NC	R/?	R/?	NC
Diet composition	C	C	C	NC	NC	NC	C	C	NC
Diet diversity	I	?	?	NC	NC	NC	?	?	NC
Birth rate	R	R	R	NC	NC	NC	R	R	NC
Age at first birth	R	R	R	NC	NC	NC	R	R	NC
Juvenile survival	R	R	R	NC	NC	NC	R	R	NC
Adult survival	R	R	R	NC	NC	NC	R	R	NC

FE - Fishery Effects on food
CE- Climate/Regime shift Effects on food
FPE - Fish predator effects (competition)
PR- Killer whale and shark predation
IT - Incidental take
SH - Subsistence harvest
DI - Disease
PO - Pollution
EN - Entanglement in fishing gear

R = reduced, I = increased, NC = no change, ? = uncertain

Review of 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

May 18, 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 Scientific 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. A condensed response to the Council's four questions is contained in the SSC minutes for the February 2001 meeting. This report is the SSC's review of the BiOp.

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 SSC 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 a draft review document. Between February and April 2001, SSC members read the draft and suggested changes that were incorporated into a revised draft and presented for final approval at the April meeting. In addition, the SSC received comments on the February draft document from the NMFS [March 7th letter from Regional Administrator Jim Balsiger]. The SSC made changes to clarify ambiguities in the draft. Final editing was completed following the April 2001 Council meeting.

This review is written as a stand-alone document. 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 a draft scientific review by the State of Alaska's SSL Restoration Team should be completed in May, and our reading of their minutes suggests that their review is likely to be consistent with and complementary to ours.

1.3 Overview

In a biological opinion, NMFS is required to make a determination as to whether or not 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 under the ESA 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.

The 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 dependent on uncorroborated critical assumptions. Opinions are frequently unsubstantiated and/or stated as facts. There is a lack of scientific balance when evaluating the credibility of alternative hypotheses. Analyses that could have informed the opinion makers were not undertaken. In some cases, recent, relevant research findings were not incorporated into the document. There are misstatements about basic fishery management principles, the dynamics of exploited populations, and the control rules used by the NPFMC. From the outset, NMFS fails to separate the historical causes of the decline in the SSL population from the current impediments to recovery. Specific examples of these issues are given in Appendix I.

The SSC believes that BiOp3 constructs an unreliable foundation for proposed RPAs and we have several suggestions for improvements. However, it would be incorrect to conclude that fisheries are wholly 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 nor 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 Appendix II.

2.1 Scientific Credibility

BiOp3, responding in part to a court directive, is an attempt by NMFS' Office of Protected Resources to determine "... *whether the BSAI or GOA groundfish fisheries, as implemented under the respective FMPs, jeopardize the continued existence of listed species in the areas affected by the fisheries (i.e., the action areas) or adversely modify critical habitat of such species.*" (BiOp3 Executive Summary). After conducting their evaluation, NMFS concluded that groundfish fisheries were "...*likely to jeopardize the continued existence of the western population of Steller sea lions*" (P.268, lines 47-48) and "... *likely to adversely modify [their] designated critical habitat.*" (P.270, lines 37-38) . A reevaluation of global effects of groundfish fisheries led NMFS to require that the harvest 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 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. Opinions are frequently unsubstantiated and/or stated as facts, and scientific balance is lacking. 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. **In these ways, the SSC finds that BiOp3 is scientifically deficient.** Some examples of these problems are found in Appendix I.

2.2 Alternative Hypotheses

BiOp3 finds that fisheries cannot be ruled out as contributing to the decline and failure of recovery of SSLs. Although alternate hypotheses for the decline and failure of SSL recovery are discussed, thorough evaluation of their contribution, individually or collectively, is lacking. The line of inquiry used in BiOp3 is: (1) to examine other hypotheses to see if they explain the SSL decline and lack of recovery, (2) to conclude that each alternative hypothesis does not explain the SSL decline and lack of recovery, (3) to conclude consequently that fisheries cannot be ruled out as contributing to the SSL decline and lack of recovery. The result is a failure to put the potential effect of fisheries in the broader context of climate change and other environmental variation. The SSC concludes that more thorough evaluation of alternative causes of the current decline would contribute to the development of the most useful management alternatives. The

SSC further recommends that future documents take this more holistic approach and attempt to address cumulative and synergistic effects of multiple factors.

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.

A major flaw of the BiOp is failure to combine all sources of mortality to compare with the current rate of SSL decline. 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, lines 32-38). The analysis of killer whale predation is based on a minimum estimate of transient killer whale population size of 125 and 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 SSLs.

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

The global fisheries management policy of the NPFMC is one of the most conservative in the world. For most stocks, an $F_{40\%}$ policy is used for the maximum permissible fishing mortality also referred to as the Acceptable Biological Catch (ABC). This fishing mortality level reduces spawning biomass-per-recruit to 40% of that for an unfished ("pristine") population. $F_{40\%}$ is

usually below the fishing mortality F_{msy} that produces maximum sustainable yield (MSY) and is considered to be a conservative rate in the fisheries literature. If there is no trend in recruitment (over time or as a function of biomass), then one can determine the corresponding $B_{40\%}$ spawning biomass level (40% of unfished spawning biomass) by multiplying biomass-per-recruit by average recruitment. $B_{40\%}$ is usually above the MSY spawning biomass level, so this population level is also conservative. A population at the $B_{40\%}$ level exhibits a high level of productivity and a low probability of recruitment failure in most cases. For stocks with sufficient information, a biomass-based harvest policy further adjusts fishing mortality downward if a population is reduced below the $B_{40\%}$ level, in order to prevent the population from declining further. Stock assessments must include projections that show that current fishing policy satisfies the NMFS overfishing criteria related to rebuilding to the MSY level in less than 10 to 12 years. Three levels of scientific review (analyst, Plan Team, SSC) are undertaken annually. The result of these reviews can be a further reduction in fishing mortality when assessments reveal potential stock problems. Moreover, the Total Allowable Catch (TAC) established by the Council and enforced by NMFS cannot be greater than and is generally set well below the ABC. **The SSC concludes that current NPFMC fishing policy is sufficient to protect fish stocks under its domain.**

In its consideration of global effects, BiOp3 does not acknowledge the conservatism of the NPFMC policy. Rather, it contains many criticisms about current fisheries management by NPFMC. In particular, the document focuses on the reduction in spawning biomass under a $B_{40\%}$ policy.

The centerpiece of NMFS' argument is that "*By design, fishing significantly reduces the spawning stock biomass from an 'unfished' level to a 'fished' level.*" (P.223, lines 38-39) An analysis is conducted in which historical biomass of groundfish species is reconstructed as if there had been no fishing. To undertake this analysis, the annual unfished recruitment time series was assumed to be identical to the recruitment time series estimated for the exploited stock. After comparing the unfished and fished series, NMFS concludes that prey availability of EBS pollock, cod, and Atka mackerel was lower in the exploited stock ($B_{40\%}$ policy) than it would have been in the unfished stock. (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, lines 15-17). (In reality, both types of removal are assumed to occur concurrently in most assessments.) The sum of the unfished biomasses is compared to the sum of the fished biomasses in Figures 6.16 and 6.17 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 recruitment would be the same at all biomass levels and that species interactions do not exist. In reality, density dependent effects are likely to occur, especially near the unfished biomass level. The consequence of these effects would be a change in the expected recruitment time series, 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. Furthermore, spawning biomass is made up of older, mature individuals, so that examining only spawning biomass tends to overstate the effects on the total

population. The focus of concern should be on the biomass for the size ranges of prey most preferred by Steller sea lions, which are smaller, younger individuals.

In order to assess possible global effects of fisheries on Steller sea lions, the SSC believes that it is more important to compare Steller sea lion declines with the actual (estimated) trend in fish biomass, rather than with a hypothetical unfished population. 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, the overall level of spawning biomass has remained stable, most flatfish and Pacific Ocean perch stocks have increased, and Atka mackerel and gadids have oscillated. The largest declining trend occurs for GOA pollock, but Figure 6.17 shows that fishing played little role in its population trend. In many other fisheries in the world, there have been much more substantial declines that have been directly traced to overfishing, and many of these stocks have not recovered. The operating paradigm for the Bering Sea and Gulf of Alaska stocks 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 supported by the multi-species analyses contained in section 6.5.3. The erroneous conclusions and misperception in BiOp3 are consequences of incorrectly trying to apply a single-species approach to understand multi-species interactions.

Therefore, the SSC concludes 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. In future BiOps, a proposal to alter the control rule should have a rationale presented in terms of SSL foraging needs and should show the effect of the proposed rule on fish stock yield and rebuilding compared to the current one.

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 occurring in other fisheries.

Available data are insufficient to conclude that competition between SSLs and Alaska's fisheries is occurring. The fact that SSLs eat fish and the fishery takes fish is not evidence of competition. If sufficient resources are available, then in general, competition does not occur when resources are sufficient to meet the needs of the putative competitors.

Furthermore, contrary to BiOp3, one might even suspect a commensal relationship between SSLs and the fishery. The fact that SSLs are often found in the vicinity of fishing vessels and may feed on fish components caught by vessels suggests that they could benefit from the presence of fishing vessels.

In the future, it will be important to better quantify competition and the relation of prey availability and SSL mortality. For direct competition to be present, SSLs and fisheries have to compete for the same prey resources, and it would be instructive to estimate the degree of overlap in prey size and depth on suitable spatio-temporal scales. Models should be developed to understand how fishing removals could reduce prey density to something less than that promoting efficient SSL foraging. The magnitude of adverse impacts to individual SSL foraging due to fishery removals would then be proportional to the likelihood that SSLs encounter the diminished prey field patch, which itself depends on the geographical breadth and duration of the limiting competition. Such an exercise could help to determine if there is a high probability of encounter with the diminished prey field by a large number of SSLs, sufficient to cause the persistent decline of a population.

A general issue in this debate is the importance of competition (inter- and intra- specific and with fisheries) in marine ecosystems. 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 or a decrease in reproductive success.

If food limitation contributes to SSL population declines, it need not be through the mechanism of fishery induced local depletion. Rather, it could be due to nutritional deficits caused by environmental changes in prey availability as illustrated by the decline in abundance of oily fish such as herring and capelin. Merrick et al. (1997)[1] showed that diet diversity may also be a key component of SSL success (p 94, lines 8-9; p 95, lines 11-25). The availability of these forage fishes is unrelated to the groundfish fishery.

The hypothesis that fishery-induced lack of prey is a significant cause of SSL mortality has been difficult for many of us to accept on first principles. The foraging behavior of SSLs is opportunistic and generalist in character, as evidenced by the large number of species observed in their scats. Given the large biomasses of fish species in the Bering Sea and the Gulf of Alaska, it remains to be demonstrated that sufficiently large areas are so depauperate of forage fishes (whether due to fisheries, habitat, or environment) that SSLs cannot find sufficient fish to survive.

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 fronts that address the competing hypotheses. While we recognize that NMFS must err on the side of caution in considering local depletion effects, it should also broaden its perspective to consider other factors.

[1] Merrick, R.L., M.K. Chumbley, and G.V. Byrd. 1997. Diet diversity of Steller sea lions (*Eumetopias jubatus*) and their population decline in Alaska: a potential relationship. Can. J. Fish. Aquat. Sci. 54:1342-1348.

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 are being developed and used to investigate ecosystem trends.

In contrast to fish population modeling, 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 no population modeling work on SSLs in BiOp3 and the last published work seems to be from 1996. A population of 40,000 animals is fairly large when considering risk of extinction, but no attempt is made in the document to examine extinction risk. This problem is exacerbated because the rate of decline is smaller than when previous population viability analyses were done 7 years ago. "*These projections* [of extinction rates] *have not been updated since 1994.*" (BiOp3, P. 104, lines 48-49) The attempt to forecast the SSL population into the future (section 9.6), simply presumes the RPAs will work to stop the decline of the whole population or else stop the decline in the closed areas. There is no attempt to forecast under alternative hypotheses mentioned above or to reconcile predation with food limitation.

The estimation of population trends is central to the conclusion that the continued survival of Steller sea lion populations is jeopardized. Consequently, the statistical basis for that determination should be thoroughly documented. Regrettably, details of model form and model performance are woefully lacking in BiOp3. Given the limited time series of Steller sea lion population "estimates" and the lack of information about the error structure of population estimates, the choice of model form is crucial. The SSC acknowledges that it is difficult to model trends in natural populations. The difficulty arises because the form of population structural relationships is unknown, population estimates are subject to observation and procedural errors, and important factors affecting population trends are unobservable, nonlinear and characterized by lagged endogenous and exogenous relationships. Nevertheless, theoretically and statistically valid structural and time series models could be constructed with the available data. Such models could help address the magnitude and significance of population trends, the probability of continued decline or recovery, and the likely significance of factors contributing to the decline or recovery.

A comprehensive population model should be developed 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 large, catches are limited, and bycatch is not addressed. 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's use of open and closed fishing areas 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 been shown to affect SSL population trends despite having been in effect for a decade. 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. Or it is possible that they did contribute to the reduction in the overall rate of decline seen in the 1990s? We just don't know. 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 efficacy of 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, particularly the impacts of such indirect effects as fishery-induced prey dispersion, 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 inhabited in 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 such that they no longer need to be part of the protected and legally designated critical habitat.

Finally, the single set of RPAs sidesteps the ESA requirements that when multiple RPAs can be expected to equally address jeopardy and adverse modification concerns, the least economically damaging set of RPAs shall be adopted.

2.9 Carrying Capacity

The debate about SSL population trends frequently involves the notion of carrying capacity, a notion that often is not well defined. BiOp3 states that SSL carrying capacity is related primarily to prey availability (P.61-62). 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, with the ultimate goal of blending them into a comprehensive model of the SSL population.** Further discussion of this issue is found in Appendix II (see comments regarding P. 61, lines 47-48, P. 62, lines 1-4).

2.10 Definition of Terms

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 important terms from the ESA such as "jeopardy", "critical habitat", and "adverse." Within a biological opinion there should be a statement of unambiguous criteria for assessing when jeopardy and adverse habitat modification are occurring for the particular species under review.** Providing these definitions would certainly help scientists judge the reasonableness of the conclusions in the opinion.

In the case of SSLs, it is especially important that the decision rules are clearly described. It is apparent that NMFS is using unstated decision rules. In discussions in front of the SSC some of the details of their development were mentioned. The rules and rationales should have been included in the document.

3.0 Preparers

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Appendix I. Examples

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.

A1.1. Unsupported/Unstated Assumptions

In Section 5.5.6.2, 'Competition and the winter season', NMFS goes to great lengths to make the case that winter is a critical time for SSLs. For example, they state that weaned pubs are inexperienced foragers; utilize more energy to forage than their adult counterparts, and require higher energy inputs per unit body mass for maintenance (P.186, lines 4-15). They cite one paper in this section (P 186, lines 16-17) and that describes seasonal variability in food intake rates for captive animals. There is no empirical evidence provided to show that SSLs are food stressed in this period.

In BiOp3 Appendix 3, NMFS estimates the theoretical level of groundfish stock biomass required to support a healthy SSL population. They contrast this estimate with the current estimate of available biomass concluding, 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*" (BiOp3 Appendix 3, P. 2-3). Ultimately, NMFS concludes that "*... fisheries do compete with non-human consumers*" but the competition occurs at the local level (App. 3, P. 4). There is no foundation for this conclusion in the Appendix. Here the statement hangs as an uncorroborated assumption.

A1.2. Contradictions within the document

In Section 5.5.6.2 (Indirect effects on Steller sea lions) NMFS attempts to build a case that fishery induced changes in the forage base have contributed and continue to contribute to the decline of SSLs.

The discussion of indirect effects on SSL 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.*' (P. 182, lines 21-25)

The authors continue:

> '*However, as explained below based on the best scientific and commercial information available, the BSAI and GOA groundfish fisheries have likely adversely affected SSL 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.'(P. 182. lines 27-30)

NMFS admits that data establishing competitive interactions between fisheries and SSLs are equivocal. On page 182, lines 39-43, NMFS acknowledges several studies that attempted to identify the competitive effects of fisheries on SSLs without resolution of the debate.

In older BiOps NMFS concluded that groundfish fisheries did not jeopardize SSLs:

> '*Nevertheless, the 1991 Opinion concluded that the fishery was not likely to jeopardize the continued existence and recovery of the SSL.*' (P. 183, lines 2-3).

Undeterred, the review continues:

> '*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.*' (P. 183, lines 8-10)

The assumptions are contained in paragraphs labeled 1, 2, and 3 (P. 183, lines 12-35) and can be summarized as follows:

1. fish abundance in a particular locale is finite;
2. for any given locale, as the intensity of fishing effort increases the absolute level of fishing induced removals increases as does the duration of their effect;
3. local depletion is more likely when resources are patchily distributed;
4. pollock and Atka mackerel are patchily distributed;
5. reducing the abundance of pollock or Atka mackerel in SSL critical habitat reduces the effectiveness of SSL foraging; and, finally
6. winter foraging adult female and juvenile SSLs are more susceptible to fishery induced adverse impacts than other segments of the population.

Assumption number 5 is critical. If this assumption is untrue, the premise for NMFS' arguments for jeopardy is without foundation.

NMFS cites the late 1970s and early 1980s fishing of pollock in the Bogoslof Island Area, and the Donut hole as examples of fishing induced local depletion. The fishing history for these areas is in no sense evidence for the kind of local depletions envisioned in P. 183, lines 14-15. The Donut hole fishery was a foreign fishery completely outside the jurisdiction of the NPFMC. Moreover, the current fishing practices under the M-S Act would never allow the pulse fishing experienced in these locales.

NMFS noted that sea lion counts on rookeries declined coincident with the expansion of pollock fishing in Shelikof Strait, but failed to recognize that during the later part of the 1980s pollock increased to high levels and sea lions continued to decline. They further fail to report that during the build-up of the Shelikof Strait fishery (1975-1982), catch rate as a proportion of exploitable

stock biomass, was approximately 3-5% annually. At the peak of the fishery (1984-1985), the catch rate was 11-14%. These catch rates are conservative by any standard.

Section 5.5.6.2 (P. 188, Indirect effects on critical habitat...) also reviews carrying capacity, and the relationship to oceanographic phenomena. Here the authors state 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.*' (P.188, line 49 to P.189, lines 1-2)

This statement does not seem compatible with former statements (e.g., P.182, lines 27-30) claiming that fishing causes declines in prey availability.

> '*After considering all of the commercial fisheries that occur in the action area, especially in areas designated as critical habitat for sea lions, and comparing those fisheries against the various fish species consumed by Steller sea lions, we would conclude that commercial fisheries would reduce the availability of Steller sea lion prey in designated critical habitat.*' (P.189, lines 5-8)

A1.3. 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 easy to capture. ...Therefore, no clear conclusion can be drawn from the dietary studies that have been conducted to date.*' (P. 134, lines 47-49; P. 135, lines 1-4)

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. These preliminary conclusions need further substantiation and should not be discarded at this point in time.

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

> '*Productivity of the Bering Sea was high from 1947 to 1976, reached a peak in 1966, and declined from 1966 to 1997.*' (P. 132, lines 20-21);

and subsequently,

> '*That some authors suggest that the regime shift changed the composition of the fish community and reduced the overall biomass of fish by about 50 percent*' (P. 132, lines 21-23).

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, line 35) in the period before extended jurisdiction (i.e., before 1977).

After arguing some authors think the regime shift reduced biomass, the BiOp reports:

> '*NMFS believes it is reasonable to conclude that the regime shift created environmental conditions that produced very large year classes of gadids*' (P. 133 lines 48-49) 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.*' (p 134, lines 1-4)

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, Lowell Wakefield Fisheries Symposium).

It is not the whole truth to say simply:

> '*From the information available, it seems reasonable to conclude that gadids (i.e. pollock and Pacific cod) were abundant before the regime shift, and that sea lions relied upon them for food before the decline.*' (p134, line 10-12)

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.

Appendix II. **Specific line-by-line comments**

This appendix gives specific comments on items in BiOp3, which we believe are useful for clarifying the historical record and for suggesting alternate and/or additional lines of inquiry for preparation of future documents. In this context, we deplore the practice of uncritically lifting whole sections of this or past BiOps for use in NPFMC 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.

BiOp3 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.

BiOp3 Section 3: Action Area

P. 60, lines 9-12
There is no citation for the 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, lines 35-36
The conclusion that Shelikof Strait is an important feeding site 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.

P. 61, lines 47-48, P. 62, lines 1-4.
The authors are using a heuristic notion of carrying capacity rather than a rigorous one. They should consider a more operational definition, such as the following ones (K and K_B) that derive from age-structured population models:

$$K = \frac{1}{R_1} S_0^{-1}\left(\frac{1}{R_1}\right)\sum_a L_a \quad \text{(carrying capacity in abundance)}$$

$$K_B = \frac{1}{R_1} S_0^{-1}\left(\frac{1}{R_1}\right)\sum_a L_a \text{Weight}_a \quad \text{(carrying capacity in biomass)}$$

$$L_a = (\text{Juvenile Survival})(\text{Adult Survival to age } a)$$

$$R_1 = \sum_a \text{maturity}_a \times \text{fecundity}_a \times L_a \text{ (lifetime egg production of a 1 year old)}$$

$$S_0^{-1}(\bullet) = \text{Inverse function of Progeny/Egg Production (R/S) Relationship}$$
(density - dependence)

This formula shows that carrying capacity is a function of lifetime egg production of a 1-year-old, the density-dependent relationship between egg production and progeny, and the cumulative survival from the progeny stage (juveniles) through adulthood. Lifetime egg production itself is a function of maturity, fecundity, and survival. Anything that affects any one of those factors will affect carrying capacity, and so one would expect that carrying capacity is inherently a time-varying quantity. The only way to assert that carrying capacity is affected primarily by a single factor (as BiOp3 does with prey availability) is to establish the values of all population parameters and their relationships with various factors of interest. As this has not been done in BiOp3, the conclusion that prey availability primarily affects SSL carrying capacity is premature. Better efforts need to be made to understand all of these parameters and the factors that affect them.

BiOp3 Section 4: Status of Species

P. 81, lines 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, lines 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 or other properties of the distribution.

P. 91, lines 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[2]) 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.

[2] Frost, K.J., and L.F. Lowry. 1986. Sizes of walleye pollock, *Theragra chalcogramma*, consumed by marine mammals in the Bering Sea. Fish Bull. 84:192-197

P. 91, lines 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 otoliths 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, lines 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, Figure 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, lines 48-49, line 1
Pacific cod are reported to be a significant prey item during winter in the GOA, and we are referred to Figure 4.7. There are some inconsistencies between Figures 4.7a, 4.7b and Tables 4.5a and 4.5b. The tables report a much larger sample size than the figures. Doug DeMaster (personal 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, lines 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[3]). Actually, pollock, squid and herring were the top three prey items by FO, Pacific cod ranked 5th according to table 4.2.

P. 93, lines 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[4]. Mean size of prey consumed was approximately 27 cm in these studies, with a CV of about 40%.

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[3] Pitcher, K.W. 1981. Prey of the Steller sea lion, *Eumetopias jubatus*, in the Gulf of Alaska. Fish. Bull. 79:467-472.
[4] Calkins, 1998. Referenced in BiOp3 on the 7th page of Table 4.2, there is no citation presented in BiOp3 literature cited.
Calkins, D.G., and E. Goodwin. 1988. Investigation of the declining sea lion population in the Gulf of Alaska. Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage, AK 99518, 76 pp.
Frost, K.J., and L.F. Lowry. 1986. Fish Bull. 84:192-197
Pitcher, K.W. 1981. Fish. Bull. 79:467-472.

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

P. 97, lines 31-36
H_o[5]: "*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, lines 48-49

[5] H_o is used to denote the null or default hypothesis, H_a is used to denote the alternative hypothesis

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.

P. 98, lines 9-23
H_o: [Implied] Newborn 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, lines 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", and "were not distinct"* sounds as though 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. 102, lines 15-16
There is a reference to standardization of count data based on unexplained ratio-estimate corrections. The document cites Braham et al. 1980[6], 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.

[6] Braham, H.W., R.D. Everitt and D.J. Rugh. 1980. Northern sea lion decline in the eastern Aleutian Islands. J. of Wildl. Management 44: 25-33

Regression parameters fiting a linear trend in Steller sea lion counts over time. (Uses count data from Table 4.6 of the November 30, 2000 Biological Opinion)

	Gulf of Alaska			Aleutian Islands			SE	Western
Year	Eastern	Central	Western	Eastern	Central	Western	Alaska	population [c/]
1975				19769				
1976	7053	24678	8311	19743				
1977				19195				
1979					36632	14011	6376	
1982							6898	
1985		19002	6275	7505	23042			
1989	7241	8552	3800	3032	7572		8471	
1990	5444	7050	3915	3801	7988	2327	7629	30525
1991	4596	6273	3734	4231	7499	3085	7715	29418
1992	3738	5721	3720	4839	6399	2869	7558	27286
1994	3369	4520	3982	4421	5790	2037	8826	24119
1996	2133	3915	3741	4716	5528	2190	8231	22223
1997		3352	3633					
1998		3346	3361	3847	5761	1913	8693	
1999	1952							
2000	1894	3117	2842	3842	5427	1071		18193
All years	(Regression fit to natual log of the count data)							
α	134.544	206.193	90.218	157.190	201.442	226.748	-21.717	
β [a/]	-0.063	-0.099	-0.041	-0.075	-0.097	-0.110	0.015	
R^2	0.73	0.94	0.87	0.81	0.83	0.91	0.78	
n	9	11	11	12	10	8	9	
Significance	0.004	0.000	0.000	0.000	0.000	0.000	0.002	
Annual rate of loss [b/]	6.1%	9.4%	4.0%	7.2%	9.2%	10.4%	-1.6%	
1990s	(Regression fit to natual log of the count data)							
α	220.426	181.562	54.931	22.092	80.365	163.385	-26.098	114.633
β [a/]	-0.106	-0.087	-0.023	-0.007	-0.036	-0.078	0.018	-0.052
R^2	0.94	0.97	0.60	0.06	0.76	0.71	0.63	0.99
n	7	8	8	7	7	7	6	6
Significance	0.000	0.000	0.024	0.582	0.010	0.018	0.059	0.000
Annual rate of loss [b/]	10.1%	8.3%	2.3%	0.7%	3.5%	7.5%	-1.8%	5.1%

a/ Slope of the linear equation, and the estimated instantaneous rate of change of the population

b/ Annual rate of loss = 1 - Exp(β); negative value implies population gain

c/ Count is the sum of GOA and AI counts for those years with counts in each subregion within an area.

P. 103, lines 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, lines 41-49, and P. 105, line1
Population projections: cite the work of York et al. 1996[7] 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.

The use of simple linear time-index models to project population trends is invalid and misleading. Simple linear models are incapable of representing changes in trends. If the estimated slope coefficient is negative (or positive) the model will project that the population will go extinct (or increase infinitely) through time. Theoretically and statistically valid structural and time series models could be constructed with the available data. Such models could help address the magnitude and significance of factors contributing to decline or recovery of SSLs. Moreover, coefficient estimates and forecasts of the dependent variable of based on log-transformed data are biased.[8]

P. 127-128, lines 47-49, lines 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. 129, lines 17-19
Regarding designation of critical habitat, the document says "... *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 predominantly 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 predominantly within 20 nm of rookeries and haulouts.

---

[7] York, A.E., R.L. Merrick, and T.R. Loughlin. 1996. An analysis of the Steller sea lion metapopulation in Alaska. Pp. 259-292 in D.R. McCullough (ed.), Metapopulations and Wildlife Conservation, Island Press, Washington, D.C.

[8] If the modeled relationship is of the form $Y = \alpha \exp(\beta X + \varepsilon)$ and coefficient estimates are found using the log-linear estimating form $y = \gamma + \beta X + \varepsilon$, where $y = \ln(Y)$, the forecasts $\hat{Y} = \exp(\hat{\gamma} + \hat{\beta}x_0)$ are biased estimates of Y and should be replaced with

$\tilde{Y} = \hat{Y}\left(\frac{1}{2}\sigma^2 - \frac{1}{2}\hat{V}(\hat{y})\right)$ where $\sigma^2 = \frac{1}{n-2}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2$ and

$\hat{V}(\hat{y}) = \sigma^2 [1 \quad x_0]\left[[1 \quad X]'[1 \quad X]\right]^{-1}\begin{bmatrix}1\\ x_0\end{bmatrix}$, where x_0 is a particular value for which forecasts of the dependent variable are desired and 1 is a scalar or an $n \times 1$ vector as required for conformability. (See e.g., Kennedy, P. 1983. Logarithmic dependent variables and prediction bias. *Oxford Bulletin of Economics and Statistics* 45: 389-392.)

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?

BiOp3 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, lines 18-21
NMFS quotes Shima et al. 2000[9], "... *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_o: 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 Calkins, 1996[10]. Summary information from these

[9] Shima, M., A.B. Hollowed and G.R. Van Blaricom. 2000. Response of pinniped populations to directed harvest, climate variability, and commercial fishery activity: a comparative analysis. Rev. in Fish Science 8(2): 89-124
[10] Calkins, D.G., and K.W. Pitcher. 1982. Population assessment, ecology and trophic relationships of Steller sea lions in the Gulf of Alaska. U.S. Dep. of Commer., NOAA. OCSEAP Final Report 19 (1983), pp. 445-546. Calkins and Godwin, 1988. Investigation of the declining sea lion population in the Gulf of Alaska. Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage, AK 99518, 76 pp.

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.

Merrick, R.L., and D.G. Calkins. 1996. Importance of juvenile walleye pollock, *Theragra chalcogramma*, in the diet of Gulf of Alaska Steller sea lions, *Eumetopias jubatus*. Pp. 153-166 *in* U.S. Dep. of Commer., NOAA Tech. Rep. NMFS 126.
Pitcher, 1981. Fish. Bull. 79:467-472

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

P. 138, lines 5-13. The conclusion that "... *it is <u>highly unlikely</u> 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, lines 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 <u>revised to account for the possibility of density dependent effects in seal lion dynamics</u>* [presumably birth rates??] *<u>due to a reduction in the carrying capacity of the environment for SSLs</u>.*"

P. 138, lines 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, lines 30-44
H_0: Commercial harvest of adult SSLs had no meaningful impact on decline, but harvest of pups from 1963-1972 did have local effects that persisted 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[11]). 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.

[11] 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

P. 176, lines 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 principal 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, lines 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 Pacific 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 predominantly 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. Dept. 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, lines 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 [12]. 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.

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

P. 187, lines 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. There needs to be a careful examination of the possibility that fishing activity may enhance the availability of prey via discards and offal to SSL.

P 187, lines 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" hypothesis. NMFS points to the strategy of fishing as evidence that fishing alters school density.

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)[13] 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, lines 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, lines 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.

[13] Loughlin, T. and R. Nelson Jr. 1986. Incidental mortality of northern sea lions in Shelikof Strait, Alaska. Mar. Mamm. Sci. 2: 14-33

BiOp3 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 ecologically 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, lines 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; and, 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. Any adverse effects on SSL foraging would have to persist in time to result in increased SSL mortality.

P. 198, lines 20-21
Undefined term: 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, lines 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, lines 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, lines 48-49
H_0: "*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 compression leaves the ecosystem free of human "interference" for long stretches of space and time.

P. 214, lines 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 an as 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, lines 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, lines 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. 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. Is there a lurking variable that may explain both phenomena?

P. 225, lines 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.

NMFS demonstrates 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, lines 4-7). **However, even taking into account that fishery harvests have increased in designated critical habitat from the 1970s to the 1990s, the changes in estimated biomass of these key resources still result in a net increase in the available prey base inside SSL CH.**

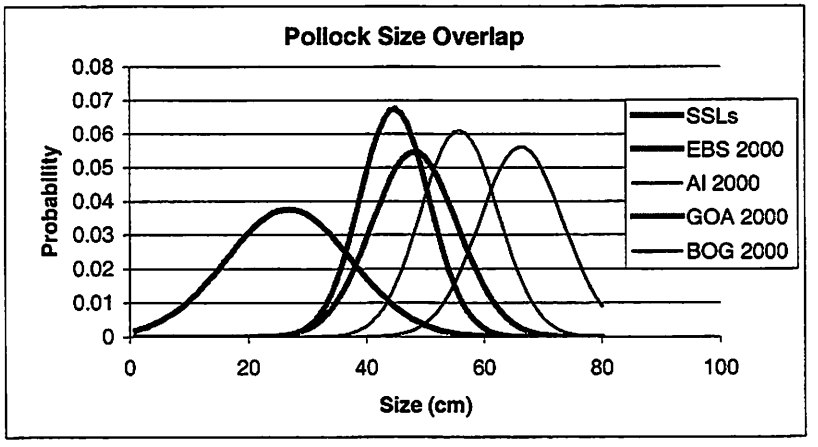
P. 226, lines 12-25.
Mean age is a poor way to characterize age structure of the pollock population. This analysis also fails to recognize that the selectivity of the fishery is highly variable and tends to vary depending on which strong year-classes are in the population.

P. 226, lines 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 predominantly 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



(Note the SSL prey size data used in the above table and figure are provided in BiOp3 Table 4.2, and are attributable to the following sources: Pitcher, 1981; Calkins and Goodwin, 1988; Frost and Lowry, 1986; and Calkins, 1998. The mean size and variance are computed as the simple mean for the four studies. These studies examined 339 stomachs. Frost and Lowry are the only source citing the age of the sampled SSLs; in this case, the samples were from sea lions less than 5 y old. Table 4.2 also cites Frost and Lowry 1986 as reporting observations from two stomachs of SSLs greater than 4 y old with pollock of mean size 46.9 cm. The small sample size cautions against characterizing population prey preferences from this observation without additional corroboration of the prey pattern. Finally, Table 4.2 cites Loughlin and Nelson, 1986 with

sample size of 36 stomachs containing pollock of mean size 40.9 cm. The samples obtained by Loughlin and Nelson were from SSLs taken in the pollock fishery, and these sea lions may have consumed pollock discarded by the fishery, again compromising the ability to utilize the data to characterize "normal" SSL prey patterns.)[14]

P. 228, lines 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, lines 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, lines 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.

[14] See footnotes 3, 4 and 13 for the list of citations referenced

P. 229, lines 28-31
H_0: [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 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, lines 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 sea lions 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, lines 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, lines 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, lines 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 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 not been given; NMFS doesn't provide an objective measure of the degree or extent of interaction.

P. 233, lines 44-49
BiOp3 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. It does not explain how the prior RPAs break down, 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* [of SSLs] *...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 sightings 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 predominantly 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 (2000) is cited 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.
In Appendix 3, it is shown that fish biomass is of the order 50 times needed to satisfy SSL feeding. BiOp3 attempts to assert that a multiplier of that order is necessary to provide for SSL feeding requirements, even in an unfished environment. The SSC disagrees with that approach. Rather, research should be conducted to establish a quantitative benchmark related to SSL feeding requirements and ability to encounter sufficient prey. The idea that total biomass should be some 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
BiOp3 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 appear 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 Figure 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
It is implied that fisheries reduce the survival of juvenile SSLs, yet on page 250, lines 46-49, NMFS says, "*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
BiOp3 asserts 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. BiOp3 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.[15] Ono reports no difference in the period of absence for females on Lowrie (stable population) and Marmot Island (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, lines 1-4
BiOp3 claims clear evidence that the reproductive rate of SSL has been compromised. That evidence is presented on P 82, lines 17-40, and relates to changes in pregnancy rates between the 1970s and 1980s. The observation has not been updated in recent years, so the long term mean pregnancy rate of the population is unknown. While the observation is relevant, the inference has to be qualified.

P. 252, lines 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. BiOp3 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.

P. 253, lines 17-18
H_0: 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 presumptive to 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 BiOp3 with the statement that "... *removal of fishery contribution*" may not reverse the decline in SSL populations?

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[15] 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, lines 48-49, P. 254, lines 1-2
BiOp3 cites the NRC [16] 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 to have demonstrated the fisheries capacity to locally deplete the resource, thereby indicting 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. Furthermore, for those locales where local depletion was noted, the effect on SSLs was never established, i.e., as demonstrated in BiOp3, the adverse impacts of local depletion cited for Atka mackerel are entirely presumptive; there is no direct evidence indicating a competitive fishery interaction leading to increased SSL mortality. Attempts to show local depletion for the cod fishery failed.

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, lines 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

[16] National Research Council, 1996. The Bering Sea Ecosystem. National Academy Press, Washington D.C.

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 effects 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 effect. This means that they have absolutely no idea whether RFRPAs will have any beneficial effect on SSL abundance, and that reality makes their proposed actions an extraordinarily expensive gamble.

P. 259, lines 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*." We disagree that fishing-created reductions in biomass 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, lines 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 Pacific 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' logic is too difficult to follow.

P. 260, lines 15-25.
BiOp3 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 this assertion of excessive exploitation rates.

P. 260, lines 27-41
BiOp3 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; neither the effective foraging density for SSL prey, nor the affects of fisheries on prey density are known.

BiOp3 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, lines 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, lines 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. In the view of the authors, any recommendation that is more conservative must be better. A better approach is to establish criteria upon which a decision can be made.

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.

DRAFT Minutes of the RPA Committee Meeting, May 9-11, 2001

Members Present:

Larry Cotter (chair)
Dave Benson
Shane Capron
Doug DeMaster
John Gauvin
Terry Leitzell
Alan Parks
Beth Stewart
John Winther
Sue Hills
Dave Jackson
Bob Small
Fred Robison
Gerald Leape
Jerry Bongen
John Iani
Matt Moir
Dave Cline
Steve Drage

Staff present: *Dave Witherell (coordinator), Ron Berg (NMFS), Mike Payne (NMFS), Sue Salveson (NMFS), Tamra Faris (NMFS), Lauren Smoker (NOAA GC), Kristin Mabry (ADF&G), and several other NMFS staff.*

Background - This Committee was established to respond to the Steller sea lion (SSL) Reasonable and Prudent Alternative (RPA) and experimental design in a technical, operational, and practical sense to try to make it more functional. The remaining task of the Committee is to provide an alternative RPA for analysis (by June), and make recommendations to the SSC, AP, and Council on the analysis.

Meeting - The sixth meeting of the RPA Committee was held on May 9 -11 in Juneau at the Federal Building, beginning at 10 am. Larry Cotter briefly reviewed the tasks of the Committee, the draft agenda, and format of Committee meetings. Public comment was taken after each meal break.

Reports

Dave Witherell reviewed the process for developing the analysis (EIS/RIR/RFA) of an amendment to address fishery/Steller sea lion interactions. This amendment would implement management measures designed to meet ESA standards relative to the November 30 Biological Opinion conclusions regarding sea lions and pollock, cod, and mackerel fisheries. The RPA Committee's primary job is to develop Alternative E for this analysis, in addition to the four already proposed and reviewed by the Council. The RPA Committee may also wish to meet during the public review period (late September) to review the analysis and recommend a preferred alternative to the Council, for their final action in October.

Alternatives proposed for EIS analysis.

Alternative A	Regulatory measures implemented by emergency rule, and designed to protect Steller sea lions, would expire.
Alternative B	The RPA measures for the 2000 pollock and Atka mackerel fisheries, and seasons and CH catch limits for Pacific cod.
Alternative C	Alternative 2 measures plus all trawling prohibited in critical habitat.
Alternative D	The BiOp RPA measures.
Alternative E	The RPA developed by the Council and its Committees.

The Committee discussed ESA criteria for the 2002 analysis. Shane noted that 2001 was a phase-in year due to the appropriations bill. The 50%/75% criteria used in 2001 to develop open and closed areas should not be considered as a bar for determining jeopardy or adverse modification for 2002 measures. **The guidelines for meeting ESA standards we have are: 1) the expected trend of SSL, and 2) the ratio of forage available to prey consumed (as in Appendix 3 of the BiOp).** Doug noted that the BIOp considered trends

for the western stock of SSL (-0.7%/year), but that the Committee could consider more regional trends when developing measures. Doug agreed to provide a detailed description of the formula used to calculate the trend later in the meeting. Unfortunately, 'recovery' for SSL is not defined, so at this point we need to craft measures that in the worst case scenario, would result in better population growth than resulting from the BiOp RPA. The measures developed by the Committee could include measures such as protection of rookeries and haulouts, spatial and temporal apportionment of the catch, a global control rule, and experimental design monitoring. Doug noted that the forage ratio calculations from the BiOp were based on the entire western stock CH, but that these could be based more regionally (e.g., GOA, AI, BS).

Committee recommendation: Assemble the new SSL recovery team to develop a recovery plan for SSL as soon as possible that includes a definition of recovery, delisting criteria, and a re-assessment of the CH designation

Robin Angliss provided an update on the 2001 Steller sea lion research projects. She provided a handout showing what projects were being done this year, and how each project addressed the 13 issues identified for research by Congress.

Sally Bibb reported on monitoring and enforcement issues. She distributed a draft discussion paper that provides guidance on many of the elements discussed by the Committee at previous meetings. Sally noted that anything is possible, but some things are more difficult to implement. Committee discussion focused on VMS monitoring. VMS has some enforcement benefit if vessel operators believe that someone may be watching their movements, however it is difficult to determine wether or not a vessel is fishing. When combined with observer data, VMS has added value for quota monitoring.

Dave Ackley provided 1999 catch data tables and figures. He converted catch data from ADF&G statistical areas to buffers around SSL areas: 0-3nm, 3-20 nm, and beyond. Because there is some overlap of statistical areas at the 20nm boundary, the numbers are approximate. Tables were distributed showing catch data broken down by FMP area, target species within target fisheries, vessel size, and week. CDQ data were not included, and confidential data were masked. Dave also provided figures showing catch by week within the buffer zones.

Bob Small briefed the Committee on development of the white paper on SSL telemetry. He distributed an outline of issues to be discussed. He was planning to provide a draft white paper at the next meeting.

Doug Demaster provided a report from the experimental design subcommittee. The Committee has recommended small scale experiments as opposed to a large scale adaptive management design like the one in the BiOp. Two of these experiments on localized depletion are already being conducted in Kodiak and Seguam. The Committee is interested in conducting an experiment with cod, perhaps off the Alaska Peninsula. The subcommittee will meet again at the next RPA Committee meeting and provide a more complete report .

Proposals

Proposals for elements of the Committee's recommended Alternative E were reviewed. Each proposal was submitted in writing, and in the format requested by the chairman.

John Gauvin proposed continuing with the 50/50 seasonal apportionment, CH limitations, and other measures for the Atka makerel fishery, but added the split team (platoons) among the AI to split effort. It would also require pre-registration with a 14 day standdown to limit vessels from moving in and out of the Atka mackerel fishery.

Sue Robinson proposed that all BSAI cod fisheries be subject to a 67/33% seasonal apportionment, with specific seasons by gear type to spread out effort. Other measures would include the 3/20 nm trawl closures around rookeries and exclusive registration for pollock or cod through April 1.

John Winther proposed that BSAI longline fisheries should be exempted from any RPA measures because the harvest rates were lower that reported in the BiOp, and most of the catch was taken in areas well outside of CH. He provided maps showing catch distribution.

Alan Parks proposed a zonal approach for GOA cod fisheries. Basically, the approach would limit what vessels could fish within specified buffer zones (0-3, 3-12, 0-20 nm) depending on gear type or vessel size. The proposal contains lots of other provisions including seasons, global control rule, PSC for octopus, TAC rollover limits, halibut PSC apportionment, MRB reduction for cod, and increased observer coverage.

Jerry Bongen proposed a 70/30 seasonal allocation for the BSAI Pacific cod pot quota. Pot vessel <60' could fish everywhere except within 3 nm of rookeries, and pot vessel >60' could fish everywhere except within 3 nm of haulouts, 10 nm of rookeries, Area 518 and the Seaguam foraging area.

Matt Moir proposed that GOA cod fisheries should return to a single season and pollock TAC should be apportioned into 4 equal seasons. Rookery and haulouts closures should be established out to 10 nm. Pollock and cod vessels < 60' would be allowed to fish within 10 nm of haulouts. In Area 3, all vessels would be allowed to fish within Gull Point, Ugak Island, Barnubus, and Ikolik haulouts.

Brent Paine proposed 10 nm closures of rookeries and haulouts for BS cod trawl fisheries, and closure of Area 9. The BSAI cod TAC would be split into two management areas with separate TACs, but one season that opens January 20.

Gerry Leape and Dave Cline proposed an RPA with 5 elements: 1) reduced TAC levels for pollock, cod, and mackerel; 2) four seasons for all three species; 3) no trawling in CH; 4) for fixed gear cod fishery use daily catch limits and vessel size/gear limits to disperse effort; 5) prohibit pollock fishery in AI.

Terry Leitzell proposed two seasons (40/60% TAC allocation) for BSAI pollock and 10 nm closures around rookeries and haulouts in the AI and BS (with a few exceptions), as well as Area 9 and the Seguam foraging area. The AI fishery would only occur during the first season.

Chairman Larry Cotter made several closing remarks. He noted that this first meeting amounted to a 'dance' among Committee members. Industry will need to develop a composite proposal for the next meeting; the environmental community will need to do the same. Larry believes that the amendment should incorporate a framework concept so that management can readily change as new information becomes available.

The meeting ended at approximately 12:30 pm on May 11.

DRAFT Minutes of the RPA Committee Meeting, May 21-24, 2001

Members Present:

Larry Cotter (chair)
Dave Benson
Shane Capron
Doug DeMaster
John Gauvin
Terry Leitzell
Alan Parks
Beth Stewart
John Winther
Sue Hills
Wayne Donaldson
Jack Tagart
Bob Small
Fred Robison
Gerald Leape
Jerry Bongen
John Iani
Matt Moir
Dave Cline
Steve Drage

Staff present: *Dave Witherell (coordinator), Cathy Coon (NPFMC), Tom Laughlin (NMFS), Mike Payne (NMFS), Sue Salveson (NMFS), Tamra Faris (NMFS), Lauren Smoker (NOAA GC), Kristin Mabry (ADF&G), and several other NMFS staff.*

Background - This Committee was established to respond to the Steller sea lion (SSL) Reasonable and Prudent Alternative (RPA) and experimental design in a technical, operational, and practical sense to try to make it more functional. The remaining task of the Committee is to provide an alternative RPA for analysis (by June), and make recommendations to the SSC, AP, and Council on the analysis.

Meeting - The seventh meeting of the RPA Committee was held May 21 - 24 in Seattle at the Alaska Fishery Science Center, beginning at 8 am. Larry Cotter briefly reviewed the tasks of the Committee, the draft agenda, and format of Committee meetings. The minutes from the previous meeting were approved with one small editorial revision. Public comment was taken after each meal break.

Reports - At the last meeting, Dave Cline questioned the impacts of fishing on pre-spawning and spawning aggregations of fish. Marten Dorn and Chris Wilson (NMFS) responded to these questions. Regarding the potential impacts on spawning fish, there is no evidence that fishing on spawning aggregations affects sustainability. It was noted that cod off Norway have been fished for thousands of years; currently the Norwegian stock has declined due to excessive fishing mortality. The key to sustainability is fishing at conservative harvest rates. Off Alaska, the overall mortality is controlled by quota, and we only take about 10-20% of the exploitable (i.e., spawning) biomass annually. The management aim for cod in Alaska is to conserve 40% of the spawning capacity. It doesn't matter to future recruitment whether the fish are removed before or after spawning. Recruitment success of cod and pollock appears to be primarily dependent upon environmental conditions. Committee members discussed current harvest rates for pollock and cod off Alaska, and how the ABC rates are generated.

Lauren Smoker reported on some legal guidance from NOAA GC on questions raised at the last RPA committee meeting. She covered 3 topics: Recovery, limited access issues with pre-registration, exclusive registrations, and super exclusive registration requirements, and reporting co-ops. She reported specifically in regards on the recovery question as follows: NMFS must be able to insure that the fisheries avoid jeopardy and adverse modifications and therefore, the RPA committee has to design an RPA that removes any jeopardizing or adversely modifying effects from fishery interactions with Steller sea lions such that the resulting fishery avoids jeopardy and adverse modification. Given the underlying uncertainty with the precise point at which the fisheries no longer jeopardize SSL or adversely modify its critical habitat, if the RPA committee only aims for stability of the population trend for the western portion of SSL as the best case

scenario under its proposal for a modified fishery, and does not acknowledge or account for any reasonable probabilities that the modified fishery could still contribute to a continuing population decline or diminishing prey field within critical habitat, NMFS may not be able to insure that the modified fishery avoids jeopardy and adverse modification.

Sue Salveson reported on additional catch analysis provided by Dave Ackley. Weekly catch data were aggregated by vessel class and buffer area. Additional analysis of observer data was undertaken for BSAI fixed gear cod fisheries. Very little (15%) of the BSAI cod catch is taken with hook and line gear within 20 nm buffers. More (80%) is taken inside the rookery and haulout areas by pot gear.

Russ Andrews (UBC) reported on his foraging studies of lactating female SSL using time-depth recorders. These instruments provide very refined information on dive depth over time (every 10 seconds). It allows the researcher to infer dive function. In addition, stomach temperature recorders provides exact information about when a SSL eats a fish, as stomach temperature drops in response when fish > 150 grams are ingested. Russ compared SSLs with time-depth recorders from Forrester Island (in SEAK) and Seguam (AI). Although these results couldn't be considered conclusive because the data came only from one year (1997) and very few animals (4 and 3), several observations were made. At both locations, the SSL started foraging dives within ½ hour of leaving the rookery. At Forrester, the SSLs made deep (100-200 m) foraging dives to the bottom, and had their first successful foraging event after about 5 hours. They left Forrester on foraging trips, and returned at any time of the day or night. On average, they spent about 50% of their time at sea, with 23 hours onshore, and 26 hours offshore. Based on scat analysis, the SSL from this site were feeding on a wide variety of prey including gadids, forage fish, salmon, rockfish, and flatfish. At the Sequam deployment site, the SSLs made fairly shallow (25 - 100 m) foraging dives to the bottom, and had their first successful foraging event after about 1 hour. They left Seguam on short foraging trips in the evening and and returned in the early morning. On average, they spent about 25 % of their time at sea, with 23 hours onshore, and 7 hours offshore. Based on scat frequency of occurrence analysis, the SSL from this site fed nearly entirely on Atka mackerel.

Russ concluded that his information did not support a nutritional stress hypothesis, and in fact showed just the opposite. In a declining population, one would expect SSL to make longer foraging trips, ingest foods at a lower rate, and exhibit lower population growth. Russ noted that the Seguam population was declining at the time of the study, but that SSLs from this site made shorter foraging trips, high foraging success, and had pup growth that was twice as fast as pups on Forrester Island.

Russ also reported on movement patterns of SSL from the Forrester Island and Sequam locations. He noted many individual home range areas extending beyond 20 nm from the rookery. Some preliminary calculations estimate 90% of home ranges to be around 50 km (27nm) long. This refers only to females w/ pups because they tend to stay closer to the haulout or rookery if no pups they tend to be much more wide-ranging.

Tamra Faris provided a summary of the NEPA scoping process. She handed out a 5 part scoping document describing the alternatives and issues to be analyzed. A comment letter template was included for the public to comment. The public comment period ends June 22, 2001.

Bob Small presented his draft 'white paper' on satellite telemetry and Steller sea lion research conducted by NMFS and ADF&G. The paper described how the satellite-linked time-depth recorders (SDR)s function, how the data are extracted and summarized, a summary of deployments to date, and results of the research to date. The draft paper includes figures and tables providing information on individual tags, including deployment site, age and sex of the SSL tagged, and the number of days monitored. A final draft of the white

paper, based on the outline distributed at the last meeting, will not be complete in the near-term. The committee expressed their concern that this paper was important for evaluating telemetry information.

Tom Laughlin described the NMFS satellite tagging effort. To date 100 SDRs have been deployed by NMFS. A total of 20 animals were instrumented in 2001 and of these, 9 SDRs are still working. Of the 80 SDRs deployed through 2000, 27 failed and provided no data. Problems with the early transmitters included construction and power limitations. The earlier data is not directly comparable to more recent data. Data from the first 21 'good' transmitted animals have already been published, and the information was used to designate critical habitat. The remaining 25 animals have now been analyzed and a publication is forthcoming. Three movement patterns have been described: location movements from one place to another, nearshore foraging, and far shore foraging. Plans for future analysis include linking the telemetry data with information of fish abundance and catch.

Tom further provided a historical perspective on the use of telemetry data in the past. The 10 nm buffer zones were extended out to 20 nm during the pollock A season to protect the areas of the SSL population were in trouble when the Bogoslof pollock fishery was shut down (1992), because there was concern of displaced fishing effort. The 20 nm buffer represented a maximum foraging distance from data available at the time, and this information was also used to designate critical habitat.

Bob noted that ADF&G is at the same stage of analysis as NMFS, trying to integrate the dive data, and trying to understand foraging behavior of adult females and juveniles. Public access to individual NMFS and ADF&G satellite data is underway, and should be available in the next month or so, once data filtering is complete.

The committee discussed the foraging behavior of SSL's and questioned why SSLs would forgo nearshore prey when apparently available. SSLs are thought to be selective 'opportunistic' feeders; that is, they feed on the first things on their menu that they encounter. The committee noted the importance of surveys of prey abundance to help understand the foraging behavior of SSLs.

Initial Proposals - A letter from Cline and Leape was distributed, which conveyed their concerns and position relative to the 2002 RPA. Dave Cline further discussed his concerns under questioning of committee members. Their bottom line is that, in addition to adjusting fishing regulations per their proposal to avoid jeopardy and adverse modification, marine reserves, past 2002, should be implemented to maintain biodiversity in the North Pacific.

The committee reviewed requirements for avoiding jeopardy and adverse modification. Doug DeMaster discussed criteria on how proposals would be judged during the meeting. Lauren Smoker provided some legal guidance on questions raised at the last meeting regarding preregistration and exclusive registration, reporting co-ops, and the definition of recovery relative to ESA requirements. A bright line criteria for jeopardy and adverse modification was determined; that is, regulatory measures must, in a worst case scenario, not be expected to result in a declining trend of more than -0.7%. This is the worst case rate resulting from implementation of the BiOp RPA, which was determined by the agency to remove jeopardy and adverse modification.

John Gauvin reviewed his revised proposal for the AI Atka mackerel fishery. Measures include 50/50 seasonal TAC allocation, no fishing November 1 to January 20, and VMS requirement, global control rule, Bogoslof closure, Seguam closure, Agligidak closure, 10 nm rookery closures, and 3 nm haulout closures, inside/outside CH TAC split of 70/30, platooning of the fleet, and pre-season registration with a 14 day standdown.

Susan Robinson reviewed a revised proposal for BSAI cod. Measures include and 80/20 seasonal TAC split for trawl gear, different season dates for gear types, 10 nm rookery closures, 3 nm haulout closures, Seguam closure, Agligidak and Buldir closure to 10 nm, no trawling November 1 - February 1.

John Winther revised his proposal for cod freezer longliners. Measures include a 60/40 seasonal TAC apportionment, 10 nm closures around rookeries of Walrus Island, Agligadak and Balder, 10 nm closures around the 5 northern haulouts, and a Bogoslof closure.

Jerry Bongen reviewed his proposal from the last meeting and added additional rationale. Measures include a 70/30 seasonal TAC split, 3 nm closures around haulouts and 10 nm rookery closures with an exemption for vessels < 60', and closures in Bogoslof and Seguam for vessels > 60'.

Terry Leitzell revised the proposal for BSAI pollock fisheries. Measures include a 10 nm 'band' closure during the roe season, a 40/60% seasonal TAC apportionment, closure of Bogoslof and Seguam, closure of rookeries to 10 nm, 3 nm closure of haulouts, closure of the AI during the non-roe season, and for the Bering Sea non-roe season the suite of measures adopted for the second half of 2001.

Steve Drage reviewed the revised proposal for Gulf of Alaska trawl fisheries. Measures include one season for cod, four seasons for pollock with 25% TAC apportionment to each, 10 nm closures of rookeries, 3 nm closure of haulouts, allowance for vessels <60' to fish within 3-10 nm of haulouts, and allowance for all vessels to fish within 3-10 nm of Chiswell and Rugged Islands. Further, they propose that the global control rule should be eliminated, redesignation of critical habitat, and the Shelikof foraging areas should be reclassified.

Brent Paine provided a slightly modified proposal for the BSAI cod trawl fishery. Measures include 10 nm closures around rookeries and haulouts and a 3 nm band closure in the eastern Bering Sea, seasonal TAC apportionment of 80/20, closure of Bogoslof and seaguam,10 nm rookery closures and 3 nm closures around haulouts in the AI.

Strawman: At the conclusion of the second day, Larry Cotter introduced a strawman document that contained some elements from all of the proposals. Copies were made and distributed. This strawman was used as a comparison for further committee discussions and recommendations.

DeMaster commented on the aspects of the strawman. He noted that the strawman incorporated new information on SSL movemements and diet studies. If implemented, the 10 nm closure areas would result in an increase of 4% in all areas, with an overall resulting trend of +0.9%.

Gauvin commented on the strawman closure elements for Atka mackerel. He likes his original proposal because under the strawman, the fleet would be limited on where they can fish. Some of the haulouts should be open to fishing, and have smaller buffers around rookeries. He noted that rookeries are used in the summer, but fishery occurs in February and September. He would rather see something like 7 nm closures around rookeries in the winter.

John Winther commented on the strawman. The 10 nm closures greatly impact the AI fishery; the fishing grounds are nearly all within 10 nm. John doesn't think its fair to allow pot gear within 10 nm. Concern about impacts on sablefish fishery; sablefish are not prey of SSLs, so why include this fishery in the RPA. The Pacific cod TAC split would cause more effort in the Bering Sea. A 60/40 split may inhibit the catch of CDQ fisheries. The plan team should be the group to propose a TAC split, rather than the committee. Discussion of this issue related to survey timing and exploitation rates on older fish.

Terry Leitzell reported on the AI trawl cod fishery restrictions. Their biggest concern is the seasonal apportionment. An 80/20 split is needed; a 60/40 split results in a much lower catch. Also, due the nature of the grounds, and the strawman restrictions, trawling would be almost non-existent. A split at the 178 W line was discussed, and whether or not to prohibit fishing for cod in CH west of this line. The Adak fishery should also be taken into considerations; the 10 nm circles would likely shut down the processing plant. Terry noted that we still need to deal with AI pollock.

Beth Stewart reported on the western GOA fisheries and provided a new proposal. 10 nm closures would be established for all gear types except jig gear. There would be exceptions to the closures. They still didn't like the 60/40 split, but changed the season dates (January and September 1) to try and accommodate the fisheries.

Matt Moir reported on the central GOA measures. Closures were established based on BiOp RPA areas, with exceptions. Pollock seasons would be established with equal TAC apportionments with season dates of: 1/20 - 2/25, 3/10-5/21, 9/1-9/15, 10/1-11/1.

Terry Leitzell discussed the strawman relative to BS fisheries. Concern about the definition of haulouts; don't want Pribilof haulouts closed to 10 nm because no counts have been made for years and NMFS did not see any SSL there in 1991. Still want the 80/20 season split for cod. Wants formula on allowances in CH before he can determine if he can support this measure.

John Winter discussed the longliner concerns for the BS. He believes that closures out to 10 nm are not needed for longliners.

Jerry Bongen wanted to make sure that the harvest of cod by the <60' pot vessels accounted towards the 1.4% quota when the season for big boats was closed. This is the same as was recommended by the Advisory Panel in April.

Gerry Leape commented on the strawman from the environmental community. His primary concern was that he felt it did not remove jeopardy and adverse modification. NMFS responded that the 10 nm buffers would equal 30% of CH closed including foraging areas. Without foraging areas included, the 10 nm rings would equate to 37% of CH closed. Doug noted that the forage ratio test should be met if the formula is used to limit CH catch, but concerns of perception may still exist regarding the SCA. Before conclusion of the meeting the forage ratio test was withdrawn from the committee's consideration due to data concerns and was recommended to a small committee for further refinement. Gerry does not agree with the strawman recommendation that CH should be reexamined as part of the committee's recommendation. Another concern is the global control rule. He believes that it does not go far enough to compensate for the NPFMC's unwillingness to establish MSSSTs for the stocks under its jurisdiction. He also reiterated his endorsement of a zonal approach for cod to make some allowances for small vessels. Gerry further considers a recommendation to extend AFA as inappropriate for this group. Dave Cline raised concern about the strawman's Area 9 and Seguam closures as control areas for SSL monitoring.

Allen Parks remained convinced that the zonal approach is the best way to go. He believed the zonal approach avoids jeopardy and adverse modification. He further believes that the global control rule should be addressed by assessment people, not the committee. He also wanted allowances for trawl vessels to convert to fixed gear.

Initial Composite Industry Proposal: After a few hours of breakout group caucusing Wednesday morning, the groups came together for further changes. For AI fisheries, John Gauvin reported on changes

recommended. Pollock fishing allowed outside 10 nm table 21 haulouts and rookeries, and 20 nm of Balder and Agligadak. The mackerel fishery would be prohibited east of 178 west, but allowed to the west of 178. Some haulout areas would be open outside of 3 nm and some rookeries out to 7 nm. All haulouts in 543 would be closed out to 20- nm. Gauvin stated he would provide a list later. For AI trawl cod fishery, the fishery would be spread out. Fishery for cod inside haulouts would occur east of some line. John Winther said the cod longline would not fish east of Amlia Island (173 W) in the AI, of in Area 9, 20 nm of Balder and Agligadak. The GOA group reported on their items of disagreement, and did not bring forward any changes.

Additional breakout groups met in the afternoon on Wednesday to come up with a comprehensive industry proposal by area. John Gauvin, Beth Stewart, and Terry Leitzel reported on the industry proposals for AI, GOA, and BS respectively. The strawman was ok for Bering Sea with the exception of an 80/20 split for cod. The three area proposals were brought together, and hereafter referred to as the 'industry proposal'.

Doug DeMaster provided a summary handout of methods used for a forage analysis. This analysis could be used to determine how much surplus fish would theoretically be available to the fishery once sea lion needs have been met.

The Committee reviewed a typed up version of a conglomerate of the industry proposal and clarifications were made. The issue of VMS was discussed as an overall recommendation. Extension of inshore/offshore provisions were also discussed, and the committee agreed that the provisions should be maintained.

Review of Proposals: Doug DeMaster reviewed his 'worst case scenario' trend calculations for the 5 proposals (BiOp, strawman, industry, industry/AMCC, and Leape/Cline (Table 1). The overall resulting 10 years trends resulted in worst case scenarios of the following: BiOp = -0.77%, strawman = -0.02%, industry = -0.96%, AMCC/industry = -0.74%, Leape/Cline = +0.70%. Doug will rerun these numbers because he assumed that the AMCC proposal affected both cod and pollock, but it was only for cod. He also discussed the areas of concern regarding the industry proposal. Committee discussion focused on the weighting factors applied in the calculations.

Table 1. 'Worst case scenario' population trend calculations.

Proposal	SSL trend (worst case)	% CH protected	# pups protected	# non-pups protected	Cost to industry
BiOp	-0.77%	66%	74%	56%	$$$$
Strawman	-0.02%	45%	100%	100%	$$
Industry	-0.42%	not available	not available	not available	$
Industry/ AMCC	-0.74%	not available	not available	not available	$$
Leape/Cline	+0.70%	not available	not available	not available	$$$$$

Final Proposal Recommendations: After several hours of caucusing, the industry came forward with a revised proposal that addressed NMFS concerns. A sheet of revisions was distributed and clarifications were made.

Doug provided and updated assessment of the revised industry proposal. The resulting overall trend resulting from this proposal was - 0.45% (Table 2). The modifications that improved the projections included extending an Amak closure, a 30% TAC restriction for pollock period to April 1, 542 cod closure east of 173, mackerel restricted inside CH west of 178, and other changes.

The committee discussed its final proposal recommendation. Larry noted that the suite of measures would be quantified in the analysis during the summer. He stated his intent that the committee bring forth only one alternative to the Council. Changes could be recommended by the committee before the Council takes final action. The Committee recommended that the revised industry proposal be sent forward as the committee's recommended alternative. Gerry Leape, Dave Cline, and Allen Parks objected, and they will provide a minority report. One member (Robison) remained undecided.

Table 2. Updated 'worst case' scenario calculations

Proposal	SSL trend (worst case)
BiOp	-0.77%
Strawman	-0.02%
RPA Committee	-0.45%
Industry/ AMCC	-0.74%
Leape/Cline	+0.70%

In addition to the management measures contained in the committees recommendation, the committee also recommends the following items be addressed.

1. The committee strongly urges NMFS to appoint the new SSL recovery team as expeditiously as possible, and write an updated recovery plan that includes de-listing criteria.

2. The committee recommends that NMFS move forward with a process to re-evaluate critical habitat designation, in view of existing and new scientific information, as soon as possible. (Leape objects)

3. The committee recommends that all vessels fishing for pollock, cod, and Atka mackerel in the GOA and BSAI be required to carry and utilize VMS or an acceptable alternative while fishing. The committee recognizes that a phase-in period may be necessary for a variety of practical reasons. Additionally, the committee recognizes that small jig boats (i.e., skiffs) may not have the capability to comply with this requirement and recommends that they be exempt. The committee recommends that NMFS investigate potential funding sources to assist the industry in complying with this requirement. The committee notes that the Council may wish to coordinate with the Board of Fisheries on this issue.

4. The committee recognizes that the ability for individual vessels and fleets of vessels to better manage their activities under the SSL RPAs is enhanced through the use of co-operatives and other

similar rationalization programs. The committee recommends the Council encourage the development and use of this and other similar approaches to rationalization. (Parks objects)

5. The committee recommends that the existing CVOA requirements in the Bering Sea be extended as part of the RPAs, in as much as it serves to disperse the pollock fleet.

6. The committee recognizes that a large amount of money is available for SSL research in FY01 and FY02, and that numerous research projects have been initiated. The committee is concerned that the projects be well coordinated to avoid redundancy and to ensure that the information generated be brought forward as expeditiously as possible. Accordingly, the committee recommends that the Council and NMFS consider the retention of an individual to serve as a Steller sea lion research coordinator. Additionally the committee is concerned that all data gathered as a result of the research activities is not made available to all the entities participating in SSL research and management. The committee urges the Council urges NMFS to construct the research contracts in such a way as to require that all gathered data be generically available this should create a much broader SSL database than would otherwise exist, thereby increasing the general body SSL knowledge available to the scientific community.

7. The committee has concerns with the BiOp RPA global control rule. The committee recommends that the Council consider an alternative control rule proposed by NMFS staff. Essentially, the rule would add to the existing harvest strategy by prohibiting fishing when biomass fell below 20% of pristine levels for a given stock. (Leape objects)

8. The committee is interested in having more research be conducted on fish stock surveys and assessments.

Larry Cotter expressed a desire to further refine and develop a formula that could be used to determine sea lion forage needs relative to total available biomass in the different regions. When complete this formula could be used as one method of determining the allowable harvest of prey species in different regions while ensuring that SSL forage needs are addressed. The committee concurred that such a formula should be developed.

Additionally, the committee recognizes that a more formalized system to grade the impacts of respective proposals on SSL needs to be established. This grading system should clearly articulate the various values used to determine impacts of proposed RPA measures on SSL so that a logical, consistent, and rational RPA evaluation approach is defined. The committee expects this evaluation criteria to be developed as part of the revised biological opinion.

Cotter's Strawman

(unless otherwise noted, applies to all including CDQ as well)

Area Closures

Gulf of Alaska

* 0-3 nm of all rookeries would be closed to all groundfish fishing.
* 0-3 nm of major haulouts would be closed to all groundfish fishing, except with jig gear.
* 3-10 nm of rookeries and major haulouts would be closed to groundfish fishing except with jig and pot gear. All trawling and all longlining for any FMP species withing 0-10 nm of all rookeries and major haulouts would be prohibited.
* Framework so that rookery closures extend out to 20 nm for all groundfishing when declines exceed -10% over a 10 year trend (and reverse when trends are less than -10%).

Bering Sea/ Aleutian Islands

* Area 9 (Bogoslof) and Seguam would be closed to all groundfish fishing.
* Establish a 10 nm 'Leitzell band' for the pollock fishery A season.
* 0-3 nm of all rookeries would be closed to all groundfish fishing.
* 0-3 nm of major haulouts would be closed to all groundfish fishing, except with jig gear.
* 3-10 nm of rookeries and major haulouts would be closed to groundfish fishing except with jig and pot gear. All trawling and all longlining for any FMP species withing 0-10 nm of all rookeries and major haulouts would be prohibited.
* Framework so that rookery closures extend out to 20 nm for all groundfishing when declines exceed -10% over a 10 year trend (and reverse when trends are less than -10%).
*0-20 nm closure of the 5 northern haulouts to all groundfish fishing.

Spatial Distribution

* A platoon approach would be implemented for the mackerel fishery.

TAC Specification

*Split the BSAI cod TAC into AI and BS TACs; address gear allocations through the Council.

No Fishing Periods

*No trawl fishing November 1 through January 20 in all areas, BSAI and GOA.

Temporal Distribution

* Two seasons would be established for pollock in the BSAI, with a 40/60% TAC allocation.
* Four seasons would be established for pollock in the GOA, with equal TAC apportionment.
* Retain two seasons for AI mackerel (50/50) per Gauvin proposal

* Two seasons for cod in BS and GOA with a 60/40% TAC apportionment (all gear types); one season in the AI as follows: fixed gear January 1 and trawl gear January 20.
*CDQ fisheries can fish for pollock, cod and mackerel January 1- November 1. (1/20 for trawl)

Critical Habitat Catch Limits

* CH limits for Atka mackerel established at 70% inside / 30% outside CH.
* A formula to determine the amount of allowable pollock and cod harvest in Bering Sea CH would be established based on a percentage of the SSL prey surplus in CH. This would be done seasonally based on surveys.

Monitoring

* VMS or an approved alternative system would be required for all vessels fishing in the pollock, cod, or mackerel fisheries.

Other Prey Protection

* Octopus would be designated a PSC species. All octopus taken in groundfish fisheries would be returned to the sea with a minimum of injury. No retention would be allowed.

Other Recommended Actions

* Develop a recovery plan for SSL that includes de-listing criteria.
* Re-examine critical habitat designation based on new information.
* No global control rule.
* Extend AFA and address rationalization in all areas as expeditiously as possible, including encouraging volunteer programs.

Revised Industry Proposal

Aleutian Islands Fisheries

Atka Mackerel:

Temporal Measures: A&B Seasons (January 20 and September 1).

Season TAC allocations: 50/50 per A&B seasons

Measures to reduce catch rates on localized basis: Platoon management in Areas 542 and 543. Vessels wishing top participate would register with NMFS to fish scheduled A or B seasons and would be randomly assigned to one of two teams. The teams would start in either 542 or 543, then with when the other team is done with their starting areas CH allowance. A 14 day stand down would apply.

Area Restrictions: No CH fishing in Seguam foraging area and Area 518 (Bogoslof).

No CH fishing for mackerel east of 178 West longitude.

Rookeries west of 178 West longitude closed out to 10 nm except 15 miles at Balder.

Haulouts: closed 0-3 nm.

CH Apportionment: 70% inside and 30% outside.

Pacific cod:

Seasons:

trawl:	January 20 - June 10 (80%), June 11 - October 31 (20%)
longline, jig:	January 1 - June 10 (60%), June 11 - December 31 (40%)
pot:	January 1 - June 10 (60%), September 1 - December 31 (40%)
pot CDQ	January 1 - December 31

Note: the harvest of cod by the <60' pot vessels should account towards the 1.4% quota when the 18.3% season is closed.

Area Restrictions: Longline and Pot: no CH fishing east of 173 degrees West to western boundary of Area 9, Balder closed inside 10 nm, Agligadak closed to 20 nm.

Trawl: East of 178 west: rookeries closed at 10 miles except 20 nm Agligadak, haulouts open from 3 miles and out; west of 178 west: no fishing within 10 miles at haulouts and rookeries until the Atka mackerel fishery inside CH A or B season, respectively, is completed, at which time trawling for cod can occur 3 nm outside of haulouts and 10 nm of rookeries.

Seguam foraging area closed to all gear types.

Pollock:

One season with January 20 opening.

No fishing for pollock in CH.

Other applicable allocation splits (AFA)

Bering Sea Fisheries

Area Closures

* Area 9 (Bogoslof) would be closed to pollock, cod, and mackerel fishing.
* Establish a 10 nm 'Leitzell line' for the pollock fishery A season.
* 0-3 nm of all rookeries would be closed to all groundfish fishing.
* 0-3 nm of major haulouts would be closed to pollock, cod, and mackerel fishing, except with jig gear.
* 3-10 nm of rookeries and major haulouts would be closed to pollock, cod, and mackerel fishing except with jig, longline, and pot gear. All trawling for pollock, cod, and mackerel withing 0-10 nm of all rookeries and major haulouts would be prohibited.

*0-20 nm closure of the 5 northern haulouts to all groundfish fishing.

* Close CVOA to trawl c/ps fishing for pollock (June 10 - Dec 31) as per current regulations.

* The Pribilof haulouts would be closed only to 3 nm.

* No fishing with longline and pot gear inside of 7 nm of Amak rookery.

Seasons

Pollock: January 20 - June 10 (40%), June 11 - October 31 (60%).

Cod:

trawl:	January 20 - June 10 (80%), June 11 - October 31 (20%)
longline, jig:	January 1 - June 10 (60%), June 11 - December 31 (40%)
pot:	January 1 - June 10 (60%), September 1 - December 31 (40%)
pot CDQ	January 1 - December

Note: the harvest of cod by the <60' pot vessels should account towards the 1.4% quota when the 18.3% season is closed.

Critical Habitat Catch Limits

* A-season limit of SCA fishing: no more than 30% of the annual TAC can be harvested in the SCA prior to April 1 each year. The remaining 10% of the annual TAC may be harvested outside of the SCA before April 1 or inside SCA after April 1. If the 30% was not taken in the SCA prior to April 1, the remainder can be rolled over to be taken inside after April 1.

GOA Fisheries

Closure areas

Establish closure areas as follows (jig gear not subject to any area closures):

Area 1: Closed to cod and pollock trawling out to 20 nm, except for Middleton Island where trawling would not be allowed inside 10 nm.

Area 2: Closed to cod and pollock trawling out to 10 nm around haulouts. The Pye Island and Sugarloaf rookeries are closed out to 20 nm for trawling and 10 nm for fixed gear. For Marmot Island - in the first half of the year the trawl fishery is open from 15 nm, which extends to 20 nm in the second half of the year. The Marmot closure for fixed gear in 10 nm year-round.

Area 3: Cape Barnabus and Cape Ikolik are open to all cod and pollock gear from 3 nm out. Gull Point and Ugak Island are open to trawl (outside 3 nm) in C+D season pollock and B season trawl cod.

Areas 4: Closed to pollock, cod, and mackerel fishing out to 20 nm (all gears except jig).

Areas 10, 11: Closed to pollock, cod, and mackerel fishing with trawls or pots out to 20 nm (all gears except jig). Longlining closed out to 10 nm.

Area 5: Closed to trawling out to 20 nm, except Mitrofania/Spitz where trawling, longlining, and pot fishing are allowed from 3 nm out.

Area 6: Closed to trawling out to 10 nm except that trawling, longlining, and pot fishing are allowed from 3 nm at the Whaleback, Sea Lion Rocks, Mountain Point, Caton, Castle Rock, the Pinnacles.

Seasons and apportionements

cod:

A-season = 60% of TAC: January 1 fixed gear, January 20 trawl

B-season = 40% of TAC: September 1 all gear types

pollock:

A season = January 20 - February 25 (25%)

B season = March 10 - May 31 (25%)

C season = September 1 - September 15 (25%)

D season = October 1 - November 1 (25%)

Rollovers of TAC: rollovers from one quarter to the next are ok, provided that no rollover is more than 30%.

MINORITY REPORT 5/25/01

The mission of the Steller sea lion RPA committee was to develop a set of RPAs that would allow NMFS to fulfill its obligations toward Steller sea lions under the Endangered Species Act(ESA). If we were successful in doing that, then we could explore making accommodations to meet additional economic or social needs of the affected fishing industry and fishing communities.

We believe that the Committee's proposal, in spite of the hard work of most members, fails to meet the basic ESA mandate of eliminating jeopardy for Steller sea lions and adverse modification of its critical habitat.

PRINCIPLES FOR STELLER SEA LION RECOVERY

According to the most recent biological opinion from NMFS, there are four primary effect categories on Steller sea lions; effect of global biomass levels, effects of disturbance, effects of temporal concentration, and effects of spatial concentration of fishing (p. 259). In addition, NMFS maintains that the reasonable and prudent alternative (RPA) must avoid jeopardy and adverse modification *"at all three scales, global, regional and local, where the competitive interactions occur."*

1) At the global scale, we propose to reduce groundfish (pollock, Atka mackerel and Pacific cod) catch levels from the maximum permissible level to maintain the forage base for Steller sea lions and other predators at high levels relative to the estimated unfished abundance.

   The Committee's proposal failed even to acknowledge that total take of groundfish had an impact on Steller sea lions or other predators. During the most recent meeting of the RPA Committee, we were initially asked to support the criteria of forage available divided by forage consumed as a way of determining a surplus for the commercial catch. The calculations for forage available were based on summer stock assessment surveys for the stock regionwide Over the course of the meeting, it became obvious that this could not begin to tell us what the "surplus" was in specific areas or fishing zones. More fundamentally, as NMFS has recognized, the whole concept of "surplus" in a marine ecosystem is dubious, at best.

2) At the regional scale, we propose that groundfish fisheries be dispersed in four seasons and across management areas to avoid high removal rates over short periods of fishing.

   In fact, the Committee's proposal moves in the opposite direction. It calls for significant increases in pollock catches in critical habitat including at sea foraging areas during the winter months when nutritional needs of Steller sea lions are expected to be greatest. Atka mackerel catches in critical habitat will also increase, and only minor changes were made to the Pacific cod fisheries. The justification for the Committee's proposal to invade critical habitat further was based on telemetry data presented to the Committee. The shortcomings of this data are significant and include, but are not limited to the following: First, telemetry data are highly biased toward nearshore activities due to limits of the technology. Second, the majority of the data were collected in the summer months from from a limited number of nursing females on rookeries and young-of-the-year pups. There is little to no information on their activity in the winter months, or that of subadults, male sea lions, or females without pups. While acknowledging the shortcomings, the Committee still chose to adopt the notion that Steller sea lions' prey base does not need to be protected beyond 10 nautical miles.

3) At the local scale (within critical habitat), we propose to eliminate the possibility of direct food competition and disturbance on the sea lion's prey field by establishing complete spatial separation of trawl fishing (trawl exclusion zones).

The Committee's proposal exacerbates this problem as well. In the one area where progress was being made, limits on trawling for pollock in the sea lion conservation area, the Committee chose to allow the catch to double, and to force that catch into half the critical habitat area.

4) Finally, for the fixed gear fishery, we propose a zonal approach, which would allow for continued fishing opportunities for those who need them, while allowing the testing of differential gear impacts on the prey field of Steller sea lions.

This proposal echoed a proposal offered up by Ken Stump and Phil Kline before the North Pacific Fishery Management Council in September, 2000. Despite repeated requests through the Council process and this Committee, analysis of this zonal approach has yet to be done. The Committee's proposal rejected this approach, and only puts serious limits on fishing between 0-3 nautical miles of rookeries and haulouts.

While we acknowledge that marine reserves were not officially part of the suite of recommendations that were being considered by the Committee for recommendation to the Council, it appeared to us that our case for a system of reserves as an integral part of the future of fisheries management in the North Pacific could not have been made more clear. In the longer term, we feel that marine reserves are essential to steller sea lion conservation and maintaining marine biodiversity in the North Pacific.

After experiencing more than fifteen frustrating days of working in good faith with this Committee, with little willingness by the majority to move any closer toward our recommendations, we are submitting to you this minority report.

Gerald Leape David Cline

2002 RPA Alternative Proposal to the RPA Committee

Submitted by the Alaska Marine Conservation Council
May 9, 2001

Statement of proposal

The goal of the Zonal Approach for Gulf of Alaska Pacific cod is to achieve Steller sea lion conservation through modified fishing opportunities for the fixed-gear coastal community fleets which use lower impact fishing gears and practices. Because food stress is the National Marine Fisheries Service's prevailing hypothesis for why Steller sea lions are failing to recover, the Zonal Approach attempts to minimize vessel-sea lion conflicts over Pacific cod. AMCC believes that in order for sea lions to maintain recovery over the long term, the fishery must be made more sustainable, with less impact on marine habitat and bycatch. The Zonal Approach is based on the following objectives:

- Disperse the Pacific cod fishery over space and time and thus protect the integrity of the Steller sea lion prey field (food available for sea lions).
- Enable the coastal community fixed-gear fleets the opportunity to fish in a modified way that does not disrupt Steller sea lion critical habitat. Reduce the likelihood of large-scale removals of Pacific cod by allowing fishing with pot, jig and longline gears within 20 nm from shore.
- Offer an approach that is enforceable by National Marine Fisheries Service, and is easy for the fleet to understand and comply with by putting zones in place across the shoreline.
- Create opportunity for vessels using trawl gear to convert to a gear type (pots) that is allowed to fish within 20 nm from shore.
- Incorporate measures that further reduce the by-catch of fisheries resources that have been determined important food for Steller sea lions.

Please see the attached document for the full Zonal Approach proposal.

Jeopardy and Adverse Modification

Based on the stipulations laid out in the Biological Opinion (November 30, 2000), AMCC believes that dispersing the Pacific cod fishery over space and time and using gear types and fishing practices at appropriate levels will prevent jeopardy and adverse modification of Steller sea lion critical habitat.

Social and Economic Impacts

The Zonal Approach enables the coastal community fishing fleets the opportunity to fish in a modified way at appropriate levels and practices. In addition, the Zonal Approach attempts to minimize negative impacts on the trawl sector by providing the opportunity for temporary gear conversions from trawls to pots.

Bycatch of PSC

By temporally allocating the cod TAC into the time of year that the halibut fishery is being conducted, full retention is required, reducing bycatch and discard of both species. In 1995, the NPFMC was presented with research showing that a 25% shift in TAC from trawls and longlines to pots and jigs would result in reduction in cumulative halibut bycatch mortality of 1.88 million pounds.

Adapt itself to a sound experimental design for monitoring

Because the main premise of the Zonal Approach is to protect the integrity of the Steller sea lion prey field for Pacific cod, it can be easily be adapted to an experimental design for monitoring once VMS units, reporting mechanisms, and additional observers are in place.

Alaska Marine Conservation Council

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Proposal for the Pacific Cod Fishery in the Gulf of Alaska:

A Zonal Approach for the 2002 RPA

The goal of the Zonal Approach is to achieve Steller sea lion conservation through modified fishing opportunities for coastal community fleets using lower impact fishing gears and practices. Because food stress is the National Marine Fisheries Service's prevailing hypothesis for why Steller sea lions are failing to recover, the Zonal Approach attempts to minimize vessel-sea lion competition for cod by dispersing the fishery temporally and spatially. The Zonal Approach is based on the following elements:

- Coast wide zones from 0 to 20 nm as an approximation of critical habitat designed to be enforceable by NMFS and easy for the fleet to comply with.
- Reduction of large-scale removals of cod by allowing fishing with pot, jig and longline gears within 20 nm from shore. This will enable coastal community fleets to fish in a modified way that does not disrupt Steller sea lion critical habitat.
- Opportunity for vessels using trawl gear to convert to pots in order to fish inside 20 nm from shore.
- Incorporation of measures to reduce bycatch of species that have been determined important food for Steller sea lions.
- Safeguards against overfishing through application and strengthening of the global control rule.

Spatial Dispersion

The intent of the spatial dispersion element is to slow the rate of removals of Pacific cod from within the 20 nm zone.

> *The fisheries effects that give rise to these determinations include both large scale removals of Steller sea lion forage over time, and reduced availability of prey on the fishing grounds at scales of importance to individual foraging Steller sea lions, particularly in critical habitat.* (Nov 30 BiOp page 271).

We propose coast wide zones from 0 to 20 nm as an approximation of critical habitat designed to be enforceable by NMFS and easy for the fleet to comply with. Fixed gear types are permitted inside 20 nm and trawl gear is permitted outside 20 nm based on findings in the Biological Opinion.

> *The possible effects of these other gear types are dwarfed by the magnitude of biomass removals by the trawl sector.* (Nov. 30 BiOp page 217).

Table 1: Recommended Management Action for Gulf of Alaska Pacific Cod Fisheries qSpatial Dispersion				
Zone	**1**	**2**	**3**	**4**
Area of Zone	0 nm from shore and beyond	3 nm from shore and beyond	12 nm (Territorial Sea Boundary) from shore and beyond	20 nm from shore and beyond
Vessels eligible to fish within zone	Vessels with a maximum of 60 pots or 5 jig machines, as per State rules	Vessels with a maximum of 60 pots or 5 jig machines plus all longliners <60 ft. LOA	Zone 2 and 3 vessels, plus vessels using pot and jig gear with no gear restrictions plus longliners >60 ft. LOA	Zone 1, 2 and 3 vessels, plus vessels using trawl gear
Intent of Action	The intent of Zone 1 is not to preempt State rules.	The intent of the 60-pot limit in Zone 1 and 2 is to have no more than 60 pots per vessel at one time.		

Temporal Dispersion

The intent of temporal dispersion is to reduce the likelihood of localized depletion occurring in critical habitat according to requirements contained in the Nov. 30 BiOp (page 274, 9.2.3 Temporal Apportionment of TACs).

> *"Establishing summer and winter seasons for all these species would be important to preventing localized depletion"* (Nov.30 BiOp, p. 260)

AMCC proposes that vessels fishing with fixed gear open on the first day of each quarter, and vessels fishing with trawl gear start on the 20th day of each quarter except the C season. This mirrors the current regulatory framework for fixed/trawl gear starting dates.

Table 2: Recommended Management Action to Temporally Disperse the GOA Pacific Cod Fishery

Season	% TAC	Fixed Gear Start/End Dates	Trawl Gear Start/End Dates
A	25%	Jan 1/March 31	Jan 20/March 31
B	25%	April 1/June 30	April 20/June 30
C	25%	July 1/Sept 30 (pots & jigs only)*	N/A*
D	25%	Oct 1/Dec 31	Oct 20/Oct 31

*** Note: We recognize that the summer season will have increased bycatch in some gear types. Our goal is to maximize dispersion of the cod fishery by allowing opportunity for those gears without bycatch problems to fish cod in the summer. TAC not taken in the summer season could be rolled over to the D season.**

Global Control Rule

The global control rule should apply to the cod fishery to safeguard against overfishing. We recommend that NMFS consider strengthening the formula to require conservation action sooner than the BiOp measure.

Other Provisions for the Zonal Approach

AMCC recognizes that the Zonal Approach has consequences for the fleets and conservation considerations. The following are recommended management actions intended to build in flexibility for the various cod fleets, address bycatch issues, and meet requirements in the Biological Opinion.

1. Enable Gear Conversion from Trawls to Pots

Intent:

- Enable LLP qualified cod trawl vessels to convert to pots so they are eligible to fish for cod within 20 nm.

Action:

- Issue LLP pot cod endorsements to LLP qualified cod trawl vessels.
- Vessels are not allowed to target Pacific cod with trawl gear and pot gear under this provision in the same quarter.

Rationale:

- Conversion from trawls to pots should slow down harvest rates and make it possible to allow those vessels to operate inside 20 nm.

2. Prohibit Retention of Octopus in the Pacific Cod Fishery

NMFS data shows that octopus is important prey for Steller sea lions. With the possibility of the cod trawl sector converting to pot gear and fishing throughout the year, octopus bycatch is likely to increase.

Intent:

- Address the potential increase in octopus bycatch in the cod fishery.
- Encourage live discard of octopus.
- Prevent a bycatch fishery for octopus from developing.

Action:

- Prohibit retention of octopus in the cod fishery.

Rationale:

- Action applies to entire cod fishery because of the enforcement difficulties outlined in the NMFS Draft Discussion Paper.

3. Roll Over of TAC Across Seasons

Intent:

- To maintain temporal dispersion while allowing a level of flexibility for the fleets if TAC is not completely caught in a quarter.

Action:

- In 2002, allow unfished TAC, at a maximum of one quarterly seasonal amount, to be rolled over to the next quarterly season within that year as a phase-in measure for a limited roll over of TAC starting in 2003.
- Starting in 2003, allow a maximum 1/5 of a quarterly season's TAC to be rolled over to the next quarterly season within that year. A higher percentage rollover may be appropriate from the C season to the D season.

Rationale:

- Temporal dispersion is maintained by allowing a maximum percentage of any quarterly seasonal TAC to be rolled over to the next quarter.

TONY KNOWLES, GOVERNOR

AGENDA C-1(d)(2)
JUNE 2001

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

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May 18, 2001

James W. Balsiger, Regional Administrator
National Marine Fisheries Service – Alaska Regional Office
National Oceanic and Atmospheric Administration
P.O. Box 21668
Juneau, AK 99802-1668

Dear Dr. Balsiger:

The Alaska Department of Fish & Game (ADF&G) shares the concerns of the National Marine Fisheries Service (NMFS) over the decline of Steller sea lions. Steller sea lions have been on ADF&G's list of species of special concern since 1993, even before the western population was designated as endangered under the federal Endangered Species Act in 1997. This letter summarizes ADF&G's current plans to protect sea lions, manage state fisheries, and comply with state and federal laws. The department will retain its management flexibility so it can respond to new information or circumstances and make appropriate changes to the management measures we describe in this letter. We want to assure NMFS, and others, that ADF&G takes the Steller sea lion decline very seriously and that we will participate in research efforts and take management actions that provide for their protection.

Background: The Biological Opinion

The November 30, 2000, biological opinion on Bering Sea/Aleutian Islands and Gulf of Alaska groundfish fisheries concluded that the federally managed groundfish fisheries, as modified by reasonable and prudent alternatives, are not likely to jeopardize the continued existence of the western population of Steller sea lions, or adversely modify the sea lions' critical habitat. That conclusion is based in part on a review of the environmental baseline, which includes an analysis of the cumulative effects that state and federal fisheries may have on Steller sea lions. In light of the scientific evidence, ADF&G agrees with the "no jeopardy" conclusion.

In reviewing the environmental baseline, the biological opinion reported that the state-managed fisheries are expected to continue into the future. That expectation is, in fact, part of the environmental baseline against which the likelihood of jeopardy is measured. The biological opinion has suggested that more analysis of particular state fisheries is desirable, but it also necessarily implies that the continuation of state-managed fisheries poses no jeopardy to the continued existence of Steller sea lions. That implication arises from the fact that the effects of the federal fisheries, as modified, have been determined to pose no jeopardy, even when added to

the effects accounted for in the environmental baseline. In fact, we believe that the biological opinion has significantly overstated the possible link between state fisheries and Steller sea lions. A more accurate assessment of state fisheries would make a finding of jeopardy even less likely.

The "no jeopardy" conclusion reached in the biological opinion appears, therefore, to bring the state fisheries within the scope of the incidental take statement issued for the federal fisheries and, thus, into compliance with the Endangered Species Act. Even so, ADF&G does not intend to rely on the incidental take statement and maintain the status quo, but rather intends to increase its efforts to manage state fisheries to further avoid negative effects on Steller sea lions.

Protection Measures Currently in Place

The Alaska Board of Fisheries (Board) has established policies, including time, area and gear closures, or restrictions that protect Steller sea lions and other animals that prey on fish. For example, large areas of state waters are closed to nonpelagic trawl gear.[1] Although the trawl ban was not adopted specifically to protect against localized depletion of prey for sea lions, it has that beneficial effect. The trawl ban therefore addresses the primary concern expressed in the biological opinion about threats posed to Steller sea lions by commercial fishing. In fact, the Board has enacted regulations providing that state groundfish management will be guided by a policy of avoiding localized depletions of fish.[2] In addition to the trawl ban and the Board's groundfish principles, many other measures taken by the State of Alaska to conserve fish stocks also protect Steller sea lions.

The Board and ADF&G have also taken specific actions for the expressed purpose of protecting Steller sea lions. For example, the Board has divided Prince William Sound into three management areas and arranged the state pollock fishery to provide that no more than 40 percent of the guideline harvest level be taken from any one area.[3] ADF&G has managed the fishery to limit the take in each area to about 30 percent, allowing a 10 percent buffer. This action spreads out the fishery spatially to avoid the possibility of localized depletions of prey (should that be a factor in Steller sea lion recovery), much as the reasonable and prudent alternatives require for the federal pollock fishery. Further, a portion of eastern Prince William Sound is closed to pelagic trawl gear during the pollock fishery (5 AAC 28.263), and most of eastern Prince William Sound is closed to all trawling year-round (5 AAC 39.165). Moreover, pollock fishing is prohibited during June 1 through November 1 within 10 nautical miles of seven rookeries and haulouts in Prince William Sound (5 AAC 28.250) consistent with federal regulations. Another specific protection measure is the adoption by Emergency Order of federal no fishing zones within three miles of sea lion rookeries. These are just some of the steps that have been taken at the state level to protect Steller sea lions.

Salmon, Herring and Pacific Cod Fisheries

The biological opinion identified state salmon, herring, and Pacific cod fisheries as "likely to affect" Steller sea lions. The careful choice of words is important because actions that affect an

[1] 5 AAC 39.165.
[2] 5 AAC 28.089.
[3] 5 AAC 28.263.

endangered species are not prohibited if the effect does not rise to the level of a "take," as that term is defined under the Endangered Species Act. Still, the biological opinion has identified concerns about the state salmon, herring, and Pacific cod fisheries, and ADF&G will not ignore those concerns. ADF&G has responded to the offer of assistance extended in the biological opinion by submitting three proposals to NMFS in hopes of securing grant money for the purpose of researching and addressing such concerns.

Put simply, the basis for the concern expressed in the biological opinion is that localized removals of fish may harm Steller sea lions by reducing the prey available for them. ADF&G's most current analysis of the salmon, herring, and Pacific cod fisheries leads to the conclusion that those three fisheries do not cause any significant reduction in the prey available to Steller sea lions, so no significant modification of those fisheries is necessary. That conclusion is based in part on the following facts about each fishery.

Pacific salmon are pelagic species that spend most of their ocean residence in offshore and oceanic areas. Some salmon fisheries of the western and central Gulf of Alaska do occur in designated sea lion critical habitat. However, most of the Alaskan salmon catch occurs in western Alaska, Upper Cook Inlet, and areas of the Gulf of Alaska east of Prince William Sound, which are outside of sea lion critical habitat.

Salmon are found occasionally in the diet during the spring and summer months.[4] With the exception of chinook salmon, you would expect an infrequent occurrence of Pacific salmon in the diet during the fall and winter months based on well-known ocean distribution of Pacific salmon.[5] Pacific salmon, other than chinook salmon, are a pelagic species and spend most of their ocean residence in offshore and oceanic areas. Pacific salmon are very short-term and transitory residents of coastal areas and would occur in abundance in foraging areas during the late spring and through the summer months. Salmon occur in nearshore foraging areas either as juveniles migrating from freshwater rearing habitats to oceanic rearing areas, or as mature adults migrating from oceanic rearing areas to natal stream spawning areas.

Salmon stocks that migrate through the critical habitat of western Steller sea lions have steadily increased under state management and are presently at high levels. Salmon populations have been at historically high levels of abundance during the period when the declines of the western Steller sea lions occurred.

Salmon fisheries target mature salmon in terminal or near-terminal fishing areas. Although some salmon fisheries in the western and central Gulf of Alaska occur in critical habitat, the catch occurs in areas that are "downstream" (i.e., relative to the direction of salmon migration) of rookeries and critical foraging areas. This means that salmon fisheries remove salmon generally after they have migrated through rookeries and critical foraging areas.

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[4] Merrick, R.L. and D. G. Calkins. 1996. Importance of juvenile walleye pollock, Thregra chalcogramma, in the diet of Gulf of Alaska Steller sea lions, Eumetopias jubatus. Pp. 153-166 in U.S. Dept. of Commerce, NOAA Tech. Rep. NMFS 126.

[5] Groot, C. and L. Margolis (Editors). 1991. Pacific salmon life histories. UBC Press, Vancouver.

In summary, because salmon abundances have been at historic high levels during and following the period of the decline in western Steller sea lions, salmon are only an occasional contributor to Steller sea lion diets during times when prey are not thought to be limiting, and salmon fisheries occur in areas "downstream" of Steller sea lion rookeries and critical foraging areas, it is extremely unlikely that fisheries for salmon compete with Steller sea lions.

Herring stocks exhibit cyclic patterns of abundance that also do not correspond to the decline in Steller sea lions. In recent years Prince William Sound herring have declined to low levels for an extended period, but these herring were very abundant during the 1980s when Steller sea lions were most rapidly declining.

Although herring are not usually listed as the primary prey species for Steller sea lions, sea lions are observed to dive and feed near herring aggregations throughout the year when herring schools are in deep waters. For a very brief period in the spring, herring move into shallow waters to spawn. Most of Alaska's herring harvest occurs during this brief spawning period, during one or a series of very short openings, which last from 15 minutes up to about 12 hours. During the times when no fishing is permitted, Steller sea lions have no competition from the commercial fishery.

Alaska's herring fisheries are managed under a conservative harvest policy, which constrains the exploitation rate to a maximum of 20 percent of the spawning biomass. Part of the rationale for this conservative harvest policy is to explicitly provide for herring's role as a forage species for upper trophic level predators such as Steller sea lions. In addition, no herring harvest is allowed when herring abundance falls below a critical threshold level. Prince William Sound herring fisheries are currently closed because herring abundance has fallen below the threshold levels and are not anticipated to reopen for at least the next two years, given the present stock condition. In Cook Inlet (Kamishak Bay), although the herring abundance appears to be above the threshold necessary to allow commercial exploitation, the fishery was closed for the third consecutive season in 2001 due to a preponderance of recruit age fish (five years old and younger). No decision regarding the reopening of the Cook Inlet fishery has been made; this will depend on results from ongoing assessment and sampling. These conservative harvest policies further minimize the potential for competition between herring fisheries and Steller sea lions to the point where it is difficult to conceive of the fisheries having any significant negative effect on Steller sea lions. Because fishery openings are extremely short, removals are limited to relatively small amounts of herring south of Bristol Bay, and harvests will occur within listed critical habitat only at Kodiak and Dutch Harbor in 2001, the potential for adverse impact through removal of prey and direct interaction with fishing vessels is expected to be low.

Alaska manages the state Pacific cod fishery conservatively under Guiding Principles for Groundfish Fishery Regulations (5 AAC 028.89) that include, among others, minimization of bycatch of other associated fish and shellfish and prevention of localized depletion of stocks, protection of habitat, and maintenance of slower harvest rates by methods and means and time and area restrictions. Though not created solely for Steller sea lion protection, these principles are based on broad ecosystem considerations. Consistent with these principles, only pot or jig gear is allowed, and the number of pots is limited to sixty per vessel and the number of jigging machines to five per vessel, which essentially results in a small boat fishery. State guideline

harvest levels are set at a maximum of 25 percent of the regional acceptable biological catch. These and other regulations result in temporal and spatial distribution and total catch amounts that are small in contrast to the removals in the federal fisheries.

ADF&G staff do not believe that salmon, herring, or Pacific cod fisheries, either individually or cumulatively, have any significant negative impact on the ability of Steller sea lions to forage effectively. Accordingly, ADF&G will not develop a habitat conservation plan under section 10 of the Endangered Species Act at this time. We will, however, increase our monitoring and analysis of the potential effects of state-managed fisheries on Steller sea lions during the 2001 and later fishing seasons so we can further modify fisheries if we believe it will benefit Steller sea lions.

Conclusion

The North Pacific Fishery Management Council, at its April 2001 meeting, recommended a joint effort between NMFS and the State of Alaska to consider additional measures to protect Steller sea lions. As I have said, the state will work with NMFS and will consider the need for additional measures to protect Steller sea lions in respect to fisheries, including those in state waters. ADF&G will also continue to manage its fisheries conservatively in the near future, as in the past, but with a more focused analysis of any effects state fisheries may have on Steller sea lions.

Article VIII, section 5, of the Constitution of the State of Alaska requires that wildlife, including sea lions, be maintained on the sustained yield principle. To satisfy that constitutional mandate and other laws, the department will continue to investigate and assess the relationship between fisheries and Steller sea lions. One way in which ADF&G will fulfill its legal duties is to provide an assessment to the Board of Fisheries of possible effects on Steller sea lions as the Board considers the adoption of fishery management plans and other regulations.

ADF&G will also continue to employ the expertise of its own scientists from the Division of Wildlife Conservation and the Division of Commercial Fisheries to expand and improve the analysis of any effects that fisheries may have on Steller sea lions. Our efforts will include building on the October 12, 2000, report that Dr. Gordon Kruse and others prepared in response to NMFS's request for information on state fisheries. Our efforts will also include keeping abreast of the analyses of Steller sea lions and federal fisheries that are being conducted by other entities, including the Sustainable Fisheries Division of NMFS, the Protected Resources Division of NMFS, the North Pacific Fishery Management Council, the National Academy of Sciences, and the state's own Alaska Steller Sea Lion Restoration Team (ASSLRT). ASSLRT and the state's Steller sea lion stakeholder committee were formed by Governor Knowles in the fall of 2000 to focus Alaskan experts in fisheries management and Steller sea lion (ASSLRT), as well as a second committee of stakeholders, to find methods to protect sea lions while providing opportunities for fisheries. We hope our efforts will be bolstered by funding of the three research proposals ADF&G recently submitted to NMFS.

In considering future management decisions and advising the Alaska Board of Fisheries, we will look for fisheries that could be deemed reasonably likely to have a significant negative effect on

Steller sea lion foraging behavior. If it becomes known that a state fishery is reasonably likely to have a significant negative effect on Steller sea lion foraging, ADF&G will pursue action to appropriately modify the fishery or prepare a habitat conservation plan under section 10 of the ESA. We are presently unaware, however, of any current state fishery that makes that action legally necessary or a wise use of agency resources.

I hope this letter contributes to the maintenance of a cooperative relationship in which the free sharing of information facilitates sound resource management decisions. That should lead to the ultimate goal, which is the recovery of Steller sea lions, without jeopardizing the viability of commercial fisheries in Alaska.

Sincerely,

Frank Rue
Commissioner

cc: John Sisk, Office of the Governor
Kevin Duffy, ADF&G
Doug Mecum, ADF&G
Lance Nelson, Department of Law

5/28/01

Distribution and abundance of killer whales *Orcinus orca* on the Southeast Bering Sea shelf and slope during summer 1997 and 1999

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Abstract

Density and abundance estimates for killer whales *Orcinus orca* were determined from cetacean line-transect survey data collected during July 1997 and June 1999 in conjunction with echo-integrated trawl (EIT) surveys of pollock *Theragra chalcogramma* on the southeast Bering Sea shelf and slope. There appears to be large interannual variability in the distribution and behavior of killer whales in the southeast Bering Sea. During July 1997, killer whales were a denizen of the Outer Shelf domain (100 – 180 m) of the southeast Bering Sea and were rare in the Middle Shelf domain (50 – 100 m), except near the Pribilof Islands. During June 1999, killer whales were rare in both the Middle and Outer Shelf domains and appeared to congregate in the southeast slope region (180 – 1000 m) north of Unimak Pass and Akutan Island. Separate stratified density and abundance and estimates of killer whales are provided for these two years; however, the coefficients of variation for are very large and should be retained with the estimates. Estimates of killer whale abundance for the southeast Bering Sea shelf and slope, from outer Bristol Bay (160.32°W) to the western side of the Pribilof Islands (171.08°W), vary by an order of magnitude from 5,333 (94.5% C.V.) during July 1997 to 414 (59.5% C.V.) during June 1999. The sighting on 24 July 1997 of numerous groups of killer whales in one super-pod of an estimated 200 killer whales near the Middle Shelf front (100 m isobath) illustrates the potential for this species to form very large congregations of animals. To define the role of killer whales as top trophic predators in the southeast Bering Sea, studies are needed to identify specific trophic linkages in different shelf, slope or basin regions. At present, the prey preferences and foraging strategies for the killer whales in these surveyed regions are unknown.

Introduction

Questions have been raised concerning the number of killer whales *Orcinus orca* in the southeast Bering Sea and their role as top predators in the ecosystem. To provide a frame of reference for discussion on the distribution and abundance of this species during the late 1990s, I have assembled estimates of density and abundance, stratified by shelf domains (as delineated in Figure 1) from data collected during two cetacean surveys conducted in July of 1997 and June of 1999. The cetacean surveys were conducted in

conjunction with Alaska Fisheries Science Center echo-integration trawl (EIT) surveys of pollock *Theragra chalcogramma* across the southeast Bering Sea shelf and slope.

Given the potential for killer whales to form large, highly mobile pods with wide spatial separation between groups, density and abundance estimation for this species is not very tractable within line-transect survey methodology. Therefore, all percent coefficients of variation (C.Vs) provided with the estimates of density and abundance need to be retained with the estimates to illustrate the large degree of variation associated with the sightings data.

Methods

Line-transect surveys of cetaceans were conducted from the flying bridge of the NOAA research vessel *Miller Freeman* across the southeast Bering Sea from outer Bristol Bay (160.32°W) to the western side of the Pribilof Islands (171.08°W) from July 17 to August 5, 1997 and from June 7 to July 2, 1999. The area surveyed encompassed the middle shelf (50 – 100 m) and outer shelf (100 – 180 m) domains, slope (180 – 2000 m) and, in 1999, limited inner shelf domain (< 50 m depth) north of the Aleutian Islands, and limited basin (> 2000 m) regions (Figures 2a and 2b). The amount of survey effort (km) using 25-x power binoculars and the area surveyed in each domain are summarized for 1997 and 1999 in Tables 2a and 2b, respectively. Surveys were conducted in passing mode, using closing mode only for sightings of very rare species (e.g. right whale, *Eubalaena glacialis*). Two observers simultaneously censused to the horizon with 25 x 150 power Fujinon binoculars, equipped with compass and reticles. A third observer guarded the trackline by eye, aided with 7 x 50 power hand-held binoculars. The height from the surface of the water to the eyes of observers on the 25 x 150 power binoculars was 12.4 m in 1997 and 12.1 m in 1999. The theoretical probability of sighting an animal on the trackline, g(0), was assumed to be 1.0 for all species. All sightings were recorded on a laptop computer linked to the ship's GPS.

Only sightings obtained while on 25x power binocular effort ('on-effort') were used in the abundance and density determinations. The total number of animals for each on-effort sighting, which in some cases included calves, were used in estimates of density and abundance. Killer whale abundances were stratified by shelf domain of the southeast Bering Sea, as defined by bathymetry (Figures 1). For purposes of comparative density estimation, the middle shelf domain was further stratified into eastern (160.3°W - 163.7°W), central (163.7°W -168.1°W) and western (168.1°W -171.1°W) strata for the southeastern shelf (Figure 1). Killer whale densities were computed from the 1997 and 1999 sightings data with program DISTANCE (Laake et al., 1994). Program DISTANCE evaluates several models of detection probability as a function of the perpendicular distance of the sightings from the track-line (f(x)). Selection of the model with the best fit was based on Akaike's Information Criteria (AIC) (Buckland et al., 2001): Half-normal; Hazard Rate; and Uniform models. Estimators are chosen based on the minimum AIC.

Results

A summary of the number of killer whale sightings in the southeast Bering Sea (160.32°W – 171.08°W) during July 1997 and June 1999 is presented in Table 1. The amount of 'on-effort' survey effort for each shelf, slope and basin strata (as defined in Figure 1) is provided in Tables 2a and 2b along with the suite of survey parameters, and stratified estimates of killer whale density and abundance during July 1997 and June 1999. The best model fits were obtained using the Uniform key/Cosine adjustment model.

Separate, stratified density and abundance estimates of killer whales are provided for July 1997 and June 1999; however, the coefficients of variation are very large and should be retained with the estimates. Killer whale abundance estimates for the southeast Bering Sea shelf and slope, from outer Bristol Bay (160.32°W) to the western side of the Pribilof Islands (171.08°W), vary by an order of magnitude from 5,333 (94.5% C.V.) during July 1997 to 414 (59.5% C.V.) during June 1997 (Tables 2a and 2b). There appears to be large interannual variability in the distribution and behavior of killer whales in the southeast Bering Sea. During July 1997, killer whales were a denizen of the Outer Shelf domain (100 – 180 m) and near Middle Front (100 m isobath) region, but were rare in the Middle Shelf domain (50 – 100 m), except near the Pribilof Islands (Figure 3 and Table 2a). During June 1999, killer whales were rare in both the Middle and Outer Shelf domains and appeared to congregate in the southeast slope region (180 – 1000 m) north of Unimak Pass and Akutan Island (Figure 4 and Table 2b).

On 24 July 1997, during the strong El Niño year, a super-pod of approximately 200 killer whales was studied near the Middle Front (100 m isobath, 55.75 °N; 165.19 °W, refer to Figure 3) in warm 11.5 °C water, outside of the extensive coccolithophore bloom of *Emiliana huxleyi* on the Middle Shelf. Such distributions illustrate the potential for this species to form very large and patchy aggregations of animals that do not readily lend themselves to population estimation by line-transect theory. No such large super-pods were observed during June 1999. The largest groups of 15-25 killer whales occurred in the slope region (180 m – 1000 m isobaths) north of Unimak Pass and Akutan Island (approximately 54.3 °N – 54.5 °N; 165.7 °W – 165.9°W, Figure 4). Conditions during June 1999 were much cooler than during July 1997. Sea surface temperature (SST) on the middle shelf during June 1999 was 6 °C colder than during July 1997 (SST 4.4 °C versus 10.4 °C). Ice had retreated from the Middle Shelf domain only several weeks prior to the June survey.

During July 1997, killer whales were not associated with the highest chlorophyll water on the shelf or slope, nor with the coccolithophore bloom on the Middle Shelf. Chlorophyll *a* in the coccolithophore bloom was on the order of 1-2 $\mu g\ l^{-1}$ and was among the higher values for the middle and outer shelf domains. The shelf-edge region had the highest concentration of chlorophyll *a* (2-33 $\mu g\ l^{-1}$), yet killer whales were not associated with this region. High chlorophyll values therefore do not appear to be a good proxy for the preferred habitat of killer whales on the shelf and slope; however, without more coastal survey effort in shallower regions less than 50 m, near islands and through passes, it is unknown whether this relation would hold in shallower regions closer to the Aleutian Chain (< 50 m depth).

Table 1. Summary of killer whale sightings for July 1997 and June 1999 surveys of the southeast Bering Sea shelf and slope.

	1997			1999		
Species	#Sightings	#Animals	% On-effort	#Sightings	#Animals	% On-effort
Orcinus orca	11	259	82%	14	96	71%

Table 2. Summary of the line-transect survey parameters of density (D, point estimate, number of animals km^{-2}; the highest density is in bold), and abundance (N; the highest abundance is in bold) of killer whales *Orcinus orca* as stratified by ecological domains of the Southeast Bering Sea (160.32°W – 171.08°W, Figure 1) during July 1997 (a) and June 1999 (b): inner shelf north of the Alaska Peninsula (< 50 m depth); eastern middle shelf (50-100 m); central middle shelf (50-100 m); western middle shelf (50-100 m); outer shelf (100-180 m); slope (180-2000 m); and basin (> 2000 m). The southeast middle shelf domain was further stratified into eastern (160.3°W -163.7°W), central (163.7°W - 168.1°W) and western (168.1°W -171.1°W) strata (Figure 1). Parameters for each stratum include: effort (E, km surveyed); number of sightings used in analysis (S); effective strip width (EWS, km); encounter rate (ER); and mean group size (E(S), number of killer whales per group).

Table 2a. *Orcinus orca*, July 1997

Stratum	E (km)	S	ESW (km)	ER	E(S)	D	Area (km^2)	N
Inner Shelf Aleutians	26.2	0	5.03 (19.0)*	0.0		0.0	9207	0
Eastern middle Shelf	172.5	0	5.03 (19.0)*	0.0		0.0	30586	0
Central middle Shelf	170.7	1	5.03 (19.0)*	.586E-02 (167.4)*	5.0	.291E-02 (168.5)*	55466	161 (168.5)*
Western middle Shelf	50 76	2	5.03 (19.0)*	.394E-01 (113.2)*	4.5 (77.8)*	.176E-01 (138.7)*	35822	631 (138.7)*
Outer Shelf	224.7	6	5.03 (19.0)*	.267E-01 (68.5)*	39.3 (82.1)*	**0.104 (108.6)***	43521	**4541 (108.6)***
Slope	134.0	0	5.03 (19.0)*	0.0		0.0	23740	0
All domains	778.9	9	–	–	–	.0269 (94.5)*	198,342	5333 (94.5)*

* Percent coefficient of variation in parentheses

Table 2b. *Orcinus orca*, June 1999

Stratum	E (km)	S	ESW (km)	ER	E(S)	D	Area (km^2)	N
Inner Shelf Aleutians	182.5	0	7.3	0.0		0.0	9207	0
Eastern middle Shelf	424.9	0	7.3	0.0		0.0	30586	0
Central middle Shelf	631.9	2	7.3	.317E-02 (131.9)*	4.5 (11.1)*	.976E-03 (132.4)*	55466	54 (132.4)*
Western middle Shelf	379.8	1	7.3	.263E-02 (79.3)*	7.0	.126E-02 (79.3)*	35822	45 (79.3)*
Outer Shelf	668.0	1	7.3	.150E-02 (50.6)*	1.0	.103E-03 (50.6)*	43521	4 (50.6)*
Slope	430.1	4	7.3	.930E-02 (77.9)*	7.5 (77.8)*	**.478E-02 (110.1)***	23740	**113 (110.1)***
Basin-edge	23.2	1	7.3	.043 (100.0)*	7.0	**.021 (100.0)***	9496	**196 (100.0)***
All domains	2,740	9	_	_	_	.199E-02 (59.5)*	207,833	414 (59.5)*

* Percent coefficient of variation in parentheses

Summary

Killer whales in the southeast Bering Sea appear to show large interannual variability in distribution and behavior. As highly motile predators, they may respond strongly to different oceanographic conditions that contribute to the availability and distribution of their preferred prey. As top predators in the system, their ecological role would also be expected to shift geographically. Conditions during the summer of 1997 were dominated by atmospheric forcing linked to a powerful El Niño. During these warm conditions, killer whales appeared to prefer the Outer Shelf or near Middle Front region. Conversely, 1999 was a relatively cool summer by comparison, with a lag in the ice retreat until May. Killer whales during June 1999 appeared to congregate in the southeast corner of the slope domain, north of Unimak Pass and Akutan Island. Although the abundance of killer whales in the surveyed southeast Bering Sea shelf and slope domains in 1999 was an order of magnitude less than in 1997 (414 killer whales (59.5% C.V. with a 95% confidence interval of 130 – 1315 whales) in 1999 versus 5,333 killer whales (94.5% C.V. or a 95% confidence interval of 949 – 29,972) in 1997), such high C.V.s suggest the potential for overlap in the estimates. Results from these line-transect surveys, conducted in conjunction with EIT-surveys of pollock, typically have limited coverage through Aleutian passes and shallow coastal domains less than 50 m depth. Additional survey coverage in these regions would augment these results.

To define the role of killer whales as top trophic predators in the southeast Bering Sea, studies are needed to identify specific trophic linkages in different shelf, slope or basin domains. At present, the prey preferences and foraging strategies of the killer whales in the surveyed regions summarized herein are unknown.

Acknowledgements

The officers and crew of the NOAA research vessel *Miller Freeman* were very helpful in the successful completion of the surveys. The expertise and dedication of the observers, Robert Pitman, Richard Rowlett, Todd Pusser and Scott Sinclair were invaluable to the quality of the sightings data. The Alaskan Fisheries Science Center (AFSC) and the Southwest Fisheries Science Center provided equipment for the surveys; Jeff Laake (AFSC) provided generous assistance with program DISTANCE. This research was supported by: the Office of Protected Resources, Recover Protected Species Program, NOAA; the Joint Institute for the Study of the Atmosphere and Ocean (JISAO), University of Washington; the North Pacific Marine Research Initiative, and the Northwest Fisheries Science Center and AFSC, NOAA. This research is dedicated to the memory of Dr. Jim Traynor, a NOAA scientist who first welcomed the inclusion of cetacean surveys in conjunction with hydroacoustic surveys of pollock in 1997.

References

Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L., Thomas, L. 2001. *Introduction to distance sampling*. Oxford University Press, Oxford, UK, 398 pp.

Laake, J.L., Buckland, S.T., Anderson, D.R., Burnham, K.P. 1994. *DISTANCE User's Guide V2.1*. Colorado Cooperative Fish & Wildlife Research Unit, Colorado State University, Fort Collins, CO, 84 pp.

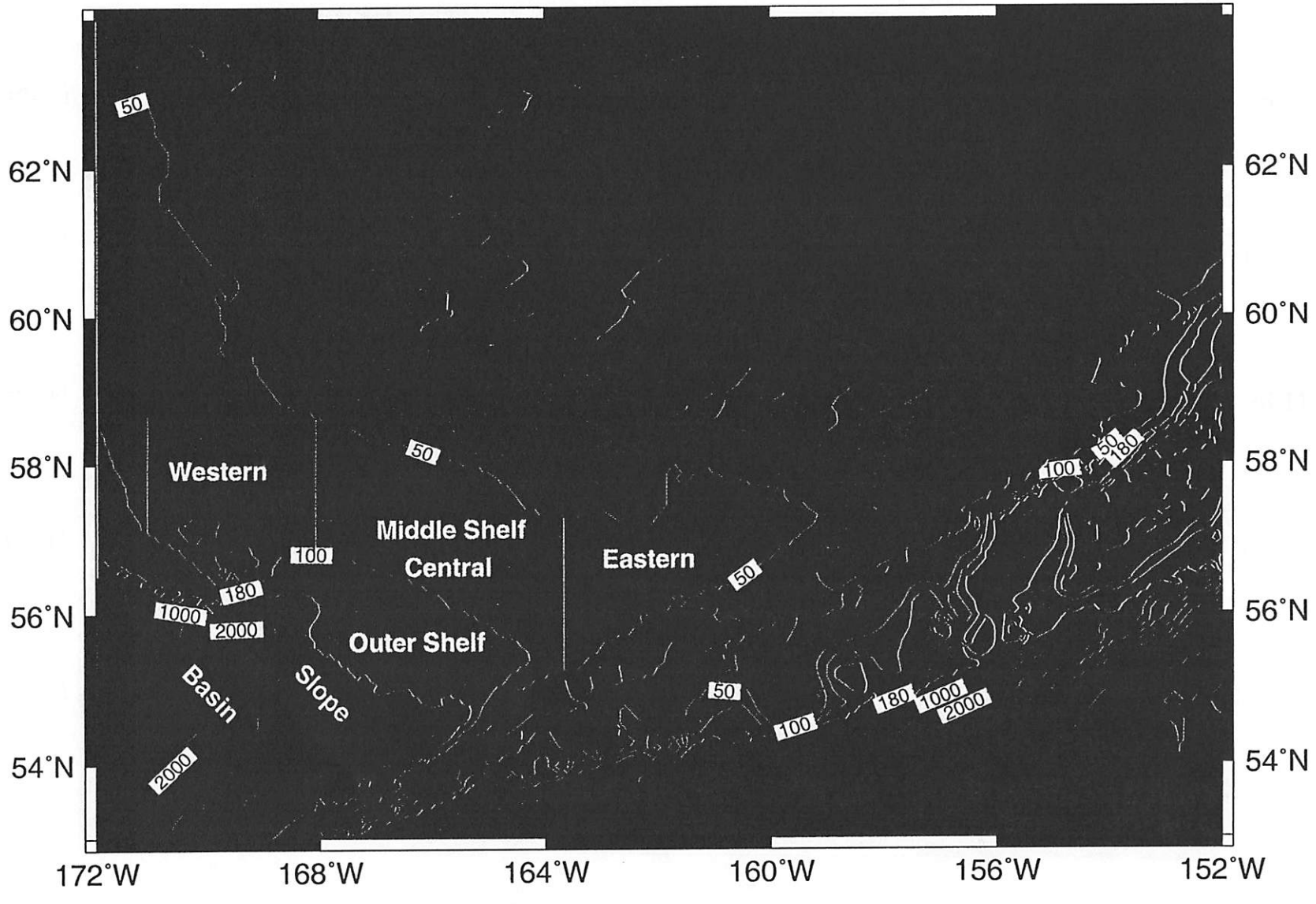


Figure 1. Shelf domains of the Southeast Bering Sea used in cetacean abundance estimation

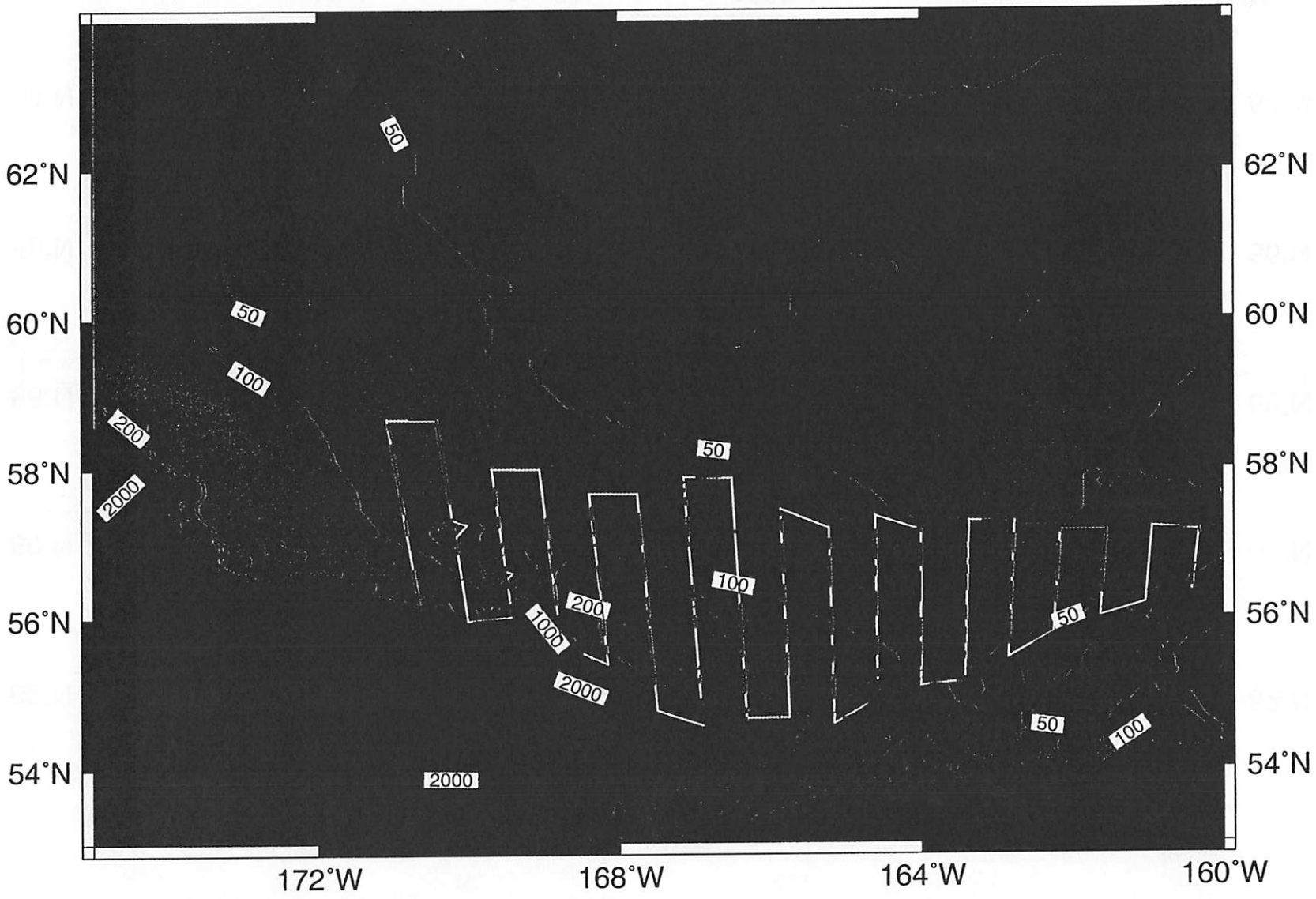


Figure 2a. Cruise track (white) for cetacean surveys in the southeast Bering Sea, July 17 - August 5, 1997; survey effort using 25X power binoculars (black) or hand-held binoculars (red).

Figure 2b. Cruise track (white) for cetacean surveys south of the Aleutians and in the southeast Bering Sea, June 7 - July 2, 1999; survey effort using two pairs 25X power binoculars (black) or hand-held binoculars (red).

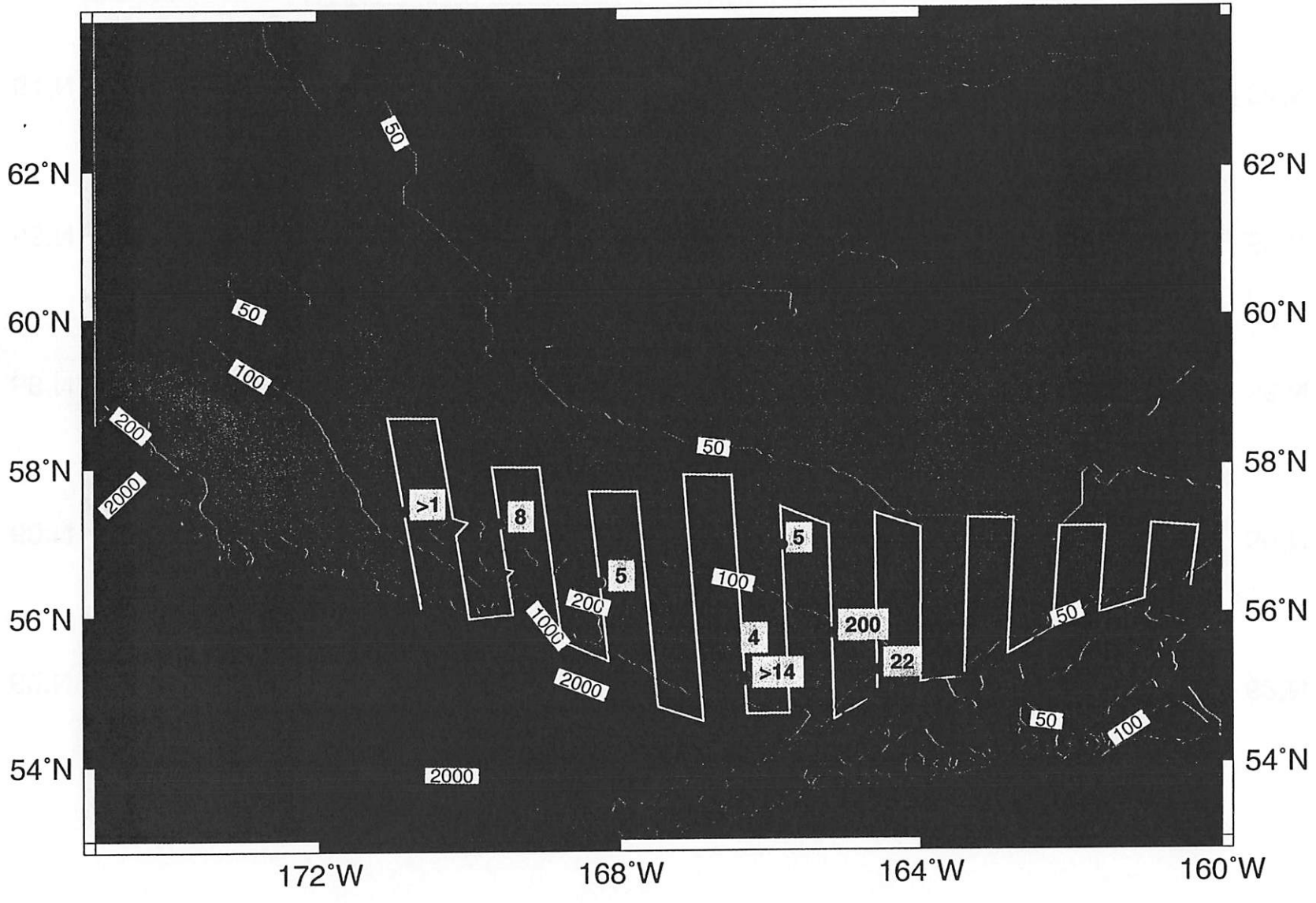


Figure 3. Killer whale sightings in the southeast Bering Sea, July 17 - August 5, 1997

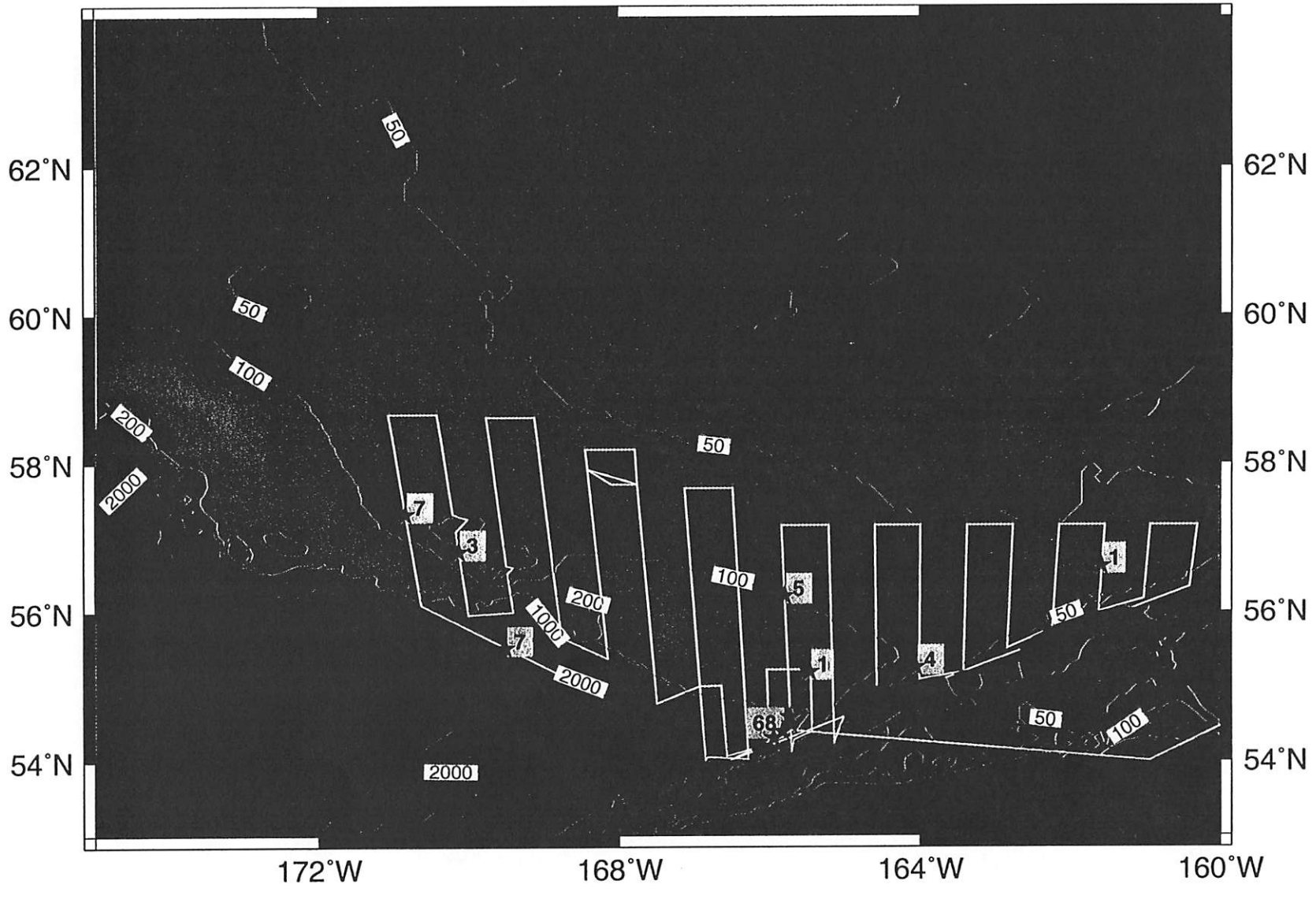


Figure 4. Killer whale sightings in the southeast Bering Sea, June 10 - July 2, 1999

Petitions containing approximately 260 signatures were received in the Council office.

AGENDA C-1
JUNE 2001
Supplemental

Western Gulf of Alaska Fisherman

Tel: (206) 729-8083
e-mail: jcjr3@qwest.net Website: http://www.users.qwest.net/~jcjr3/

April 30, 2001

RECEIVED
MAY - 9 2001
N.P.F.M.C

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

RE: RPA Committee Report

Dear Mr. Benton,

We were startled to find that our area around Sand Point and King Cove have been so severely impacted by new RPA measures for the rest of 2001. Closure for 10 miles around all listed sea lion rookeries and haulouts is a dramatic increase in total closures in this area.
The new closures at Sanak, Mountain Point and Castle Rock are devastating and when combined with the loss of the exemption for trawlers less than 60 feet at Sea Lion Rocks, the whole thing spells disaster for local fleets.

When we look to Kodiak in the East, we see rules that were an attempt to allow some of the traditional fisheries to continue. When we look to the West and the Bering Sea, we see that the rules have been changed back to what they were 10 years ago. Why were we so singled out for punishment?

Our area shows a sea lion population trend line of –1%, which is nearly flat, and yet now all of our traditional fishing areas are now closed. This is incomprehensible. This is a tragedy for us.

We read that the 2001 RPA rules are not to be used as a template for 2002 rules. Please hear us, the 2002 RPA cannot include closures around the new haulouts, and we must have an exemption at Sea Lion Rocks. We must have access to at least some of the historic fishing grounds around our communities, where we have fished forever.

Thank you for listening to us,

Signature	Name	Address
	NORMAN E LARSEN	SAND POINT, AK
	GLEN GARDNER JR	Sand Point, AK.
	Kolette McDonald	Sand Point, AK
	April Withers	Sand Point. AK
	Anne M Morris	Sand Point AK
	Lona Nelson Rice	Sand Point Ak
	Dennis W McGlashan	Sand Point, AK
	Susan Frank	Sand Point, AK
	Peggy S. Kenyon	Sand Point, AK.
	[illegible]	Sand Point, Ak
	Hugh C Miller	Sand Point, AK
	Tiffany Larsen	Sand Point, AK
	Patti Holmberg	Sand Point AK 99661
	Denise Wilds	Sand Point AK 99661
	Jacque Linestrom	SAND POINT AK 99661
	Loritta Strand	Sand Point AK 99661
	Ivy Gardner	SAND POINT, AK 99661
	Kolette McGlashan	Sand Point, AK 99661
	Dennis McGlashan	Sand Point, AK 99661
	Maria Silva	Sand point, AK 99661
	CLARENCE GALOVIN	SAND POINT AK 99661
	ANNETTE GALOVIN	SAND POINT AK 99661

May 16, 2001

NPFMC
605 West 4th, Suite 396
Anchorage, Ak. 99501-2252

RE: comments on SEIS

Dear Mr. Benton, chairman;

I have been a commercial fisherman in Alaska since 1986, drift fishing salmon in Upper Cook Inlet and fishing for halibut, Pacific cod and rockfish using both long line and jig gear in the north GOA, PWS and Cook Inlet. I also represent the Cook Inlet Jig Association.

I am commenting on behalf of the smallest of the small boat fleet, the jig fishermen. Different Gear types have a different take rate and impact on the environment. Jig fishing has the slowest harvest rate and lowest impact of any commercial fishery with basically no negative impact on the environment. Our incidental or by-catch of non-targeted species is nil as reported in the SEIS. Jig gear has no sea bird or sea mammal interaction. The only difference between a sport fishing vessel and a jig vessel as related to the environment is the number of lines and hooks that each may be deploy. **If jig gear is prohibited from fishing with in three miles of sea lion haul outs then subsistence and sport fishing must be prohibited.** The take of Pacific cod using jig gear during the parallel fishery in the Cook Inlet Management area (Cape Fairfield to Cape Douglas) from 1996 thru 1999 as reported by ADF&G Homer Office is 130,037 lbs. total. The PWS area jig gear has a lower Pacific cod harvest than the Cook Inlet area.

In the GOA, fixed gear includes all gear types other than trawl. The BSAI TAC is split into three gear types, trawl, fixed gear and jig (see p. 2.7-148 SEIS). Jig gear should have a gear specific GHL allocation in the GOA. Jig fishing is a developing method in Alaskan waters. Please give us the latitude and opportunity to develop this clean fishery into an economically viable enterprise.

We propose jig vessels be exempt from all sea lion haul outs year around in the GOA including the Prince William Sound and Cook Inlet Areas.

We also propose a federal Pacific cod allocation be set aside for jig gear in the GOA or at least allow us to harvest our state waters gear specific GHL allocation to be taken from either state or federal waters under a parallel season.

Sincerely

Don N. Bunker

Don N. Bunker, Chairman, Cook Inlet Jig Association
P. O. Box 604
Anchor Point, Ak. 99556
ph. 907-235-6935

PETER M. & LINDA C. ENTICKNAP
PO BOX 1086 HAINES, ALASKA 99827
Phone (907) 766-2257 ♦ Fax 766-2455
E-Mail: peter@enticknap.net

April 25, 2001

Federal Fisheries:
Chairman David Benton, North Pacific Fishery Management Council
605 W. 4th Ave, Suite 306
Anchorage, AK 99501-2252

RE: Public Comment on Steller Sea Lion Recovery

When the ecosystem cannot support a top predator like the Stellar Sea Lion, clearly ~~there~~ this is a sign that the system is sick. Protecting the Stellar Sea Lion is important. Managers need to provide a clear schedule for how sea lion research currently being commissioned relates to future sea lion conservation measures. We encourage you to analyze gear-specific differences in fishery impacts on Steller Sea Lion prey

Use weekly delivery limits for vessels fishing in critical habitat as a way to slow down the rate of harvest and make it possible for small boats and fixed gear vessels to participate effectively.

Vessels with substantial cod bycatch (such as trawlers in flatfish fisheries) should be allowed only 5% maximum retainable bycatch (instead of 20%, as currently allowed) when fishing in critical habitat. This will help protect the integrity of the prey by everyone who catches cod. Increased monitoring of fishing through vessel monitoring systems and observers should be increased on all vessels that fish in critical habitat.

In 2002, regulations for fisheries that occur in sensitive habitats should encourage less selective gears to convert to more selective gears with slower rates of extraction (for example, conversion from cod trawling to pots).

Consider findings of and coordinate with the various working groups analyzing the sea lion issue, including the State of Alaska Steller Sea Lion Recovery Team.

Yours,

Cc: C-1

Malcolm Milne

Dear Mr Benton,

I am writing you to express my support for the Zonal Approach as a plan for Stellar Sea Lion conservation. As a member of a coastal community and a commercial fisher I feel it is very important to make allowances for the small boat fleet and differentiate between us and the large scale operations.

Thank You for your attention

Malcolm Milne, Po Box 1846
Homer AK 99603

NOAA GC-AKL C-1 6/01

Some legal guidance from NOAA GC on
questions raised at the last RPA committee meeting

Recovery question

A question arose at the last RPA committee meeting as to how far must an agency go toward insuring that its actions do not appreciably reduce the likelihood of both the survival and recovery of a listed species (i.e. jeopardize) or appreciably diminish the value of critical habitat for both the survival and recovery of a listed species (i.e. destruction or adverse modification).

Federal agencies are required under the ESA to insure that any actions taken by the agency are not likely to jeopardize the continued existence of any listed species of result in the destruction or adverse modification of critical habitat of such species. Therefore, if an action causes jeopardy or adverse modification, the action must be modified so that it no longer causes jeopardy or adverse modification.

Competitive interaction was the basis for both the determination of jeopardy and adverse modification of critical habitat. Therefore, an RPA was designed to remove the adverse effects of the competitive interaction and thereby avoid jeopardy and adverse modification. According to data from 1991-2000, the western population of Steller sea lions is experiencing a rate of decline between 4-5% per year. Between 1998-2000, the estimated decline was 13%. The BiOp concluded that although the western population of Steller sea lions has declined for the past 20 years due to a combination of environmental and fisheries-related factors, the fishery contribution was likely a significant factor in understanding the current decline. Given the uncertainty as to the exact effects and the amount of the decline caused by competitive interaction, as well as the requirement that agencies insure that their actions will not jeopardize a listed species or adversely modify its critical habitat, the agency designed an RPA that, in the best case, would remove the adverse effects of fishing such that population trends for Steller sea lions would be stable or increasing in abundance at a rate of 0.5% - 2% per year and, in the worst case, would affect the underlying growth rate of the entire western population of Steller sea lions such that over the next 8 years, Steller sea lions would experience an annual decline of 0.7%.

We are at a disadvantage in determining what precise fishery actions/effects impede the survival and recovery of Steller sea lions because there are gaps in our scientific understanding and information and because we have not yet determined at what level the western population of Steller sea lions will be deemed recovered. However, NMFS must be able to insure that the fisheries avoid jeopardy and adverse modification and therefore, the RPA committee has to design an RPA that removes any jeopardizing or adversely modifying effects from fishery interactions with Steller sea lions such that the resulting fishery avoids jeopardy and adverse modification. Given the underlying uncertainty with the precise point at which the fisheries no longer jeopardize Steller sea lions or adversely modify its critical habitat, if the RPA committee only aims for stability of the population trend for the western population of Steller sea lions as the best case scenario under its proposal for a modified fishery, and does not acknowledge or

account for any reasonable probabilities that the modified fishery could still contribute to a continuing population decline or diminishing prey field within critical habitat, NMFS may not be able to insure that the modified fishery avoids jeopardy and adverse modification.

Limited access issues with pre-registration, exclusive registration, and super exclusive registration requirements

A question arose at the last RPA committee meeting as to whether pre-registration, exclusive registration, or super exclusive registration requirements would be limited access-type measures. Using the most basic definitions of these terms, pre-registration is a management measure that would allow any person currently authorized to fish in a particular area the continued ability to fish in that area as long as the person registered with NMFS by the established deadline; exclusive or super exclusive registration is a management measure that would require a person to choose which area or areas he or she will fish in to the exclusion of his or her ability to fish in another area or areas. Using the definition of pre-registration above, pre-registration would not create a limited access system in that no constraints would be placed on the ability of a permit holder to use his or her permit to the fullest extent authorized. However, exclusive or super exclusive registration systems, which make fishermen choose among the areas in which they are currently authorized to fish, may be a limited access measure in that a fisherman may be required to make a choice that may affect their ability to use their permit to its fullest extent. Therefore, it would be prudent for the committee and Council to consider the criteria for limited access systems set forth in section 303(b)(6) of the Magnuson-Stevens Act in addition to the other statutory criteria in developing such a proposal and preparing the analysis of such a proposal. Even if the measure is not limited access in the long run, the committee will diffuse the ability for someone to challenge the lack of consideration of the 303(b)(6) criteria. Consideration of these criteria also will likely assist the committee and the Council in making a more informed and fully considered proposal and ultimately a better record for the action.

Reporting Co-ops

The concept of reporting co-ops was raised at the last RPA committee meeting. Although the concept is not yet fully developed, it would appear that reporting co-ops do not trigger IFQ or limited access issues. The Magnuson-Stevens Act defines IFQs as "a Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person." As I understand the concept, a reporting co-op would not allocate a percentage of fish or limit access to a particular fishery in and of itself, but would be a more extensive or perhaps different system of reporting requirements than that which exists for other fisheries. While implementation issues concerning effective monitoring and enforcement may be presented by a reporting co-op, it does not appear to raise IFQ or limited access issues.

Larry Cotter
C-1
6/01

Reasonable and Prudent Alternative (RPA) Committee

Report to the
North Pacific Fishery Management Council
June 2001

Larry Cotter, chair
Dave Witherell & Cathy Coon, staff

RPA Committee Members

- Larry Cotter (chair)
- Dave Benson
- Shane Capron
- Doug DeMaster
- John Guavin
- Terry Leitzell
- Alan Parks
- Beth Stewart
- Jack Tagart
- Sue Hills
- Wayne Donaldson
- John Winther
- Bob Small
- Fred Robison
- Gearald Leape
- Jerry Bongen
- John Iani
- Matt Moir
- Dave Cline
- Steve Drage
- Tony DeGange

Background

- In February, the Council tasks the Committee to:
  - To make recommendations on open/closed areas 2001.
  - To develop RPA alternative and experimental design for 2002 amendment package for June meeting.

Goals and Objectives

- Goal: Develop an EIS RPA alternative for 2002 and beyond that meets the mandates of the ESA, MSFCMA, and other applicable laws, while conserving marine biodiversity and sustaining viability of the diverse fishing communities dependent upon the Alaska fishery resources.
- Objectives:
  - Remove jeopardy and adverse modification.
  - Develop a sound experimental design for monitoring.
  - Minimize social and economic impacts.
  - Minimize bycatch of PSC and other groundfish.
  - Promote safety at sea.

Criteria for Meeting ESA Standards

- **Guidelines used by the committee to meet ESA standards were:**
  - **expected trend of SSL (a jeopardy guideline)**
    - **should meet or exceed the BiOp RPA projected lower population trend of -0.7%**
  - **the ratio of forage to prey consumed (adverse modification guideline)**
    - **fish should be harvested relative to biomass to avoid localized depletion**

Additional Analyses for Committee

- Satellite Telemetry Data
  - a white paper is being drafted that describes satellite tags function, data analysis and results to date
- Catch Data
  - by ADF&G statistical area, SSL buffers zone, FMP area, target species, vessel size category, and gear type.
- Monitoring and Enforcement issues
  - NMFS discussion paper on feasibility
- Experimental Design
  - a subcommittee has recommended focused small scale experiments (e.g. the Chiniak Gully experiment)

Summary of Proposals

- Cotter's Strawman
- Industry proposal
- Combined Industry / AMCC proposal
- Leape / Cline proposal
  - All of these proposals are attached in the minutes

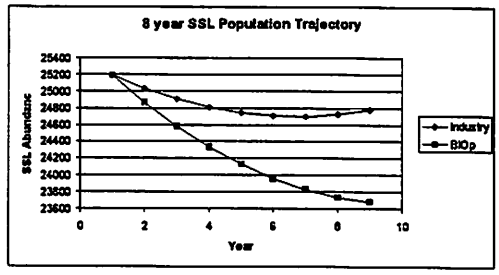
Proposal Population Trend Calculations

Proposal	Lower SSL trend
BiOp (comparison)	-.77%
Strawman	-.02%
Industry	-.41%
Industry/AMCC	-.21%
Leape/Cline	+0.70

Population 'bump' by area

Area	Biop	Strawman	RPA Committee	Industry/AMCC	Leape/Cline
1	0	0.03	0.03	0.0325	0.0375
2	0.04	0.03	0.02	0.0325	0.0375
3	0	0.03	0.02	0.0325	0.0375
4	0.04	0.03	0.04	0.0325	0.0375
5	0	0.03	0.03	0.0325	0.0375
6	0.04	0.03	0.0275	0.0325	0.0375
7	0	0.03	0.015	0.015	0.0375
8	0.04	0.03	0.015	0.015	0.0375
9	0.04	0.04	0.04	0.04	0.0375
10	0.04	0.03	0.0325	0.0325	0.0375
11	0.04	0.03	0.0325	0.0325	0.0375
12	0	0.03	0.025	0.025	0.0375
13	0.04	0.03	0.0275	0.0275	0.0375
Net trend	-0.77%	-0.02%	-0.41%	-0.21%	0.70%

Projected Population Trajectory



RPA Committee Proposal

- The committee voted to send the final industry proposal forward as the committee's recommended alternative.
  - (16 in favor, 3 objections, 1 undecided)
  - Minority report (Leape/Cline) attached under May 21-24 minutes

RPA Committee Proposal (Aleutians)

- Atka Mackerel:

Temporal Measures: A& B Seasons (January 20 and September 1).
Season TAC allocations: 50/50 per A&B seasons
Measures to reduce catch rates on localized basis: Platoon management in areas 542 and 543.
Area Restrictions: No CH fishing in Sequam foraging area and Area 518
No CH fishing for mackerel east of 178° W longitude
Rookeries west of 178° W longitude closed out to 10 nm except 15 miles at Buldir
Haulouts: closed 0-3nm.
CH Apportionment: 70% inside and 30% outside.

RPA Committee Proposal (Aleutians)

• Pacific Cod:

Seasons:

trawl:	January 20 - June 10 (80%), June 11-October 31 (20%)
longline, jig:	January 1 - June 10 (60%), June 11-Dec. 31(40%)
pot:	January 1 - June 10 (60%), September 1-Dec. 31(40%)
pot CDQ:	January 1 - December 31

Note: the harvest of cod by the <60' pot vessels should account towards the 1.4% quota when the 18.3% season is closed.

RPA Committee Proposal (Aleutians)

• Pacific Cod (cont.):

Area Restrictions:

Longline and Pot: no CH fishing E of 173° W to Western boundary of Area 9, Buldir closed inside 10 nm, Agligadak closed to 20 nm.

Trawl: E of 178°W: rookeries closed at 10 nm except 20 nm Agligadak, haulouts open from 3 nm and out; west of 178° W: no fishing within 10 miles at haulouts and rookeries until mackerel fishery inside CH A or B season, respectively, is completed, at which time trawling for cod can occur outside 3 nm outside of haulouts and 10 nm of rookeries.

Sequam foraging area closed to all gear type.

RPA Committee Proposal (Aleutians)

• Pollock

One season with January 20 opening

No fishing for pollock in CH (0-20nm)

Other applicable allocation splits (AFA)

RPA Committee Proposal (Bering Sea)

Area Closures:

- Area 9 (Bogoslof) and Sequam would be closed to pollock, cod, mackerel fishing.
- Establish a 10 nm 'Leitzell line' for the pollock A season
- 0-3nm of all rookeries would be closed to all groundfish fishing.
- 0-3nm of major haulouts would be closed to all groundfish fishing except jig gear.
- 3-10nm of rookeries and major haulouts would be closed to pollock, cod, and mackerel fishing except with jig, longline, and pot gear. All trawling for pollock, cod, and mackerel within 0-10nm of all rookeries and major haulouts would be prohibited.
- Close CVOA to trawl c/p's fishing for pollock (June 10-Dec 31) as per current regulations
- 0-20nm closure of the 5 northern haulouts to all groundfishing
- The Pribilof haulouts would be closed to only 3nm
- No fishing with longline and pot gear inside of 7nm of Amak rookery

RPA Committee Proposal (Bering Sea)

Seasons:

Pollock:		January 20-June 10 (40%), June 11-October 31 (60%)
Cod:		
	trawl:	January 20-June 10 (80%), June 11 - October 31 (20%)
	longline, jig:	January 1 - June 10 (60%), June 11 - December 31 (40%)
	pot:	January 1 - June 10 (60%), September 1 - December 31 (40%)
	pot CDQ	January 1 - December 31

Note: the harvest of cod by the <60' pot vessels should account towards the 1.4% quota when the 18.3% season is closed.

Critical Habitat Catch Limits:

A-season limit of SCA pollock fishing: no more than 30% of the annual pollock TAC can be harvested in the SCA prior to April 1 each year. The remaining 10% of the annual TAC may be harvested outside of the SCA before April 1 or inside SCA after April 1. If the 30% was not taken in the SCA prior to April 1, the remainder can be rolled over to be taken inside after April 1.

RPA Committee Proposal (GOA)

Area Closures:

Establish closure areas as follows (jig not subject to any closures).

Area 1 (PWS): Closed to cod and pollock trawling out to 20 nm, except for Middleton Island where trawling would not be allowed inside 10nm.

Area 2 (Kenai): Closed to cod and pollock trawling out to 10 nm around haulouts. The Pye Island and Sugarloaf rookeries are closed out to 20 nm for trawling and 10 nm for fixed gear. For Marmot Island - in the fist half of the year the trawl fishery is open from 15nm, which extends to 20 nm in the second half of the year. The Marmot closure for fixed gear is 10 nm year round.

Area 3 (Kodiak): Cape Barnabus and Cape Ikolik are open to all cod and pollock gear from 3nm out. Gull Point and Ugak Island are open to trawl (outside 3nm) in C+D season pollock and B season trawl cod.

RPA Committee Proposal (GOA)

Area Closures (cont.):

Area 4 (Chignik): Closed to pollock, cod, and mackerel fishing out to 20 nm (all gears except jig)

Area 10,11 (S of Unalaska): Closed to pollock, cod, and mackerel fishing with trawls or pots out to 20 nm (all gears except jig). Longlining closed out to 10nm.

Area 5 (Sand Point): Closed to trawling out to 20nm, except for Mitrofania/Spitz where trawling, longlining, and pot fishing are allowed from 3nm out.

Area 6 (King Cove): Closed to trawling out to 10 nm except that trawling, longlining, and pot fishing are allowed from 3nm at the Whaleback, Sea Lion Rocks, Mountain Point, Caton, Castle Rock, the Pinnacles.

RPA Committee Proposal (GOA)

Seasons and apportionments:

Cod:

A-season = 60% of TAC; January 1 fixed gear, January 20 trawl
B-season = 40% of TAC: September 1 all gear types

Pollock:

A-season = January 20 - February 25 (25%)
B-season = March 10 - May 31 (25%)
C-season = September 1 - September 15 (25%)
D-season = October 1 - November 1 (25%)

Rollovers of TAC: rollovers from one quarter to the next are OK, provided that no rollover is more than 30%

Additional Recommendations

- The committee strongly urges NMFS to appoint the new SSL recovery team as expeditiously as possible, and write an updated recovery plan that includes de-listing criteria.
- The committee recommends that NMFS move forward with a process to re-evaluate critical habitat designation, in view of existing and new scientific information, as soon as possible. (Leape objection)

Additional Recommendations (cont.)

- The committee recommends that all vessels fishing for pollock, cod, and Atka mackerel in the GOA and BSAI be required to carry and utilize a VMS or an acceptable alternative while fishing. (The committee recognizes that a phase-in period may be necessary).
  - ✓ Jig exemption
  - ✓ NMFS to investigate potential funding sources for industry to comply.
- The committee is interested in having more research be conducted on fish stock surveys and assessments.

Additional recommendations (cont.)

- The committee recognizes that the ability for vessels and fleets to better manage activities under SSL RPAs is enhanced through use of co-ops and other similar rationalization programs, and recommends the Council encourage the development and use of approaches to rationalization (Parks objection).
- Urges NMFS and the Council to retain a SSL research coordinator to ensure the projects be well coordinated to avoid redundancy and to ensure that the information generated by brought forward expeditiously as possible. Funding caveats in research contracts to expedite data release.

Additional recommendations (cont.)

- The committee has concerns with the BiOp RPA global control rule. The committee recommends that the Council consider an alternative rule proposed by NMFS staff.
  - ✓ Essentially, the alternative rule would add to the existing harvest strategy by prohibiting fishing when biomass fell below 20% of pristine levels for a given stock. (Leape objection)

Additional recommendations (cont.)

- Further refine and develop a formula that could be used to determine sea lion forage needs relative to total available biomass in the different regions. When complete this formula could be used as one method of determining the allowable harvest of prey species in different regions while ensuring that SSL forage needs are addressed.

Additional recommendations (cont.)

- A more formalized system to grade the impacts of respective proposals on SSL needs to be established. This grading system should clearly articulate the various values used to determine impacts of proposed RPA measures on SSL so that a logical, consistent, and rational RPA evaluation approach is defined. The committee expects this evaluation criteria to be developed as part of the revised biological opinion.

Summary

- The committee has recommended an alternative that appears to avoid jeopardy and adverse modification.
- The committee has additional recommendations regarding the sea lion recovery team, CH designation, vessel monitoring, rationalization programs, the SEIS analysis, and synthesizing research findings.
- Final note: the committee plans to meet again to provide additional guidance to the Council.

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C-1
6/01

Steller Sea Lion 2002 RPA
Comments to the NPFMC - June 4, 2001

I. Recommendation for Zonal Approach

Include AMCC's RPA proposal entitled ***"Zonal Approach for the Gulf Cod Fishery"*** in the suite of alternatives to be analyzed for the 2002 RPA. We believe the analysis should include a range of alternatives especially for fisheries that are prosecuted by very diverse fleets from many coastal communities such as Gulf cod. The Zonal Approach provides the Council with some variations to consider when making a final decision next fall.

The Zonal Approach proposal (attached) provides a reasonable away to achieve sea lion conservation through modified fishing opportunities for coastal community fleets using lower impact fishing gears and practices.

We limited trawl gear to the zone beyond 20 nm because of information from NMFS that trawling has the most impact on the prey field. NMFS states:

> *The possible effects of these other gear types are dwarfed by the magnitude of biomass removals by the trawl sector.* (Biop, November 30, 2000, p. 257)

> *In terms of effects on ESA 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.* (Biop, Nov. 30, 2000, p. 215)

> *Trawling may disadvantage sea lions not only by removing their potential prey within their foraging areas, but also disrupting the normal schooling behavior of the prey species.* (Biop, Nov. 30, 2000, p. 187)

II. RPA Committee Proposal

We believe the RPA Committee recommendation relies heavily on a misinterpretation of the data that assumes 0-10 miles is more important than the rest of critical habitat.

A. Concerns About Use of the Telemetry Data

The RPA committee recommendation places a great deal of emphasis on the telemetry data. It is important to acknowledge limitations of the data and what it tells us about foraging behavior. There are some important caveats associated with what conclusions can be drawn from the data.

Regarding SDR units:

To achieve an at-sea hit, the animal has to 1) rise far enough out of the water to expose the transmitter located on the back of the animal or 2) be resting at the surface with the transmitter exposed and dry. Most of the time that sea lions are foraging offshore, they will not be at the surface with the transmitter dry at the same time that the satellite passes overhead. The scientists conclude that many fewer hits occur offshore compared to the time sea lions actually spend offshore.

Regarding foraging behavior:

> *Steller sea lion foraging patterns can be divided into at least two categories 1) foraging that occurs around rookeries and haulouts and that is crucial for adult females, pups, and juveniles, and 2) foraging that may occur over much lager area where these and other animals may range to find the optimal foraging once they are no longer tied to rookeries and haulouts for reproductive or survival purpose* (NMFS, RFRPA, October 1999, p. 25).

Sea lion biologists noted these caveats regarding the accuracy of assumptions made about Steller sea lion activity:

> *There are several important caveats to consider with these telemetry location data: (1) due to a larger proportion of time spent at the surface nearshore, the probability of obtaining at-sea locations near haulouts and rookeries is likely higher than when further offshore when sea lions are diving to depth in deeper waters; (2) at-sea locations do not directly indicate where sea lions are foraging; (3) the large majority of pups, and perhaps most juveniles, were likely still nursing and thus not foraging independently for prey; and (4) telemetry data are lacking for subadults and females without pups.* (RPA Committee meeting minutes of March26-29)

What conclusions can we draw from the telemetry data?

The large number of satellite hits between 0 to 10nm and the low number of hits beyond 10nm does not necessarily mean that 0 to 10nm is the primary Steller sea

lion foraging area. Sea lion biologists noted at the May RPA Committee meeting that one cannot conclude the area beyond 10nm is less important to Steller sea lion foraging needs. Indeed there is reason to give the 10-20 nm areas equal weight when designing conservation measures.

B. Global Control Rule

The RPA Committee recommendation weakens the global control rule. AMCC believes this is a basic precautionary measure to build into the RPA. The GCR is there to prevent fisheries from driving a stock below half of the level needed to produce MSY. AMCC recognizes environmental conditions as a major factor in the natural ebb and flow of marine populations. The GCR is to reduce the degree to which fisheries exacerbate the effect of natural conditions especially on declining stocks of importance to an endangered species. The GCR is both reasonable and prudent especially in the context of endangered species recovery.

C. Conclusion

AMCC cannot support the RPA Committee recommendation because of 1) its strong emphasis on the 0-10 nm telemetry data as the rationale for scaling back on critical habitat protection and 2) the weakening of the global control rule.

Proposal for the Pacific Cod Fishery in the Gulf of Alaska:
A Zonal Approach for the 2002 RPA
May 9, 2001

Name of Proposer: Alaska Marine Conservation Council

Statement of proposal: The goal of the Zonal Approach for Gulf of Alaska Pacific cod is to achieve Steller sea lion conservation through modified fishing opportunities for coastal community fleets using lower impact fishing gears and practices. The Zonal Approach minimizes competition for cod between fisheries and Steller sea lions by dispersing the fishery over area and time and thus protecting the integrity of the Steller sea lion prey field (food available for sea lions).

The Zonal Approach is based on the following elements:

- Coast wide zones from 0 to 20 nm as an approximation of critical habitat designed to be enforceable by NMFS and easy for the fleet to comply with.
- Reduction of large-scale removals of cod by allowing fishing with pot, jig and longline gears within 20 nm from shore. This will enable coastal community fleets to fish in a modified way that does not disrupt Steller sea lion critical habitat.
- Opportunity for vessels using trawl gear to convert to pots in order to fish inside 20 nm from shore.
- Incorporation of measures to reduce bycatch of species that have been determined important food for Steller sea lions.
- Safeguards against overfishing through application and strengthening of the global control rule.

Jeopardy and Adverse Modification
Based on the stipulations laid out in the Biological Opinion (November 30, 2000), dispersing the cod fishery over area and time and using gear types and fishing practices at appropriate levels will prevent jeopardy and adverse modification of Steller sea lion critical habitat.

Social and Economic Impacts
The Zonal Approach enables the coastal community fleets the opportunity to fish in a modified way at appropriate levels. In addition, the Zonal Approach attempts to minimize negative impacts on the trawl sector by providing the opportunity for gear conversion from trawls to pots.

Minimizing Bycatch of PSC
Gear conversion from trawl to pots will reduce halibut bycatch. A summer season for cod using pots and jigs will achieve temporal dispersion without creating more bycatch.

Adaptation to a sound experimental design for monitoring
An experimental design can be overlaid on this cod management program. AMCC recommends selecting discrete areas where a scientific hypothesis can be tested to derive statistically useful results.

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Proposal for the Pacific Cod Fishery in the Gulf of Alaska:

A Zonal Approach for the 2002 RPA

The goal of the Zonal Approach is to achieve Steller sea lion conservation through modified fishing opportunities for coastal community fleets using lower impact fishing gears and practices. Because food stress is the National Marine Fisheries Service's prevailing hypothesis for why Steller sea lions are failing to recover, the Zonal Approach attempts to minimize vessel-sea lion competition for cod by dispersing the fishery temporally and spatially. The Zonal Approach is based on the following elements:

- Coast wide zones from 0 to 20 nm as an approximation of critical habitat designed to be enforceable by NMFS and easy for the fleet to comply with.
- Reduction of large-scale removals of cod by allowing fishing with pot, jig and longline gears within 20 nm from shore. This will enable coastal community fleets to fish in a modified way that does not disrupt Steller sea lion critical habitat.
- Opportunity for vessels using trawl gear to convert to pots in order to fish inside 20 nm from shore.
- Incorporation of measures to reduce bycatch of species that have been determined important food for Steller sea lions.
- Safeguards against overfishing through application and strengthening of the global control rule.

Spatial Dispersion

The intent of the spatial dispersion element is to slow the rate of removals of Pacific cod from within the 20 nm zone.

> *The fisheries effects that give rise to these determinations include both large scale removals of Steller sea lion forage over time, and reduced availability of prey on the fishing grounds at scales of importance to individual foraging Steller sea lions, particularly in critical habitat.* (Nov 30 BiOp page 271).

We propose coast wide zones from 0 to 20 nm as an approximation of critical habitat designed to be enforceable by NMFS and easy for the fleet to comply with. Fixed gear types are permitted inside 20 nm and trawl gear is permitted outside 20 nm based on findings in the Biological Opinion.

> *The possible effects of these other gear types are dwarfed by the magnitude of biomass removals by the trawl sector.* (Nov. 30 BiOp page 217).

Table 1: Recommended Management Action for Gulf of Alaska Pacific Cod Fisheries qSpatial Dispersion				
Zone	**1**	**2**	**3**	**4**
Area of Zone	0 nm from shore and beyond	3 nm from shore and beyond	12 nm (Territorial Sea Boundary) from shore and beyond	20 nm from shore and beyond
Vessels eligible to fish within zone	Vessels with a maximum of 60 pots or 5 jig machines, as per State rules	Vessels with a maximum of 60 pots or 5 jig machines plus all longliners <60 ft. LOA	Zone 2 and 3 vessels, plus vessels using pot and jig gear with no gear restrictions plus longliners >60 ft. LOA	Zone 1, 2 and 3 vessels, plus vessels using trawl gear
Intent of Action	The intent of Zone 1 is not to preempt State rules.	The intent of the 60-pot limit in Zone 1 and 2 is to have no more than 60 pots per vessel at one time.		

Temporal Dispersion

The intent of temporal dispersion is to reduce the likelihood of localized depletion occurring in critical habitat according to requirements contained in the Nov. 30 BiOp (page 274, 9.2.3 Temporal Apportionment of TACs).

> *"Establishing summer and winter seasons for all these species would be important to preventing localized depletion"* (Nov.30 BiOp, p. 260)

AMCC proposes that vessels fishing with fixed gear open on the first day of each quarter, and vessels fishing with trawl gear start on the 20th day of each quarter except the C season. This mirrors the current regulatory framework for fixed/trawl gear starting dates.

Table 2: Recommended Management Action to Temporally Disperse the GOA Pacific Cod Fishery

Season	% TAC	Fixed Gear Start/End Dates	Trawl Gear Start/End Dates
A	25%	Jan 1/March 31	Jan 20/March 31
B	25%	April 1/June 30	April 20/June 30
C	25%	July 1/Sept 30 (pots & jigs only)*	N/A*
D	25%	Oct 1/Dec 31	Oct 20/Oct 31

*** Note: We recognize that the summer season will have increased bycatch in some gear types. Our goal is to maximize dispersion of the cod fishery by allowing opportunity for those gears without bycatch problems to fish cod in the summer. TAC not taken in the summer season could be rolled over to the D season.**

Global Control Rule

The global control rule should apply to the cod fishery to safeguard against overfishing. We recommend that NMFS consider strengthening the formula to require conservation action sooner than the BiOp measure.

Other Provisions for the Zonal Approach

AMCC recognizes that the Zonal Approach has consequences for the fleets and conservation considerations. The following are recommended management actions intended to build in flexibility for the various cod fleets, address bycatch issues, and meet requirements in the Biological Opinion.

1. Enable Gear Conversion from Trawls to Pots

Intent:

- Enable LLP qualified cod trawl vessels to convert to pots so they are eligible to fish for cod within 20 nm.

Action:

- Issue LLP pot cod endorsements to LLP qualified cod trawl vessels.
- Vessels are not allowed to target Pacific cod with trawl gear and pot gear under this provision in the same quarter.

Rationale:

- Conversion from trawls to pots should slow down harvest rates and make it possible to allow those vessels to operate inside 20 nm.

2. Prohibit Retention of Octopus in the Pacific Cod Fishery

NMFS data shows that octopus is important prey for Steller sea lions. With the possibility of the cod trawl sector converting to pot gear and fishing throughout the year, octopus bycatch is likely to increase.

Intent:

- Address the potential increase in octopus bycatch in the cod fishery.
- Encourage live discard of octopus.
- Prevent a bycatch fishery for octopus from developing.

Action:

- Prohibit retention of octopus in the cod fishery.

Rationale:

- Action applies to entire cod fishery because of the enforcement difficulties outlined in the NMFS Draft Discussion Paper.

3. Roll Over of TAC Across Seasons

Intent:

- To maintain temporal dispersion while allowing a level of flexibility for the fleets if TAC is not completely caught in a quarter.

Action:

- In 2002, allow unfished TAC, at a maximum of one quarterly seasonal amount, to be rolled over to the next quarterly season within that year as a phase-in measure for a limited roll over of TAC starting in 2003.
- Starting in 2003, allow a maximum 1/5 of a quarterly season's TAC to be rolled over to the next quarterly season within that year. A higher percentage rollover may be appropriate from the C season to the D season.

Rationale:

- Temporal dispersion is maintained by allowing a maximum percentage of any quarterly seasonal TAC to be rolled over to the next quarter.

4. Seasonal Apportionment of Halibut PSC

Intent:

- Prevent the yearly PSC for halibut from being taken all in one quarter.

Action:

- Split the yearly PSC by season according to seasonal apportionment of TAC. Consideration should be given to those seasons in which gear types with the highest use of halibut bycatch participate. (Since the C season would be open only to pots and jigs, a corresponding apportionment of the PSC cap would be made to that season.)

Rationale:

- The yearly PSC of halibut allocated to longline gear for 2001 was mostly caught in the cod " A" season, effectively closing the cod longline fishery in the "B" season. By splitting the PSC cap among quarters, the opportunity for vessels using longline gear to fish later in the year is increased.

5. Reduce the Maximum Retainable Bycatch of Pacific Cod

Intent:

- Prevent a "ballast" fishery for cod from occurring within 20 nm from shore.

Action:

- Reduce the MRB for cod from 20% to 5% within 20 nm from shore.

Rationale:

- The 20% MRB for cod is an economic incentive for a ballast fishery. Bycatch of cod should be minimized inside 20 nm to help control the total removals of cod from the prey field.

NOTE: The intent is to lower the MRB to an appropriate level such that more at-sea discards are not created. Therefore, the recommended 5% MRB may need to be adjusted by the agency to reflect a true 'intrinsic' bycatch rate. However, if the intrinsic bycatch rate or volume were high enough to disrupt the Steller sea lion prey field, further action would be needed.

6. Improve Data Collection and Enforcement

Observer Coverage

Action:

- Increase observer coverage, especially on vessels with high extraction rates, to monitor catch effectively both inside the 20 nm zone and beyond. NMFS should prioritize where increased observer coverage should be placed to maximize benefit and utility of greater data collection.
- A funding mechanism using Steller sea lion moneys should be used to increase observer coverage equitably.

VMS

Action:

Install VMS on those vessels deemed necessary by NMFS as a tool to improve fishery data and enforce new fishery regulations.

- The cost of implementing VMS for Steller sea lion protection measures should be funded by NMFS (as the agency has done in certain other fisheries).

Rationale:

- NMFS has stated, *"VMS combined with observer data improves NMFS's ability to determine where catch was made"* (NMFS Draft Discussion Paper, Revised May 4, 2001, page 7).

7. Weekly Delivery Limits

Because the Zonal Approach spreads the cod fishery over time and area through gear restrictions, fishing zones and seasonal splits, weekly delivery limits may not be necessary to prevent large scale removals and localized depletion. However, analysis of the full RPA package should be conducted before excluding this element since the possibility exists for fishing to exceed acceptable rates inside 20 nm. Delivery limits may be needed as a tool to further slow down the fishery.

JOHN GAUVIN
C-1 6/8/01

DRAFT / /01

2002 RPA Alternative Proposal to RPA Committee

Name of Proposer: Groundfish Forum

Brief statement of proposal: Proposed modifications to the conduct of the Atka mackerel fishery will further reduce the potential for competition with sea lion foraging. By separating the fleet into two teams that fish Central and Western Aleutians at different times, daily fishing rates on a local basis are reduced to approximately one-half of daily rates in 2001 A season. This proposal retains some measures included in the 1998 Council recommended amendments to the mackerel fishery and the NMFS November 30th 2000 Biological Opinion. Our proposal also uses the same area open and closed areas that were established for measures for the second half of 2001.

Retained from the 1998 Council modifications are:

1) A and B seasons with 50% of annual TAC for each;
2) Start dates of January 20th and September 1st for A and B seasons;
3) End date for B season of November 1st;
4) VMS requirement for vessels fishing Aleutians Atka mackerel.

Retained from November 30th, 2000 RPAs is:

1) Implementation of global control rule if stock falls below threshold biomass.

Retained from second half of 2001 ER measures is:

1) Closed areas for mackerel encompassing significant portions of sea lion critical habitat where mackerel are found in the Aleutian Islands, GOA, and RPA area 9 (see Note 1 below).

New measures:

1) 70% of the AI mackerel annual TAC to be harvested in CH in order to make fishery removals more proportional to the area and depth distribution of the mackerel population and thus better protect the mackerel stock while reducing rockfish bycatch, which occurs at a higher rate in the deeper waters outside of CH. The proposed 70%/30% inside/outside catch distribution is based on the proportion of area within and outside CH in the Aleutians with depths suitable for the Atka mackerel (see NMFS November 30, 2000 Biological Opinion). The 70%/30% inside/outside apportionment should be revised in the future if survey data or other relevant scientific information become available to more accurately estimate the distribution of the mackerel population. Revisions should also be made in the event that critical habitat is redefined such that the 70%/30% inside/outside split is no longer pertinent.

2) It reduces daily catch rates of mackerel within critical habitat in each statistical sub-area to zero in the Eastern Aleutians and approximately one-half of current catch rates per day in the Central and Western Aleutians. This will address the major issue originally identified by NMFS in 1998 associated with the mackerel fishery wherein a subset of fishing areas showed some evidence of reduced mackerel abundance as measured by CPUE changes in the respective areas. The goal of this part of our proposal is to further reduce potential for localized depletion and foraging competition. Reduction in daily catch rates in each Aleutian Islands statistical sub-area will be accomplished by a random division of the vessels registering with NMFS to fish scheduled A or B seasons in Central and Western Aleutians into two teams and regulations separating the critical habitat mackerel fishing in the Central and Western AI sub-areas for those teams. Our analysis shows that this will reduce the daily harvest rate of mackerel within the Central and Western Aleutians from approximately 1,000 MT per day to about 500 MT per day. See Note 2 below for details on how the division of the mackerel fleet will be accomplished.

Note 1: Areas where mackerel are found in "targetable" concentrations that would be closed to mackerel fishing under this proposal are as follows: Gulf of Alaska (all areas); Bering Sea (area 518 or RPA Area 9 (Bogoslof); CH in Aleutians east of 178 degrees West Longitude including the foraging area and Agligidak rookery (site #53 from Table 21); areas closed to mackerel fishing within CH west of 178 degrees longitude as per second half of the year ER in 2001. These closed areas include 10 mile no trawl zones (Table 21 sites: #11, 12, 14, 17, 20 ,24, 27, 28, 30, 31, 34, 36 and 38) and haulouts closures at three miles and no transit zones at 3 miles (Table 21 sites #13, 15, 16, 19, 21, 22, 23, 25, 26, 29, 32, 33, 35 and 37).

Note 2: The division of fishing effort will be accomplished as follows. For each mackerel season, all vessels pre-registered to fish mackerel in the Central and Western Aleutians will be randomly assigned into one of two different teams. The deadline for pre-registration will be 30 days prior to the respective start date of the season. Each team will be comprised of an equal number of vessels, unless an odd number of vessels are registered to fish. One-half of the seasonal amount of the mackerel TAC for the respective sub-area per A or B season will be reserved for each team (further divided by inside and outside of CH apportionments). In the event that an uneven number of vessels are registered, NMFS will divide the available seasonal harvests between the two teams as a fraction of the number of vessels per team divided by the overall number of vessels registered to fish (e.g. 4/9 for Team C and 5/9 for Team W).

The inside CH mackerel fishing for the vessels selected for the "C" team will have to start in the Central Aleutians (sub-area 542), while the "W" team will have to start its CH fishing inside SSL CH in the Western Aleutians (sub-area 543). Teams can begin fishing the CH portion in the sub-area to which they were not originally assigned only when the team originally assigned to start in that area has harvested

the CH portion of that sub-area TAC (or NMFS otherwise determines that the team not originally assigned to that sub-area may commence fishing there). Teams may, however, begin fishing the outside of CH portion of the sub-area in either area (whether they were assigned to start in that area or not). Effectively, there are no restrictions (except the division of the TACs between teams) on either team regarding the harvest of mackerel outside of CH in either sub-area during the mackerel fishery.

Stand down provision: To help ensure that registrants are actually committed to mackerel fishing under the sea lion protection constraints and hence an equitable division of the mackerel harvest between teams is achieved, vessels registering to fish in Central or Western Aleutians mackerel seasons will therefore agree to a "stand down" on all other groundfish fisheries such that they cannot engage in directed fishing for any other groundfish species for a period of 14 days from the start date of the mackerel season for which the vessel is registered to participate. The proposers feel that such a stand down provision is the only way to achieve a fair division of catch between the two teams.

How does the proposal remove jeopardy and adverse modification? Will it meet the ≥50% CH criteria, ≥50% non-pup protection criteria, and ≥75% pup criteria? In addition to other measures that promote sea lion protections, our proposal includes closure of areas of critical habitat identical to those included in the Council's recommendations for area closures for the second half of 2001 ER measures. Criteria for the sufficiency of closed areas thus far have been applied across all areas (GOA, Bering Sea, and Aleutians) instead of on a specific region basis. Assuming area closures for other fisheries in the Bering Sea, Aleutians, and Gulf of Alaska are "similar" to the Council's April 2001 recommendations, then the area closures overall will exceed the criteria above. Further, if the closed areas in our proposal are viewed from the perspective of the percentage of critical habitat where Atka mackerel are found in targetable concentrations, then we more than exceed the above closed area criteria.

Most importantly, our proposal directly addresses the principle concern in terms of potential adverse modification of sea lion CH that was raised for the mackerel fishery, based on Fritz's 1998 "Do trawl fisheries create localized depletions of Atka mackerel" paper (United States Department of Commerce, 1998). While the mackerel fishery is a relatively small in comparison to other fisheries where NMFS has found jeopardy (annual removals of about 65,000 MT compared to 200,000 MT for cod and 1.3 MMT for pollock). Nonetheless, NMFS' concerns with the mackerel fishery have been that the 1998 CPUE depletion study identified a subset of the traditional mackerel fishing areas where the decline in CPUE was linked to potential for a temporary "fish down" effect in the area where fishing occurs. Since then, seasonal apportionments of the TAC have been implemented (1999) and removals per season are already below the threshold amounts identified with potential localized depletion in years prior to the measures developed by the Council in 1998. Our proposal further reduces potential for foraging competition by dividing the

fleet's CH fishing into two groups fishing in different Aleutians sub-areas. This is expected to reduce harvest rates on a statistical sub-area basis to zero in the Eastern Aleutians and approximately one-half of the current rates in the Central and Western Aleutians (about 500 MT per day in contrast to the current rate of about 1,000 MT per day). This addresses the potential for localized depletion and foraging competition in the most direct manner possible. Further, we believe the adoption of inside/outside of CH fishing limits in closer proportion to the real distribution of the mackerel biomass will help to ensure that the Atka mackerel fishery does not negatively affect the mackerel resource for the industry's future and as forage for sea lions.

Lastly, with the retention of existing rookery closed areas at 10 miles and haulout and no-transit sites areas at three miles, a considerable area buffer to separate the area open to fishing for mackerel from sea lion sites. The preliminary results of a recent tagging study conducted over the last two years (Fritz et al., 2001) suggests that there is little mixing between Atka mackerel inside and around the rookeries and mackerel in the outside area open to fishing. While these results are specific to the Eastern Aleutians, an extension of the study to Kiska this summer will soon be available for verification of the spatial separation of the fishery and sea lion closed areas outside of Eastern Aleutians.

How does the proposal minimize social and economic impacts? It preserves the economics of the mackerel fishery in Central and Western Aleutians to the greatest extent possible given the overriding objective of creating effective sea lion protections. It helps to protect the dedicated mackerel participants from increased effort as a result of the measures to slow down catch rates to address potential sea lion competition. At the same time, it protects other groundfish fisheries from increased effort from mackerel boats as a result of measures to subdivide the mackerel TAC in Central and Western Aleutians.

How does the proposal minimize bycatch of PSC and other groundfish?
The mackerel fishery is not constrained by PSC bycatch. It has been hamstrung, however, by sharpchin and northern rockfish bycatch which has closed the fishery with large portions of the TAC unharvested several times since the 1998 fishery modifications became effective and especially when the trawl injunction occurred last fall. This proposal allows most of the mackerel fishing to occur in the depth strata were mackerel are found. Rockfish are far less abundant in the critical habitat areas open to mackerel fishing under this proposal relative to the areas outside critical habitat where mackerel fishing has been attempted. We anticipate that rockfish bycatch will not be a significant issue for the fishery under this proposal. This is beneficial to other Aleutians fisheries as well because if rockfish bycatch approaches removals approaching the rate of fishing associated with the overfishing exploitation rate, then restrictions can be places on any and all Aleutians fisheries that have potential for catching rockfish.

How does the proposal promote safety at sea? The division of the sub-area TACs into two equal amounts designated for each team prevents an increase in incentives to race for fish.

Does the proposal adapt itself to a sound experimental design for monitoring? Yes. The closure of mackerel fishing (in addition to pollock and cod) in area 518 or Bogoslof represents an excellent control area for fishing and no fishing comparisons. Further, should the committee's final RPA recommendation include the separation of the cod and mackerel trawl fisheries at 178 degrees West longitude, then this side by side difference may be useful for scientific comparisons of the effects CH fishing by those fisheries.

What information is available to support your proposal (supply if possible)?

1) Sea State data presented to the RPA committee in March 2001 on daily catch rates of mackerel in CH
2) Rookery, haulout, and no transit area closures as per NMFS Table 21.
3) NMFS 1998 EA for modifications to the Atka mackerel fishery ("EA, RIR, IRFA for an amendment to the BS/AI FMP to reapportion total allowable catch of Atka mackerel and reduce fishery effects on Steller sea lions, June 1998"), Appendix 1 includes Fritz paper.
4) Closure notices for the mackerel fishery B seasons (as a result of rockfish bycatch) in 1999-2000.
5) Fritz, Lowell, Suzanne McDermott, and Sandra Lowe. 2001 "Efficacy of trawl fishery exclusion zones in maintaining prey availability for Steller sea lions: Description of Atka mackerel tagging project in Seguam Pass, Aleutian Islands, AK." A draft manuscript available from NMFS Alaska Fisheries Science Center, REFM Division.

Bob Mikol
C-1
6/01

VVS Presentation to the NPFMC

Good afternoon Mister Chairman and members of the Council. My name is Robert Mikol and I work for OceanLogic, a small, fisheries-management software and GIS firm located in Juneau, Alaska. Though the topic before you is specifically RPA, I'd like to address a component of this management, VMS (Vessel Monitoring System). Also, though I work for OceanLogic, I believe that I speak for most (if not all) marine software developers and their clients, the fishermen.

We have a software product that we call the Vessel Verification System (VVS). We are seeking Council and the National Marine Fisheries Service (NMFS) approval for this type of product. We hope that it might be used as both a backup to the current VMS and as a low-cost alternative for smaller vessels participating in the groundfish fisheries. VMS backup certification is requested so that vessels may continue fishing if for some reason they are unable to transmit their VMS signal.

History of Problem:
For the past several years, NMFS has been concerned with vessels fishing in or transiting various restricted areas. As a result, the North Pacific Fisheries Management Council has required some vessels to carry a vessel monitoring system (VMS). Due to the high latitudes of our fishing grounds and the "shadows" created by the Aleutian Islands only one vendor, with a specific unit, has been approved, as of this date.

Since the inception of the VMS program in the North Pacific groundfish fisheries, several concerns have arisen.

1. Real Events:
   1.1. Loss of unit due to weather
   1.2. Loss of unit due to power interruption
   1.3. Normal problems that occur in manufacturing
2. Other Concerns:
   2.1. Loss of satellite or system
   2.2. Loss of vendor server
   2.3. Murphy's Law

To remedy these concerns, industry has asked NMFS to seek a backup to the sole source, single system situation that they are in, because as the current regulations stand, if a vessel, for any reason loses its VMS it must cease fishing, return to port and have the unit repaired or replaced. This interruption of the fishing trip (depending on the size of te operation) could easily cost many thousands of dollars to the vessel owner, skipper and crew. We at OceanLogic, believe we have a low-cost, backup solution that would allow a vessel to finish its trip before returning for VMS unit maintenance. This solution is a VVS, Vessel Verification System.

Solution:

The VVS is a secure software program designed to record vessel activity through the vessel's computer and GPS. In doing so, the VVS creates a non-editable record that can be downloaded and exported for analysis and review.

We have worked with NMFS Enforcement and Sustainable Fisheries and have received their support for this project. Enforcement has indicated that the system does not have to be a "Black Box," however it must be tamper-resistant and leave an evidentiary trail of tampering. The VVS fulfills both of these requirements.

Additionally, the VVS has the ability to produce near real-time reporting of a vessel at sea. The VVS exports a file identical to the current VMS. The VVS file is then sent as an email attachment at regular intervals (every 2, 4, 6 or more hours) as requested by NMFS Enforcement. In our discussions with Enforcement, these reporting intervals would be determined by a number of factors appropriate for that vessel, including that fishery, current fishing conditions, proximity to critical habitats and closed fishing areas. For smaller vessels or appropriate fisheries, VVS data might be sent at the end of a fishing trip through a landline.

Finally, the VVS is not just an enforcement tool. It has the ability to record and archive valuable information. In addition to a comment field that can be filled in at the discretion of the user, the VVS archives ten fields of data, in an open data standard that can exported into any number of programs, for any number of uses ranging from industry collaboration, science and even litigation if necessary.

Summary:
In summary, we ask that the Council help us and the fishing community move forward with a software based VMS backup implementation. We are in a chicken and an egg situation. Just as you need to know that the system is secure and has Enforcement's support, Enforcement needs to hear from you that the Council supports this approach.

So, specifically, we ask that a motion be brought to the floor (and passed) that gives NMFS guidance to formally analyze software based VMS backups and possible small boat VMS alternative. The requirements of this system should:

1. Collect and Archive GPS data
2. Tamper-resistant
3. Create evidentiary trail of tampering
4. Export data for analysis and review

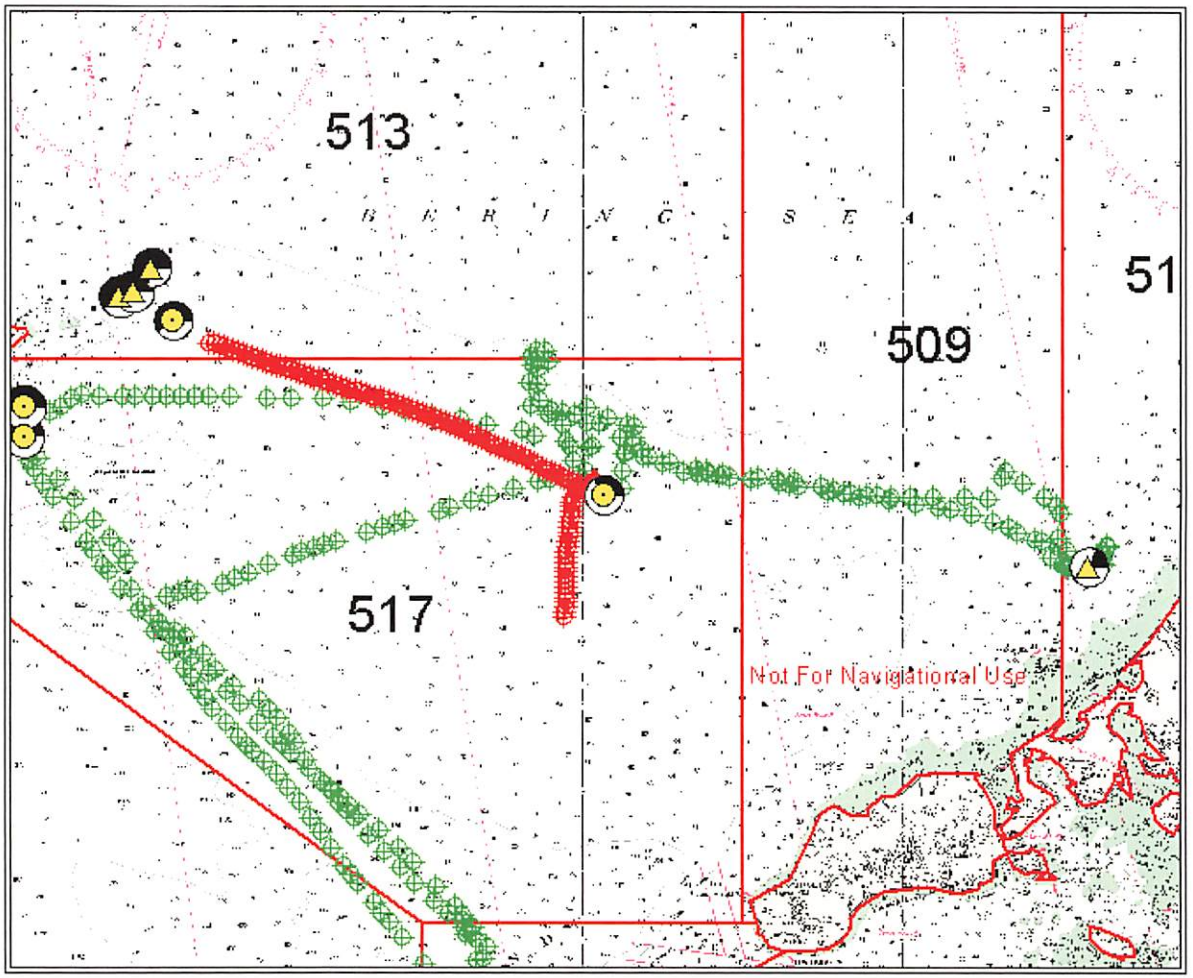
Finally, I want to stress that this is not just an OceanLogic issue. The vessel verification system we developed is not rocket science. If you approve of this type of software based backup system, you will soon see it in the programs that fishermen use today (Nobeltec's Visual Navigator; ECC (Electronic Chart Company) Globe;OceanVision; etc.).

Software

...to make a motion requesting that NMFS Enforcement analyze a secure VMS backup system and possible small boat alternative to the current VMS program. Any new monitoring system must: Collect and archive GPS data; be tamper-resistant; create evidentiary trail of tampering; and export data for analysis and review.

Bob Mikol
C-1

VMS and VVS Comparison



OceanLogic VVS Data
ARGOS/ELSA Data

Avg Pollock Size (grams)
0 - 499 gr
500 - 699 gr
700 - 899 gr
900 - 1299 gr
> 1300 gr

Percent Male and Female
Females
Males

NMFS Fishing Areas

Projection: Mercator
Scale: 1:2,600,000

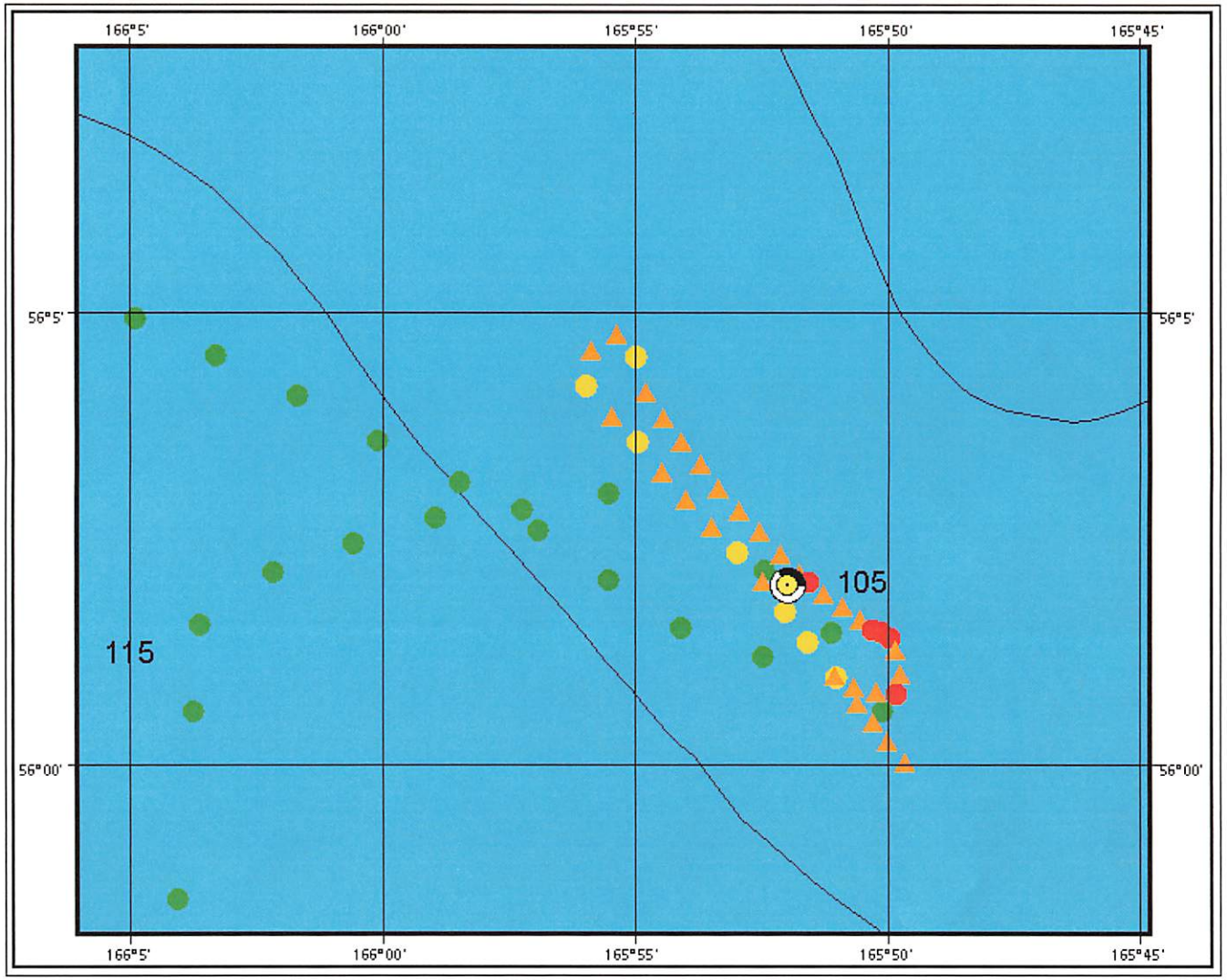
The OceanLogic VVS data are the red tracks in the view. Note the tighter series of points. These points show a higher resolution and when enlarged will illustrate more of a fishing signature.

50 0 50 100 150 200 250 300 Miles

Create by OceanLogic LLC using data from NACLS ARGOS VMS and OceanLogic VVS data, March 2001. For more information please contact Robert Mikol at 907.586.0145.

Bob Mikol
C-1

Fishing Effort using VVS data



Avg Pollock Size (grams)
- 0 - 499 gr
- 500 - 699 gr
- 700 - 899 gr
- 900 - 1299 gr
- > 1300 gr

N

Percent Male and Female
- Females
- Males

OceanLogic VVS Data
- 0 - 1 (Hauling or Jogging)
- 2 - 4 (Average Trawl Speed)
- 5 - 7 (Near Trawl Speed
- 8 - 9 (Running Slow)
- 10 - 12 (Running)

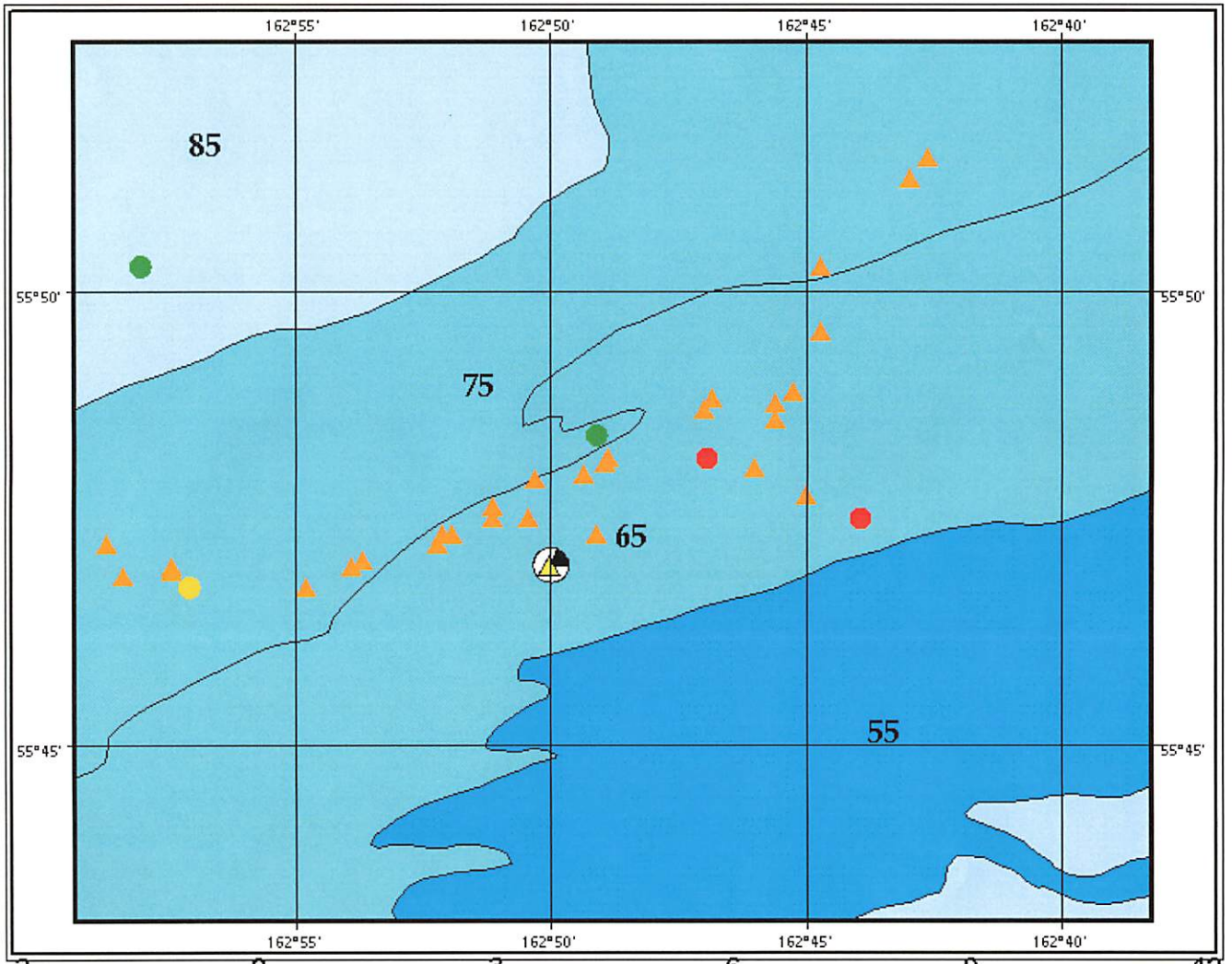
Projection: Mercator
Scale: 1:125,000

In this view, the OceanLogic VVS data shows the position of the vessel in five minute intervals. As a result, compressed points indicate a slower speed and help to identify fishing behavior, particularly when the speed legend is applied.

Bathymetry is in meters.

Create by OceanLogic LLC using data from OceanLogic's VVS, March 2001. For more information please contact Robert Mikol at 907.586.0145.

Fishing Effort using VMS data



Avg Pollock Size (grams)
- 0 - 499 gr
- 500 - 699 gr
- 700 - 899 gr
- 900 - 1299 gr
- > 1300 gr

N

Percent Male and Female
- Females
- Males

ARGOS/ELSA Data
- 0 - 1 (Hauling or Jogging)
- 2 - 4 (Average Trawl Speed)
- 5 - 7 (Near Trawl Speed
- 8 - 9 (Running Slow)
- 10 - 12 (Running)

Projection: Mercator
Scale: 1:125,000

In this view, the ARGOS VMS data shows the position of the vessel when the satellite passes over head. Though the GPS speed data indicates that the vessel is likely to be fishing, a difinate fishing signature is not easy to see.

Bathymetry is in meters.

Create by OceanLogic LLC using ARGOS VMS data, March 2001. For more information please contact Robert Mikol at 907.586.0145.

DRAFT C-1

NPFMC STELLER SEA LION RPA COMMITTEE PROPOSAL TO AVOID JEOPARDY AND ADVERSE MODIFICATION,

Submitted by Gerry Leape and Dave Cline, 5-10-01

I. SUMMARY

On July 19, 2000, all groundfish trawl fishing off Alaska was enjoined by court order within Steller sea lion critical habitat west of 144W long., pending preparation of a Programmatic FMP-level Biological Opinion (FMP BiOp) by NMFS. With the release of the Section 7 consultation FMP BiOp in November 2000, NMFS concluded that the groundfish fisheries as a whole jeopardize Steller sea lions and adversely modify sea lion critical habitat, requiring new and more comprehensive RPA regulations for pollock, Atka mackerel and Pacific cod fisheries. Those reasonable and prudent alternative (RPA) measures have not been enacted and the fisheries are operating under emergency RPA rules during the first half of 2001. These rules fall far short of what is required in the FMP BiOp and by the Endangered Species Act. The goal of any acceptable alternative to the emergency RPA rules should be to design a fishery based on levels of fishing that avoid jeopardy and adverse modification of Steller sea lion critical habitat as required by the Endangered Species Act.

The November 30, 2000, Steller Sea lion FMP-level Biological Opinion concludes that competitive interactions with groundfish fisheries jeopardize the survival and recovery of sea lions and cause adverse modification of sea lion critical habitat at three temporal-spatial scales: the global, the regional and the local.[1] BiOp at p. 259 identifies 4 primary effects categories: effect of global biomass levels, effects of disturbance, and effects of temporal and spatial concentration of fishing. NMFS says the RPA must avoid jeopardy and adverse modification "*at all three scales where the competitive interactions occur*" (FMP BiOp, p. 290). The RPA alternative that we propose has four main elements to address competition with Steller sea lions at the three scales of competitive interaction identified by NMFS:

1. At the global scale, reduce groundfish (pollock, Atka mackerel, Pacific cod) catch levels from the maximum permissible level to maintain the forage base for Steller sea lions and other predators at high levels relative to the estimated unfished abundance.
2. At the regional scale, disperse groundfish fisheries in at least four seasons and across management areas outside to avoid high removal rates over short periods of time (pulse fishing).
3. At the local scale within critical habitat, *eliminate* the possibility of direct food competition and disturbance on the prey field by establishing complete spatial separation of trawl fishing (trawl exclusion zone).
4. For the fixed-gear (non-trawl) cod fishery, employ trip/day/week catch limits, total catch limits, vessel size and gear limits, and at least four seasonal allocations of the quota within critical habitat in order the disperse the effort of longline, pot and jig fishermen in a way that is highly likely to avoid harming Steller sea lions.

[1] FMP BiOp, p. 289: "*This competitive interaction, occurring at the global, regional, and local scales has been shown to jeopardize the continued existence of Steller sea lions by interfering with their foraging opportunities for the three major prey species resulting in reduced reproduction and survival.*"

Our proposal builds upon Alternative 2.1 (the "Low and Slow" fishing strategy) of the North Pacific Groundfish Draft Programmatic SEIS as a framework for developing an RPA alternative. Our RPA alternative will:

1. Reduce total catch levels for pollock, Atka mackerel and Pacific cod. NMFS acknowledges that trophic interactions (predator/prey dynamics) are not formally considered in the stock assessment advice under the existing FMPs (See Draft North Pacific Groundfish PSEIS 4.1, p. 48). Spawning stock biomass for important forage fishes should be maintained at high levels relative to the average stock size expected under unfished conditions in order to avoid adverse impacts to Steller sea lions and other predators in the North Pacific food web. TAC reductions of comparable magnitude as those envisioned in Draft PSEIS Alternatives 2.1 or 2.2 should be part of the RPA package of measures to avoid jeopardy and adverse modification at the global scale.

2. Disperse all three fisheries across at least 4 seasons and across regional management districts, including at least two-week-long stand down periods between seasons. The major objectives of temporal dispersion of the fisheries are the dispersal of catches away from the fall and winter period and distribution the catches more evenly across the year to reduce the probability of localized depletions associated with removing large amounts of biomass in short periods of time, i.e., "pulse" fishing.[2] Catches should also be distributed by broad management areas in districts 610-620-630 and Shelikof Strait in the GOA, areas east and west of 170 degrees W. Longitude outside critical habitat in the Bering Sea, and areas 541-542-543 in the Aleutian Islands Atka mackerel fishery.

3. Scrap the proposed FMP BiOp RPA "experimental design" of open and closed areas in Steller sea lion critical habitat and *eliminate all trawling* for pollock, Atka mackerel, Pacific cod and other groundfish in critical habitat except as prescribed for experimental fisheries of a more discrete nature with well-defined, manageable objectives and a reasonable expectation of detecting significant differences. Trawl exclusion zones achieve the objective of complete spatial separation of trawl fishing from foraging areas adjacent to rookeries and haulouts in order to *eliminate* the possibility of direct competition in these core areas that are essential to the survival and recovery of the species.

4. Allow a fixed-gear cod fishery within critical habitat between 3-20 nmi with constraints on catch per trip/day/week, on total catch, vessel size, gear, as well as dispersal at least four

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[2] Regarding temporal dispersion and the quarterly approach, Section 7 consultation **10 March 1993 Memorandum from William Aron to Steven Pennoyer** strongly opposed a proposal for making an A/B seasonal pollock allocation in the GOA as in the BS/AI because it would increase catches in the winter season and because it would violate the strategy of temporal dispersion of the fishery: "*The quarterly approach is fundamental to the NMFS conservation strategy of temporal and spatial allocation of the pollock TAC to minimize sea lion impacts. That NMFS took this approach was probably a fundamental reason why the U.S. District Court and the Court of Appeals found in favor of the Service in the complaint filed by Greenpeace over the 1991 walleye pollock GOA TAC. Adoption of the BSAI approach would contradict past actions by NMFS, without allowing the strategy [i.e., quarterly allocations in the GOA] sufficient time to have positive effects on the sea lion population.*" See also **4 April 1993 Memorandum of William Aron to Steven Pennoyer** regarding the effects of a proposed GOA pollock third quarter starting date of September 1: "*This starting date is likely to cause adverse impacts on Steller sea lions by concentrating fishing effort in the fall and winter when juvenile sea lions may be vulnerable to shortages of prey resources.*"

seasons and across management areas in order to minimize competitive interactions and minimize the impact of fishing at the point of fishing. Require vessel monitoring systems (VMS), and observer coverage on the fixed-gear cod fleet fishing inside critical habitat to address the need for a monitoring system to evaluate more systematically the differential effects of fixed gears on the sea lion prey base.

In addition, we include a fifth RPA measure to protect sea lion prey diversity in the Aleutian Islands:

5. Continue the closure of the directed Aleutian Islands pollock fishery to facilitate rebuilding of a depleted stock and to insure that an important sea lion prey stock is not further reduced by fishing in this region.

Steller sea lion habitat is also prime nursery and spawning grounds for other fish species (e.g., halibut, herring, salmon, crab), as well as important habitat for large whales, seals, porpoises, seabirds, etc. We believe Steller sea lion habitat conservation ultimately must be part of a comprehensive habitat conservation plan, including a network of marine reserves, to protect biodiversity and sustain viable fisheries in surrounding waters.

II. BASIS FOR PROPOSAL

NMFS has concluded that large-scale groundfish fisheries targeting important forage fish species such as walleye pollock, Atka mackerel, and Pacific cod are likely to jeopardize the continued existence of endangered Steller sea lions and adversely modify their critical habitat.[3] NMFS is required by the Endangered Species Act to develop Reasonable and Prudent Alternative (RPA) measures that avoid jeopardy and adverse modification of critical habitat at all three scales of competitive interaction.

A. Global Scale

Currently there is no explicit requirement or policy framework in the FMPs for considering the cumulative ecological effects of an MSY-based fishing strategy on marine food webs or on long-term ecosystem stability. The FMP BiOp concludes that the intent of the $F_{40\%}$ harvest policy (i.e., to reduce targeted stocks to about 40% of stock size that would be expected on average in the absence of fishing) jeopardizes Steller sea lions. In 1999, for instance, the FMP BiOp estimates that the fisheries had *reduced the combined female spawning biomass for pollock, cod, and Atka mackerel to 45% of the expected unfished level* (FMP BiOp, p. 224). This cumulative effect on multiple prey stocks has occurred over the last 20 years (see FMP BiOp, Figures. 6.16 and 6.17), resulting in the estimated 55% decline in aggregate spawner biomass of pollock, cod, and Atka mackerel by 1999. The FMP BiOp concludes that the cumulative effect of the default $F_{40\%}$ harvest policy diminishes the prey base

[3] NMFS ESA Section 7 Biological Opinion, November 30, 2000, p. 289: "*The preceding analysis in this biological opinion supports a determination that certain groundfish fisheries currently authorized by the FMP are likely to jeopardize the continued existence of endangered Steller sea lions and adversely modify their critical habitat. These determinations result from available evidence of competitive interaction between the fisheries for pollock, Atka mackerel and Pacific cod and Steller sea lions. This competitive interaction, occurring at the global, regional and local scales has been shown to jeopardize the continued existence of Steller sea lions by interfering with their foraging opportunities for the three major prey species resulting in reduced reproduction and survival. The reduction in survival and reproduction has enhanced decline in the numbers of sea lions relative to an unfished action area.*"

"globally" and reduces the effective carrying capacity of sea lion critical habitat *even before fishing starts at the beginning of each year.*

The RPA's Global Control Rule does not maintain stocks above the $B_{40\%}$ "target" stock size or address the cumulative adverse effects of the $F_{40\%}$ harvest policy under the FMPs that were identified in the FMP BiOp

The November 2000 FMP BiOp concludes that the default $F_{40\%}$ harvest policy poses a cumulative competitive threat at the "global" scale of the entire range of the exploited stock by reducing the prey base 60% or more over time ($B_{40\%}$), as intended under this MSY-based exploitation strategy. However, NMFS offers only the "Global Control Rule" as a remedy, which would not reduce TAC levels or stop fishing on the stock until it reaches 1/2 $B_{40\%}$ (i.e., $B_{20\%}$, or 20% of the average unfished stock size), therefore the GCR does nothing to address the cumulative reductions in prey biomass which effectively diminish the carrying capacity of sea lion critical habitat.

The November 2000 FMP BiOp RPA fails to address the effects of independently derived ABC and TAC levels from the single-species stock assessment models. By proposing no change to the status quo $F_{40\%}$ harvest policy under the FMPs, the BiOp RPA's Global Control Rule virtually ensures that carrying capacity for Steller sea lions will continue to decline or, at best, to "equilibrate" at the currently endangered level. This maneuver attempts to lower the bar for recovery by establishing the currently endangered SSL population as the new management baseline. In this way NMFS makes a mockery of recovery, which should be based on historical numbers of sea lions from the period *before* the decline was first documented in the 1970s.

As a remedy for the shortcomings of the FMP BiOp RPA and management under emergency RPA rules, we offer examples from the Groundfish Draft Programmatic SEIS (PSEIS). PSEIS Alternatives 2.1 and 2.2 propose TAC reductions for pollock, Pacific cod and Atka mackerel totaling 33% and 96%, respectively (PSEIS 4.2, p. 24).[4] Under the approach of Alternative 2.1, for instance, overall TACs are to be reduced by the best estimate of the portion of biomass in closed areas of critical habitat. At Draft PSEIS 4.4, pp. 10-12, NMFS says that expected BS/AI and GOA pollock spawning stock biomass would increase 23% and 74%, respectively, from 2001-2005 under Alternative 2.1 (relative to Alternative 1), and 67% and 74%, respectively, under Alternative 2.2 (relative to Alternative 1). Similar effects are expected for Pacific cod (PSEIS 4.4, pp. 35-36). No estimates are given for Atka mackerel but TAC would be reduced 67% and therefore spawning stock biomass would be expected to increase. The effect of fishery removals on Steller sea lions is significantly reduced in both alternatives (PSEIS 4.2, p. 22) by reducing fishing pressure on age 3- to 10-year-old fish and generally making more prey available in the ecosystem (PSEIS 4.4, p. 12).

There is ample discussion of this global-scale effect on the sea lion prey base in the November 2000 FMP BiOp.

[4] Table 4.2-6, total estimated reduction in catch from all fisheries under Alternative 2.1 and 2.2.

B. Regional Scale

The rationale behind the FMP BiOp RPA regional-scale measures is to reduce intensity of fishing effort in a particular season at the regional scale in the 34% of critical habitat open under the RPA (pp. 291-293). One temporal and two spatial actions are taken (pp. 291-293): four season apportionment of TAC in critical habitat but only two seasons outside critical habitat; catch limits within open portions of critical habitat based on best estimates of biomass distribution (p. 293, Table 9.4); and spatial distribution of TACs in existing broad mgmt areas.

We conclude that NMFS must disperse all three fisheries across at least 4 seasons and across regional management districts, including at least two-week-long stand down periods between seasons. The major objectives of temporal dispersion of the fisheries are the dispersal of catches away from the fall and winter period and distribution the catches more evenly across the year to reduce the probability of localized depletions associated with removing large amounts of biomass in short periods of time, i.e., "pulse" fishing.[5] Catches should also be distributed by broad management areas in districts 610-620-630 and Shelikof Strait in the GOA, areas east and west of 170 degrees W. Longitude outside critical habitat in the Bering Sea, and areas 541-542-543 in the Aleutian Islands Atka mackerel fishery.

Furthermore, there is inadequate data to determine spatial and temporal distribution of prey species in critical habitat and there is inadequate monitoring (e.g., VMS and observer coverage) to insure that RPA regulations are complied with inside critical habitat. For instance, see BiOp at p. 239: "*survey-based estimates of prey abundance on a time and spatial scale adequate to predict the availability of forage to Steller sea lions (e.g., monthly) are not available.*" Given the lack of fine-scale survey biomass information and the admission of NMFS that much fishing activity within critical habitat is not adequately monitored to insure compliance with existing regulations, there is no way to *insure* that competition is avoided short of prohibiting fishing in these critical habitat zones.

The only way to eliminate direct competition in critical habitat is to prohibit all trawling for pollock, cod, Atka mackerel and other groundfish in critical habitat

We urge NMFS to scrap the proposed FMP BiOp RPA "experimental design" of open and closed areas in Steller sea lion critical habitat and prohibit all trawling for pollock, Atka mackerel, Pacific cod and other groundfish in critical habitat *except as prescribed for experimental fisheries of a more discrete nature with well-defined, manageable objectives and a reasonable expectation of detecting significant*

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[5] Regarding temporal dispersion and the quarterly approach, Section 7 consultation **10 March 1993 Memorandum from William Aron to Steven Pennoyer** strongly opposed a proposal for making an A/B seasonal pollock allocation in the GOA as in the BS/AI because it would increase catches in the winter season and because it would violate the strategy of temporal dispersion of the fishery: "*The quarterly approach is fundamental to the NMFS conservation strategy of temporal and spatial allocation of the pollock TAC to minimize sea lion impacts. That NMFS took this approach was probably a fundamental reason why the U.S. District Court and the Court of Appeals found in favor of the Service in the complaint filed by Greenpeace over the 1991 walleye pollock GOA TAC. Adoption of the BSAI approach would contradict past actions by NMFS, without allowing the strategy [i.e., quarterly allocations in the GOA] sufficient time to have positive effects on the sea lion population.*" See also **4 April 1993 Memorandum of William Aron to Steven Pennoyer** regarding the effects of a proposed GOA pollock third quarter starting date of September 1: "*This starting date is likely to cause adverse impacts on Steller sea lions by concentrating fishing effort in the fall and winter when juvenile sea lions may be vulnerable to shortages of prey resources.*"

differences. Trawl exclusion zones achieve the objective of complete spatial separation of trawl fishing from foraging areas adjacent to rookeries and haulouts in order to *eliminate* the possibility of direct competition in these core areas that are essential to the survival and recovery of the species.

Critical habitat involves a determination of the physical or biological features that are essential to the conservation of the endangered species, and each federal agency must insure that its actions within the area are not likely to destroy those features that make it "critical" or adversely modify its usefulness to the species.[6] In the case of Steller sea lions, prey resources are the most important feature of marine critical habitat.[7] Both NMFS and the Alaska Department of Fish and Game have previously concluded that prey resources determine the carrying capacity of that habitat for sea lions,[8] and the November 30, 2000 BiOp reaches the same conclusion:

> "*The value of the marine portions of critical habitat that has been designated for Steller sea lions will be determined by the abundance and distribution of prey species. The abundance of prey within these foraging areas, over time, would determine the number of predators they could support in that time; as the abundance increased, the area would be able to support more predators, as the abundance decreased, the area would be able to support fewer predators. Similarly, the distribution of prey species will determine whether prey are available to foraging sea lions and will determine whether they can forage successfully.*" BiOp at p. 254.

In the supporting documentation for Amendments 25 and 20 to the Fishery Management Plans of the GOA and BS/AI (Prohibition of all groundfish trawling in the vicinity of sea lion rookeries, 1991), NMFS recommended a prohibition on ***all*** trawling in the vicinity of rookeries because:

1. trawl fisheries account for the majority of the catch of species of concern in critical habitat;
2. trawlers have higher bycatch of non-target prey species including juvenile pollock, squid, octopus, salmon, herring, capelin, and sand lance, as well as flatfishes, rockfishes, and shellfish, any number of which may serve as important seasonal or secondary items in the sea lion diet, depending on availability;
3. trawlers are the primary source of lethal incidental entanglements in nets;
4. trawlers are responsible for benthic habitat disturbances and changes in species composition.[9]

Similarly, the November 2000 FMP BiOp (p. 215) indicates that trawl fishing accounts for 86% of the catch in the BSAI and 73% in the GOA, and is therefore the major concern with regard to adverse fishing effects on the sea lion prey base. Increasingly since the 1970s and early 1980s these fisheries have concentrated their catches in sea lion critical habitat, reaching record levels in the mid-1990s. Even

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[6] NMFS. Estimated Catches of Walleye Pollock, Atka Mackerel, and Pacific Cod Within Critical Habitat of the Steller Sea Lion in the Bering Sea, Aleutian Islands, and Gulf of Alaska from 1977-1992. AFSC Processed Report 93-13.

[7] NMFS. Biological Opinion on Groundfish Fisheries in the BSAI and GOA. December 3, 1998, p. 62.

[8] NMFS Biological Opinion on 2000 TAC Specifications for the BSAI and GOA and American Fisheries Act, December 22, 1999, p. 66. ADF&G. Overview of State-Managed Marine Fisheries in the Central and Western Gulf of Alaska, Aleutian Islands and Southeastern Bering Sea with Reference to Steller Sea Lions. Regional Information Report 5J00-10. October 12, 2000, p. 19: "*Prey resources are not only the primary feature of Steller sea lion critical habitat, but they also appear to determine carrying capacity of the environment for Steller sea lions.*"

[9] North Pacific Fishery Management Council/NMFS. 1991. EA/RIR for Amendments 25 and 20 to the FMPs for Groundfish of the GOA and BSAI (Proposed Prohibition to Groundfish Trawling in the Vicinity of GOA and BSAI Steller Sea Lion Rookeries).

with reductions in trawling in critical habitat envisioned under the FMP BiOp's RPA, NMFS fails to address interactive competition from disturbance of trawl gear on prey as discussed in the FMP BiOp at p. 264.[10]

NMFS has not demonstrated that *any* level of trawling in critical habitat will avoid jeopardy or adverse modification. There is no reasonable and prudent basis for allowing these trawl fisheries to operate in critical habitat, targeting prime sea lion prey. We conclude that complete exclusion of the trawl fisheries from critical habitat is the only way to *insure* that direct competition with sea lions in critical habitat is eliminated. The closure of all sea lion critical habitat to all trawling under our proposal comprises 386,770 km2 of ocean surface, or 12% of the fishery management regions west of 150 degrees W. longitude. These trawl exclusion zones comprise approximately 15% of the total shelf area <200 m depth in the BS/AI and 40% of the shelf area in the GOA (see Draft PSEIS 4.4, p. 33).

C. Local Scale

In the November 2000 FMP BiOp, NMFS concludes that short-term localized depletions and disturbance effects of trawl gear on the prey field[11] are reasonably likely effects of fishing and require dispersal of fisheries "*at the local scale of relevance to individual foraging sea lions*" (p. 291). The rationale is to "*ensure that the TAC is harvested in a dispersed manner such that the rate of removal does not exceed rate of replacement*" (p. 291). FMP BiOp at p. 293 says that a single temporal measure is used: 4-season apportionment of TAC. FMP BiOp at p. 291 also cites AFA co-ops (p. 291) to slow down the fisheries, but not in a dramatic fashion (see Fig. 5.3, Daily catch rates EBS Jan-Mar 1998-2000 as well as Fig. 6.15a). However, the **16 November 2000 Draft RPA** that was leaked to industry included use of daily maximum catch rates (p. 39): "*For all areas fished by the pollock, Pacific cod, and Atka mackerel fisheries in the GOA, AI and EBS (east of 170W only), maximum catch rates will be established.*" Recent average fishery catch rates were to be set as the new daily maximum catch rates.

Minus daily maximum catch limits, the 4-season approach does not address the competitive interaction at the local scale within critical habitat. Vessel size limits, trip limits and differential effects of fishing gears were not seriously considered at all. To remedy this omission, our proposal establishes daily catch limits for pollock, Atka mackerel and Pacific cod as in PSEIS Alternative 2.1 (see Draft PSEIS 4.1, p. 30, Table 4.1-7). The daily catch limits apply inside and outside critical habitat. They are intended to address the effects of fishing at the local scale and they help to mitigate the impacts of fishing which is concentrated on the boundaries of critical habitat (the edge effect). They slow down the fisheries and reduce the intense temporal concentration of these fisheries that has occurred in the past decade. However, the choice of daily catch limits was based on *average* daily catch rates, which may be too

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[10] NMFS FMP BiOp at p. 264: "*The groundfish fisheries can cause dense schools of prey species to scatter which affects the foraging behavior of marine mammals and seabirds that target aggregated prey (Brock and Riffenburgh 1960; Dayton et al. 1995, and others). Repeatedly causing fish schools to scatter and reducing their density would also reduce the value of the foraging areas to Steller sea lions by increasing the amount of time and energy [that] sea lions would have to expend to feed on the same number of fish.*"

[11] See BiOp, p. 264: "*The groundfish fisheries can cause dense schools of prey species to scatter which affects the foraging behavior of marine mammals and seabirds that target aggregated prey (Brock and Riffenburgh 1960; Dayton et al. 1995, and others). Repeatedly causing fish schools to scatter and reducing their density would also reduce the value of the foraging areas to Steller sea lions by increasing the amount of time and energy [that] sea lions would have to expend to feed on the same number of fish.*"

high. As amended to exclude the Aleutian Islands pollock fishery, we tentatively propose the following daily catch limits:

Species	Area	Daily Catch Rate (mt/day)
Pollock	Eastern Bering Sea	5,000
Pollock	Aleutian Islands	NA
Pollock	GOA	1,000
Pacific cod	BSAI	600
Pacific cod	GOA	400
Atka mackerel	BSAI	300

In addition to daily catch limits, or as a possible substitute if daily catch limits cannot be enforced in the non-AFA pollock co-op groundfish fleets, we propose weekly catch limits and trip limits.

Proposed modifications to the fixed-gear cod fishery

To the extent that any level of fishing for these groundfish species can be justified in critical habitat, the justification should be based on a the use of the most selective and least disruptive fishing gears, in this case pots, jigs, and hook-and-line gear. BiOp Table 6.2 provides a summary of possible effects of harvesting groundfish in the BSAI and GOA with various gear types:

		Trawl	Hook-and-line	Pot	Jig
Percentage of total catch in 1999:	BSAI:	86%	12%	2%	0.02%
	GOA:	73%	14%	13%	0.1%
Maximum rate of removal (mt/week) in 1999:	BSAI:	96,072	10,155	5,753	47
	GOA:	18,357	4,336	4,087	34
Number of vessels in 1998:	BSAI:	166	115	79	
	GOA:	198	876	178	
Bycatch prohibited Species:		salmon herring halibut crab	halibut some crab	crab	
Effects on habitat:		Benthic modification Reduced biodiversity Incidental catch	Some benthic modification Incidental catch		Not applicable

BiOp at p. 215 states that trawl fishing accounts for 86% of the catch in the BSAI and 73% in the GOA, and BiOp at p. 257 states that that the potential effects of non-mobile gear are dwarfed by the magnitude of biomass removals by the trawl sector catch. Furthermore, the fixed gears are likely to have less adverse effects on critical habitat: "*In terms of effects on ESA-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."

We propose to allow a slower-paced, lower-impact, fixed-gear cod fishery within critical habitat between 3-20 nmi with limits on catch per trip/day/week, on total catch, vessel size, gear, as well as dispersal in at least four seasons and across management areas in order to minimize competitive interactions and interactive (disturbance) effects of fishing at the point of fishing. Our proposal requires vessel monitoring systems (VMS) and observer coverage on the fixed-gear cod fleet fishing inside critical habitat to address the need for a monitoring system to evaluate more systematically the differential effects of fixed gears on the sea lion prey base. Our fixed-gear cod alternative can be summarized briefly as follows:

- prohibit trawling in critical habitat
- allow for continued cod fishing in critical habitat by pots, jigs, and longline catcher vessels in compliance with the Steller sea lion Biological Opinion guidelines for temporal and spatial dispersion of the catch and catch limits
- disperse the TAC spatially according to cod biomass distribution by broad management areas
- further disperse the fixed gear catch in critical habitat by staggering the distribution of pot, jig and longline effort to avoid concentrated, large-scale removals and localized depletions inside or outside critical habitat: pots, jigs and small longliners beyond 3 nmi; pots, jigs, and longline catcher vessels beyond 10 nmi; and all fixed gear and trawl vessels beyond 20 nmi
- disperse the TAC evenly across four seasons and establish trip/daily/weekly catch limits to avoid the intense concentration of the catch in any given area and to slow down the fisheries during any season, thereby further reducing the likelihood that fixed gear catches in critical habitat will cause localized depletions or undue disturbance of the prey field for sea lions

COD FIXED-GEAR SPATIAL DISPERSION

Rookeries and Haulouts:

0-3 nmi	3-10 nmi	10-20 nmi	Beyond 20 nmi
no fishing zone around rookeries and haulouts	pots*, jigs, and small longliners (<60 ft)**	pots, jigs, small long-liners and catcher long-liners >60 ft.	pots, jigs, small longliners, catcher longliners, freezer longliners, and trawlers

* 60 pot/vessel limit
** Vessel monitoring system (VMS) and 30% observer coverage vessels <60 ft

Aquatic Foraging Areas:

- Prohibit cod trawling in designated aquatic foraging habitat.
- Cap fixed gear catches at a conservative percentage (e.g., 10%) of survey cod biomass within the foraging area.

Other Spatial Measures:

- Seasonal exclusive area registration
- Use Sea Lion Conservation Area (SCA) instead of critical habitat as the management area for purposes of cod regulations in the Bering Sea
- Establish separate Bering Sea and Aleutian Islands TAC apportionments
- Distribute Gulf of Alaska TAC across management areas 610, 620, and 630
- Distribute Aleutian Islands TAC across management areas 541, 542 and 543
- Distribute Bering Sea TAC in the SCA, east of 170W long. and west of 170W long.

COD TEMPORAL DISPERSION

Bering Sea, Aleutian Islands, and Gulf of Alaska Fishing Seasons:

SEASON START DATES	PERCENT ANNUAL TAC
A.....Jan 20	25%
B.....Apr 1	25%
C.....Jun 15	25%
D.....Sep 1	25%

Concurrent BS, AI and GOA seasons
Two-week stand-downs
No rollovers

D. Aleutian Islands Pollock Fishery Closure

The Aleutian Islands region pollock stock has declined steadily in the surveys since the early 1980s. The 2000 triennial trawl survey biomass estimate ranges from 20-50% of its value in the early 1980s, when systematic trawl surveys began. Results from the 2000 Aleutian Islands triennial groundfish survey indicate a 16% decline in revised AI/Unalaska-Umnak area (165W-170W long.) biomass from 158,912 mt in 1997 to 133,366 mt in 2000, and an 11% increase in revised estimates for Aleutian Islands west of 170W long. (Ianelli et al. 2000, Table 1.19). Even with the 11% increase in survey pollock biomass west of 170W long., however, the stock remains at only about 20% of its 1983 survey biomass:

Pollock biomass estimates from the Aleutian Islands Triennial Groundfish Survey, 1980-2000.

	Aleutian Island and Unalaska-Umnak area (165W-17W long)		Aleutian Region (170E-170W)	
Year	Old estimates	New estimates	Old estimates	New estimates
1980	308,745		252,013	
1983	778,666		495,982	
1986	550,517		448,138	
1991	183,303	218,783*	179,653	167,140*
1994	151,444	117,198	86,374	77,503
1997	205,766	158,912	105,600	93,512
2000	180,456	133,366	132,145	105,554

Ianelli et al., Preliminary Draft BSAI Pollock Assessment for November Plan Team meeting, Table 1.19, p.87.
* Estimates since 1991 have been revised due to discrepancies in the strata definitions of the surveys.

Large uncertainties about the discreteness of the "stock" and its relation to the other pollock "stocks" abound. The stock assessment acknowledges that the status and dynamics of this stock are not well understood, that catch-age data is limited, and that reliable estimates of Fmsy, Bmsy, F40% or B40% do not exist for the Aleutian portion of the pollock stock. Therefore Aleutian region pollock falls into Tier 5 of the FMP overfishing definition (Amendment 56) and a fishing mortality rate is set arbitrarily at F = .75 of natural mortality rate (M) as a "conservatism," even though the addition of the fishing mortality nearly doubles the estimate d mortality rate in the absence of fishing. Given the large uncertainties about this stock, the long-term decline in stock biomass estimates from triennial Aleutian trawl surveys, the difficulties of determining M for any stock, and the importance of pollock as a forage fish in the Aleutians, there is no good basis for continuing to fish on this stock.

In the interest of protecting the depleted pollock stock as well as pollock predators in the Aleutian Islands, the North Pacific Council did the precautionary thing and the right thing by closing the fishery in 2000. The Council action was in keeping with stock assessment Plan Team recommendations for a moratorium on directed fishing for AI pollock going back to 1996:

> "*...the Plan Team believes that the Aleutian pollock fishery should be managed on a bycatch-only basis for the following reasons: 1) the trawl survey time series indicates that the Aleutian pollock biomass has declined sharply and consistently since 1983, and gives no reason to expect an upturn in the foreseeable future; 2) some fish captured in the Aleutian Islands region may be part of the Aleutian Basin stock, a stock on which fishery impacts should be minimized; and 3) pollock has been shown to be an important prey item for Steller sea lions....*"

Unfortunately, the NMFS 30 November 2000 Steller sea lion FMP-level Biological Opinion (p. 238) concluded that a pollock fishery closure is "inappropriate" as an experimental test of the effectiveness of the sea lion RPAs. Whether or not the closure serves as a test of the effectiveness of the RPAs, it makes sense in all other respects and is far more reasonable and prudent from the point of view of Steller sea lion and pollock conservation alike.

Furthermore, Biological Opinion RPA contains no provision to disperse an "experimental" fishery geographically across Aleutian Islands management areas in the same manner as Gulf of Alaska pollock or Aleutian Atka mackerel, and the draft PSEIS Alternative 2.1 follows this ill-conceived approach despite the clear evidence of serial depletion of this stock over the course of the past decade. Between 1990 and 1998, more than 465,000 mt were taken out of the stock in a brief, intense first quarter fishery on pollock spawning aggregations, and nearly all of it was taken from sea lion critical habitat. In the Amukta Pass region, where large pollock spawning aggregations were exploited in the early 1990s, few pollock are found today. Over the course of the 1990s, the fishery moved farther west in search of fishable aggregations as the stock abundance declined. As an important secondary prey item for Steller sea lions in the Aleutian Islands, the loss of this resource due to serial depletion in the 1990s constitutes a major adverse impact on prey availability during a period of steady decline in the Aleutian sea lion population.

In the interest of rebuilding the pollock stock biomass and ensuring adequate prey availability for pollock predators, including the endangered Steller sea lion, the Aleutian Islands pollock fishery should remain closed.

6/01
C-1

Al L. Anderson, Chairman
Chignik Marketing Association
P.O. Box 10
Chignik Lagoon, Ak 99565

June 2, 2001

Dave Benten, Chairman
North Pacific Fishery management Council
605 West 4th Avenue Suite 306
Anchorage, Alaska 99501

Re: RPA Committee Recommendations For 2002 and Beyond

Dear Mr. Chairman,

As chairman of the Chignik Marketing Association, I am writing this letter in regards to our concerns with the RPA committees' recommendations for Steller sea lion recovery and fishery interaction.

Specifically, to the complete closure to fishing for Pacific cod in Area 4, which are the waters adjacent to our community. We understand that by closing our waters to fishing enables other areas to be opened. We disagree with this concept. We believe that all coastal communities should have equal access to resources adjacent to their communities. Also, all communities should equally share the burden of Steller sea lion recovery measures.

We also disagree with allowing trawling around Mitorfania Island and Spitz Island. We consider Mitorfania Island and Spitz Island to be part of our area. We resent the fact that there are recommendations to close most of the waters in our area used by the local fleet when pot fishing and then still allow trawling around Mitorfania Island and Spitz Island. This is unacceptable to us.

We have reviewed the "Zonal Approach" proposed by Alaska Marine Conversation Council and by comparison to the recommendations of the RPA committee, believe it is a better approach to Steller sea lion recovery and fishery interaction. We do, however, have some concerns about no-gear restrictions in Zone 3 of the AMCC proposal. We do not want to create a derby fishery that is unrestricted in Zone 3. We also have concerns about the four-season split, the 1/4 TAC allocations to each season, and the possible adverse effects when the cod are dispersed. We recommend that consistent stock surveys be conducted to determine the biomass in each of the four seasons and that the TAC is set for each season in proportion to the available biomass.

We understand that not any one proposal is perfect, but we support much of AMCC's proposal. Please include the above modifications and recommendations and we urge you to include the Zonal Approach in the analysis for Steller sea lion recovery and fishery interaction.

It is easy for fishermen to understand, provides equal access to the resource, and will be easy for managers to enforce and monitor.

We are preparing to start salmon fishing in Chignik and, in a matter of days, will be fishing. It may be impossible for us to attend the scheduled meeting or send any one to Kodiak, let alone review the documents and fully understand the complexity of the issue. Needless to say, the meeting comes at an extremely poor time for us. We encourage you not to limit the analysis to just one concept.

The forecast for low salmon prices and high operating cost increases the need to have access and opportunities to fish Pacific cod in federal waters next to our community.

We urge you to include the Zonal Approach in the analysis for Steller sea lion recovery and fishery interaction

Sincerely,

Al L. Anderson

Al Anderson
Chignik, Alaska

C-1
6/01

Native Village of Perryville
P.O. Box 101, Perryville, Alaska 99648

May 30, 2001

Dave Benten, Chairman
North Pacific Fishery Management Council
605 West 4th Avenue Suite 306
Anchorage, Alaska 99501

RE: RPA Committee Recommendations on Area 5 of GOA

Dear Mr. Chairman,

We are writing this letter today to express our concern about trawling that may be allowed near Mitrofania Island and Spitz Island from three miles out.

With Steller Sea Lion conservation measures shutting down fisheries everyone is trying to fish wherever they can. If trawling is allowed near Mitrofania and Spitz Islands and the Sea Lion population continues to decline, we are going to face even more restrictive regulations down the road.

Local people do not want to be the cause of further declines and no one else should be excused to come into our area and bring this upon us.

The food we catch to make it through winter is caught out in front of our villages. It includes salmon, cod, halibut, crab, marine mammals, clams, sea urchins etc. Each time a vessel trawls for Pollock or codfish in front of our village, they catch more than Pollock or cod.

We can no longer catch coho salmon from the Kametoolook River, which is the nearest river to Perryville because that salmon run has crashed. We can no longer hunt caribou because there is no longer caribou in our area and they are in Tier II status. Steller sea lions are endangered and everyone wants us to stop eating a traditional food. The trawlers want us to quit eating sea lion for subsistence food but they want to fish near the rookeries and haulouts.

We have expressed frustration at Board of Fish meetings because there is seldom any enforcement in our area to patrol and see what the vessels are doing.

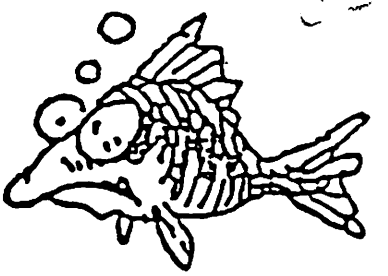
Our villages cannot move. We urge you to disallow this request because of the long-term consequences it will cause for our people.

Sincerely,

Gerald Kosbruk

Gerald Kosbruk,
President

North
Pacific
Longline
Association



May 9, 2001

Mr. Larry Cotter, Chairman
NPFMC RPA Committee
Juneau, Ak

RE: Longline RPA Alternative Proposal to the RPA Committee

Dear Larry:

Based on the NMFS written record as well as testimony and documentation we have presented to the RPA Committee and the Council, we make the following proposal:

Name of Proposer: Thorn Smith, North Pacific Longline Association

Brief Statement of Proposal: We propose that in the BSAI region longliners be exempted from the fishery restrictions in the 2002 RPA.

Jeopardy/Adverse Modification, CH, Pups: The longline fishery is well dispersed in time and space, minimal in critical habitat. It does not cause "holes in the prey field," or localized depletion (please see color charts of weekly effort by statistical area). It does not cause jeopardy, adversely modify critical habitat, or affect pups.

Social and Economic Impacts: None – status quo.

Minimize Bycatch of PSC and Groundfish: Bycatch mortality of halibut in the longline fishery is minimal, as is bycatch of other species.

Safety at Sea: No change – status quo.

Experimental Design: Don't know.

Supporting Information: Biops 1 & 2 and the Cod EA emphasized the temporal and spatial dispersion of the longline fishery, and its minimal impact on critical habitat – and did not recommend its inclusion under the RPA. It is the fishery that NMFS has always dreamed of (Penny Dalton, personal communication). BiOp3 addressed weekly removal rates, removals inside critical habitat and overall harvests of GROUNDFISH in the BSAI in 1999, by gear type. It concluded longline gear was far less likely to cause localized depletion than was trawl gear. (BiOp3, pp. 215-217) Here a reminder that the NPLA

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does not subscribe to the theory of localized depletion, but believes that predation by orcas and sharks is the key factor in the recovery of SSL's.

The Questions and Answers accompanying BiOp3 also address longlining and localized depletion. "...the hook and line fishery does fish in a manner that is consistent with the intent to minimize the disturbance in the prey field." (Q&A, p.6, 12/1/00, attached)

This language would lead one to the conclusion that longliners should continue unmolested by the RPA. However, in contrast to its statement that longliners took about 5,000 mt of groundfish per week in 1999 (BiOp3, p. 215), NMFS insisted that longliners took a maximum of 10,155 mt per week and because of that rate should be subjected to the RPA. (Biop3, Table 6.2, attached) No other rationale was offered. In fact the maximum weekly harvest by longliners was only 5,593 mt, about half the amount claimed. (Please see E-mail exchange between Smith, DeMaster, Smoker, attached) Contrary to other assertions in the BiOp, average removals in the first half of the year were only 2,840 mt, average removals from mid-September to Mid-November were 3,158 mt. (See BiOp3, p. 215, 1999 best blend estimates, attached) These BiOp3 errors are critical.

BiOps 1 & 2 and the Cod EA did not find that the BSAI longline fishery should be subject to the RPAs. The sole criterion for inclusion suggested in BiOp3 was in error. Clearly the status quo ante BiOp3 is the proper status for the longline fleet. Any 2002 RPA restrictions should be designed around that fishery.

Sincerely,

Thorn

Thorn Smith

Fishing vessels are, of course, mobile and impacted vessels should be able to shift their operations to open areas provided they are able to find markets for their catch in different communities. Fishermen may face increased costs and uncertain markets if they are forced to shift their operations away from the communities in which they live. However, because of their mobility, we would expect the impacts to individual fishermen to be less than the impacts to processors and the communities located within closed areas.

Q 9. What's going to happen to the carefully arranged bycatch management system in the BSAI and GOA under this new fishery scheme (crab/halibut/salmon...)?

In the biological opinion, NOAA Fisheries, has first determined what is necessary to remove jeopardy from SSLs, and then worked with NOAA Fisheries' Sustainable Fisheries to implement the RPA in a manner that would minimize impacts or modifications to current management strategies that minimize bycatch at certain times of the year and in certain locations.

Q 10. Is it true Eastern Bering Sea pollock stocks are up 70% for 2001? If so, how can SSLs be starving due to fishery removals when the supply of pollock is going up? Doesn't this prove the junk food hypothesis?

The Plan Team reported that biomass of pollock (3 years and older) in 2001 is considerably larger than the equivalent biomass estimate in 2000. That fact doesn't remove the potential for commercial fisheries to adversely impact the prey field of Steller sea lions. What does matter is that we are attempting to ensure that adequate forage is available to Steller sea lions throughout the year and throughout their range. Removals on the order of 15,000 tons per day of key prey species, like pollock, can create areas where sea lions can not effectively forage. In general, NOAA Fisheries has concluded that prey biomass in the BSAI and GOA is adequate to support a viable population of Steller sea lions. However, NOAA Fisheries has also concluded that commercial fishing for pollock, Pacific cod, and Atka mackerel can seriously deplete the local prey field that sea lions rely on to survive and reproduce.

Q 11. Long-liners and pot fisheries don't make "holes in the prey field", they catch fish one at a time. Why are those gear fisheries included in this scheme?

~~Long-lining includes hook-and-line fishing and the pot fishery.~~ Individually, these two types of fishing do not have the magnitude of impact on fisheries as does the trawl fishery. However, cumulatively, the rate of removal for pot fisheries can be high over short time periods and total removals approach that of the trawl fishery for some species. This makes the potential rate of removal for these fisheries a concern, and does have the potential to create "holes in the prey field". However, the hook and line fishery does fish in a manner that is consistent with the intent to minimize disturbance to the prey field. NOAA Fisheries recognizes that and for that reason , NOAA Fisheries is allowing hook and line fishing during periods that other fishing is restricted. As protective measures for SSL are being developed, both fisheries are being reviewed separately from ~~other~~ trawl fisheries to see if their impact is of concern.

Q 12. Why does NOAA Fisheries believe that cod fishing jeopardizes Steller sea lions?

Cod is an extremely important component of the SSL diet especially in winter when SSL conservation is considered most important. Most of the fishery occurs inside critical habitat. For these reasons, the cod fishery overlaps in area, in time, and removes large amounts of fish in a very short period, thereby potentially creating "holes in the prey field", which can be of significant consequence to SSLs. The cod fishery is conducted using several gear types and NOAA Fisheries is considering the impacts of each of these gear types when developing conservation measures, as the various gear types have the potential for different levels of impacts.

Q 13. Substantial evidence seems to indicate other causes for the decline of Steller sea lions, such as ocean regime shift and predation by killer whales. Why is NOAA Fisheries focusing on the fisheries as the cause of the decline?

It is difficult to separate the effects of the regime shift and the effects of fishing on the declining SSL population. However, NOAA Fisheries has examined all the known or apparent causes of the decline - environmental shifts, increased predation, direct mortality, indirect and/or incidental

Table 6.2. Summary of the possible effects of harvesting groundfish in the BSAI and GOA with various gear types.

	Trawl	Hook-and-line	Pot	Jig
Percentage of total catch in 1999	BSAI = 86% GOA = 73%	BSAI = 12% GOA = 14%	BSAI = 2% GOA = 13%	BSAI = 0.02% GOA = 0.1%
Maximum rate of removal (mt/week in 1999)	BSAI = 96,072 GOA = 18,357	BSAI = 10,155 GOA = 4,336	BSAI = 5,753 GOA = 4,087	BSAI = 47 GOA = 34
Number of vessels in 1998	BSAI = 166 GOA = 198	BSAI = 115 GOA = 876	BSAI = 79 GOA = 178	
Bycatch of prohibited species	salmon herring halibut crab	halibut some crab	crab	
Effects on habitat	Bottom trawl disturbance of benthic habitat, modification of hard substrate. Long term ecological effects are likely to reduce biodiversity. Incidental catch of living substrates (corals, anemones, sponges, and sea whips) and modification to non-living substrates.	Some disturbance with similar effects as bottom trawl (although on a smaller scale). Incidental catch of living substrates (mostly anemones and sponges) and modification to non-living substrates.		Significant negative impacts to benthic habitat is unlikely.

----Original Message----
From: Andy Smoker <Andy.Smoker@noaa.gov>
To: Douglas Demaster <Douglas.Demaster@noaa.gov>
Cc: Lowell Fritz <Lowell.Fritz@noaa.gov>; Thorn Smith <Thorndog@worldnet.att.net>
Date: Friday, March 02, 2001 12:59 PM
Subject: Re: MAXIMUM WEEKLY COD CATCH IN BSAI

greetings shaky town....

I have no idea where the 10,155 mt amount came from. I don't recall providing this information for the BIOP I may have but its part of the problem when folks ask for information that they think they understand, but don't really understand the intricacies of the data, and or don't hear or understand the conditions that the providers send along, ...or for that matter make simple spread sheet errors in manipulating the data (of which all conditions I'm also guilty)..

The spread sheet I sent is for groundfish & may actually include a little non quota.. ie non groundfish species. I re ran the data this morning excluding non-quota species and don't see that it decreased the amount. Sooo what I sent and am sending today is ALL GROUNDFISH which includes the non-target species (ie bycatch).
The term bycatch can refer to prohibited species. I've included a table of halibut mortality for the H&L in mt by week. (the mortality rate applied against total bycatch is about 12% for hook& line gear).

Also this estimate includes all targets..ie Pcod, greenland turbot and sablefish...

as far as explanations of such a dramatic difference in these two estimates goes.....ya got me...
The maximum week for pot gear that I've seen over the years is about 4,000 mt. For 1999 it appears to be about 3,000. That combined with the H&L amount gets you closer to the 10kmt number but not quite. I understand that the estimate for pot gear is pretty high as well. The 10 kmt number does appear to be about double the estimate I get from the blend ...so maybe a factor got in there some how....Or if somebody was working with exclusively observer data and tried to extrapolate for the unobserved boats .... of the 30 or so at sea catcher processors about 1/3 of them are >60' but <125 and are therefore observed 30% of the time. However they'd represent the smaller boats so I don't see an erroneous extrapolation procedure increasing the catch by roughly 100% based on the 70% of the unobserved catch of the least productive 1/3 of the fleet...huh...I dunno....

Douglas Demaster wrote:

> Andy- thanks for responding to Thorn so fast. Do you know where the figure 10,155 mt came from (table 6.2 BiOp3) for HAL max rate of removal in 1999? Does the 10,155 mt figure include bycatch while the 5,593 figure does not? Thanks. Doug
>
> Andy Smoker wrote:
>
> > groundfish catch by week by gear type.
> > maximum weekly catches are as follows:
> > HAL= 5,593 JIG =24 POT = 2,920 TRW = 90,720
>
> Thorn Smith wrote:
>
> > ANDY, A WHILE AGO YOU CONFIRMED THAT THE MAXIMUM WEEKLY CATCH OF GROUNDFISH (ALL CATCH AND BYCATCH) IN THE BSAI IN 1999 WAS ABOUT 5,700 MT (I CAN'T FIND THE NUMBER). THE AFSC IS STILL INSISTING IT IS IN EXCESS OF 10,000 MT. I NEED TO GET THE TRUTH TO DOUG DEMASTER FAST. I HAVE CALLED YOU, BUT NO ANSWER. IF YOU GET THIS MESSAGE AND CAN CALL OR E-MAIL DOUG COPYING ME, I WOULD APPRECIATE IT. THANKS, THORN

1999 BLEND ESTIMATES OF WEEKLY GROUNDFISH CATCH BY GEAR

MAX		5,593	24	2,920	90,716	BYCATCH MORTALITY 53

WED	HAL	JIG	POT	TRW
01/02/99	1,233			
01/09/99	4,788			
01/16/99	4,550		6	
01/23/99	3,921	3		13,905
01/30/99	4,231	2		51,858
02/06/99	3,971	4		82,466
02/13/99	4,575	13		90,303
02/20/99	4,508			58,731
02/27/99	4,282	3		79,388
03/06/99	4,378	9	13	66,648
03/13/99	3,715	2	15	40,164
03/20/99	3,990	1	4	28,346
03/27/99	4,585	1	0	15,702
04/03/99	4,714	0	595	20,451
04/10/99	4,501		1,359	13,437
04/17/99	5,039		2,920	9,745
04/24/99	562		260	7,548
05/01/99	986	2	80	8,106
05/08/99	2,009		1,714	7,178
05/15/99	1,762		2,406	6,976
05/22/99	624		1,466	5,673
05/29/99	526	2	1,342	2,982
06/05/99	523	2	1,126	1,482
06/12/99	427	5	590	1,335
06/19/99	228	7		1,331
06/26/99	141	2		1,576
07/03/99	133	17		519
07/10/99	128	1		6,215
07/17/99	164	16		7,469
07/24/99	172	6	1	11,416
07/31/99	90	1	3	15,668
08/07/99	37	8	2	47,135
08/14/99	235	6	2	62,531
08/21/99	645	7	2	65,661
08/28/99	913	2		66,963
09/04/99	1,399	2	191	36,472
09/11/99	2,233	3	567	36,044
09/18/99	3,271	3	542	51,131
→ 09/25/99	5,593	8	604	90,716
10/02/99	4,302		715	60,444
10/09/99	3,993		475	59,801
10/16/99	4,765	24	45	24,599
10/23/99	1,921			9,746
10/30/99	836	3	3	19,119
11/06/99	583	2	6	3,077
11/13/99	889		14	2,598
11/20/99	945		5	1,791
11/27/99	719	1		1,341

WED	OfHAL_MORT
01/02/99	6
01/09/99	32
01/16/99	29
01/23/99	15
01/30/99	17
02/06/99	14
02/13/99	17
02/20/99	17
02/27/99	13
03/06/99	18
03/13/99	15
03/20/99	11
03/27/99	15
04/03/99	16
04/10/99	15
04/17/99	19
04/24/99	-
05/01/99	11
05/08/99	48
05/15/99	4
05/22/99	0
05/29/99	3
06/05/99	0
06/12/99	0
06/19/99	0
06/26/99	0
07/03/99	2
07/10/99	1
07/17/99	0
07/24/99	0
07/31/99	0
08/07/99	0
08/14/99	-
08/21/99	-
08/28/99	0
09/04/99	3
09/11/99	7
09/18/99	22
09/25/99	47
10/02/99	38
10/09/99	34
10/16/99	53
10/23/99	17
10/30/99	0
11/06/99	1
11/13/99	1
11/20/99	0
12/11/99	6

12/04/99	323			191
12/11/99	769	5		22
12/18/99	1,016		9	33
12/25/99	226		14	
12/31/99	532			

12/18/99	10
12/25/99	2
12/31/99	1
12/25/99	15
12/31/99	11

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

May 8, 2001

Mr. Thorn Smith
North Pacific Longline Association
4209 21st Avenue West, Suite 300
Seattle, Washington 98199

Dear Thorn,

Thank you for your data request regarding the percentage of groundfish catch and the maximum rate of groundfish removals by gear type in the Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands management area (BSAI) for 1999.

Those proportions and amounts are as follows:

1999 Percentage of total catch of groundfish by area and gear

	Trawl	Hook & Line	Pot	Jig
BSAI	91%	8%	1%	0.01%
GOA	79%	13%	8%	0.10%

1999 Maximum weekly catch of groundfish by area and gear

	Trawl	Hook & Line	Pot	Jig
BSAI	90,716	5,593	2,920	24
GOA	12,746	2,242	2,054	34

We acknowledge that this information was erroneously presented in Table 6.2 of the November 30, 2000, Biological Opinion and that future analyses upon which section 7 consultations are based will use the correct data.

Sincerely,

James W. Balsiger
For Administrator, Alaska Region

CC: Rob Wurm

Responses of Cod *(Gadus morhua)* and Haddock *(Melanogrammus aeglefinus)* to Baited Hooks in the Natural Environment

Lokkeborg, Bjordal, and Ferno. 1989. Canadian Journal of Fisheries and Aquatic Science 46: 1478-1483.

Summary: The behavior of cod and haddock was observed in the North Sea with underwater television. The study was conducted from an oil platform which provided stable concentrations of fish at a weather independent observation site. While a portion of the study is devoted to behavioral responses to different baits, there are elements of the study concerning the effectiveness of longline gear in the prey field. The findings substantiate that longline gear is less likely to contribute to local depletion due to its relative effectiveness in the prey field and water column.

- Less than 5% of the cod reacted to the bait and showed a behavior response pattern. Of those that reacted, only 29% of the cod bit the bait, and of those that bit the bait, only 37% were hooked. $= 0.5\%$
- Cod rarely made more than one behavioral sequence and only four fish were observed to make a bite more than once.
- Of the total number of cod hooked, 50% were hooked while an other fish was making an intense response to a bait. The struggling of a hooked fish often stimulated other fish to respond.
- The swimming activity of cod decreased in periods of strong current. There is a general tendency of the fish to swim upstream and a stronger tendency of responding fish to swim upstream to the bait which indicates that the feeding activity is stimulated chemically.
- Cod have a daily rhythmic feeding activity, with an increase at dawn and a decrease at dusk as well as varying seasonally (bimodal in September and unimodal in December). The low activity of night may be caused in part by a vertical migration off the bottom. This suggests that the effectiveness of longline gear may vary during the day in terms of cod feeding behavior.

DATA USED IN FIS MAPS FOR YEAR 2000 (COD MT)

WK	W.E.D.	BLEND	FIS OBS	month	FIS OBS	WK	W.E.D.	BLEND	FIS OBS
ni	01-Jan-2000	584	180	APRIL	3180 *	36	09-Sep-2000	3662	1856
1	08-Jan-2000	4457	1806			37	16-Sep-2000	3698	1908
2	15-Jan-2000	5073	2148	MAY	1205 +	38	23-Sep-2000	2972	1292
3	22-Jan-2000	4352	1496			39	30-Sep-2000	3009	1443
4	29-Jan-2000	4128	1897	JUNE	167 *	40	07-Oct-2000	3163	1334
5	05-Feb-2000	3620	1372			41	14-Oct-2000	3099	1303
6	12-Feb-2000	3565	1654	JULY	465 *	42	21-Oct-2000	2664	1254
7	19-Feb-2000	4136	1934			43	28-Oct-2000	2542	1252
8	26-Feb-2000	3723	2075	AUGUST	2191 *	44	04-Nov-2000	2679	1303
9	04-Mar-2000	3214	1882			45	11-Nov-2000	2892	1645
10	11-Mar-2000	4047	1583			46	18-Nov-2000	3123	1205
11	18-Mar-2000		1319 *			47	25-Nov-2000	3237	1320
12	25-Mar-2000		1706 *			48	02-Dec-2000	2505	1686
13	01-Apr-2000		1667 *	DECEMBER	2,997 *				

FIS OBS = 28 VESSELS WHICH PERMITTED USE OF DATA

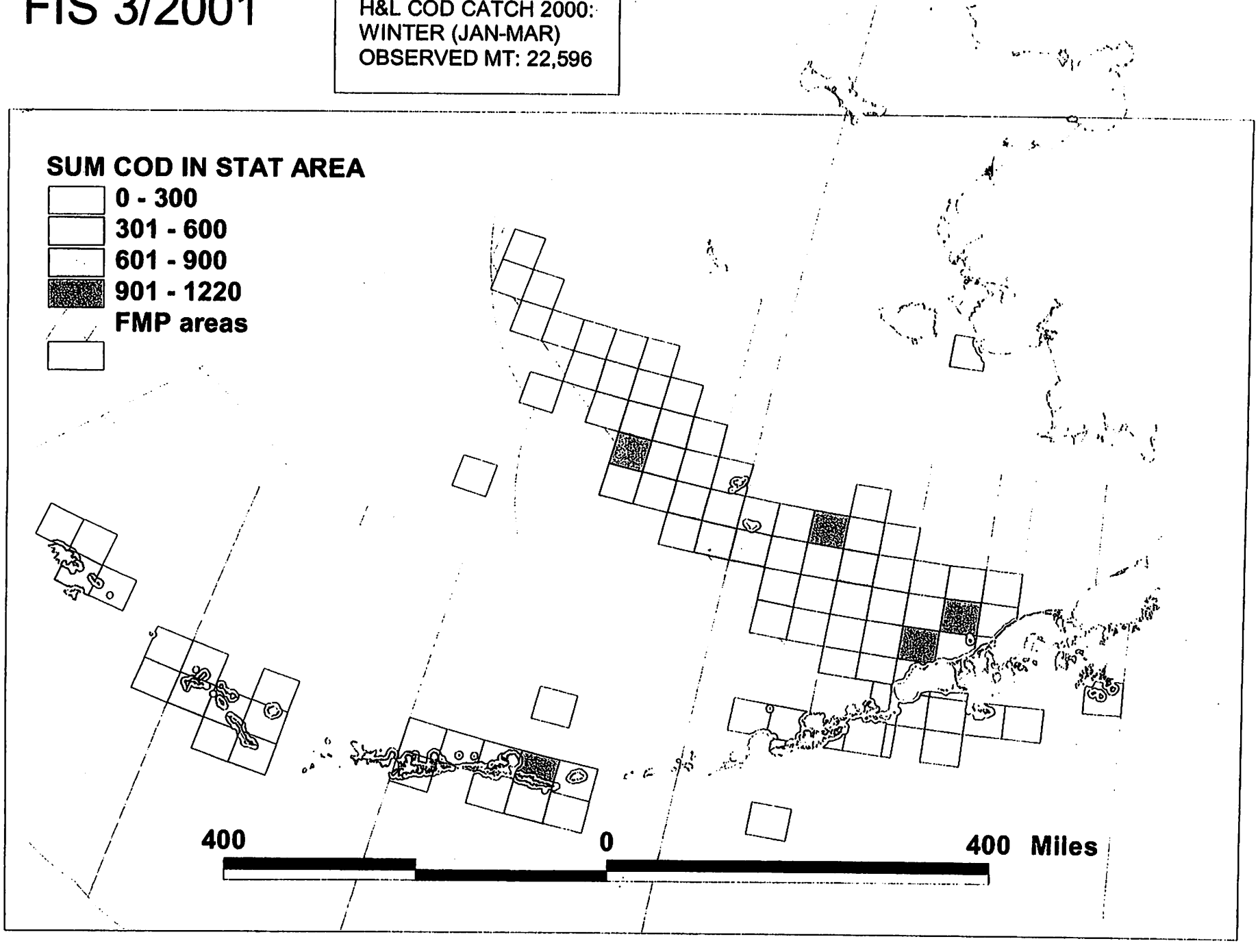
* CDQ CATCH

+TURBOT BYCATCH AND CDQ CATCH

STAT AREAS ARE ADF&G STATISTICAL AREAS
NOTE NONE OF SQUARES WERE GREATER THAN 400 MT

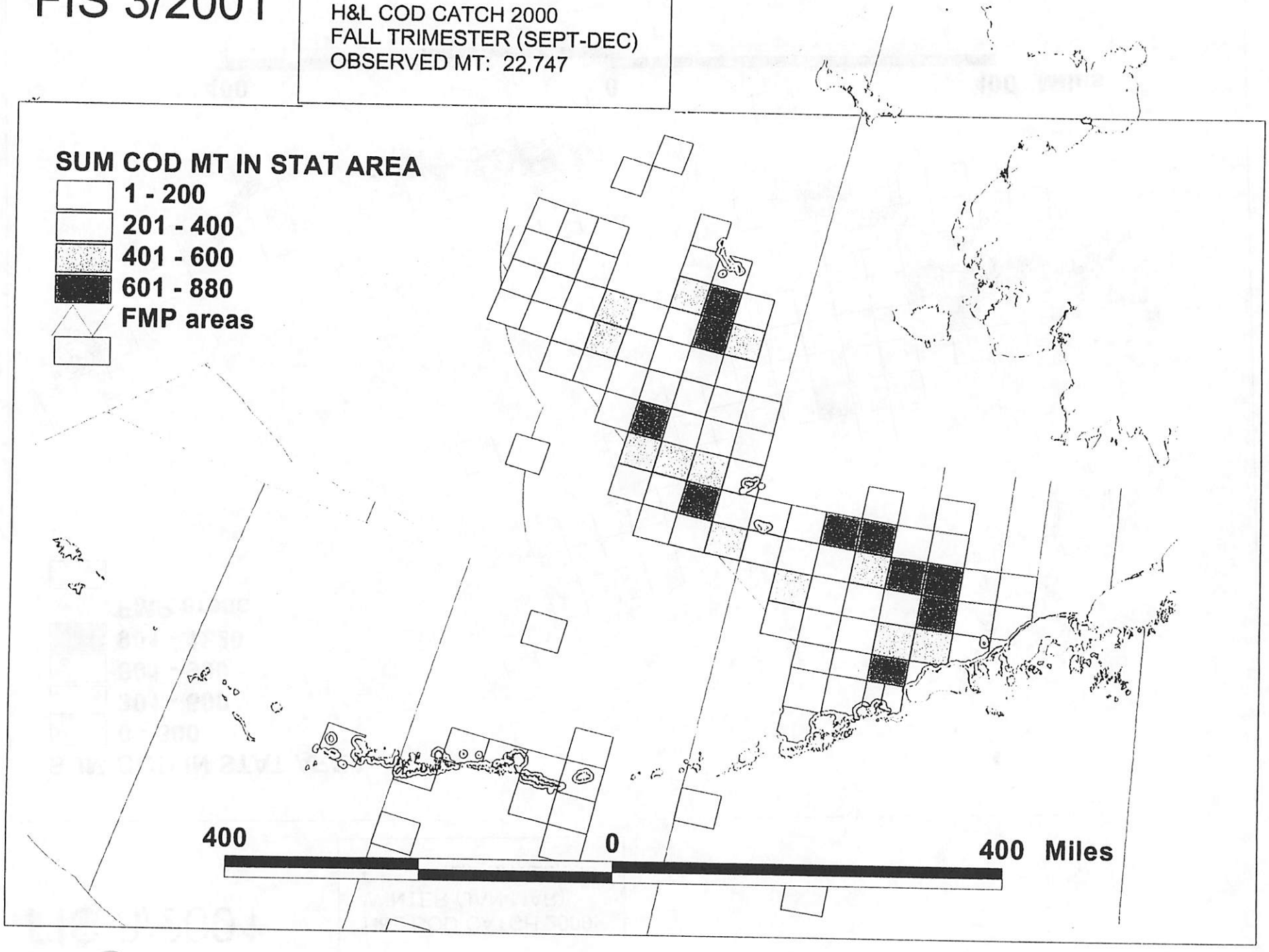
FIS 3/2001

H&L COD CATCH 2000:
WINTER (JAN-MAR)
OBSERVED MT: 22,596



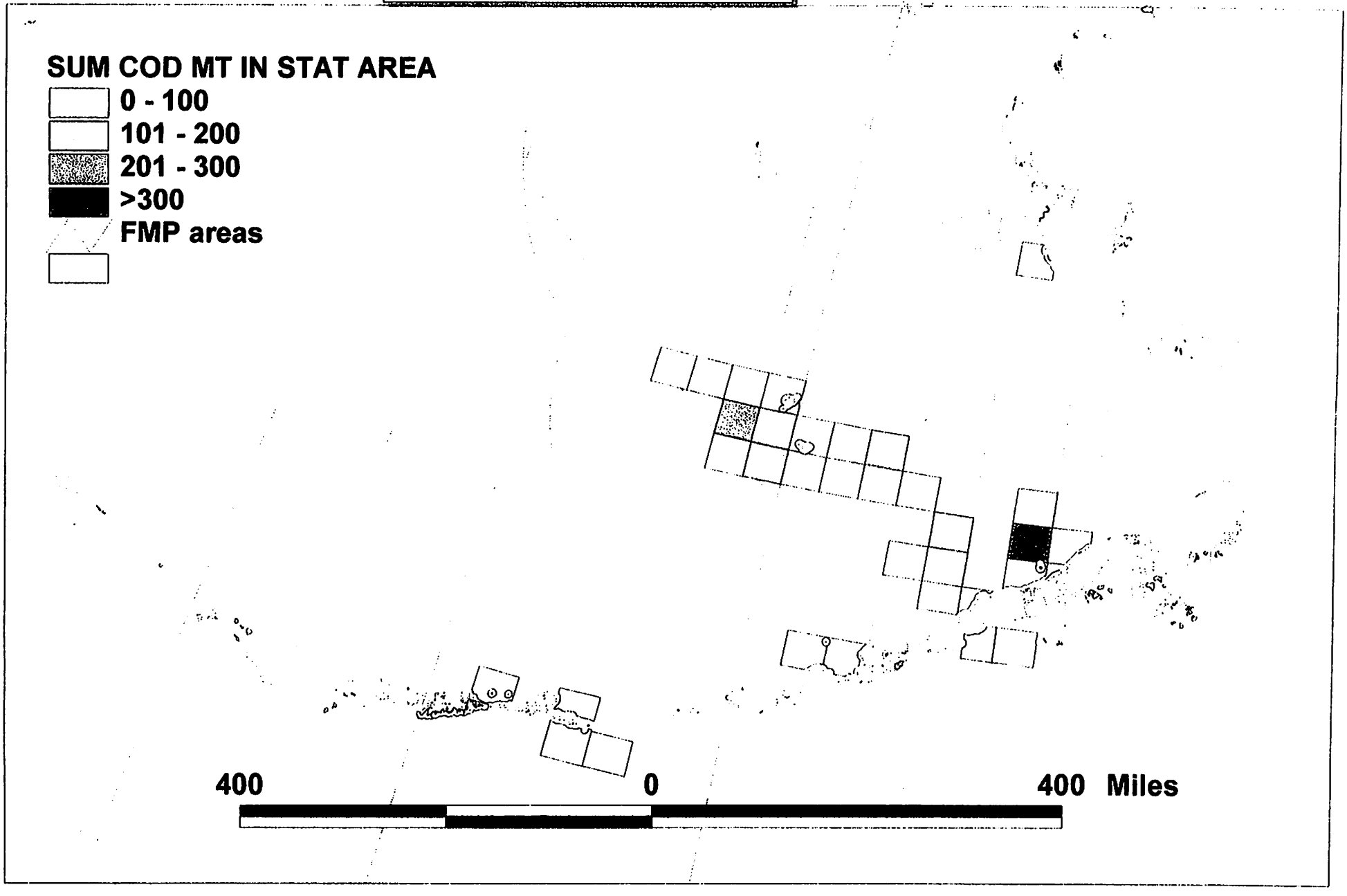
FIS 3/2001

H&L COD CATCH 2000
FALL TRIMESTER (SEPT-DEC)
OBSERVED MT: 22,747



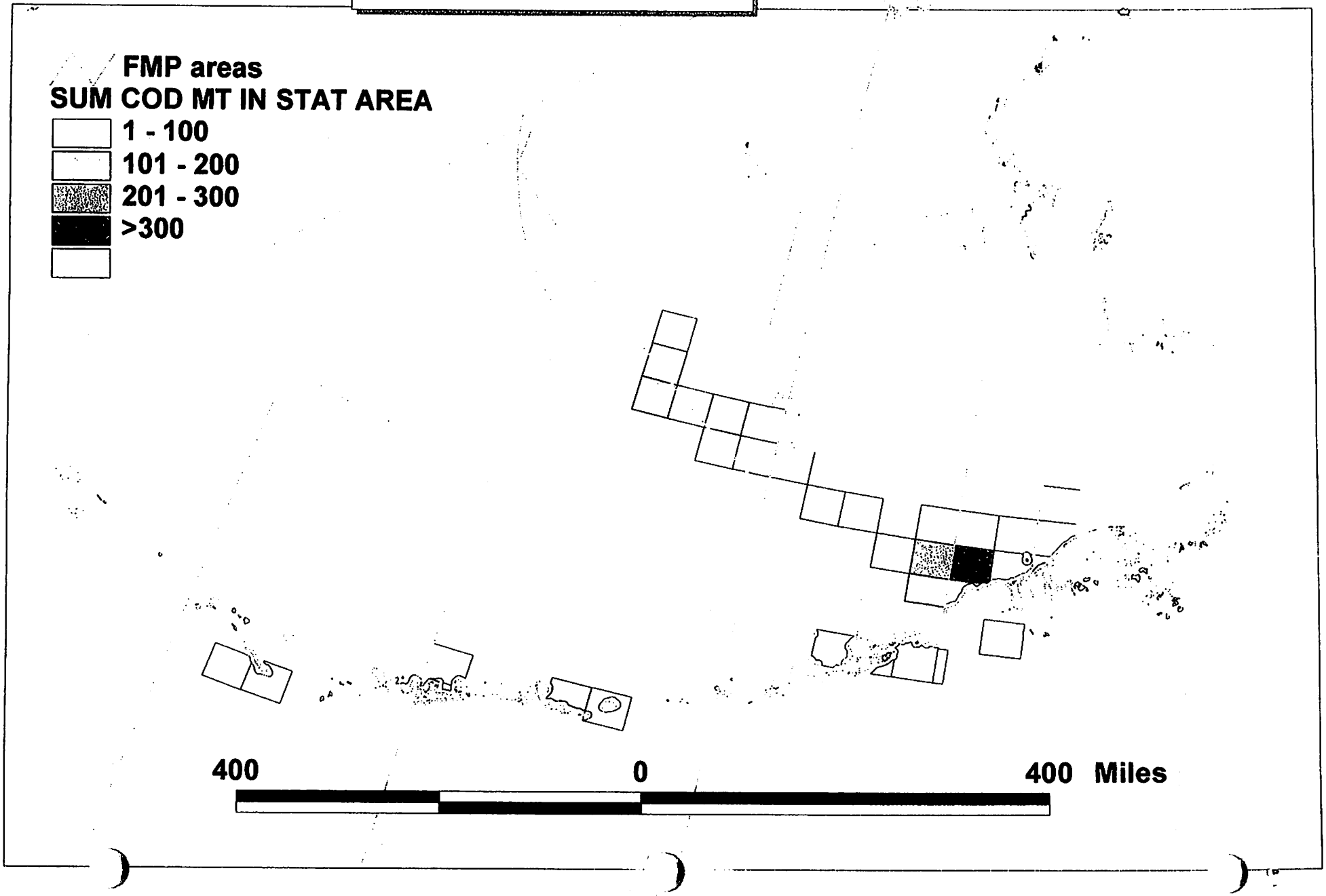
FIS 3/2001

H&L COD CATCH 2000: WEEK 1
BLEND COD MT: 4,457
OBSERVED MT: 1,806



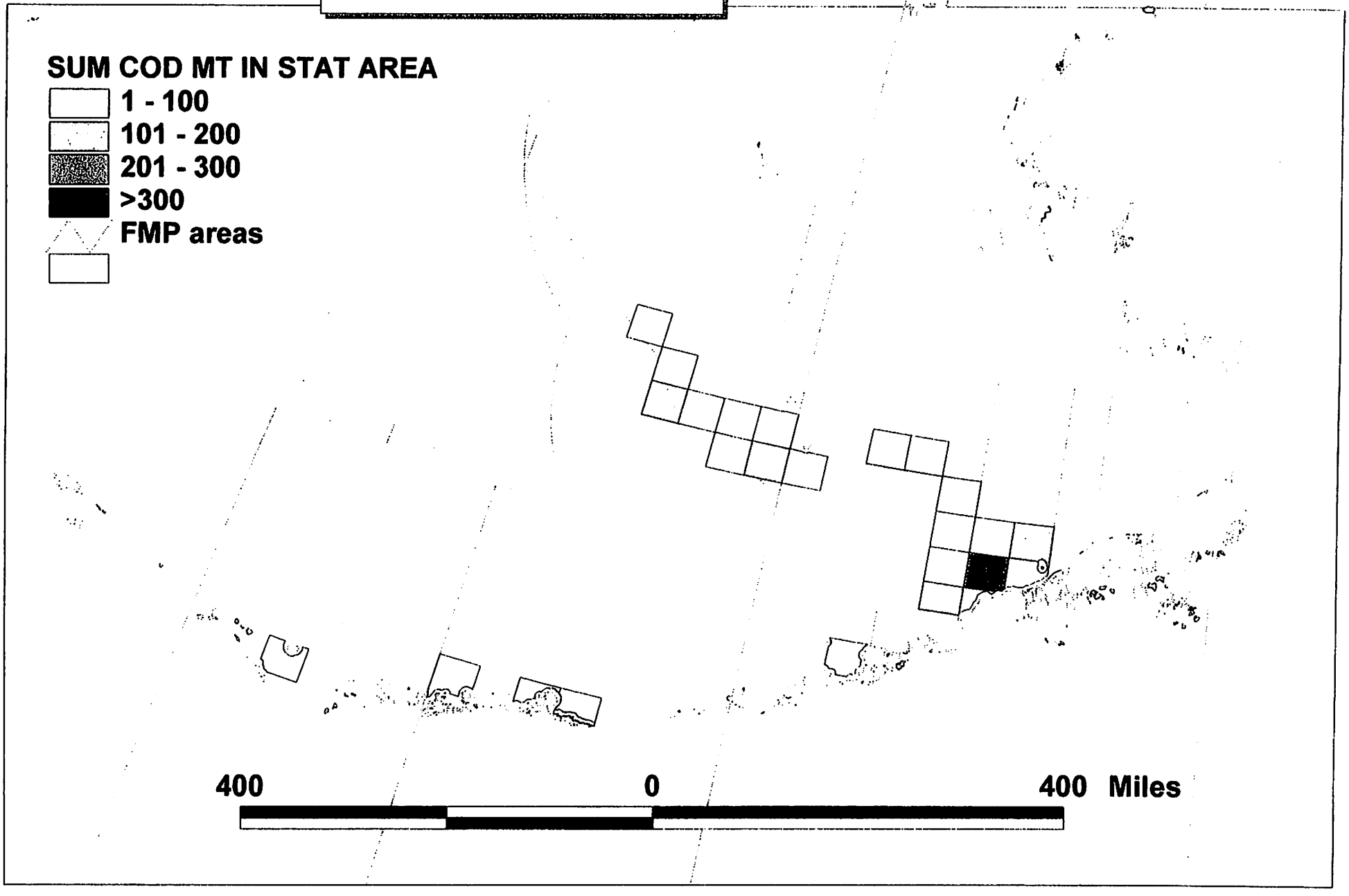
FIS 3/2001

H&L COD CATCH 2000: WEEK 2
BLEND COD MT: 5,073
OBSERVED MTI: 2,148



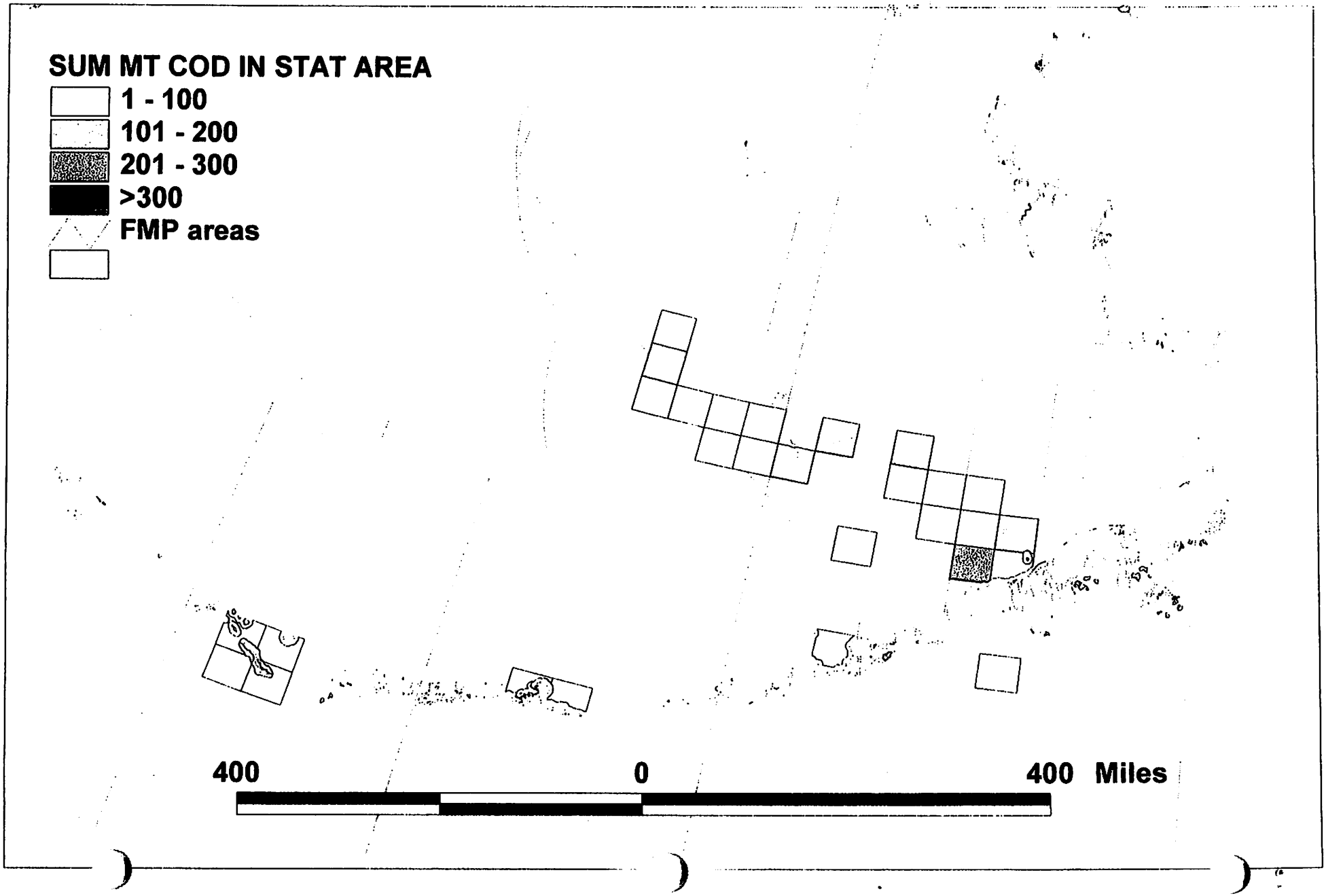
FIS 3/2001

H&L COD CATCH 2000: WEEK3
BLEND COD MT: 4,352
OBSERVED MT: 1,496



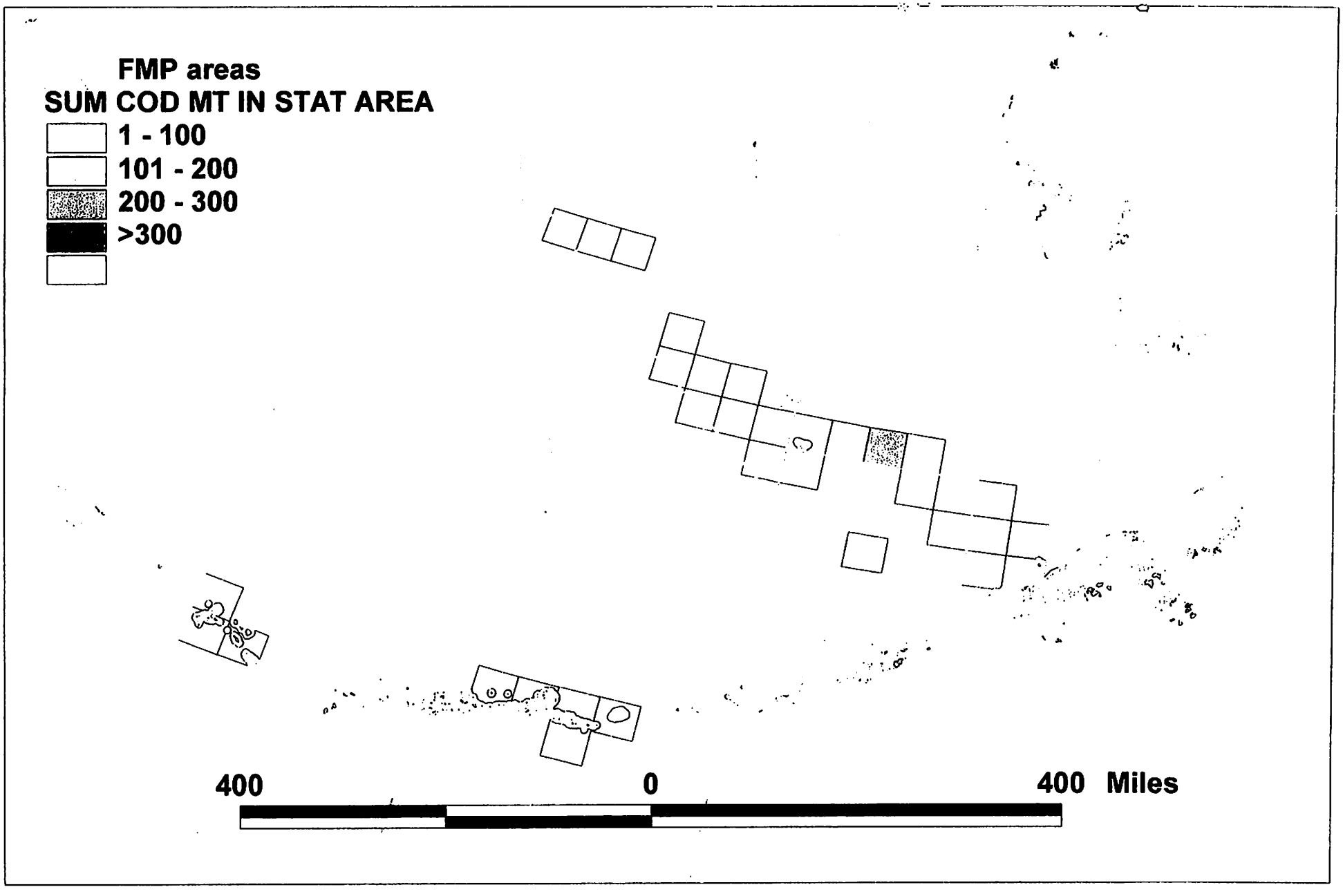
FIS 3/2001

H&L CATCH 2000: WEEK 4
BLEND COD MT: 4,128
OBSERVED MT: 1,897



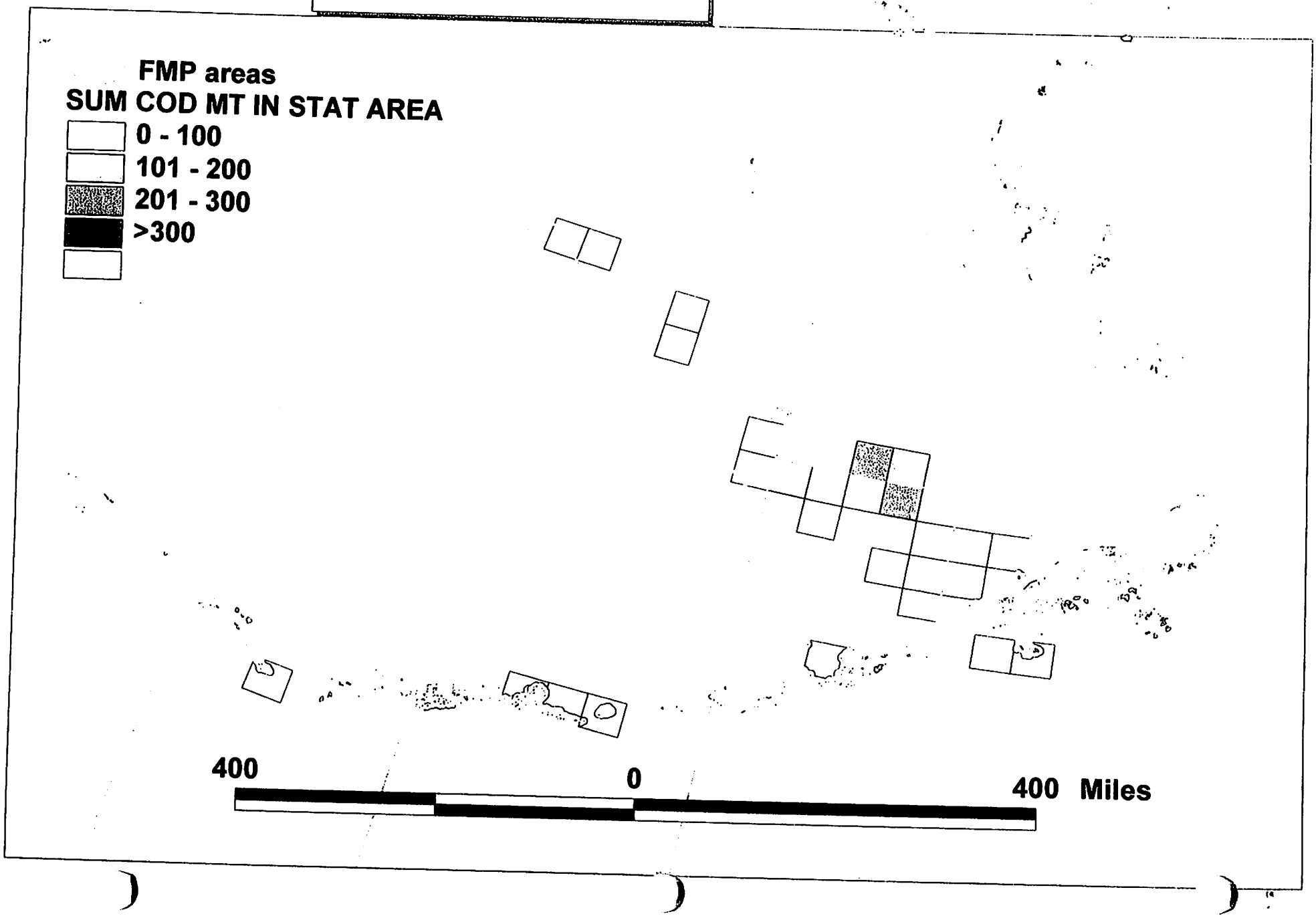
FIS 3/2001

H&L CATCH 2000: WEEK 5
BLEND COD MT: 3,620
OBSERVED MT: 1,372



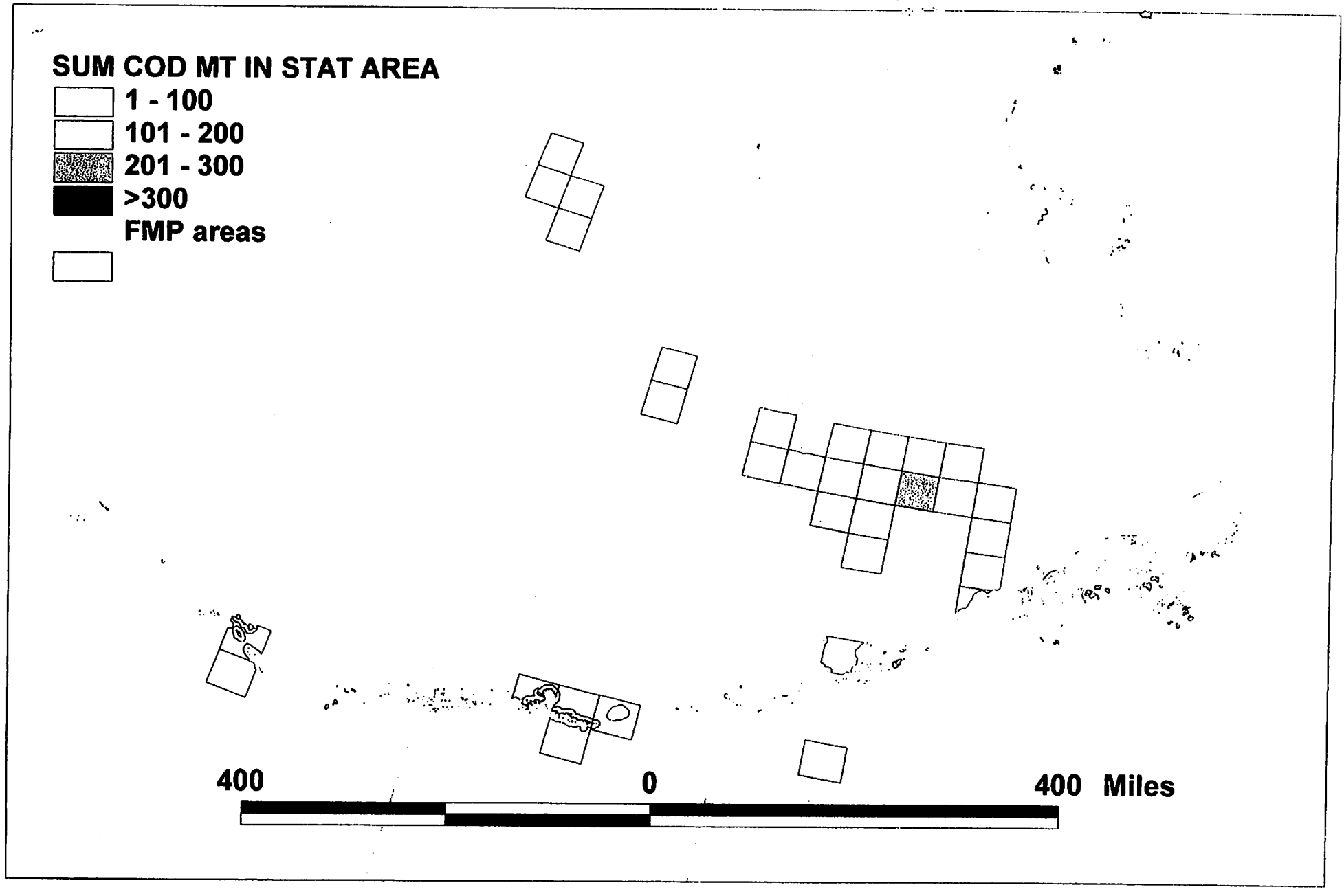
FIS 3/2001

H&L COD CATCH 2000: WEEK 6
BLEND COD MT: 3,565
OBSERVED MT: 1,654



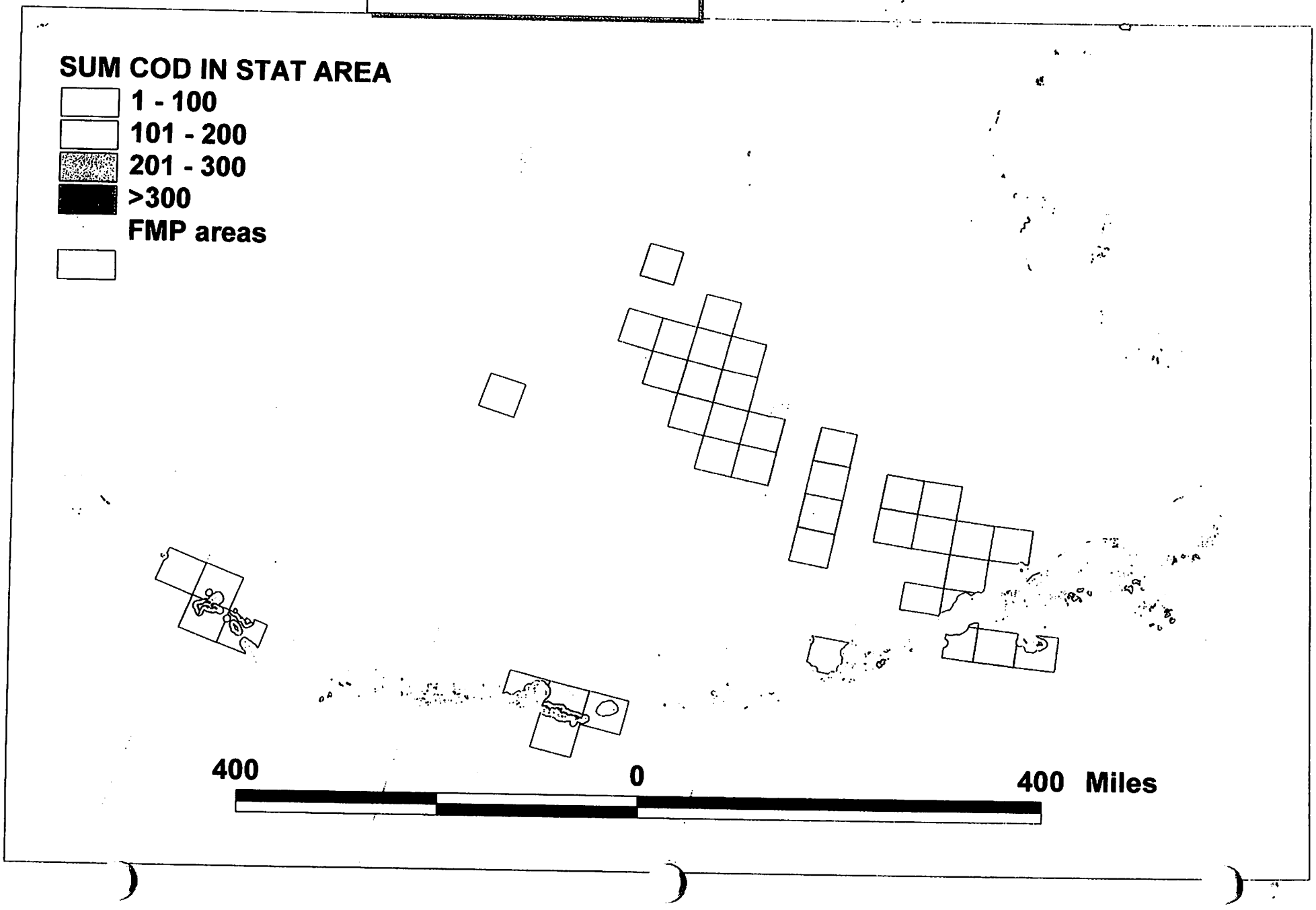
FIS 3/2001

H&L CATCH 2000: WEEK 7
BLEND COD MT: 4,136
OBSERVED MT: 1,934



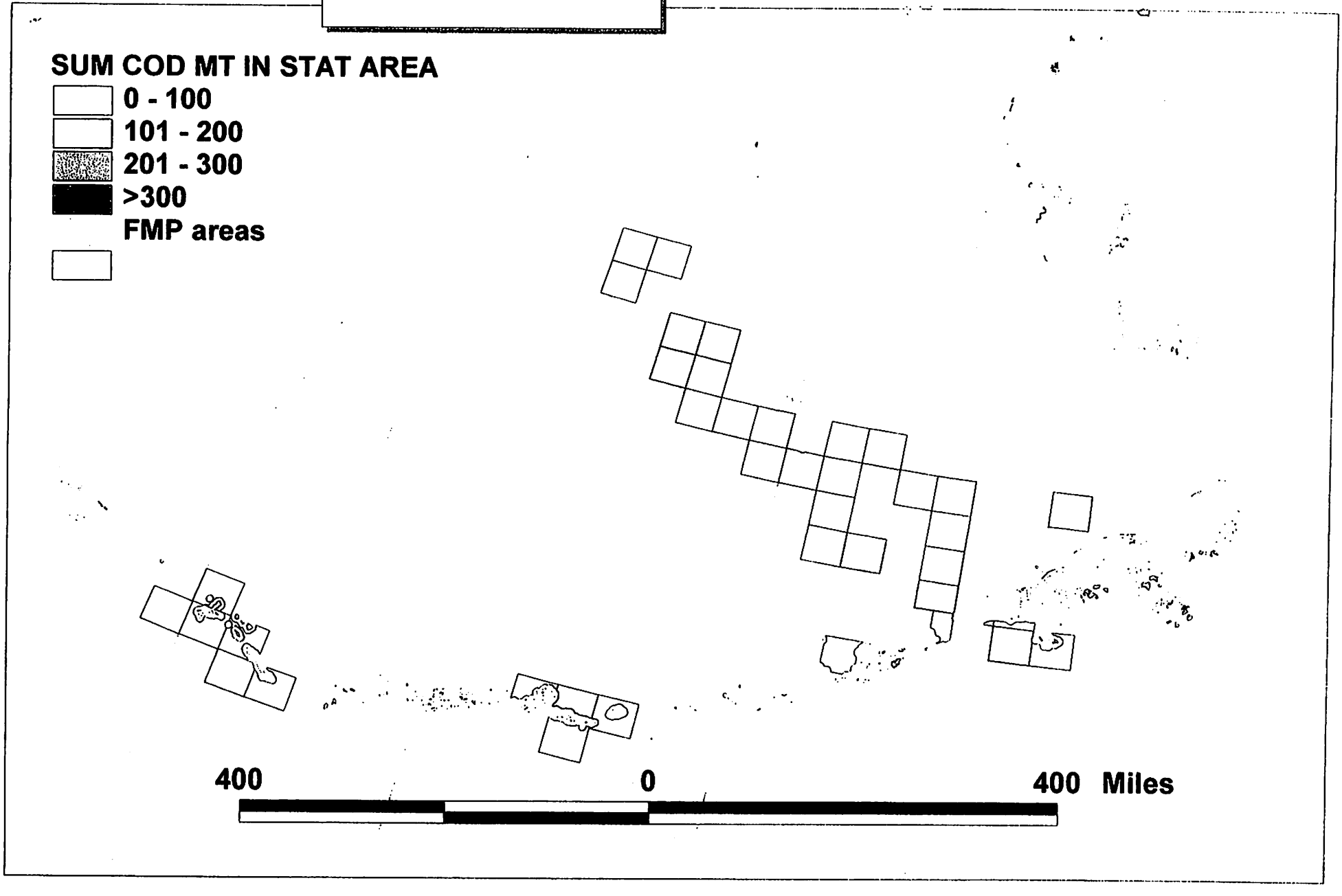
FIS 3/2001

H&L CATCH 2000: WEEK 8
BLEND COD MT: 3,723
OBSERVED MT: 2,075



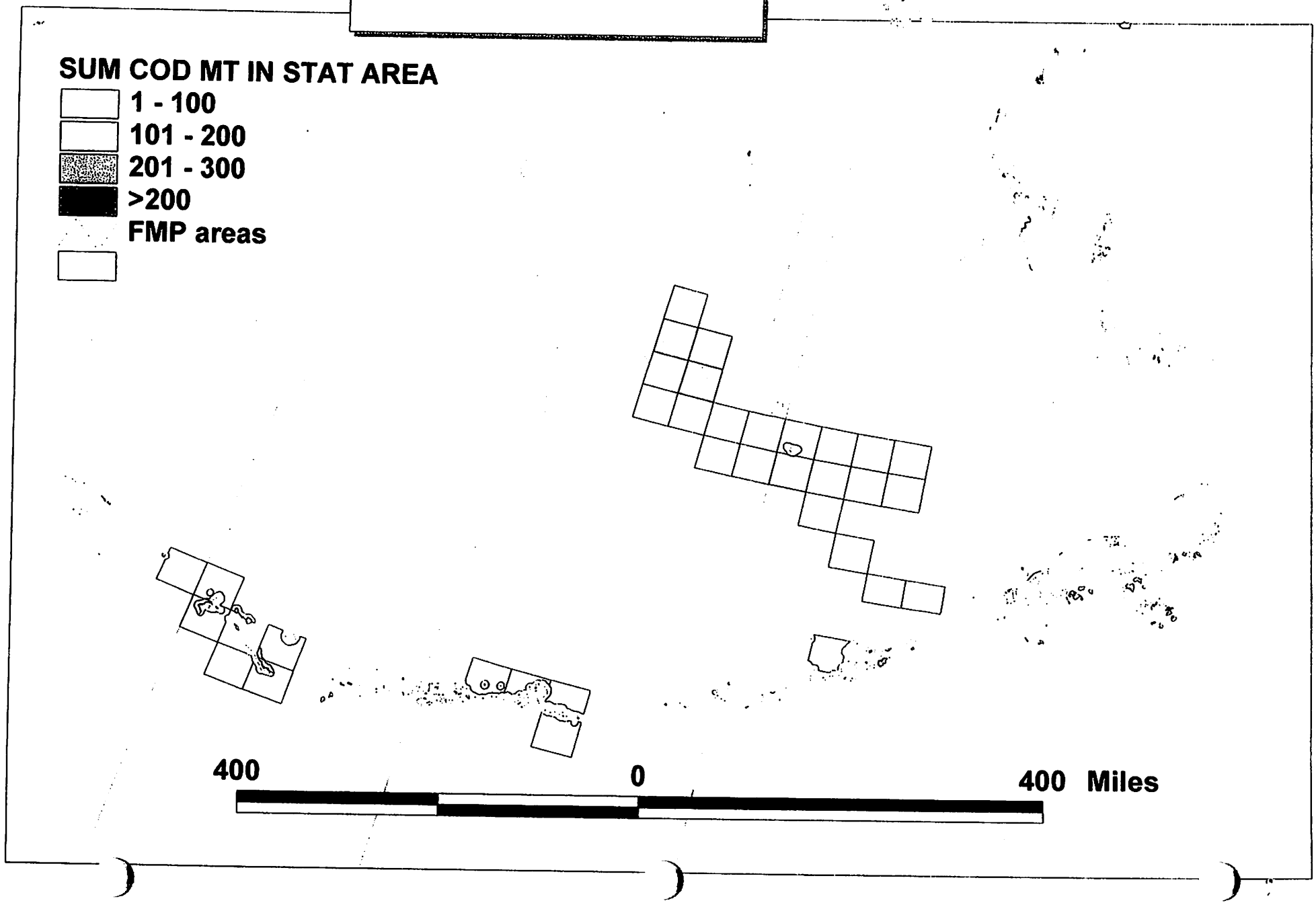
FIS 3/2001

H&L CATCH 2000: WEEK 9
BLEND COD MT: 3,214
OBSERVED MT : 1,882



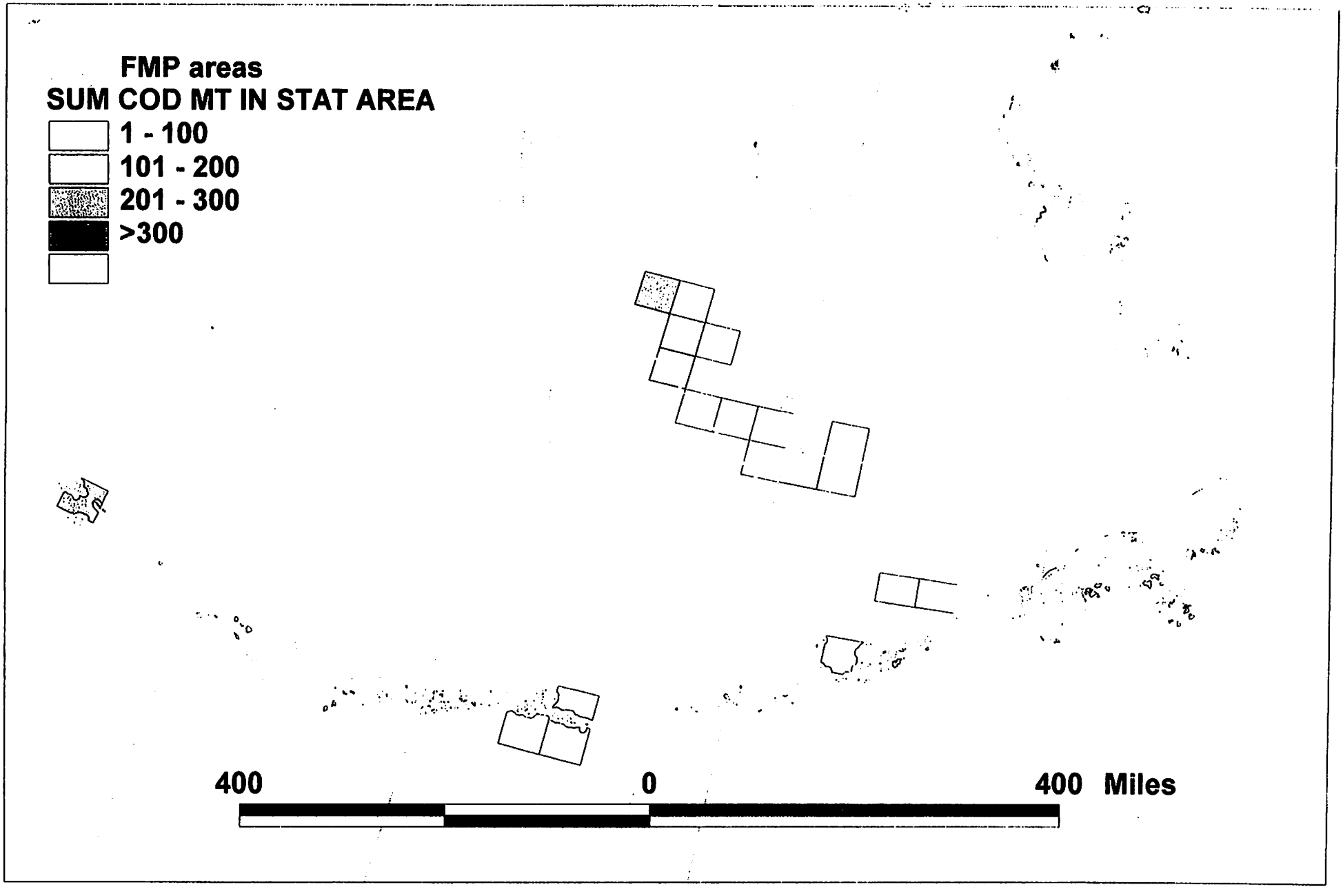
FIS 3/2001

H&L COD CATCH 2000: WEEK 10
BLEND COD MT: 4,047
OBSERVED MT: 1,583



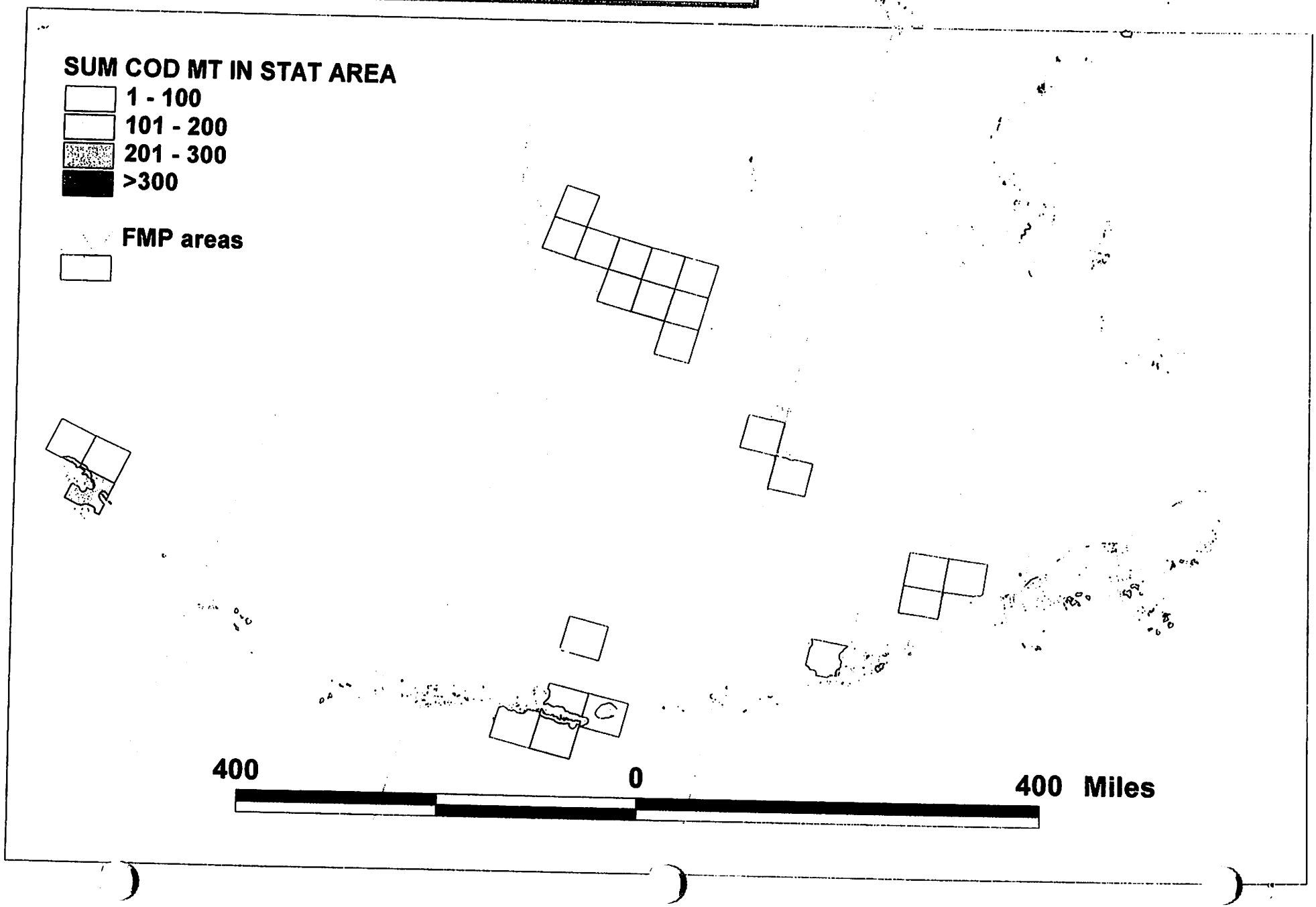
FIS 3/2001

H&L COD CATCH 2000: WEEK 11
OBSERVED CATCH 1,319



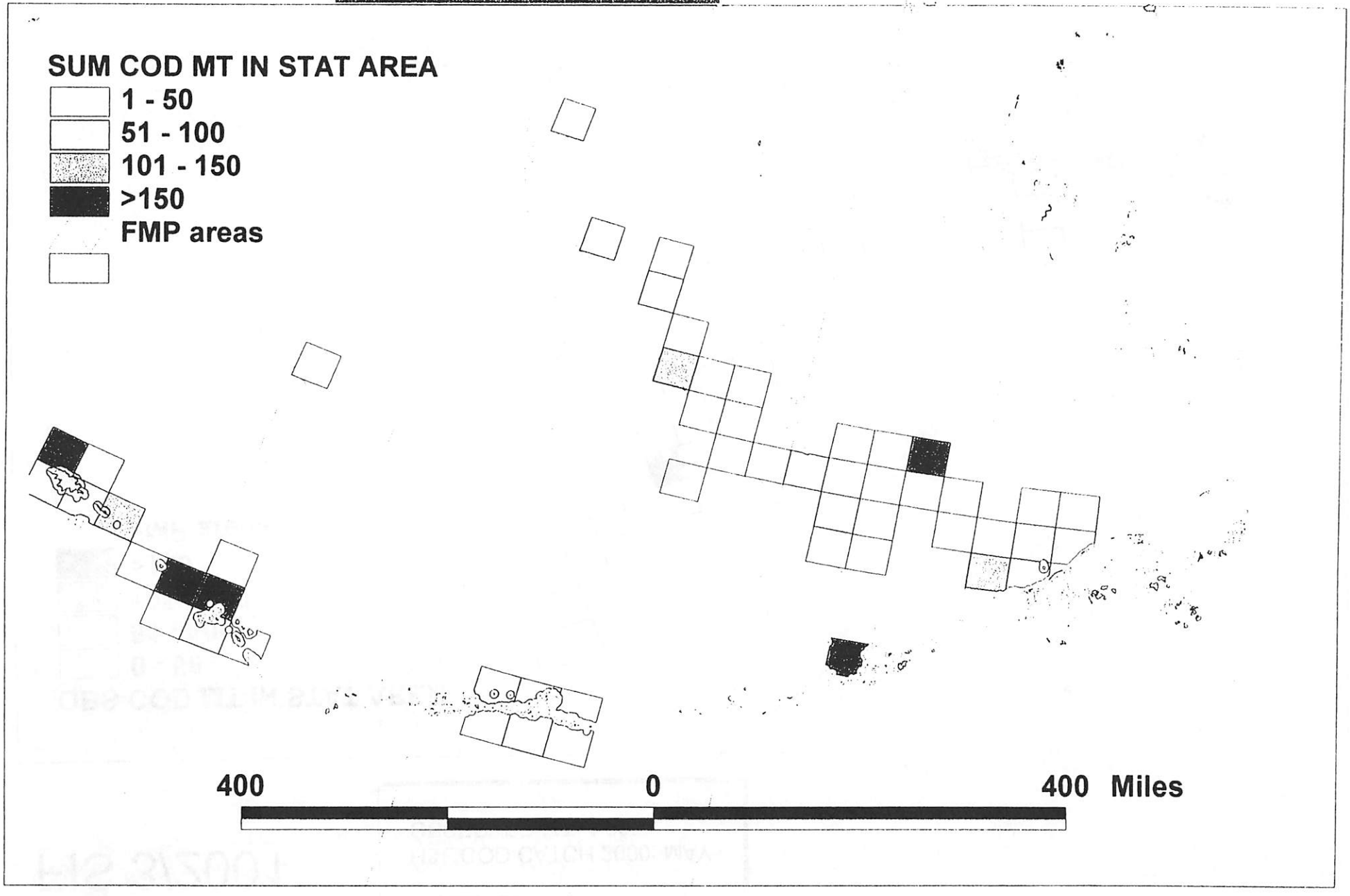
FIS 3/2001

H&L COD CATCH 2000: WEEK 12
OBSERVED CATCH: 1,706



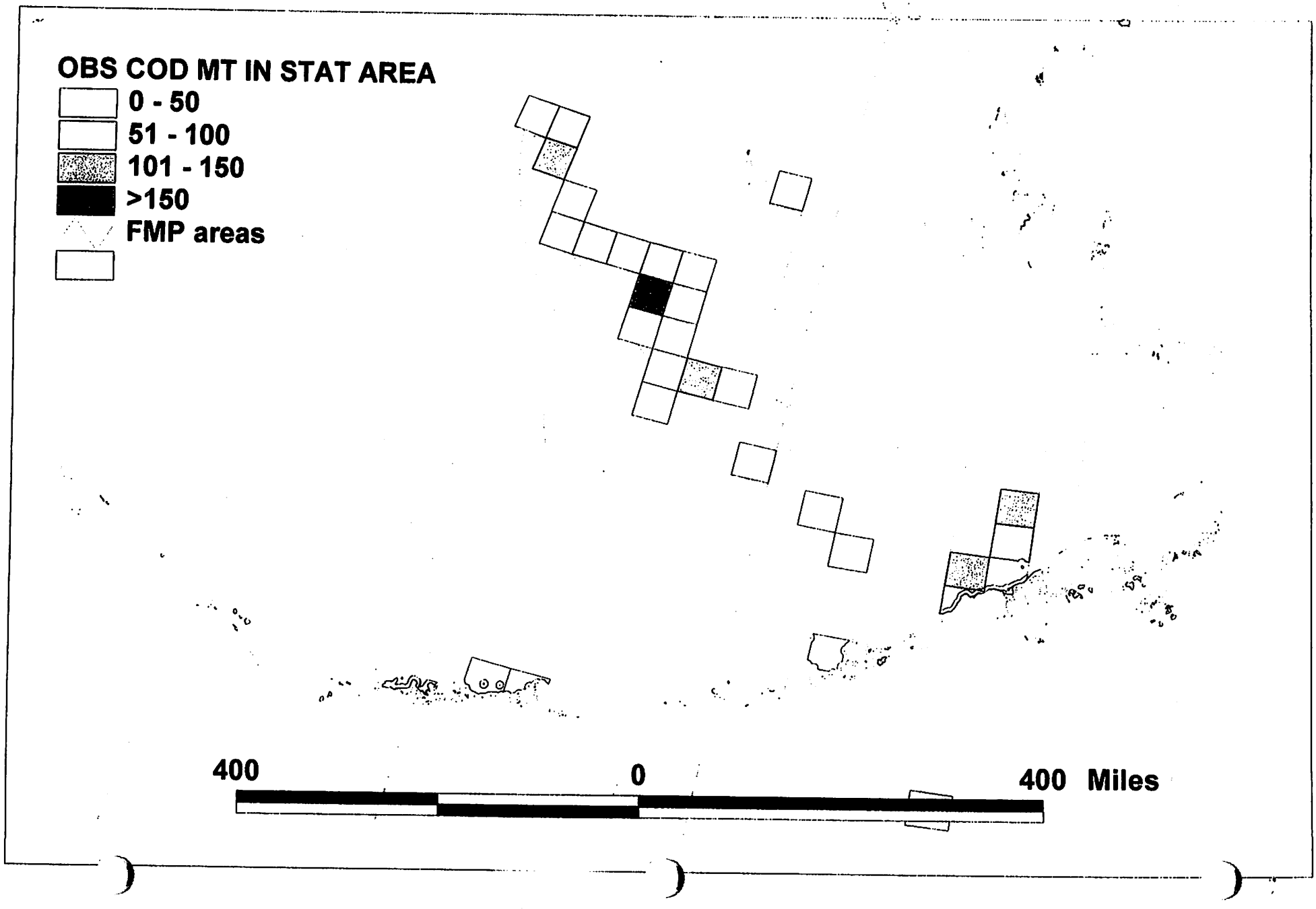
FIS 3/2001

H&L COD CATCH 2000: APRIL
OBSERVED MT 3,180



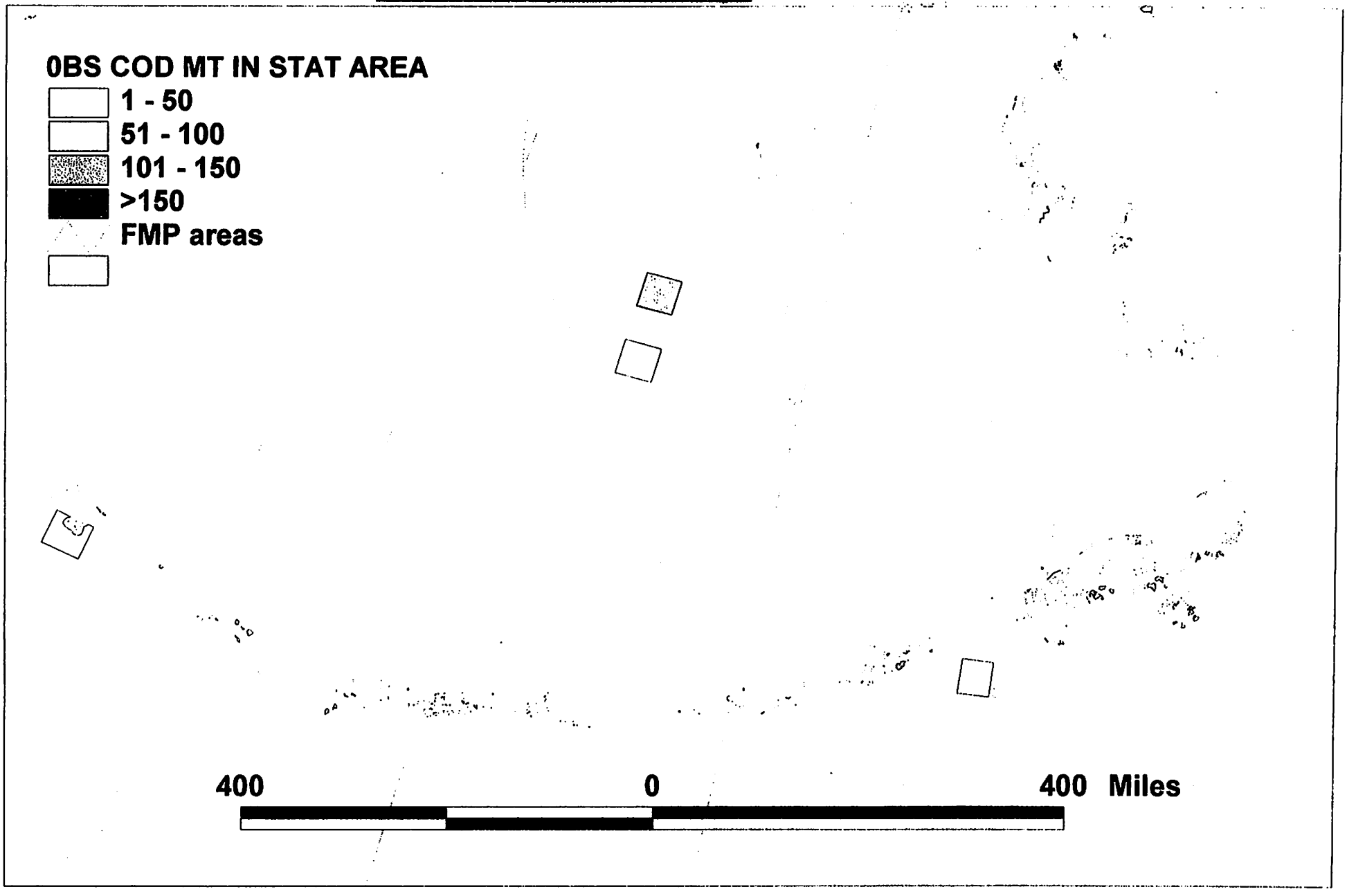
FIS 3/2001

H&L COD CATCH 2000: MAY
OBSERVED MT: 1,205



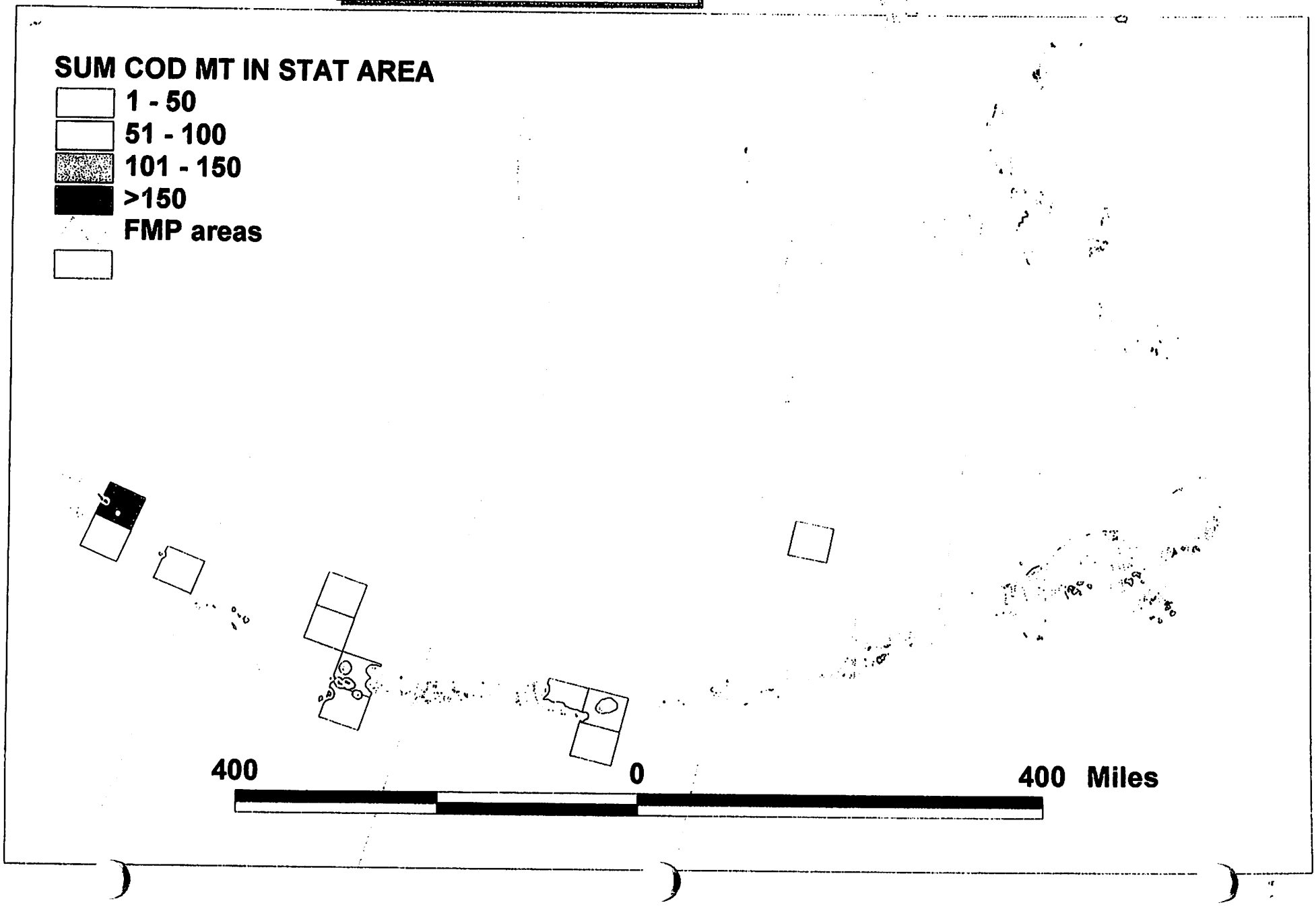
FIS 3/2001

H&L COD CATCH 2000: JUNE
OBSERVED MT: 167



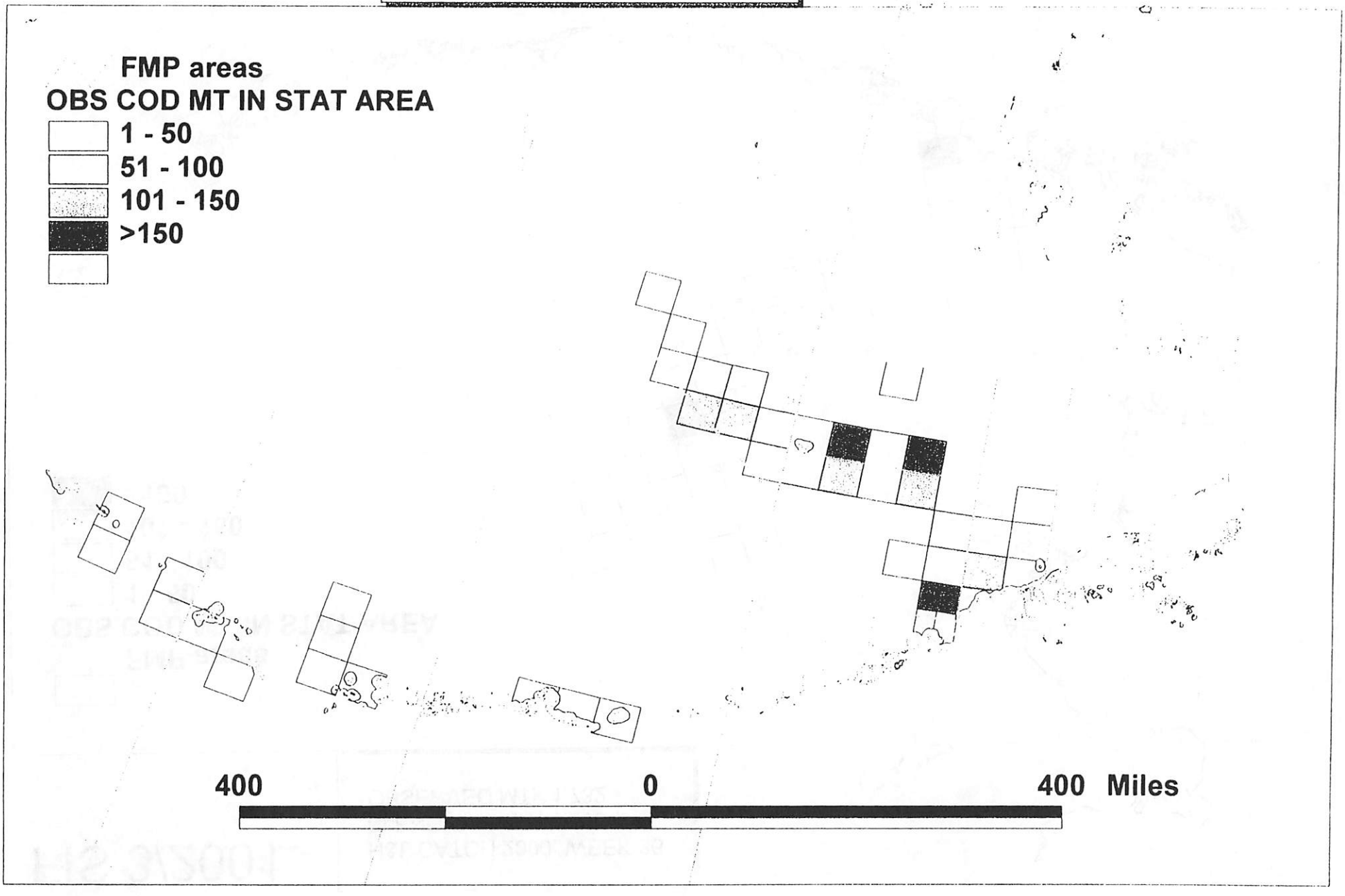
FIS 3/2001

H&L COD CATCH 2000: JULY
OBSERVED MT: 465



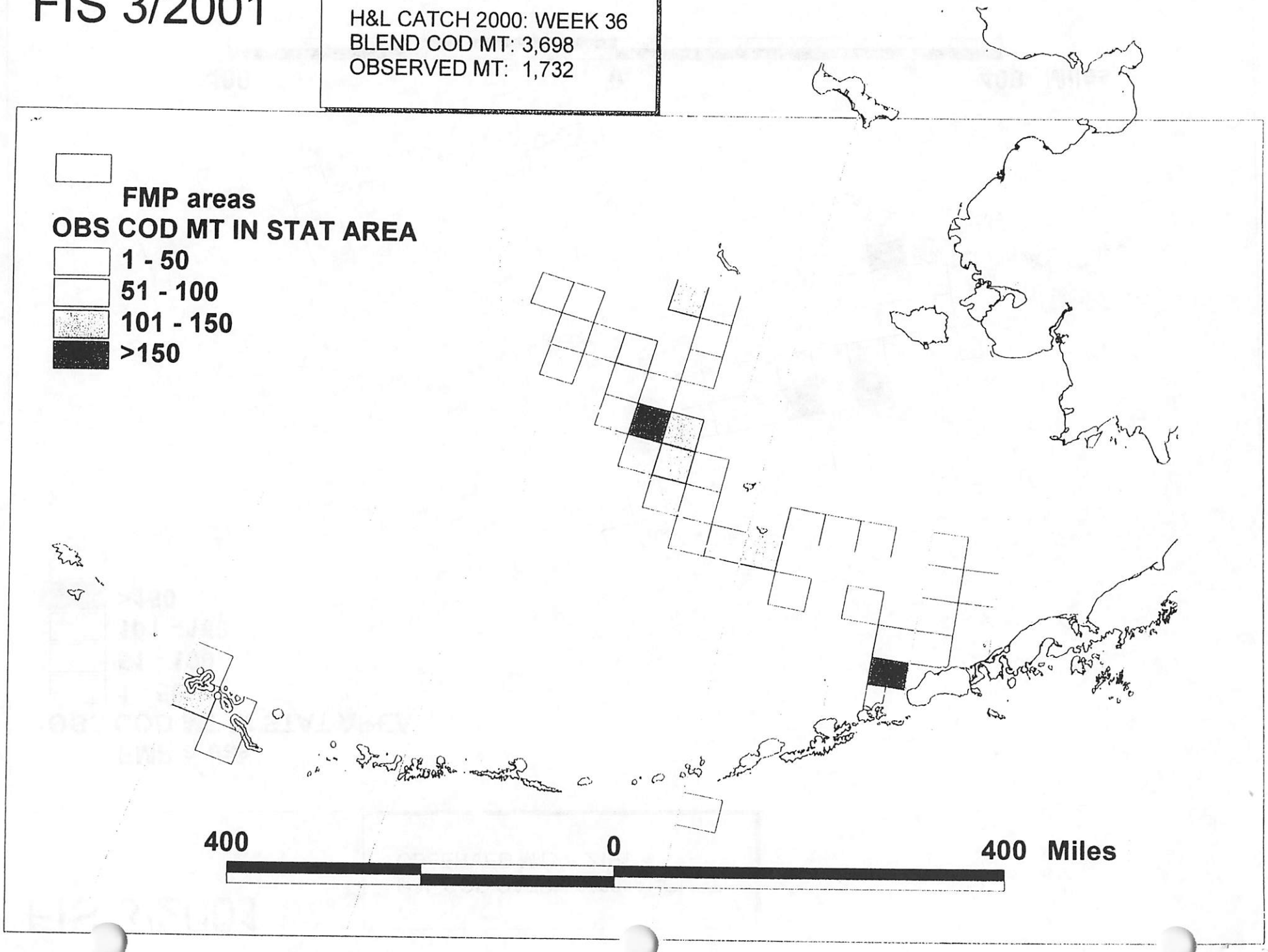
FIS 3/2001

H&L COD CATCH 2000: AUGUST
OBSERVED MT: 2191



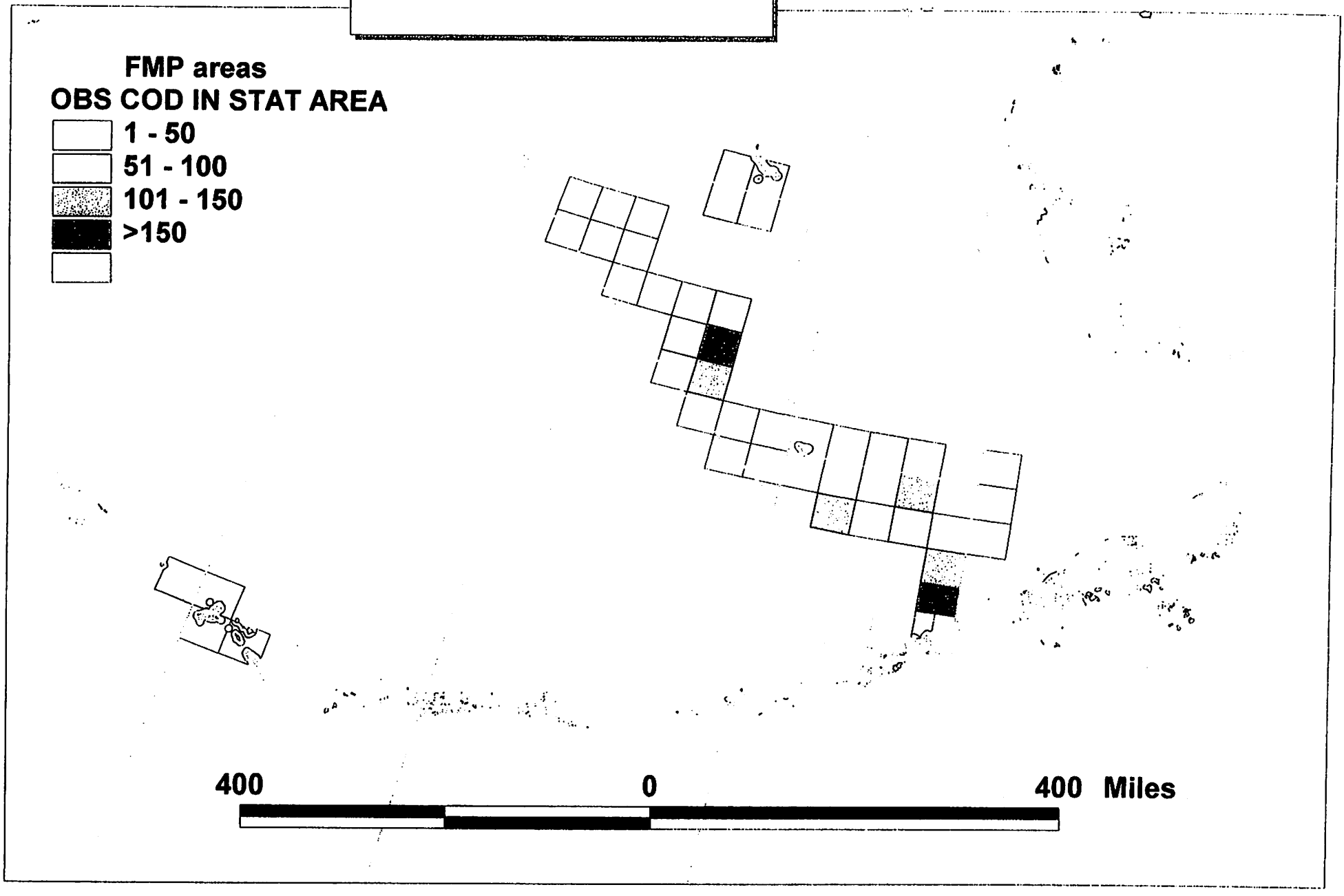
FIS 3/2001

H&L CATCH 2000: WEEK 36
BLEND COD MT: 3,698
OBSERVED MT: 1,732



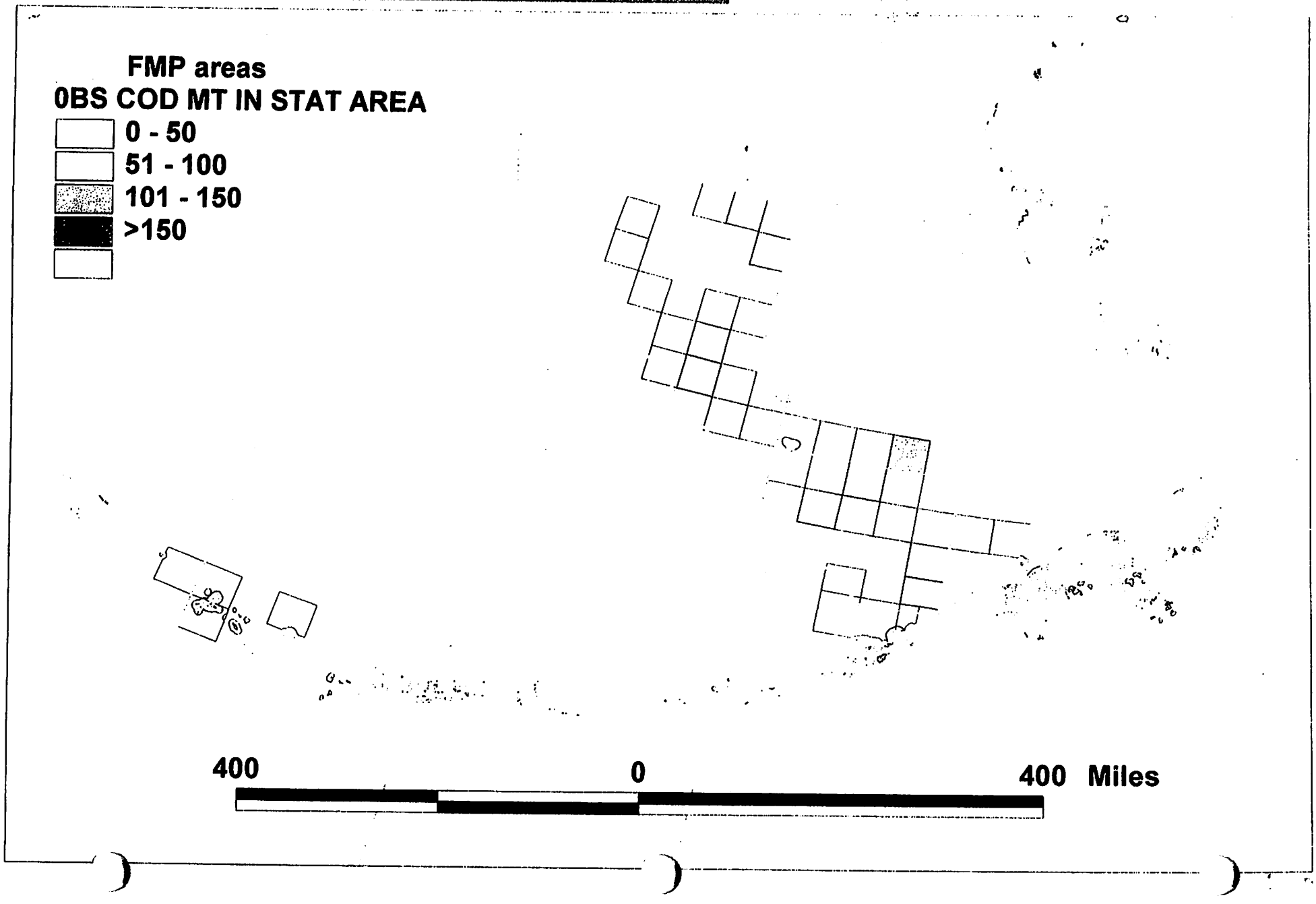
FIS 3/2001

H&L COD CATCH 2000: WEEK 37
BLEND COD MT: 3,698
OBSERVED MT: 1,908



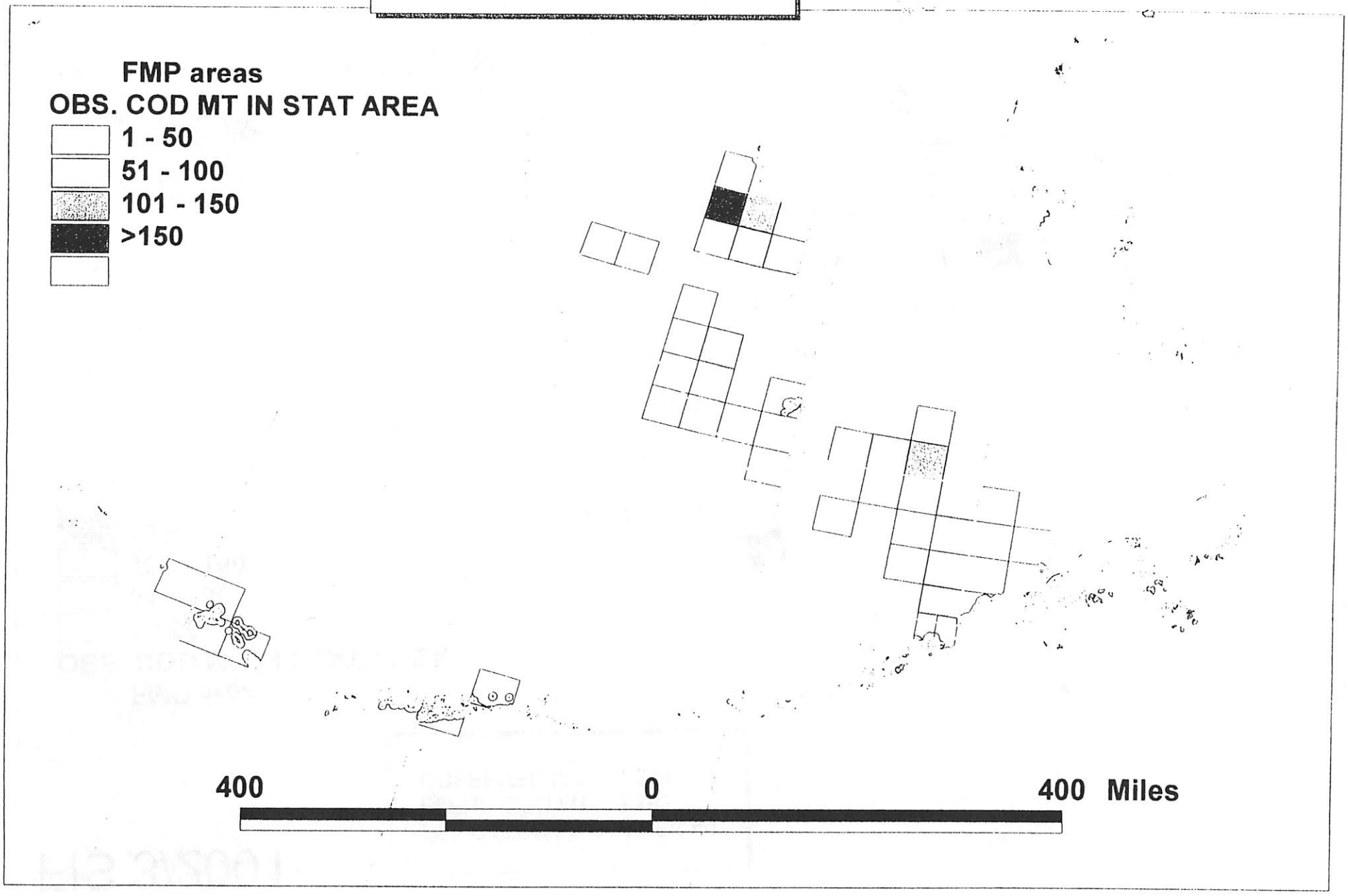
FIS 3/2001

H&L COD CATCH 2000: WEEK 38
BLEND COD MT: 2,972
OBSERVED MT: 1,293



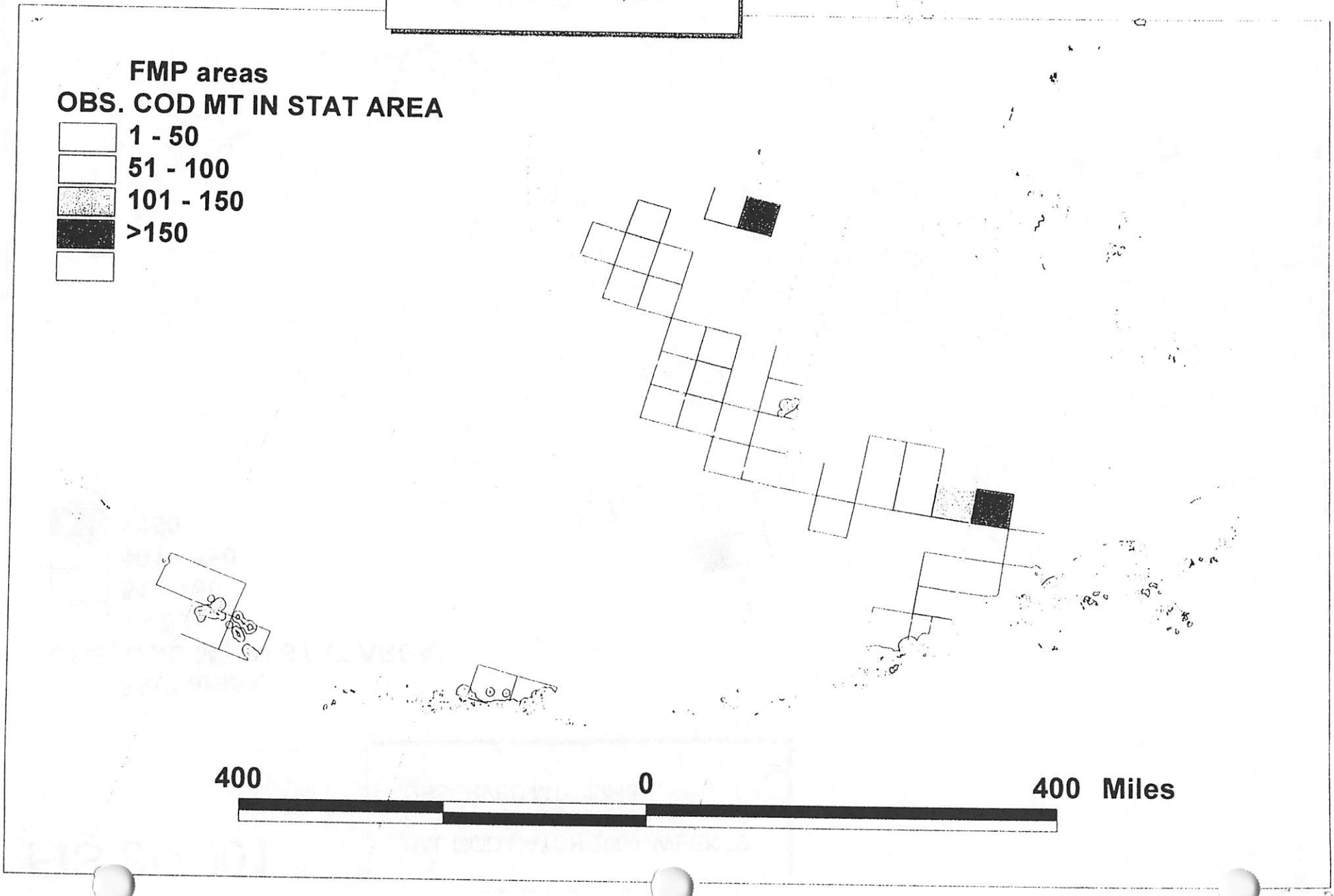
FIS 3/2001

H&L COD CATCH 2000: WEEK 39
BLEND COD MT: 3,009
OBSERVED MT: 1,443



FIS 3/2001

H&L CATCH 2000: WEEK 40
BLEND COD MT: 3,163
OBSERVED MT: 1,334



FIS 3/2001

H&L CATCH 2000: WEEK 41
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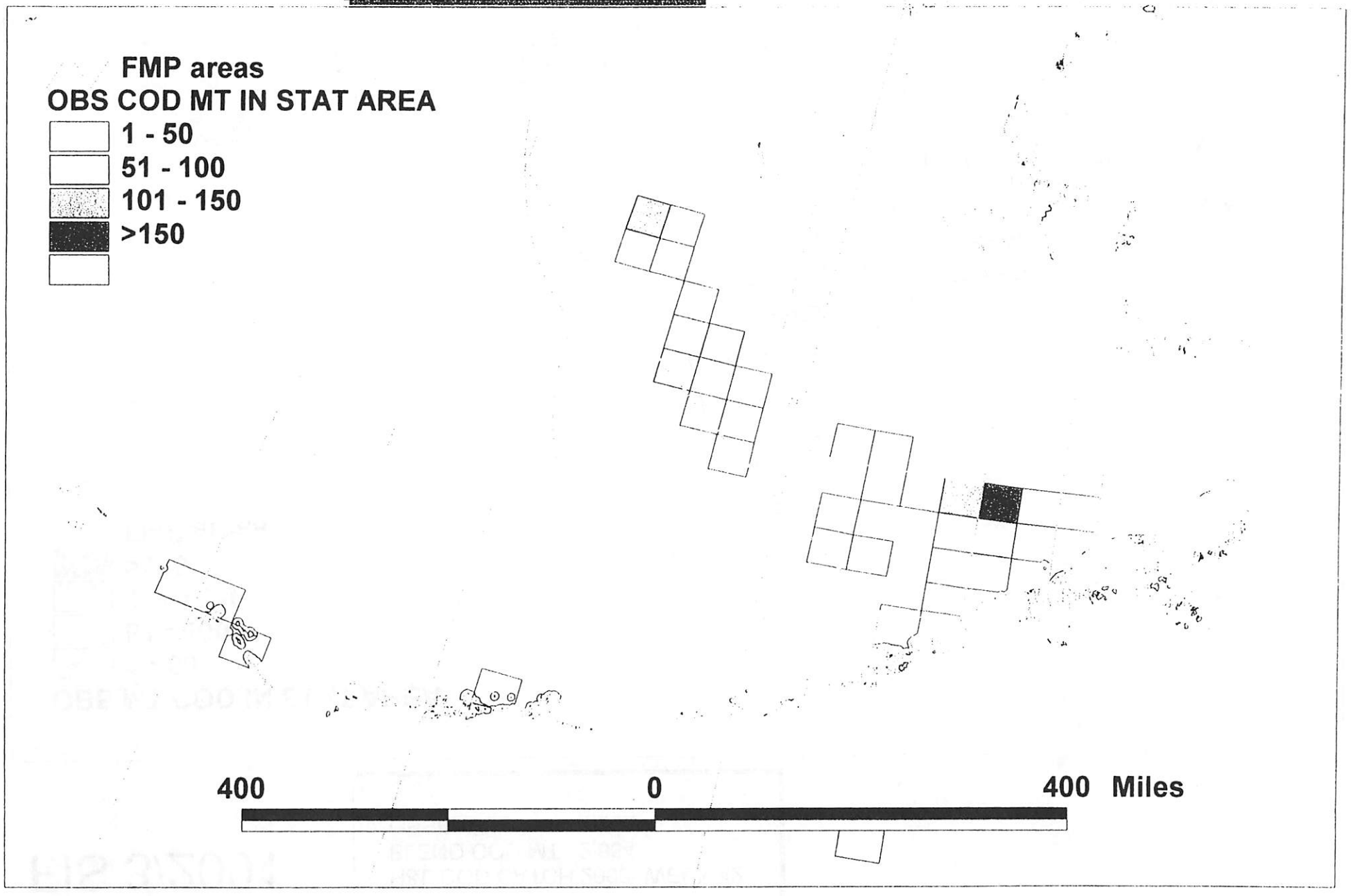
OBSERVED MT: 1,303



FIS 3/2001

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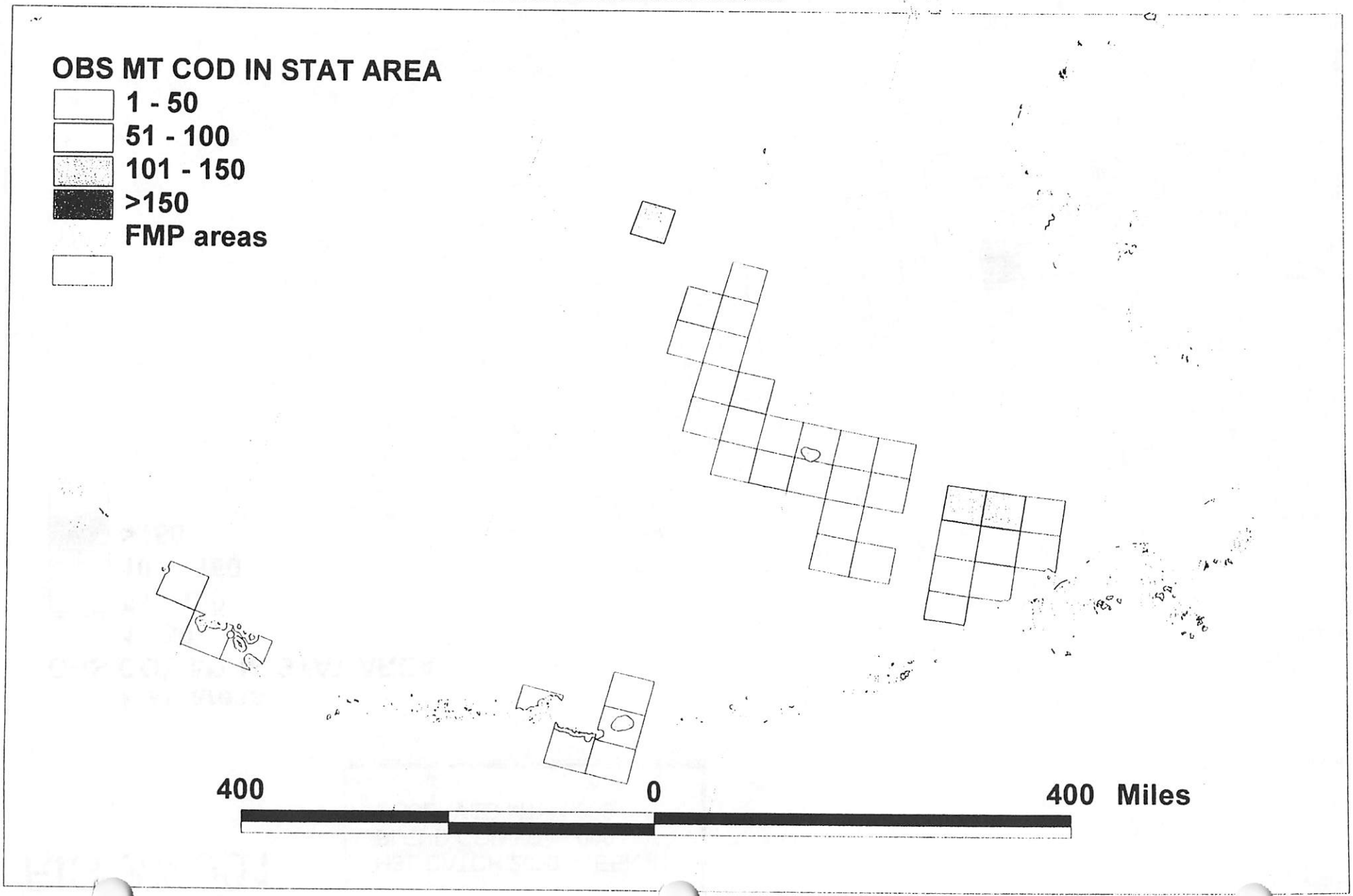
OBSERVED MT: 1,252



FIS 3/2001

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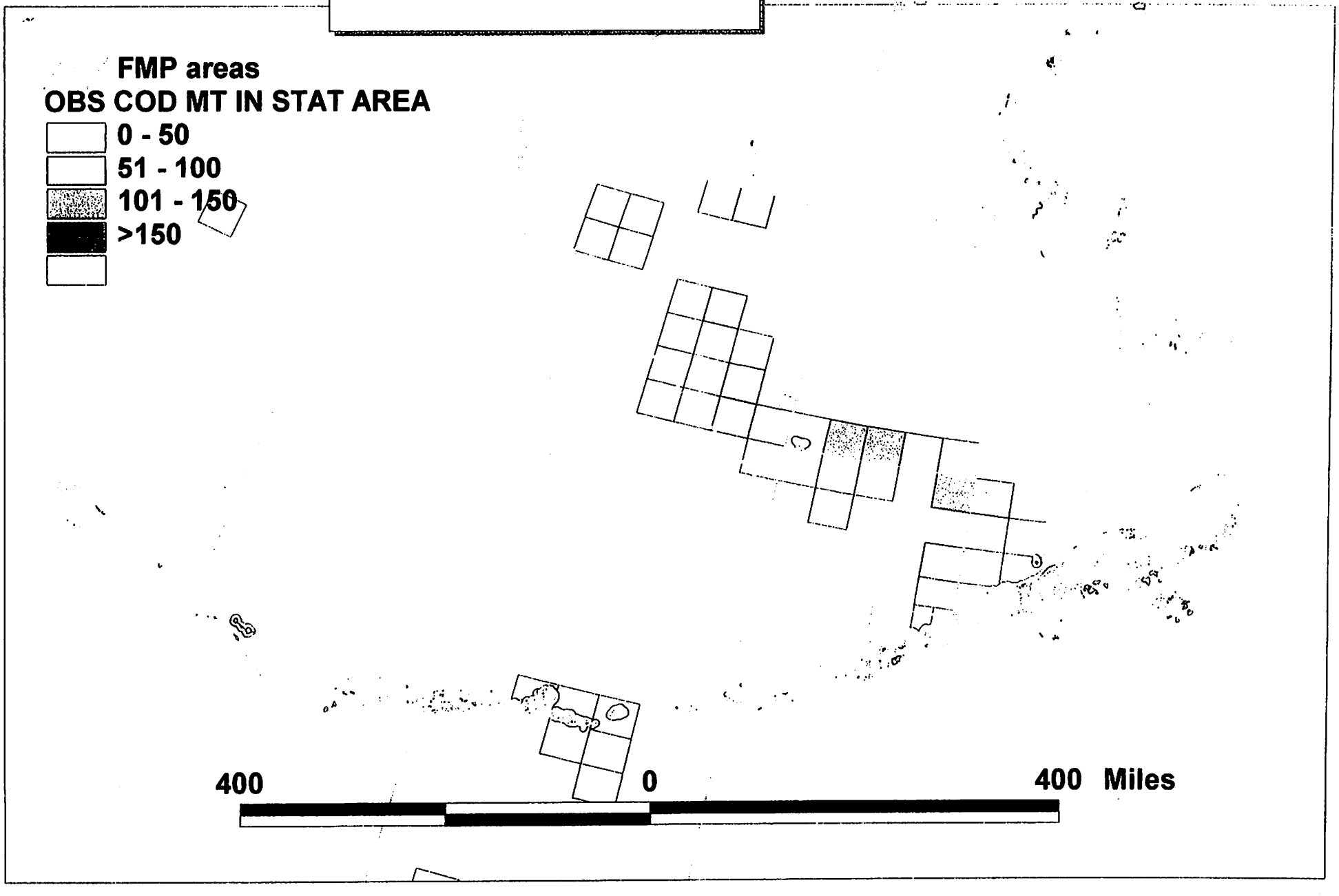

FIS 3/2001

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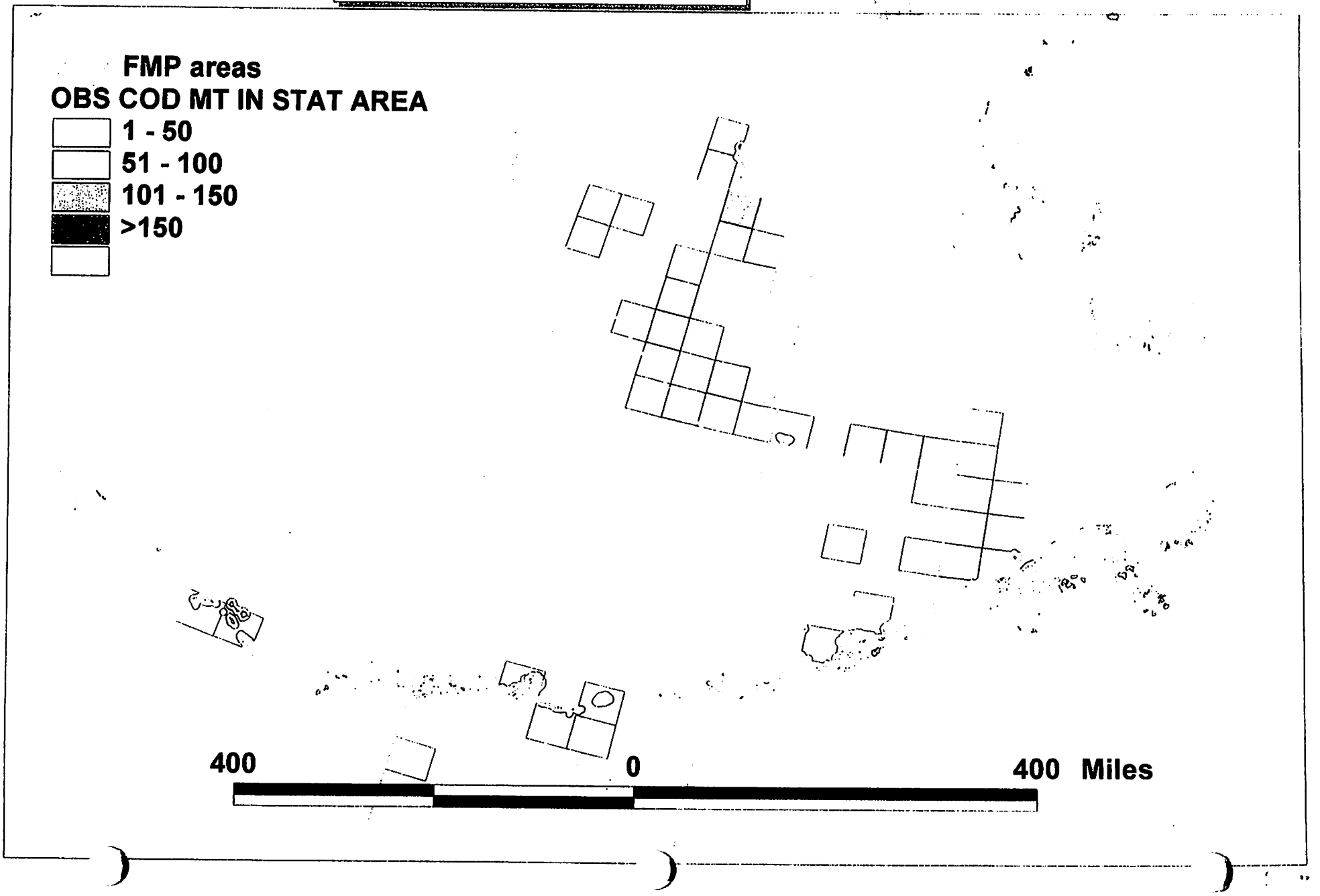
OBSERVED MT: 1,303



FIS 3/2001

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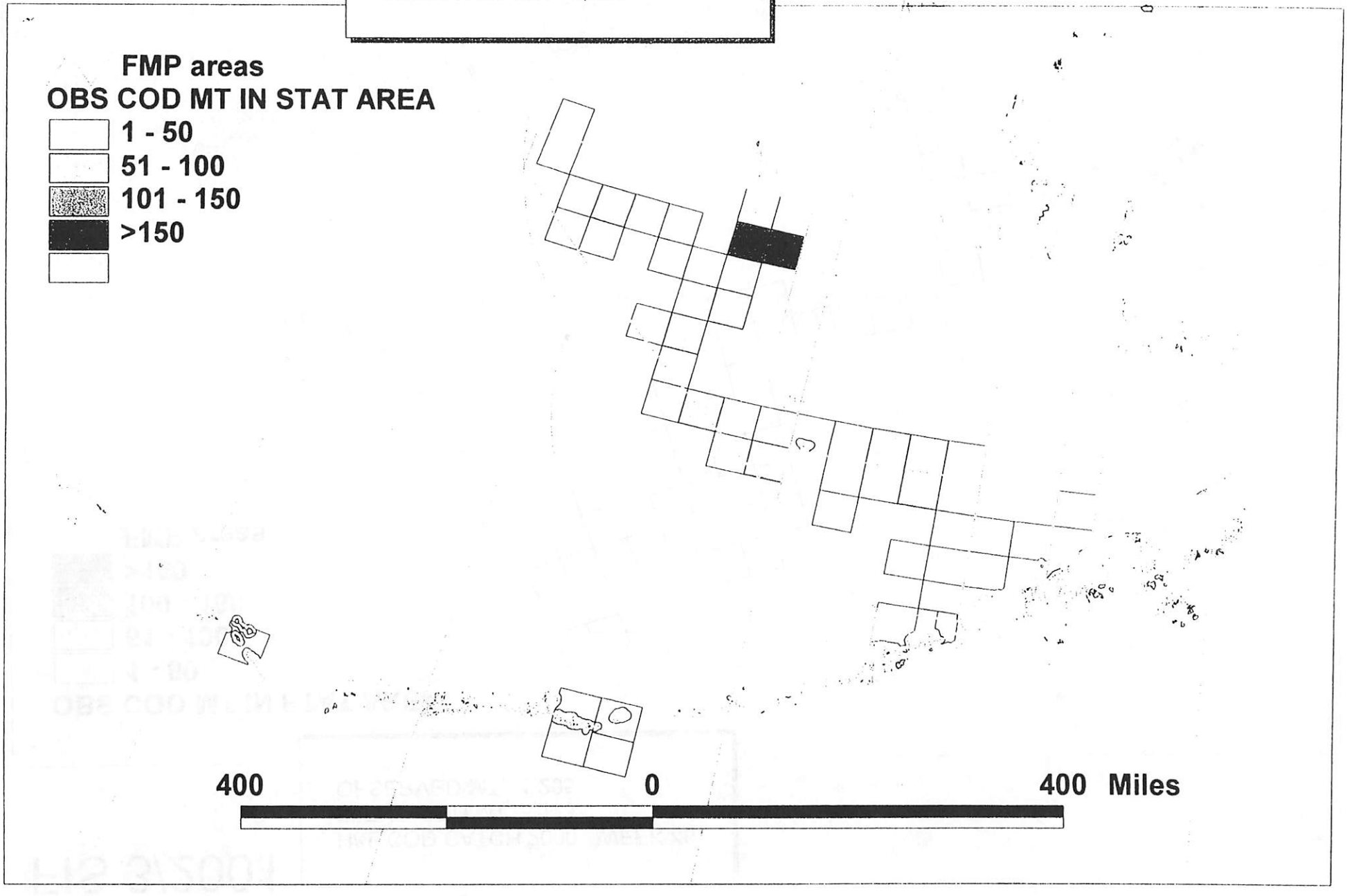
OBSERVED MT: 1,303



FIS 3/2001

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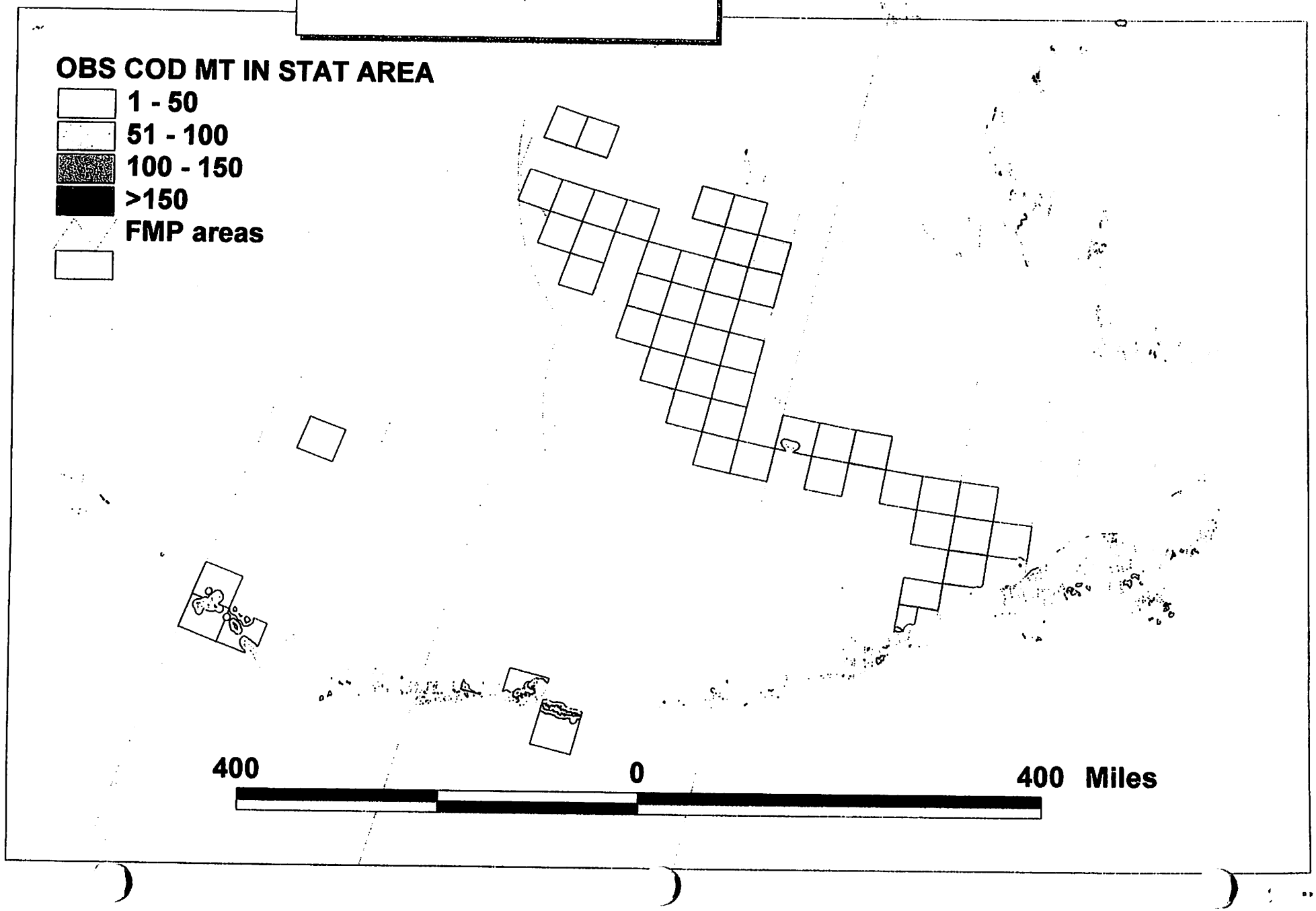

FIS 3/2001

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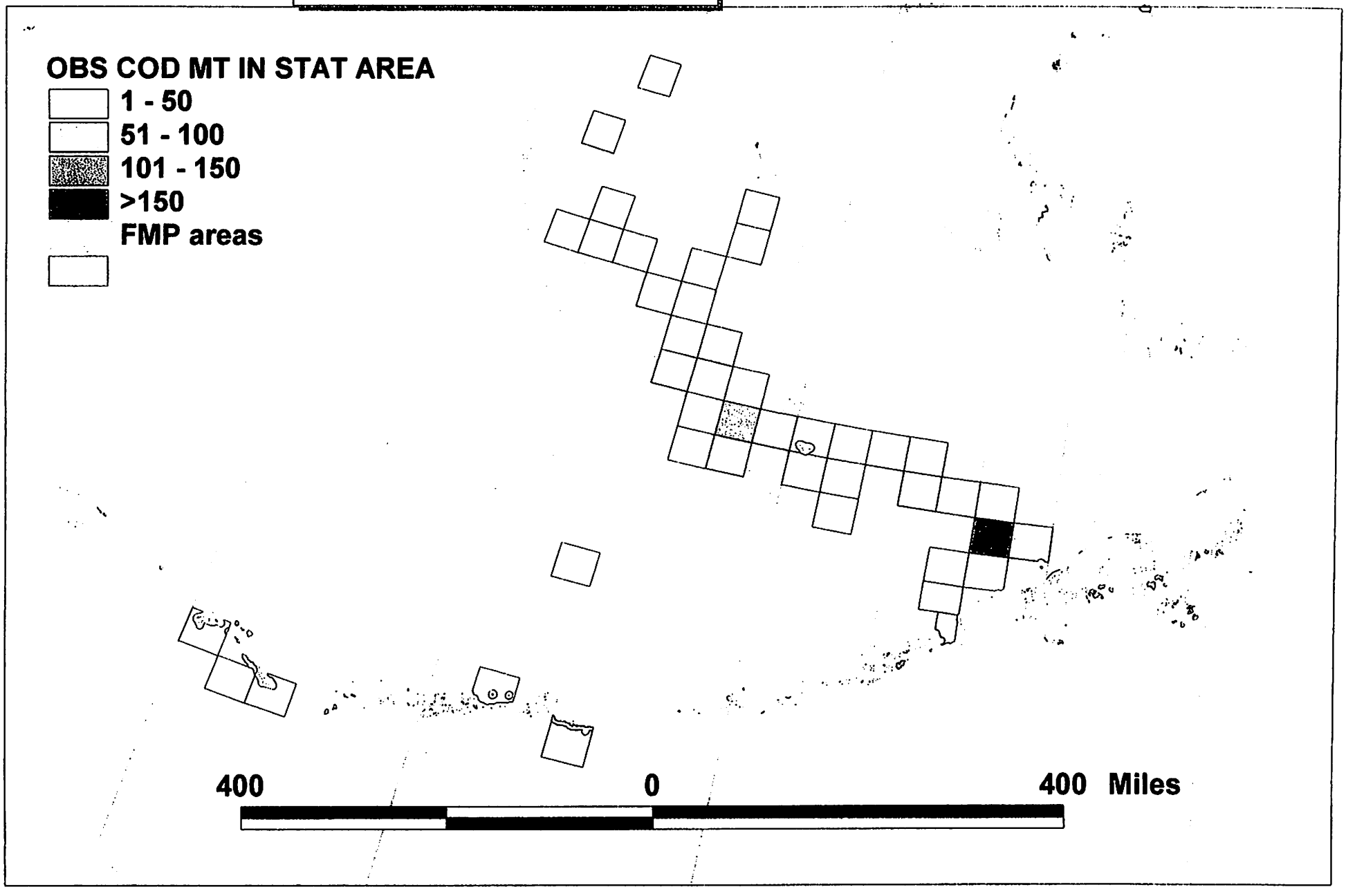

FIS 3/2001

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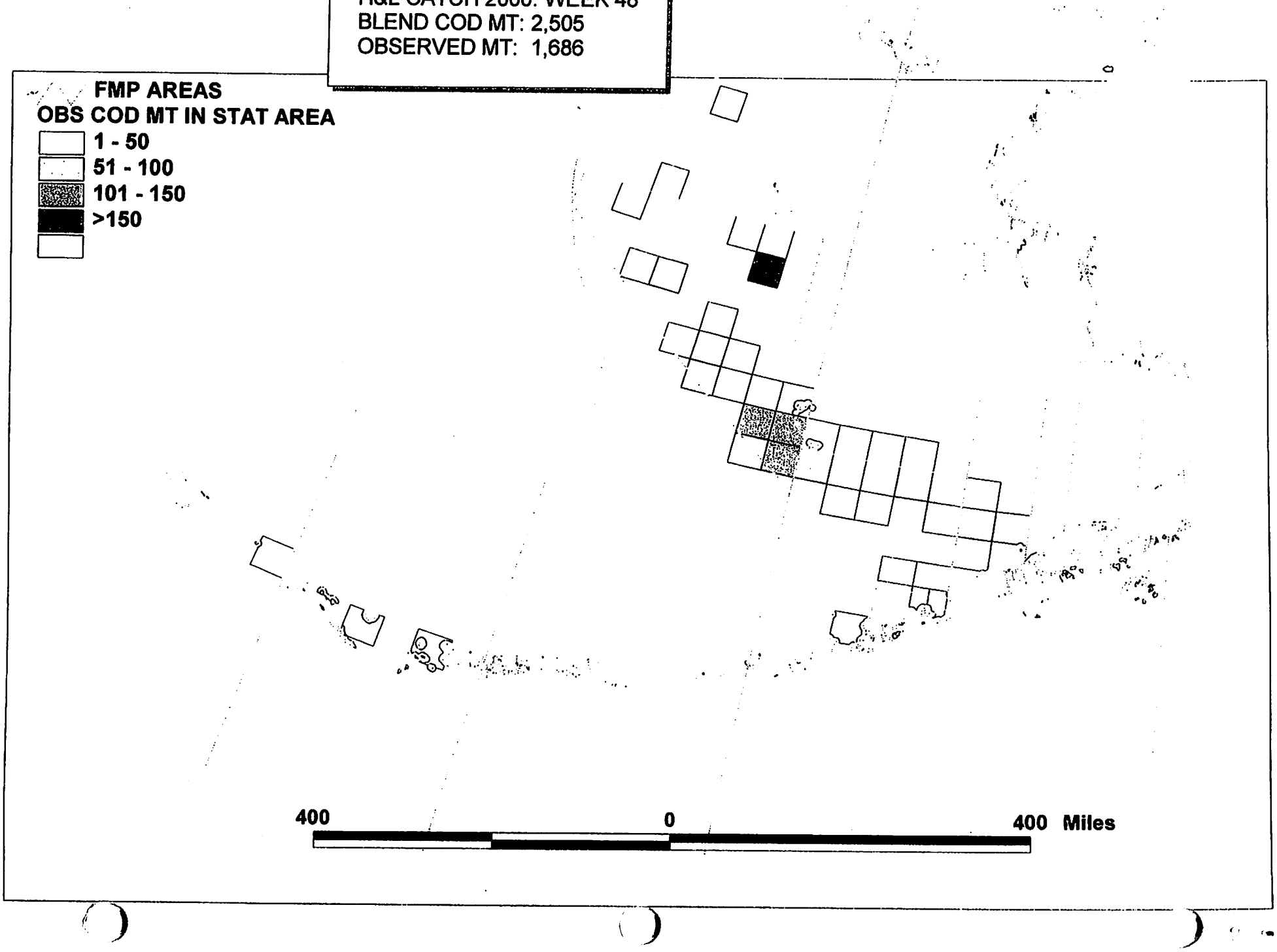

FIS 3/2001

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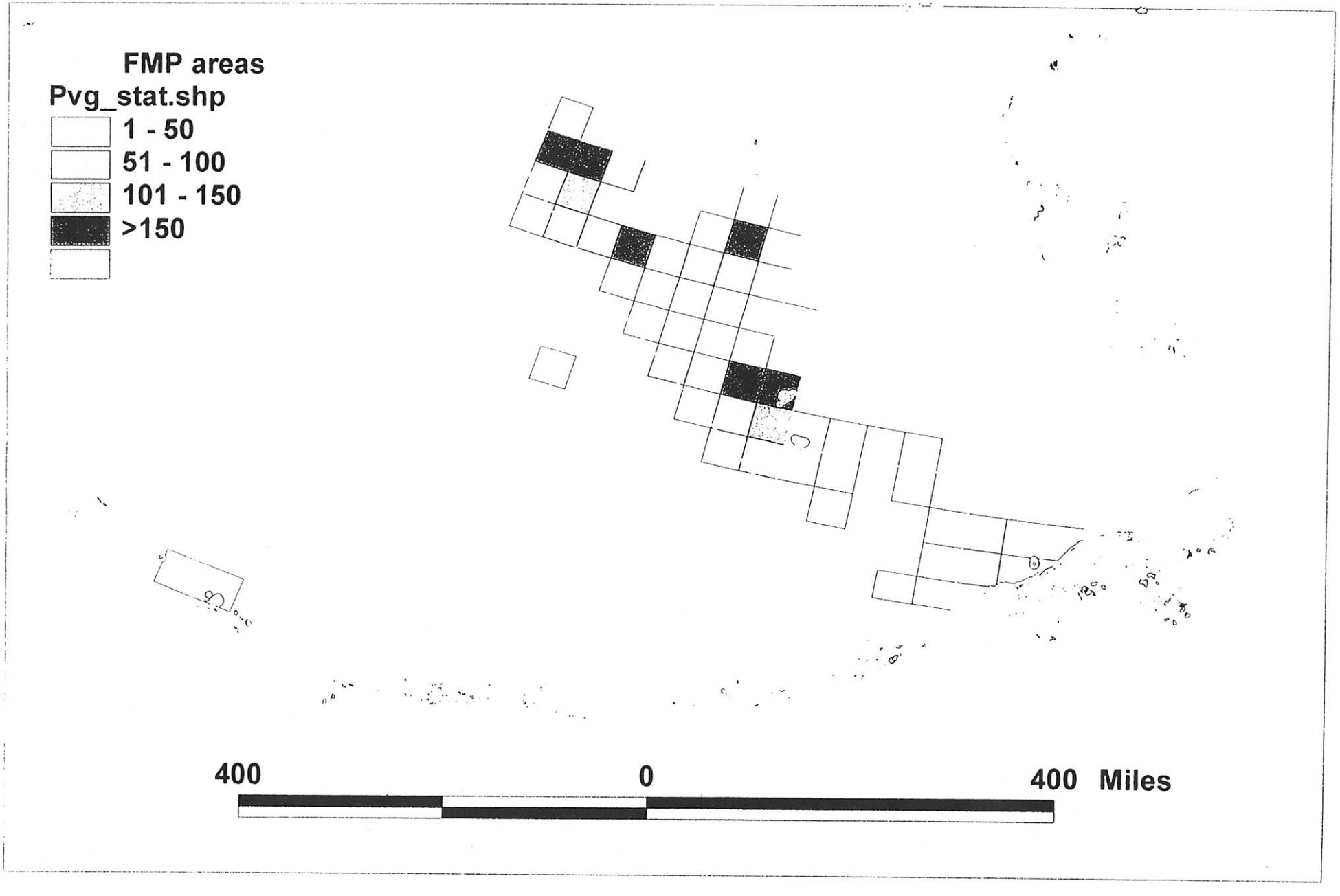
OBSERVED MT: 2,997



Environment, Inc.

C-1
Tab 1
Folder

A SACRAMENTO BEE SPECIAL REPORT

Fat of the land

Movement's prosperity comes at a high price

(First of five parts)

By Tom Knudson
Bee Staff Writer
(Published April 22, 2001)

Photo gallery

Although environmental organizations have achieved important victories, such as the Trust for Public Land's purchase of this property above San Jose, today groups are prospering while the land is not -- and much more of their money is used for bureaucratic overhead and fund raising. (Click photo for larger view in gallery)
Bee/José M. Osorio

As a grass-roots conservationist from Oregon, Jack Shipley looked forward to his visit to Washington, D.C., to promote a community-based forest management plan. But when he stepped into the national headquarters of The Wilderness Society, his excitement turned to unease.

"It was like a giant corporation," Shipley said. "Floor after floor after floor, just like Exxon or AT&T."

In San Francisco, Sierra Club board member Chad Hanson experienced a similar letdown when he showed up for a soiree at one of the city's finest hotels in 1997.

"Here I had just been elected to the largest grass-roots environmental group in the world and I am having martinis in the penthouse of the Westin St. Francis," said Hanson, an environmental activist from Pasadena. "What's wrong with this picture? It was surreal."

Soon, Hanson was calling the Sierra Club by a new name: Club Sierra.

Extravagance is not a trait normally linked with environmental groups. The movement's tradition leans toward simplicity, economy and living light on the land. But today, as record sums of money flow to environmental causes, prosperity is pushing tradition aside, and the millions of Americans who support environmental groups are footing the bill.

High-rise offices, ritzy hotels and martinis are but one sign of wider change. Rising executive salaries and fat Wall Street portfolios are another. So, too, is a costly reliance on fund-raising consultants for financial success.

Put the pieces together and you find a movement estranged from its past, one that has come to resemble the corporate world it often seeks to reform.

Although environmental organizations have accomplished many stirring and important victories over the years, today groups prosper while the land does not. Competition for money and members is keen. Litigation is a blood sport. Crisis, real or not, is a commodity. And slogans and sound bites masquerade as scientific fact.

"National environmental organizations, I fear, have grown away from the grass roots to mirror the foxes they had been chasing," said environmental author Michael Frome, at a wilderness conference in Seattle last year. "They seem to me to have turned tame, corporate and compromising."

This series of articles -- based on more than 200 interviews, travel across 12 states and northern Mexico, and thousands of state and federal records -- will explore the poverty of plenty that has come to characterize much of the environmental movement. Some of the highlights:

☐ Salaries for environmental leaders have never been higher. In 1999 -- the most recent year for which comparable figures are available -- chief executives at nine of the nation's 10

treasure at risk:

Graphic: Growing Southwest forest fires

Graphic: Fire country

Photo gallery

Day five
April 26, 2001

Main story: Solutions sprouting from grass-roots efforts

Graphic: Endangered nation

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largest environmental groups earned $200,000 and up, and one topped $300,000. In 1997, one group fired its president and awarded him a severance payment of $760,335.

□ Money is flowing to conservation in unprecedented amounts, reaching $3.5 billion in 1999, up 94 percent from 1992. But much of it is not actually used to protect the environment. Instead, it is siphoned off to pay for bureaucratic overhead and fund raising, including expensive direct-mail and telemarketing consultants.

□ Subsidized by federal tax dollars, environmental groups are filing a blizzard of lawsuits that no longer yield significant gain for the environment and sometimes infuriate federal judges and the Justice Department. During the 1990s, the U.S. Treasury paid $31.6 million in legal fees for environmental cases filed against the government.

□ Those who know the environment best -- the scientists who devote their careers to it -- say environmental groups often twist fact into fantasy to serve their agendas. That is especially true in the debate over one of America's most majestic landscapes: its Western evergreen forests. A 1999 report by the U.S. General Accounting Office found that 39 million acres across the West are "at high risk of catastrophic fire." Yet many groups use science selectively to oppose thinning efforts that could reduce fire risk.

"A lot of environmental messages are simply not accurate," said Jerry Franklin, a professor of forest ecology and ecosystem science at the University of Washington. "But that's the way we sell messages in this society. We use hype. And we use those pieces of information that sustain our position. I guess all large organizations do that."

And sometimes when nature needs help the most, environmental groups are busy with other things.

As the tiny Fresno kangaroo rat struggled for survival in the industrialized farmland of California's San Joaquin Valley in the 1990s, for example, the environmental movement did not seem to notice.

As a fisheries conservationist tried to save rare trout species across remote parts of Oregon and Nevada, he found no safety net in major environmental groups.

As sea turtles washed up dead and dying on Texas beaches in 1993, no groups made the turtles their mascot.

"I contacted everybody and nobody listened," said Carole Allen, who rehabilitates turtles injured in fishing nets. "Everybody wants to save dolphins. Turtles aren't popular. It really gets frustrating."

Yet look closely at environmentalism today and you also see promise and prosperity coming together to form a new style of environmentalism -- one that is sprouting quietly, community by community, across the United States and is rooted in results, not rhetoric.

"I'm so frustrated with the opportunism and impulsiveness of how groups are going about things," said Steve McCormick, president of The Nature Conservancy, which uses science to target and solve environmental problems. "What's the plan? What are the milestones by which we can measure our success?"

Today's challenges are more subtle and serious than those of the past. Stopping a dam is child's play compared to halting the spread of destructive, non-native species. Protecting old-growth forests from logging is simple; saving them from fire and disease is more difficult.

But as the Bush administration takes control in Washington, many groups are again tuning up sound bites -- not drawing up solutions. "President Bush is forging full steam ahead ... to open up the Arctic!" says John Flicker, president of the National Audubon Society, in one of the first mass-market fund-raising letters focusing on Bush's environmental policies. "I need you to make a Special Emergency Gift."

There is no clearinghouse for information about environmental groups, no oversight body watching for abuse and assessing job performance. What information exists is scattered

among many sources, including the Internal Revenue Service, philanthropic watchdogs, the U.S. Department of Justice and nonprofit trade associations.

Sift through their material and here is what you find:

Donations are at flood stage. In 1999, individuals, companies and foundations gave an average of $9.6 million a day to environmental groups, according to the National Center for Charitable Statistics, which monitors nonprofit fund raising.

"Our business is booming," said Patrick Noonan, chairman of the Conservation Fund, an Arlington, Va., group that provides financial and educational assistance to environmental organizations.

The dollars do not enrich equally. The nation's 20 largest groups -- a tiny slice of the more than 8,000 environmental organizations -- took in 29 percent of contributions in 1999, according to IRS Form 990 tax records. The top 10 earned spots on the Chronicle of Philanthropy's list of America's wealthiest charities.

The richest is The Nature Conservancy, an Arlington, Va., group that focuses on purchasing land to protect the diversity of species. In 1999, The Nature Conservancy received $403 million, as much as its six nearest rivals combined: Trust for Public Land, Ducks Unlimited, World Wildlife Fund, Conservation International, National Wildlife Federation and Natural Resources Defense Council.

Forty years ago, the environmental movement was a national policy sideshow. Today, it is a strong, vocal lobby that weighs in on everything from highway transportation to global trade. Some groups, such as the National Audubon Society and Environmental Defense, are generalists, dabbling in many things. Others, such as Ducks Unlimited and Conservation International, have found success in specialization.

Public support runs deep, too. "Many, many people feel almost religious about the environment," said Patricia Schifferle, former regional director for The Wilderness Society in California. "It really does touch their inner souls."

One recent public opinion poll commissioned by The Nature Conservancy found that 54 percent of the nation's 104 million households were "extremely concerned" or "very concerned" about the environment. An additional 31 percent were "somewhat concerned."

About three-fourths of all contributions in 1999 came from an estimated 8 million to 17 million Americans. Most personal contributions were modest, but some were not.

Vice President Dick Cheney, then-CEO of Halliburton Co., gave $10,000 to the Conservation Fund. Harrison Ford gave $5 million to Conservation International. Julian Robertson Jr., a leading money manager, gave more than $100,000 to Environmental Defense and more than $50,000 to The Nature Conservancy.

"This is a growth industry -- a huge growth industry," said Daniel Beard, chief operating officer at the National Audubon Society. "There is a lot of wealth that has accumulated in this country over the last 20 years. And people are wanting to do good things with it."

Conservation has not always been so comfortable. Much of its history is rooted in simplicity. Henry David Thoreau, perhaps America's earliest conservationist, set the tone with his 19th-century classic -- "Walden" -- about living in harmony with nature.

"Simplicity. Simplicity. Simplicity!" Thoreau wrote. "I say, let your affairs be as two or three, and not a hundred or a thousand; instead of a million, count half a dozen and keep your accounts on your thumbnail."

John Muir, the California naturalist whose spirited defense of the Sierra Nevada brought conservation to the forefront of the nation's attention a century ago, expanded on Thoreau's theme.

Living on bread, oatmeal and water, Muir would disappear into the Sierra for weeks, then return and pour his passion into print. "Climb the mountains and get their good tidings," he wrote. "Nature's peace will flow into you as sunshine flows into trees."

David Brower, the legendary former Sierra Club leader who led successful battles to keep dams out of Dinosaur National Monument and the Grand Canyon in the 1950s and '60s, said success springs from deeds, not dollars.

"We were getting members because we were doing things," Brower said before he died last year. "Our (strength) came from outings and trips -- getting people out. It came from full-page ads and books."

Today, there is a new approach -- junk mail and scare tactics.

> **Dear Friend,**
>
> *If you've visited a national park recently, then some of the things you're about to read may not surprise you!*
>
> *America's National Park System -- the first and finest in the world -- is in real trouble right now.*
>
> *Yellowstone ... Great Smoky Mountains ... Grand Canyon ... . Everglades. Wilderness, wildlife, air and water in all these magnificent parks are being compromised by adjacent mining activities, noise pollution, commercial development and other dangerous threats ...*

So begins a recent fund-raising letter from the National Parks Conservation Association, a 400,000-plus-member organization. The letter goes on to tell of the group's accomplishments, warn of continued threats, ask for money -- "$15 or more" -- and offer something special for signing up. "Free as our welcome-aboard gift ... The NPCA bean bag bear!"

Let's say you did send in $15. What would become of it?

According to the group's 1998-99 federal tax form, much of your money would have been routed not to parks but to more fund raising and overhead. Just $7.62 (51 percent) would have been spent on parks, less than the minimum 60 percent recommended by the American Institute of Philanthropy, a nonprofit charity watchdog group.

And the parks association is not alone.

Five other major groups -- including household names such as Greenpeace and the Sierra Club -- spend so much on fund raising, membership and overhead they don't meet standards set by philanthropic watchdog groups.

It's not just the cost of raising money that catches attention these days. It is the nature of the fund-raising pitches themselves.

"What works with direct mail? The answer is crisis. Threats and crisis," said Beard, the Audubon Society chief operating officer.

"So what you get in your mailbox is a never-ending stream of crisis-related shrill material designed to evoke emotions so you will sit down and write a check. I think it's a slow walk down a dead-end road. You reach the point where people get turned off." Then he hesitated, adding:

"But I don't want to say direct mail is bad because, frankly, it works."

Even some of those who sign the appeals are uncomfortable with them.

"Candidly, I am tired of The Wilderness Society and other organizations -- and we are a culprit here -- constantly preaching gloom and doom," said William Meadows, the society's president, whose signature appears on millions of crisis-related solicitations. "We do have positive things to say."

Many environmental groups, The Wilderness Society included, also use a legal accounting loophole to call much of what they spend on fund raising, "public education."

In 1999, for instance, The Wilderness Society spent $1.46 million on a major membership campaign consisting of 6.2 million letters. But when it came time to disclose that bill in its annual report, the society shifted 87 percent -- $1.27 million -- to public education. The group also shrank a $94,411 telemarketing bill by deciding that 71 percent was public education.

The Wilderness Society's spokesman, Ben Beach, said that kind of accounting is appropriate because fund-raising solicitations are educational.

"No one is trying to do anything that isn't right by the rule book here," he said. "A lot of us don't particularly like getting (telemarketing) calls. But that's not to say you don't learn something."

Still, the accounting practice is controversial. Nine of the nation's 20 largest groups don't use it. "Playing games with numbers is not worth the effort or questions that would come from it," said Stephen Howell, chief operating officer at The Nature Conservancy.

"It should be called what it is," said Noonan, the Conservation Fund leader. "As we become larger and more successful, I worry about the ethics of our movement. We need to think about self-regulation and standards. If not, the ones who make mistakes are going to hurt it for all of us."

Dollars can disappear in other ways, of course.

Some groups lose money on Wall Street. In 1997, Environmental Defense watched with dismay as a $500,000 "short-selling investment partnership" tumbled to $18,000. Acknowledging it was "a lot of money to lose," the group's deputy director of operations, Edward Bailey, pointed out that Environmental Defense has done well with other investments. "No one is going to be right 100 percent of the time," he said.

Comfortable office digs and sumptuous fund-raising banquets are another drain on donor dollars. The Sierra Club spends $59,473 a month for its office lease in San Francisco. In Washington, Greenpeace pays around $45,000 a month.

In June 1998, The Nature Conservancy spent more than $1 million on a single fund-raising bash in New York City's Central Park. Carly Simon and Jimmy Buffett played. Masters of ceremonies included Dan Rather, Peter Jennings, Mike Wallace and Leslie Stahl. Variety magazine reported that the 1,100 guests were treated to a martini bar and a rolling cigar station.

"The goal was to raise (our) profile among high-dollar donors," Conservancy spokesman Mike Horak said in a statement. And it paid off: $1.8 million was raised.

Fund-raising banquets never sat well with Alfred Runte, an environmental historian who served as a board member of the National Parks Conservation Association from 1993 to 1997.

"We would always go to a sumptuous hotel or the most expensive lodge -- places most Americans couldn't afford," said Runte, author of "Yosemite, The Embattled Wilderness."

"If we have to get big donors by spending money that average, dedicated members think is going to the parks, we've lost," he said. "We're no longer environmentalists. We're party-givers."

Salaries gobble up money raised, too. In 1999, top salaries at the 10 largest environmental groups averaged $235,918, according to IRS tax forms. By contrast, the president of Habitat for Humanity, International -- which builds homes for the poor -- earned $62,843. At Mothers Against Drunk Driving, the president made $69,570.

Among environmental groups, Ducks Unlimited paid its leader the most: $346,882.

"Those salaries are obscene," said Martin Litton, a former Sierra Club board member, who worked tirelessly over a half-century to help bring about the creation of Redwoods National Park in 1968 and Sequoia National Monument last year. Litton did it for free.

"There should be sacrifice in serving the environment," he said.

One large payment occurred in 1997 when the National Parks Conservation Association (NPCA) fired its president, Paul Pritchard, in a dispute over management style and direction. It awarded him $760,335 to settle his contract -- the equivalent of more than 50,000 individual $15 donations.

Thomas Kiernan, the group's current president, dismissed the incident as "3-year-old history" and called it "profoundly irrelevant."

"NPCA made an offer. We countered. It was just like every other negotiation," said Pritchard, now president of the National Park Trust, another parks-based group in Washington. "I'm proud of what I did at NPCA."

Others have a different view. "I told Paul that I thought his salary and benefits had become egregious," said former board member Runte.

Speaking of the environmental movement as a whole, Runte said: "The larger problem is the disease of money. In truth, what the environmental community has become is a money machine ... We have come to the point where we keep score by the almighty dollar. And we need to start keeping score by the health of the planet."

The Bee's Tom Knudson can be reached at tknudson@sacbee.com.

A SACRAMENTO BEE SPECIAL REPORT

Green machine

Mission adrift in a frenzy of fund raising

(Second of five parts)

By Tom Knudson
Bee Staff Writer
(Published April 23, 2001)

Dear Friend,
I need your help to stop an impending slaughter. Otherwise, Yellowstone National Park -- an American wildlife treasure -- could soon become a bloody killing field. And the victims will be hundreds of wolves and defenseless wolf pups!

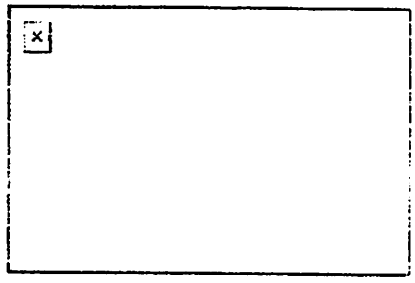

Photo gallery

Professor Peter Brussard from the University of Nevada, Reno holds up some of the stickers he has received from national conservation and wildlife groups. (Click photo for larger view in gallery)
Bee/José M. Osorio

So begins a fund-raising letter from one of America's fastest-growing environmental groups -- Defenders of Wildlife.

Using the popular North American gray wolf as the hub of an ambitious campaign, Defenders has assembled a financial track record that would impress Wall Street.

In 1999, donations jumped 28 percent to a record $17.5 million. The group's net assets, a measure of financial stability, grew to $14.5 million, another record. And according to its 1999 annual report, Defenders spent donors' money wisely, keeping fund-raising and management costs to a lean 19 percent of expenses.

But there is another side to Defenders' dramatic growth.

Pick up copies of its federal tax returns and you'll find that its five highest-paid business partners are not firms that specialize in wildlife conservation. They are national direct mail and telemarketing companies -- the same ones that raise money through the mail and over the telephone for nonprofit groups, from Mothers Against Drunk Driving to the U.S. Olympic Committee.

You'll also find that in calculating its fund-raising expenses, Defenders borrows a trick from the business world. It dances with digits, finds opportunity in obfuscation. Using an accounting loophole, it classifies millions of dollars spent on direct mail and telemarketing not as fund raising but as public education and environmental activism.

Take away that loophole and Defenders' 19 percent fund-raising and management tab leaps above 50 percent, meaning more than half of every dollar donated to save wolf pups helped nourish the organization instead. That was high enough to earn Defenders a "D" rating from the American Institute of Philanthropy, an independent, nonprofit watchdog that scrutinizes nearly 400 charitable groups.

Pick up copies of IRS returns for major environmental organizations and you'll see that what is happening at Defenders of Wildlife is not unusual. Eighteen of America's 20 most prosperous environmental organizations, and many smaller ones as well, raise money the same way: by soliciting donations from millions of Americans.

But in turning to mass-market fund-raising techniques for financial sustenance, environmental groups have crossed a kind of conservation divide.

No allies of industry, they have become industries themselves, dependent on a style of

treasure at risk
Graphic: Growing Southwest forest fires
Graphic: Fire country
Photo gallery

Day five
April 26, 2001
Main story: Solutions sprouting from grass-roots efforts
Graphic: Endangered nation
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salesmanship that fills mailboxes across America with a never-ending stream of environmentally unfriendly junk mail, reduces the complex world of nature to simplistic slogans, emotional appeals and counterfeit crises, and employs arcane accounting rules to camouflage fund raising as conservation.

Just as industries run afoul of regulations, so are environmental groups stumbling over standards. Their problem is not government standards, because fund raising by nonprofits is largely protected by the free speech clause of the First Amendment. Their challenge is meeting the generally accepted voluntary standards of independent charity watchdogs.

And there, many fall short.

Six national environmental groups spend so much on fund raising and overhead they don't have enough left to meet the minimum benchmark for environmental spending -- 60 percent of annual expenses -- recommended by charity watchdog organizations. Eleven of the nation's 20 largest include fund-raising bills in their tally of money spent protecting the environment, but don't make that clear to members.

The flow of environmental fund-raising mail is remarkable. Last year, more than 160 million pitches swirled through the U.S. Postal Service, according to figures provided by major organizations. That's enough envelopes, stationery, decals, bumper stickers, calendars and personal address labels to circle the Earth more than two times.

Often, just one or two people in 100 respond.

The proliferation of environmental appeals is beginning to boomerang with the public, as well. "The market is over-saturated. There is mail fatigue," said Ellen McPeake, director of finance and development at Greenpeace, known worldwide for its defense of marine mammals. "Some people are so angry they send back the business reply envelope with the direct mail piece in it."

Even a single fund-raising drive generates massive waste. In 1999, The Wilderness Society mailed 6.2 million membership solicitations -- an average of 16,986 pieces of mail a day. At just under 0.9 ounce each, the weight for the year came to about 348,000 pounds.

Most of the fund-raising letters and envelopes are made from recycled paper. But once delivered, millions are simply thrown away, environmental groups acknowledge. Even when the solicitations make it to a recycling bin, there's a glitch: Personal address labels, bumper stickers and window decals that often accompany them cannot be recycled into paper -- and are carted off to landfills instead.

"For an environmental organization, it's so wrong," said McPeake, who is developing alternatives to junk mail at Greenpeace. "It's not exactly environmentally correct."

The stuff is hard to ignore.

Environmental solicitations -- swept along in colorful envelopes emblazoned with bears, whales and other charismatic creatures -- jump out at you like salmon leaping from a stream.

Open that mail and more unsolicited surprises grab your attention. The Center for Marine Conservation lures new members with a dolphin coloring book and a flier for a "free" dolphin umbrella. The National Wildlife Federation takes a more seasonal approach: a "Free Spring Card Collection & Wildflower Seed Mix!" delivered in February, and 10 square feet of wrapping paper with "matching gift tags" delivered just before Christmas.

The Sierra Club reaches out at holiday time, too, with a bundle of Christmas cards that you can't actually mail to friends and family, because inside they are marred by sales graffiti: "To order, simply call toll-free ... " Defenders of Wildlife tugs at your heart with "wolf adoption papers." American Rivers dangles something shiny in front of your checkbook: a "free deluxe 35 mm camera" for a modest $12 tax-deductible donation.

The letters that come with the mailers are seldom dull. Steeped in outrage, they tell of a

planet in perpetual environmental shock, a world victimized by profit-hungry corporations. And they do so not with precise scientific prose but with boastful and often inaccurate sentences that scream and shout:

☐ From New York-based Rainforest Alliance: *"By this time tomorrow, nearly 100 species of wildlife will tumble into extinction."*

Fact: No one knows how rapidly species are going extinct. The Alliance's figure is an extreme estimate that counts tropical beetles and other insects -- including ones not yet known to science -- in its definition of wildlife.

☐ From The Wilderness Society: *"We will fight to stop reckless clear-cutting on national forests in California and the Pacific Northwest that threatens to destroy the last of America's unprotected ancient forests in as little as 20 years."*

Fact: National forest logging has dropped dramatically in recent years. In California, clear-cutting on national forests dipped to 1,395 acres in 1998, down 89 percent from 1990.

☐ From Defenders of Wildlife: *"Won't you please adopt a furry little pup like 'Hope'? Hope is a cuddly brown wolf ... Hope was triumphantly born in Yellowstone."*

Facts: "There was never any pup named Hope," says John Varley, chief of research at Yellowstone National Park. "We don't name wolves. We number them." Since wolves were reintroduced into Yellowstone in 1995, their numbers have increased from 14 to about 160; the program has been so successful that Yellowstone officials now favor removing the animals from the federal endangered species list.

Longtime conservationist Peter Brussard has seen enough.

"I've stopped contributing to virtually all major environmental groups," said Brussard, former Society for Conservation Biology president and a University of Nevada, Reno, professor.

"My frustration is the mailbox," he said. "Virtually every day you come home, there are six more things from environmental groups saying that if you don't send them fifty bucks, the gray whales will disappear or the wolf reintroductions in Yellowstone will fail ...You just get super-saturated.

"To me, as a professional biologist, it's not conspicuous what most of these organizations are doing for conservation. I know that some do good, but most leave you with the impression that the only thing they are interested in is raising money for the sake of raising money."

Step off the elevator at Defenders of Wildlife's office in Washington, D.C., and you enter a world of wolves: large photographs of wolves on the walls, a wolf logo on glass conference room doors, and inside the office of Charles Orasin, senior vice president for operations, a wolf logo cup and a toy wolf pup.

Ask Orasin about the secret of Defenders' success, and he points to a message prominently displayed behind his desk: "It's the Wolf, Stupid."

Since Defenders began using the North American timber wolf as the focal point of its fund-raising efforts in the mid-1990s, the organization has not stopped growing. Every year has produced record revenue, more members -- and more emotional, heart-wrenching letters.

Dear Friend of Wildlife:
It probably took them twelve hours to die.
No one found the wolves in the remote, rugged lands of Idaho -- until it was too late.
For hours, they writhed in agony. They suffered convulsions, seizures and hallucinations. And then -- they succumbed to cardiac and respiratory failure.

"People feel very strongly about these animals," said Orasin, architect of Defenders' growth. "In fact, our supporters view them as they would their children. A huge percentage own pets, and they transfer that emotional concern about their own animals to wild animals.

"We're very pleased," he said. "We think we have one of the most successful programs going right now in the country."

Defenders, though, is only the most recent environmental group to find fund-raising fortune in the mail. Greenpeace did it two decades ago with a harp seal campaign now regarded as an environmental fund-raising classic.

The solicitation featured a photo of a baby seal with a white furry face and dark eyes accompanied by a slogan: "Kiss This Baby Good-bye." Inside, the fund-raising letter included a photo of Norwegian sealers clubbing baby seals to death.

People opened their hearts -- and their checkbooks.

"You have very little time to grab people's attention," said Jeffrey Gillenkirk, a veteran free-lance direct mail copywriter in San Francisco who has written for several national environmental groups, including Greenpeace. "It's like television: You front-load things into your first three paragraphs, the things that you're going to hook people with. You can call it dramatic. You can call it hyperbolic. But it works."

The Sierra Club put another advertising gimmick to work in the early 1980s. It found a high-profile enemy: U.S. Secretary of the Interior James Watt, whose pro-development agenda for public lands enraged many.

"When you direct-mailed into that environment, it was like highway robbery," said Bruce Hamilton, the club's conservation director. "You couldn't process the memberships fast enough. We basically added 100,000 members."

But environmental fund raising has its downsides.

It tends to be addictive. The reason is simple: Many people who join environmental groups through the mail lose interest and don't renew -- and must be replaced, year after year.

"Constant membership recruitment is essential just to stay even, never mind get bigger," wrote Christopher Bosso, a political scientist at Northeastern University in Boston, in his paper: "The Color of Money: Environmental Groups and the Pathologies of Fund Raising."

"Dropout rates are high because most members are but passive check writers, with the low cost of participating translating into an equally low sense of commitment," Bosso states. "Holding on to such members almost requires that groups maintain a constant sense of crisis. It does not take a cynic to suggest ... that direct mailers shop for the next eco-crisis to keep the money coming in."

That is precisely how Gillenkirk, the copywriter, said the system works. As environmental direct mail took hold in the 1980s, "We discovered you could create programs by creating them in the mail," he said.

"Somebody would put up $25,000 or $30,000, and you would see whether sea otters would sell. You would see whether rain forests would sell. You would try marshlands, wetlands, all kinds of stuff. And if you got a response that would allow you to continue -- a 1 or 2 percent response -- you could create a new program."

Today, the trial-and-error process continues.

The Sierra Club, which scrambles to replace about 150,000 nonrenewing members a year out of 600,000, produces new fund-raising packages more frequently than General Motors

produces new car models.

"We are constantly turning around and trying new themes," said Hamilton. "We say, 'Ok, well, people like cuddly little animals, they like sequoias.' We try different premiums, where people can get the backpack versus the tote bag versus the calendar. We tried to raise money around the California desert -- and found direct mail deserts don't work."

And though many are critical of such a crisis-of-the-month approach, Hamilton defended it -- sort of.

"I'm somewhat offended by it myself, both intellectually and from an environmental standpoint," he said. "And yet ... it is what works. It is what builds the Sierra Club. Unfortunately the fate of the Earth depends on whether people open that envelope and send in that check."

The vast majority of people don't. Internal Sierra Club documents show that as few as one out of every 100 membership solicitations results in a new member. The average contribution is $18.

"The problem is there is a part of the giving public -- about a third we think -- who as a matter of personal choice gives to a new organization every year," said Sierra Club Executive Director Carl Pope. "We don't do this because we want to. We do it because the public behaves this way."

Fund-raising consultants "have us all hooked, and none of us can kick the habit," said Dave Foreman, a former Sierra Club board member. "Any group that gives up the direct mail treadmill is going to lose. I'm concerned about how it's done. It's a little shabby."

Another problem is more basic: accuracy. Much of what environmental groups say in fund-raising letters is exaggerated. And sometimes it is wrong.

Consider a recent mailer from the Natural Resources Defense Council, which calls itself "America's hardest-hitting environmental group." The letter, decrying a proposed solar salt evaporation plant at a remote Baja California lagoon where gray whales give birth, makes this statement:

"Giant diesel engines will pump six thousand gallons of water out of the lagoon EVERY SECOND, risking changes to the precious salinity that is so vital to newborn whales."

Clinton Winant, a professor at Scripps Institution of Oceanography who helped prepare an environmental assessment of the project, said the statement is false. "There is not a single iota of scientific evidence that suggests pumping would have any effect on gray whales or their babies," he said.

The mailer also says:

"A mile-long concrete pier will cut directly across the path of migrating whales -- potentially impeding their progress."

Scripps professor Paul Dayton, one of the nation's most prominent marine ecologists, said that statement is wrong, too.

"I've dedicated my career to understanding nature, which is becoming more threatened," he said. "And I've been confronted with the dreadful dishonesty of the Rush Limbaugh crowd. It really hurts to have my side -- the environmental side -- become just as dishonest."

Former Mexican President Ernesto Zedillo halted the project last year. But as he did, he also criticized environmental groups. "With false arguments and distorted information, they have damaged the legitimate cause of genuine ecologists," Zedillo said at a Mexico City news conference.

A senior Defense Council attorney in Los Angeles, Joel Reynolds, said his organization does

not distort the truth.

"We're effective because people believe in us," Reynolds said. "We're not about to sacrifice the credibility we've gained through direct mail which is intentionally inaccurate."

Reynolds said NRDC's position on the salt plant was influenced by a 1995 memo by Bruce Mate, a world-renowned whale specialist. Mate said, though, that his memo was a first draft, not grounded in scientific fact.

"This is a bit of an embarrassment," he said. "This was really one of the first bits of information about the project. It was not meant for public consumption. I was just kind of throwing stuff out there. It's out-of-date, terribly out-of-date."

There is plenty of chest-thumping pride in direct mail, too -- some of it false pride. Consider this from a National Wildlife Federation letter: "We are constantly working in every part of the country to save those species and special places that are in all of our minds."

Yet in many places, the federation is seldom, if ever, seen.

"In 15-plus years in conservation, in Northern California, Nevada, Idaho, Oregon and Washington, I have never met a (federation) person," said David Nolte, who recently resigned as a grass-roots organizer with the Theodore Roosevelt Conservation Alliance -- a coalition of hunters and fishermen.

"This is not about conservation," he said. "It's marketing."

Overstating achievements is chronic, according to Alfred Runte, an environmental historian and a board member of the National Parks Conservation Association from 1993 to 1997.

"Environmental groups all do this," he said. "They take credit for things that are generated by many, many people. What is a community accomplishment becomes an individual accomplishment -- for the purposes of raising money."

As a board member, Runte finds something else distasteful about fund raising: its cost.

"Oftentimes, we said very cynically that for every dollar you put into fund raising, you only got back a dollar," he recalled. "Unless you hit a big donor, the bureaucracy was spending as much to generate money as it was getting back."

Some groups are far more efficient than others. The Nature Conservancy, for example, spends just 10 percent of donor contributions on fund raising, while the Sierra Club spends 42 percent, according to the American Institute of Philanthropy.

Pope, the Sierra Club director, said it's not a fair comparison. The reason? Donations to the Conservancy and most other environmental groups are tax-deductible -- an important incentive for charitable giving. Contributions to the Sierra Club are not, because it is a political organization, too.

"We're not all charities in the same sense," Pope said. "Our average contribution is much, much smaller."

Determining how much environmental groups spend on fund raising is only slightly less complex than counting votes in Florida. The difficulty is a bookkeeping quagmire called "joint cost accounting."

At its simplest, joint cost accounting allows nonprofit groups to splinter fund-raising expenditures into categories that sound more pleasant to a donor's ear -- public education and environmental action -- shaving millions off what they report as fund raising.

Some groups use joint cost accounting. Others don't. Some groups put it to work liberally, others cautiously. Those who do apply it don't explain it. What one group labels education,

another calls fund raising.

"You use the term joint allocation and most people's eyes glaze over," said Greenpeace's McPeake. The most sophisticated donor in the world "would not be able to penetrate this," she said.

Joint cost accounting need not be boring, however.

Look closely and you'll find sweepstakes solicitations, personal return address labels, free tote bag offers and other fund-raising novelties cross-dressing as conservation. You also find that those who monitor such activity are uneasy with it.

David Ormsteadt, an assistant attorney general in Connecticut, states in Advancing Philanthropy, a journal of the National Society of Fundraising Executives: "Instead of reporting fees and expenses as fund-raising costs, which could ... discourage donations, charities may report these costs as having provided a public benefit. The more mailings made -- and the more expense incurred -- the more the 'benefit' to society."

The Wilderness Society, for example, determined in 1999 that 87 percent of the $1.5 million it spent mailing 6.2 million membership solicitation letters wasn't fund raising but "public education." That shaved $1.3 million off its fund-raising tab.

One of America's oldest and most venerable environmental groups, the Wilderness Society didn't just grab its 87 percent figure out of the air. It literally counted the number of lines in its letter and determined that 87 of every 100 were educational.

When you read in the society's letter that "Our staff is a tireless watchdog," that is education. So is the obvious fact that national forests "contain some of the most striking natural beauty on Earth." Even a legal boast -- "If necessary, we will sue to enforce the law" -- is education.

"We're just living within the rules. We're not trying to pull one over on anybody," said Wilderness Society spokesman Ben Beach.

Daniel Borochoff, president of the American Institute of Philanthropy, the charity watchdog, said it is acceptable to call 30 percent or less of fund-raising expenses "education." But he deemed that the percentages claimed by the Wilderness Society, Defenders of Wildlife and others were unacceptable.

"These groups should not be allowed to get away with this," Borochoff said. "They are trying to make themselves look as good as they can without out-and-out lying ... . This doesn't help donors. It helps the organization."

At Defenders of Wildlife, Orasin flatly disagreed. The American Institute of Philanthropy "is a peripheral group and we don't agree with their standards," he said. "We don't think they understand how a nonprofit can operate, much less grow."

Even the more mainstream National Charities Information Bureau, which recently merged with the Better Business Bureau's Philanthropic Advisory Service, rates Defenders' fund raising excessive.

"We strongly disagree with (the National Charities Information Bureau)," said Orasin. "They take a very subjective view of what fund raising is. We are educating the public. If you look at the letters that go out from us, they are chock-full of factual information."

But much of what Defenders labels education in its fund raising is not all that educational. Here are a few examples -- provided to The Bee by Defenders from its recent "Tragedy in Yellowstone" membership solicitation letter:

- Unless you and I help today, all of the wolf families in Yellowstone and central Idaho will likely be captured and killed.

- It's up to you and me to stand up to the wealthy American Farm Bureau ...

☐ For the sake of the wolves ... please take one minute right now to sign and return the enclosed petition.

☐ The American Farm Bureau's reckless statements are nothing but pure bunk.

"That is basically pure fund raising," said Richard Larkin, a certified public accountant with the Lang Group in Bethesda, Md., who helped draft the standards for joint cost accounting. "That group is playing a little loose with the rules."

Defenders also shifts the cost of printing and mailing millions of personalized return address labels into a special "environmental activation" budget category.

Larkin takes a dim view.

"I've heard people try to make the case that by putting out these labels you are somehow educating the public about the importance of the environment," he said. "I would consider it virtually abusive."

Not all environmental groups use joint cost accounting. At the Nature Conservancy, every dollar spent on direct mail and telemarketing is counted as fund raising.

The same is true at the Sierra Club. "We want to be transparent with our members," said Pope, the club's director.

Groups that do use it, though, often do so differently.

The National Parks Conservation Association, for example, counts this line as fund raising: "We helped establish Everglades National Park in the 1940s." Defenders counts this one as education: "Since 1947, Defenders of Wildlife has worked to protect wolves, bears ... and pristine habitat."

"It's a very subjective world," said Monique Valentine, vice president for finance and administration at the national parks association. "It would be much better if we would all work off the same sheet of music."

At the Washington, D.C.-based National Park Trust, which focuses on expanding the park system, even a sweepstakes solicitation passes for education, helping shrink fund-raising costs to 21 percent of expenses, according to its 1999 annual report.

Actual fund-raising costs range as high as 74 percent, according to the American Institute of Philanthropy, which gave the Trust an "F" in its "Charity Rating Guide & Watchdog Report." Borochoff, the Institute's president, called the Trust's reporting "outrageous."

"Dear Friend," says one sweepstakes solicitation, "The $1,000,000 SUPER PRIZE winning number has already been pre-selected by computer and will absolutely be awarded. It would be a very, very BIG MISTAKE to forfeit ONE MILLION DOLLARS to someone else."

Paul Pritchard, the Trust's president, said the group's financial reporting meets non-profit standards. He defended sweepstakes fund raising.

"I personally find it a way of expressing freedom of speech," Pritchard said. "I can ethically justify it. How else are you going to get your message out?"

The Bee's Tom Knudson can be reached at tknudson@sacbee.com.

A SACRAMENTO BEE SPECIAL REPORT

Litigation central

A flood of costly lawsuits raises questions about motive

(Third of five parts)

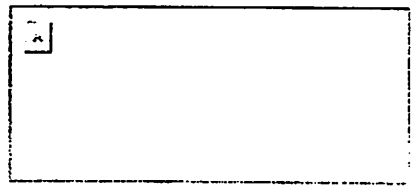

Photo gallery

Dr. Peter Moyle, a University of California, Davis professor, helps with electro shocking in a flood plain near the Cosumnes River south of Sacramento. A professor of fisheries biology, he has struggled to protect the splittail fish that are native to this area. (Click photo for larger view in gallery)
Bee/Jose M. Osorio

By Tom Knudson
Bee Staff Writer
(Published April 24, 2001)

No one knows the Sacramento splittail better than Peter Moyle.

For 20 years, Moyle, a professor of fisheries biology at the University of California, Davis, has struggled to protect the silvery fish that lives in the Sacramento-San Joaquin River Delta. He even helped prepare a petition requesting that the U.S. Fish and Wildlife Service list the fish under the Endangered Species Act in 1992.

But when the Southwest Center for Biological Diversity sued the wildlife service in 1998 to force a ruling on the petition, Moyle wasn't pleased.

The reason? By then, three wet winters had touched off a splittail population explosion. What's more, a multibillion-dollar habitat restoration plan for the Delta, called Cal-Fed, was brightening the fish's future.

"I was sorry to see it," Moyle said of the suit. "Things were getting better."

When Moyle later learned that the center's law firm had been awarded $13,714 in public money for a court victory that led to the fish being listed as "threatened," he was shocked.

Suing the government has long been a favorite tactic of the environmental movement -- used to score key victories for clean air, water and endangered species. But today, many court cases are yielding an uncertain bounty for the land and sowing doubt even among the faithful.

"We've filed our share of lawsuits and I'm proud of a lot of them," said Dan Taylor, executive director of the California chapter of the National Audubon Society. "But I do think litigation is overused. In many cases, it's hard to identify what the strategic goal is, unless it is to significantly reshape society."

The suits are having a powerful impact on federal agencies. They are forcing some government biologists to spend more time on legal chores than on conservation work. As a result, species in need of critical care are being ignored. And frustration and anger are on the rise.

"It's all about power and the trophy," said Kay Goode, assistant field supervisor for endangered species at the U.S. Fish and Wildlife Service in Sacramento, which has been sued so often that employees call it "litigation central."

"We can't continue at this pace," Goode said.

The crush of cases is prompting some lawyers and government officials to speculate that the suits could be motivated, at least in part, by money. Under federal law, an attorney who wins an environmental "citizen suit" against the government is entitled to an award of taxpayer-funded attorney fees.

"I worry that the propensity to sue the (fish and wildlife) service every time it misses a

treasure at risk
Graphic: Growing Southwest forest fires
Graphic: Fire country
Photo gallery

Day five
April 26, 2001
Main story: Solutions sprouting from grass-roots efforts
Graphic: Endangered nation
Photo gallery

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deadline sets our community up for an easy assault on the availability of fees," said Michael Bean, a senior attorney for Environmental Defense, one of the nation's largest conservation groups.

The Southwest Center's lawyers say money is not a factor for them.

"We file a lot of cases, but the point is not to generate income; it is to win and spur change," said James Tutchton, lead lawyer on the splittail case, which was filed in conjunction with the Sierra Club. "People don't like the fact that we represent unpopular groups and species and win."

There is no central repository for environmental lawsuits. But information obtained by The Bee from the Department of Justice using the U.S. Freedom of Information Act and from federal courthouses around the nation shows that:

* During the 1990s, the government paid out $31.6 million in attorney fees for 434 environmental cases brought against federal agencies. The average award per case was more than $70,000. One long-running lawsuit in Texas involving an endangered salamander netted lawyers for the Sierra Club and other plaintiffs more than $3.5 million in taxpayer funds.

* Attorneys for environmental groups are not shy about asking for money. They earn $150 to $350 an hour, and sometimes they get accused of trying to gouge the government. In 1993, three judges on the U.S. Circuit Court of Appeals in Washington were so appalled by one Sierra Club Legal Defense Fund lawyer's "flagrant over-billing" that they reduced her award to zero. "Even a perfunctory examination of (the lawyer's) time entries would show that she billed on a Brobdingnabian scale," wrote the judges, referring to the giants in "Gulliver's Travels" to drive their point home.

* Lawyers for industry and natural resource users get paid for winning environmental cases, too. When California water districts won a follow-up suit over the splittail last year, their law firms submitted a bill for $546,403.70 to the government. The Justice Department was stunned.

"Plaintiffs have failed to exercise any billing discretion," wrote U.S. Attorney Matthew Love in a January brief. "They seek compensation for excessive, duplicative and redundant tasks ... charge their normal hourly rates for (routine) activities such as telephone calls, letter writing (and) review of files."

* Since 1995, most cases brought have not been about dams, nuclear power or pesticides, but about rare and endangered species. That flood of suits has turned judges into modern day Noahs who decide which species are saved -- and which aren't. But the judges -- guided by law, not science -- aren't always the best-equipped to make biologically correct decisions.

* Suing on behalf of species is a specialty niche. Four law firms filed more than half of all such suits from 1995 to 2000. A whopping 75 percent of those cases were lodged in six states: California, Arizona, Oregon, New Mexico, Texas and Colorado. One kind of case -- over "critical habitat" -- has so swamped the Fish and Wildlife Service that it has halted the biological evaluations necessary to add new species to the federal endangered species list.

* Lawyers don't just bill for legal work. They also submit claims for lobbying, talking to the news media and flying and driving to and from meetings and courthouses.

"This has become a cottage industry," said Elizabeth Megginson, former chief counsel for the U.S. House Committee on Resources. "And it is being paid for by you and me, by taxpayers.

"Lawsuits are filed not so much to benefit species but for other reasons," said Megginson, who investigated dozens of cases for the committee. "It certainly is a way of supporting lawsuits that might not be filed if (environmental groups) had to pay their own way."

Citizen suits came into prominence three decades ago when Congress passed sweeping environmental laws, including the Endangered Species Act and the Clean Water Act. Realizing that political pressure could deter federal agencies from enforcing the law, Congress granted

environmental groups and ordinary citizens the right to hold the government accountable in court.

Since then, citizen suits have played an essential role in cleaning up and restoring the American landscape. A 1988 endangered-species suit by the Natural Resources Defense Council forced the U.S. Bureau of Reclamation to restore water to the San Joaquin River, bringing a ghost stream back to life. Another citizen suit led to the listing of the northern spotted owl as a federally "threatened" species, dramatically curtailing logging in the Pacific Northwest.

But like strong medicine, the power of the law works both ways. Used strategically, it can work miracles. Used otherwise, it can generate powerful side effects, even hurt what it is meant to help.

"Lawyers can be like engineers," said Gregory Thomas, chief executive officer of the Natural Heritage Institute, an environmental law and mediation group in Berkeley. "The engineering mentality says that if something can be built, it should be built. The legal mentality tends to be that if a case can be brought, it should be brought.

"But we know, from both engineering and lawyering, that that leads to socially undesirable results. It leads to dams that ought not be built. And it leads to lawsuits that ought not be brought."

On April 15, 1998, when millions of Americans were filing their taxes, the Southwest Center for Biological Diversity was filing a lawsuit to protect Alaska's Queen Charlotte goshawk. Six weeks later, the center's legal team was in California to sue over the Sacramento splittail. Then came another California case concerning 39 species, from the Pacific pocket mouse to the California gnatcatcher.

No environmental group in America files more endangered species cases at a more frenetic pace than the Southwest Center, which has since dropped the "Southwest" from its name to reflect its expansion into California and Oregon. Public records show that from 1994 to 1999 alone, the Center for Biological Diversity and its lawyers filed 58 lawsuits, an average of one every 32 days.

"We're panicked," said Kieran Suckling, the center's executive director. "There are species going down before our eyes."

But most of the suits don't hinge on the science of endangered species -- they're based on statutory deadlines. When Congress passed the Endangered Species Act in 1973, lawmakers filled it with deadlines to force bureaucrats to make timely decisions. When the Fish and Wildlife Service fails to meet those deadlines, which is often, it can be sued.

Missed deadline suits can be sweeping in scope. When the service failed to make timely decisions on 44 rare California plants proposed for the endangered list, the center sued on all 44 -- and won.

To date, the center has succeeded in adding 87 species in California to the federal endangered list.

"What we have accomplished is huge and real," Suckling said. "If citizens were not able to file these suits, the law would be meaningless. Politics would rule. And politics is always against endangered species."

Other environmentalists question the wisdom of such an approach.

"A missed-deadline case is like shooting fish in a barrel," said Thomas at the Natural Heritage Institute. "Anybody can bring such a case. Anybody can win such a case. The question is, having won it, have you advanced a broader strategic solution?"

Frequently, the answer is no, said Bean, of Environmental Defense, one of the country's most

experienced endangered species attorneys.

"The reality is listing often doesn't do a whole lot to improve the status of these species," Bean said. "Nine percent of listed species are improving. Thirty to 35 percent are declining. It won't do a lot of good to list species if they continue to decline -- and we ultimately lose them."

But it's not missed-deadline cases that are stirring up the most conflict. It's another category of lawsuit that seeks to secure "critical habitat" for species listed as federally threatened or endangered. Critical habitat is defined as habitat essential to the survival and recovery of a species.

Such suits generate playful headlines. Consider one recent case involving the California red-legged frog, a federally threatened species.

"Threatened Frogs May Get Leg Up," the Hartford Courant wrote after federal biologists last year -- in response to a center suit -- proposed to designate one-twentieth of California, 5.4 million acres, as critical habitat for the frog. The Engineering News-Record -- a trade journal -- hopped on the story. "Builders Jumpy Over Frog Limits," it reported.

Federal officials say the case was actually a leap backward for conservation.

"Critical habitat does not add a lot of value and -- in many cases -- almost no value to the conservation of species," said Michael Spear, head of the California-Nevada office of the Fish and Wildlife Service. "We will cover a significant part of California, one way or the other, with critical habitat this year."

But to Suckling, critical habitat has a near-magical power: to halt development, logging and other activity on land not occupied by endangered species but "critical" to their recovery. The idea is that species could eventually re-colonize such areas, or at least pass through them during migration.

Work stoppages are already happening in Arizona, where the designation of 790,000 acres of critical habitat for the cactus ferruginous pygmy owl, spurred by a center suit, has brought sprawl to a crawl around Tucson.

And what the owl has done for Tucson, the red-legged frog will do for California, only more so, Suckling said.

"Ten years from now, when tens of millions of acres of critical habitat will have been in existence across the West, there will be an enormous increase in species recovery and habitat restoration," he said in an e-mail. "The money spent on its designation will be seen as a bargain. It is a heck of a lot cheaper than keeping species in the emergency room for the rest of eternity."

The most massive critical habitat allotment of all came earlier this year when the Fish and Wildlife Service, again prodded by a center suit, designated 39,000 square miles of Alaska as critical for the spectacled elder, a sea duck.

"You know what is so important about the spectacled eider?" Suckling said. "That designation will be the only thing standing between George Bush and the oil rigs."

But such cases may be backfiring. In January, then-wildlife service director Jamie Rappaport Clark placed a moratorium on additions to the endangered list, saying the agency's resources are being gobbled up by critical habitat litigation.

"Critical habitat has turned our priorities upside-down," Clark said. "Species that are in need of protection are having to be ignored. This is a biological disaster."

Clark also voiced concern about the tax dollars that flow to environmental lawyers who win critical habitat, missed deadline and other cases. "I guess it's pretty good employment," she said.

Like other Fish and Wildlife officials, Clark has no direct role in negotiating attorney fees. That is handled by the Justice Department and, when talks break down, federal judges. The money comes not out of the Fish and Wildlife budget, but from a special "Judgment Fund" that pays claims of all kinds against the government.

So the size of the awards was news to Clark. Informed that some climb to $100,000 or more, she reacted angrily. "I guess they (lawyers) dress pretty well," she said. "I believe citizens should have the opportunity to sue the government, but this has gone over the edge."

William Curtiss, a vice president with the Earthjustice Legal Defense Fund -- the nation's largest nonprofit environmental law firm -- said public anger should be directed at government officials for breaking the law and for prolonging cases in court.

"It's hypocritical for the government to drag these things out for years, make the plaintiff jump through every hoop and hurdle, then turn around and whine about how much it costs," Curtiss said. "I don't buy it."

Few firms win larger fee awards than San Francisco-based Earthjustice, formerly the Sierra Club Legal Defense Fund. When Earthjustice won a coho salmon suit recently, for example, it submitted a bill for $439,053 to the Justice Department, and settled for $383,840. Most of the invoice was for 931 hours of legal work by Earthjustice senior attorney Michael Sherwood -- at $350 an hour.

Curtiss said $350 is a reasonable hourly fee for an experienced San Francisco attorney and Sherwood is the firm's most experienced.

Other lawyers, though, say the rate is high. "Nobody I'm aware of charges $350 an hour on our side," said Gregory Wilkinson, an attorney who represents irrigation and water districts. Wilkinson's rate is $225 to $250 per hour.

Earthjustice President Vawter "Buck" Parker said that unlike trial lawyers, his firm's lawyers have no incentive to win big awards.

"When we win fees, they go into a common pot for the general support of the whole organization," Parker said. "No one sees a change in their salary. No one sees their office budget go up ... on account of it."

One big controversy unfolded outside of public view in 1994 when a Sierra Club lawyer and other attorneys asked for $5 million, the largest fee request of the decade, as a partial settlement for winning an endangered species suit in Texas.

"The claim is excessive by any standard of fairness or reasonableness," U.S. attorneys wrote in protest to a federal judge.

The judge put the billing documents under seal. But, obtained by The Bee, they show that U.S. Attorney Charles Shockey was so irritated that he did not limit himself to dry legalese. He titled one legal motion:

"FEDERAL DEFENDANT$ OPPO$ITION TO PLAINTIFF$ MOTION ... FOR AWARD OF THEIR COMBINED CO$T OF LITIGATION."

The Justice Department and plaintiffs' lawyers settled the partial claim for $2 million. But the lawsuit eventually cost the government an additional $1.5 million, federal records show, ranking it first among fee awards in the 1990s.

Fee disputes are fairly common. Lawyers for the Environmental Defense Center in Santa Barbara asked for $123,462.53 in a 1996 Endangered Species Act case that led to the listing of the red-legged frog as "threatened." U.S. District Judge Manuel Real balked. He cut the award to $44,511, calling the billable hours "overstated."

The original frog invoice included charges for time spent talking to the news media, traveling, even adding up the legal bill itself.

"Hours spent are grossly unreasonable ... given the straightforward, simple unchanging nature of the case," Justice Department lawyers argued in papers filed with Real.

The 1993 suit that infuriated the Washington. D.C. circuit judges involved a Clean Air Act case filed by the Environmental Defense Fund against the Environmental Protection Agency.

In the case, the judges wrote that the Defense Fund's attorney Kirsten Engel "claimed to have spent 73.45 hours -- nearly two work weeks -- preparing two letters to the EPA about EDF's request for attorney fees.

"We are compelled to conclude that Engel submitted outrageously excessive time entries ... Therefore, we award the petitioner none of the $17,773.50 it asks for Engel's work," the judges said in their decision.

"We regard over-billing the government as a serious transgression, damaging to the public and violative of the trust reposed in each member of the bar," the judges concluded.

Occasionally environmental lawsuits cause other damage -- to the very groups that file them.

One such case unraveled in Arizona recently when the Southwest Center sued the U.S. Forest Service, alleging that it failed to "consult" with the Fish and Wildlife Service about cattle grazing's effect on endangered species -- a violation of federal law.

The suit targeted large swaths of federal land leased to ranchers, including a lease held by Joe and Valer Austin, owners of the picturesque El Coronado Ranch in the Chiricahau mountains.

The Austins are no ordinary husband-and-wife ranch team.

Since buying El Coronado in 1984, they have invested more than $1 million to return it to ecological health. They have constructed 20,000 erosion control structures, cut back herds dramatically and reduced the seasons they graze, and worked to restore threatened and endangered species. They have welcomed university and government scientists to the ranch to observe their efforts.

Their work has earned them numerous awards, including the Joseph Wood Krutch Award from The Nature Conservancy in 1996 and, two years later, the W.R. Chapline Land Stewardship Award from the Society for Range Management.

That didn't satisfy the Southwest Center, which alleged in its 1998 Forest Service suit that the Austins' ranching practices were harming endangered species.

"It was a real slap in the face," Joe Austin said.

Valer Austin added: "They just put us in the same bucket with everybody else. They didn't even come out here to see what we were doing."

The Austins didn't stand idly by. They jumped into the lawsuit with the federal government -- and emerged victorious. Senior U.S. District Judge Alfredo Marquez in Tucson ruled that the suit had been brought in bad faith and ordered the center to pay the Austins' $56,909 legal bill.

Still, Joe Austin feels conservation has suffered a defeat.

"Everything we were trying to do to convince other ranchers and landowners that endangered species are not a liability has been lost," he said. "The Southwest Center proved me wrong. The Southwest Center proved to everybody that having an endangered species is a liability.

"In fact, many people think you should just get rid of them," Austin said. "That is the exact thing I didn't want to happen."

What's the center's view? "It's a bummer," said Suckling. "I wish it had not come down this way. But would I sue again? Absolutely. (The Austins) are having an impact on public land. The fact that they are doing good things elsewhere doesn't excuse it."

The Bee's Tom Knudson can be reached at tknudson@sacbee.com.

A SACRAMENTO BEE SPECIAL REPORT

Seeds of Change

Solutions sprouting from grass-roots efforts

(Fifth of five parts)

By Tom Knudson
Bee Staff Writer
(Published April 26, 2001)

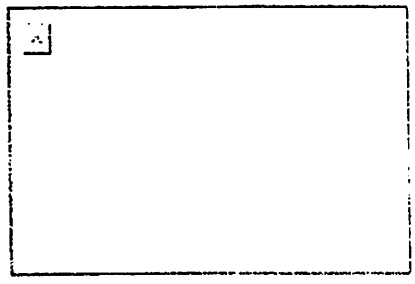

Photo gallery

The Nature Conservancy has enlisted schoolkids -- including Cub Scouts from Galt -- to help maintain the Cosumnes River Preserve. Aharon Sweatt, 7, center, Steven Scally, 7, far left, and others spend a Saturday morning planting trees and working toward badges. (Click photo for larger view in gallery)
Bee/Jose M. Osorio

Change is knocking on the door of America's environmental movement. Change is remodeling it from within.

From the outside, the pressure is coming from ranchers, corporate executives, small-town merchants, educators, schoolkids and other ordinary people embracing a home-grown style of environmentalism that is quietly saving species, restoring forests and grasslands, and preserving open space.

From the inside, it is coming from a broad spectrum of environmentalists -- chief executive officers, fund-raising specialists, state directors, program officers, lawyers and others -- struggling to bring more science, entrepreneurial skill, accountability, teamwork and results to a movement they say has grown self-righteous, inefficient, chaotic and shrill.

"Haphazard conservation is worse than haphazard development. We've had haphazard conservation for 30 years," said Patrick Noonan, chairman of The Conservation Fund, a Virginia group that provides financial and technical support to small environmental organizations.

Yet this new brand of stewardship remains more seed than storm, lacking the clamor and conflict that often accompany environmental news. Its disciples do not view the world darkly. Their habitat is one of hope, not hype.

"We've effectively sold the idea that the world is screwed up," said Dan Taylor, executive director of the National Audubon Society's California chapter. "What people are looking for now are some durable solutions on how to make it better."

Just as consumer taste shapes the corporate landscape, so, too, is hunger for a new kind of environmentalism changing the conservation world. The number of environmental groups is booming -- up from a few hundred in 1970 to more than 8,000 today. And most are sprouting not in traditional power centers -- such as Washington, D.C., or San Francisco -- but in other cities, small towns and rural areas.

The grass-roots nature of the change can be read in the names of the organizations themselves: the Malpai Borderlands Group in Douglas, Ariz.; the Henry's Fork Foundation in Ashton, Idaho; the Great Valley Center in Modesto; the Applegate Partnership in Oregon.

"People now realize they can organize themselves," said Noonan. "They can band together in their community to save that river, field, mountain or whatever. It's America at its best."

Behavioral patterns are shifting, too. No longer is influencing public policy so lofty a goal. Today, some groups focus on a more tangible prize: buying, protecting and restoring land. And no longer do all groups simply say no to economic development; today, a few are learning how to make commerce and conservation walk side by side.

Change is leafing out at the national level, as well, where five of the country's 10 largest groups focus not on advocacy but buying and protecting land -- up from just one 30 years

treasure at risk
Graphic: Growing Southwest forest fires
Graphic: Fire country
Photo gallery

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ago. Those groups -- The Nature Conservancy, Conservation International, Ducks Unlimited, the Trust for Public Land and the Conservation Fund -- have another common denominator: They are among the fastest-growing environmental groups in America.

Two of the 10 biggest groups, and many smaller ones, prosper without junk mail or telemarketing. Five are wealthy enough to compete with corporations for land. Two have their own scientific research institutes. At least two take in significant sums of money -- $4 million a year or more -- from corporations, including oil, timber and mining companies.

Like experimentation on the dot-com frontier, such activity is bringing a burst of creativity to the conservation community, spawning start-ups and spinoffs that bear little resemblance to conventional environmental groups.

Look closely at this landscape and you see organizations with no members, no lawyers, even no payrolls. You also see conservation efforts sprouting in unlikely places -- including an Appalachian farm supply store, a commercial fishing fleet in Mexico, a fast-growing Florida suburb and cattle ranches in California and Arizona.

"You have to manage with people in mind nowadays ... You can't turn the land back to what it was in 1840," said Warner Glenn, a southeast Arizona rancher. Glenn is working with The Nature Conservancy, university scientists and others to keep grasslands healthy for rural families and for wildlife.

Priorities are beginning to change, too. No longer is the designation of parks and wilderness areas as dominant a theme. Today, some are focusing on the restoration of worked-over land, public and private alike, an approach many scientists say can produce greater benefit for the natural world. Some are taking conservation to the inner city, creating parks and cleaning up toxic sites in neighborhoods overlooked by mainstream groups.

And no longer is it enough simply to point out problems. Today, people inside the environmental movement and outside are picking up shovels, planting trees, healing wetlands, tearing out parking lots, working with government and industry -- and solving problems themselves.

This new environmental frontier has no road map, no catalog of places saved or species protected. But plenty of people know it well. One is Bill Kittrell, director of the Clinch Valley program for The Nature Conservancy in the Appalachian Mountains of southwest Virginia.

Closer to Nashville than Washington, southwest Virginia seems an odd place for a branch office of the nation's largest environmental group. The countryside -- thickly forested with hickory, walnut and other hardwoods -- is picturesque. But, speckled with small towns and abandoned coal mines, it is no pristine wilderness. Eighty-nine percent of the area is private land.

Yet for the Conservancy, which focuses on protecting rare and endangered species, this quiet corner of Appalachia is more important than a national park. One morning not long ago, Kittrell was waist-deep in the Clinch River, trying to illustrate why.

He sloshed this way and that, using a large viewing scope to peer into the water. Five minutes passed. Ten minutes. A few moments later, one of his colleagues -- biologist Braven Beaty -- reached into the river and scooped what looked like a small yellow-brown stone off the bottom.

"Here we go!" Beaty said. "This is a fine-rayed pigtoe mussel. This is a federally endangered species."

Held in the sun, the mussel gleamed. And Kittrell beamed. "This is what we call a G-1 species," he said. "That means there are fewer than five population groups worldwide. The loss of any one population is a threat to the entire species."

All told, southwest Virginia's rivers and creeks are home to 48 rare and endangered mussels and fish, the highest number of imperiled species in any ecosystem in the United States, outside Hawaii. That concentration of rarity -- and a determination to remedy it -- was what

drew the Conservancy to southwest Virginia.

"Most environmentalists, they always want more," the Conservancy's former President John Sawhill told The Bee before his death last year. "We wanted to know, 'How much is enough? What do we really need to do to conserve biological diversity in the U.S.? How will we measure success?' "

"So we came up with the idea of creating what we call a conservation blueprint: a map showing all the sites nationwide that need to be protected in order to accomplish our mission," Sawhill said. On that map, a handful of areas glow red and orange -- color codes for extreme biological danger. They are southwest Virginia, Hawaii and parts of California, Nevada and Florida.

"Now we know where we're headed and what we're trying to accomplish," Sawhill said.

The Conservancy also works closely with local residents, including Buddy Thomas, owner of the Castlewood Farm Supply & Garden Center and president of the chamber of commerce in Russell County, Va.

"I've heard it so many times from these farmers: 'What importance are these little mussels?' " Thomas said. "When I tell them those mussels are God's little filters to clean the water, they look at it a whole different way."

"I got a 2-year-old girl," Thomas continued. "You know what my favorite thing in the world is to do? It is to get my fishing rod and my kid and play in that creek. Everybody loves the creek. I can't find many people who want to see it hurt."

Thomas even formed his own conservation start-up -- the all-volunteer Copper Creek Watershed Citizens' Awareness Group -- to bring farmers, environmentalists and others together to solve problems.

"We'll get a lot further doing things together than by butting heads, making threats and telling people they can't do things," he said. "You tell people around here they can't do something, they'll do it or die."

A similar approach is unfolding outside the United States, where Conservation International, the youngest of the nation's major environmental groups, concentrates on a handful of the planet's richest biological zones, from the Congo Basin in Africa to Mexico's Gulf of California.

On turquoise water under a sweltering sun, Conservation International scientist Juan Garcia is putting a new strategy to work to save a wide variety of marine life in the gulf. He is working with the very people who are exploiting the gulf, also known as the Sea of Cortez.

Garcia labors alongside fishermen, trying to make shrimp trawling, one of the world's most wasteful fishing technologies, less destructive. Dragged behind large boats, trawl nets snare everything in their path, including sea horses, marine turtles and silvery schools of fish too small to eat.

In the Sea of Cortez, trawl nets capture up to 9 pounds of unwanted species for every pound of shrimp, one of the highest ratios anywhere.

"We are working with six or seven vessels," Garcia said. "They are very enthusiastic about trying to find a solution."

Such community-driven conservation efforts are the brainchild of Conservation International's founder and chairman, Peter Seligmann, who believes the secret to environmental success in other countries is to "make sure everybody understands conservation is in their self-interest."

Seligmann is applying conservation to internal matters, too. A few years back, he abandoned junk-mail fund raising in favor of personal solicitations to major donors. The result: more accountability for donor dollars.

"If you have a million people giving you $25, nobody has the leverage to say -- 'OK, how did you spend my money?' -- because they don't care. It's just 25 bucks," he said. "But when somebody gives you $1,000, they have the right to know, and you have the obligation to inform them, how you spend their money.

"The other problem with direct mail is it requires exaggeration," Seligmann said. "You don't build effective long-term conservation programs based on exaggeration."

Even some groups that continue to raise money though the mail are doing it differently: They refuse to cry wolf.

"We very rarely say, 'The world is coming to an end, send $25,' " said Taylor, the Audubon Society leader. "What we do say is, 'Send us money so we can buy this area, restore that area.' That approach has performed nicely."

In Tucson, the Sonoran Institute takes matters a step further -- it doesn't have a membership at all.

"A membership is very expensive," said Luther Propst, executive director of the organization, which protects open space across the western United States, Canada and Mexico. Instead, it raises money from foundations.

A membership "will also influence your decision-making, often in ways that take you away from science and what your field people tell you. You are tempted to oversimplify. We find that foundation officers appreciate it when you are honest."

Frustrated with junk mail, even Greenpeace is trying alternatives, including something called "direct dialogue" in which volunteers stand on street corners and ask for donations.

But instead of seeking a one-time contribution of cash, the Greenpeace volunteers are asking for a monthly credit-card or checking-account deposit, thus eliminating junk mail and cutting fund-raising costs. That approach is popular in Europe but relatively new in the United States.

"Our argument to donors is, 'This (direct deposit) is how you can really help us,' " said John Passacantando, Greenpeace's executive director. "We're spending too much money to get your money."

Some environmentalists are even taking a fresh look at the movement's most potent weapon: the law. "The law prohibits bad things; it doesn't encourage good things," said Michael Bean, a senior attorney with Environmental Defense, a major national group.

Bean, one of the nation's most seasoned endangered species lawyers, has sued to get the California desert tortoise on the endangered species list and compel American shrimp fishermen to reduce the accidental catch of sea turtles in their nets.

Now he's found a new niche: saving wildlife without litigation.

"The preconceived notion is that the best way to get results is always to tighten the screws," Bean said. "But there are some circumstances in which you get better results by creatively loosening the screws."

One such case unfolded in North Carolina where landowners, wary of land-use restrictions, were leveling pine forests to ward off an endangered woodpecker.

Bean helped broker a deal in which landowners not only agreed to stop such "panic cutting" but also to manage their forests in ways that would attract the birds -- all in exchange for a guarantee from the federal government that they would suffer no new restrictions on using their land.

Bean said the idea behind such "safe harbor agreements" is simple: People who do good deeds shouldn't be punished for doing them.

Incentives are coming to regulatory matters, too.

"We believe in regulation. But you can only go so far with a regulatory system. Free enterprise is the greatest motivator the world has ever known," said Noonan, the Conservation Fund chairman.

"Developers come to us all the time," Noonan continued. "They don't want to get tied up, fight it out for years. They want certainty. I can jam any developer I want. I may not win, but I can jam them. For two, three, four years. That's power. But it's also frightening power."

When a large investment group recently announced plans to build a new subdivision in fast-growing Palm Beach County, Fla., Noonan worked with the developer to create ribbons of open space that will provide habitat for endangered species, restore surface and groundwater flows, and link neighborhoods with bicycle and pedestrian trails.

"We're not going to stop population growth, at least not in our lifetime," Noonan said. "So I suggest the next big leap is: How do we support good development?"

Increasingly, environmental groups also are using the free market to accomplish something that has proved nearly impossible for local, county and state regulators: stopping sprawl.

They are doing it by buying land, even in some of the most booming real estate markets in America. "We're un-developers," said Will Rogers, president of the Trust for Public Land, which recently saved a choice 534-acre parcel from subdivision in the hills above San Jose, for $1.9 million.

Some of the trust's work takes place an ecosystem overlooked by many conservation groups: the inner city. In Oakland, it is turning urban blight into parks. In Los Angeles, it is converting a toxic Superfund site into a soccer field.

"There is an increased awareness that land can be recycled, that parks can be created often out of brownfields" -- abandoned industrial sites, Rogers said. "It's gnarly stuff, in terms of toxics and liability. But it's a big, exciting category. We've done probably 36 brownfields projects over our history."

Noonan's Conservation Fund recently pulled off one of the biggest conservation transactions of all -- buying from a logging company 300,000 acres in New York, Vermont and New Hampshire for $76.7 million.

"We outbid Wall Street on that one," Noonan said. "That's happening more and more."

Like a brokerage house for the environmental movement, the Conservation Fund brought together other nonprofit groups, foundations and public agencies to complete a transaction none could have completed on its own.

"The big weakness of our movement is we don't collaborate very well," Noonan said. "We're seeing a new set of people come into the movement who can talk the language of business and who are humble enough to know they can't do it alone."

Land also can be protected through strategies such as that adopted by California rancher Scott Stone: Restore it to ecological health. Last year, as bright orange flames raced along a creek at the Yolo Land and Cattle Co. northwest of Winters, Stone stood nearby, watching contentedly.

"You can see what we're trying to get rid of," he said, pointing to vast golden fields of yellow star thistle, medusa head and goat grass -- non-native, ecologically harmful weeds and grasses.

The spread of non-native weeds and other species may seem insignificant, but it is actually one of the nation's most serious ecological problems. Exotic weeds and grasses choke out native plants, increase fire danger and destroy wildlife habitat.

Conventional remedies -- herbicides and hoes -- offer little hope. The problem is simply too large. For many weed species in the West, the only option is fire. And in California, few people know more about the therapeutic power of fire than Central Valley farmer John Anderson, who helped Stone plan and carry out his pastoral pyrotechnics.

"That star thistle is history!" Anderson shouted gleefully as knee-high flames raced along a dirt road.

Sitting on the ground as smoke curled around him, his face streaked with ash, Anderson turned philosophical. "We need to reinstitute a culture of fire in the West," he said. "We've feared it for years, and now nobody knows how to burn."

Anderson took advantage of his fireside chat to call for the creation of a massive new federal program to restore land to ecological health -- "a national land health care system," he called it.

"You really can't nickel-and-dime habitat restoration," said Anderson, a member of the National Audubon Society board. "Most of the money we're getting now (from government agencies) is nickel and dime. We need big bucks ... We need millions and millions of dollars to fight weeds right now."

But there are alternatives to federal money, too. You can, for example, call on school kids, as The Nature Conservancy is doing south of Sacramento at its Cosumnes River Preserve.

"We decided that the way to the heart of the community was through the schoolchildren," said Mike Eaton, director of the preserve. "So we set out to create hands-on opportunities." Today, about 4,000 schoolkids a year plant trees, collect acorns and gather frog, fish and duck stories to take home.

Tapping into community spirit is also an approach used by the Malpai Borderlands Group, a network of ranchers in Arizona and New Mexico. There, free market tools such as conservation easements and cooperative grazing partnerships are put to work to protect ranches and open space critical to wildlife.

"There are very few ranchers in this country that are not pro-wildlife," said Warner Glenn -- a member of the group's board -- relaxing on the porch of his ranch home last year as lightning illuminated Mexico's Sierra Madre range to the south.

In 1996, Glenn became the first person to photograph a wild jaguar in the United States. He wrote a book about it and is donating a portion of the proceeds to jaguar conservation.

When the population of a rare species of leopard frog dropped precariously in a drought a few years back, another Malpai rancher, Matt Magoffin, fashioned a homemade water truck. He and his family hauled 1,000 gallons of water a week to the frogs for 2 1/2 years.

"Environmentalists are fighting with ranchers, but we both want the same goals," Magoffin said. "We want to maintain open space and keep subdivisions from spreading across the landscape."

Corporations have also joined the ranks of nontraditional conservationists. And many environmentalists are distrustful.

"The lack of accountability on the part of America's corporate leadership is back where it was in the 1870s," said Carl Pope, executive director of the Sierra Club. Less than 1 percent of the Sierra Club's budget comes from corporations, and such gifts are run through a rigorous environmental screening process.

But Conservation International President Russell Mittermeier embraces corporate wealth.

"The private sector drives much of what happens in the world," said Mittermeier, who has been likened to Indiana Jones for his intrepid travels through tropical jungles to save endangered primates. "One can either be in an adversarial relationship with it, or one can

work with people in the private sector who are really concerned and interested in change."

Ford Motor Co. has donated more than $5 million to Conservation International for habitat protection in Brazil and Mexico. Starbucks is backing efforts to promote the cultivation of shade-tolerant coffee plants in Chiapas, Mexico, saving forests from being logged to make way for coffee plantations.

William Clay Ford Jr. -- the car company's chairman -- has served on the Conservation International board member. So has retired Intel Chairman Gordon Moore, who recently gave the group $35 million to start its own research arm.

Although many environmentalists say corporate support is a public relations ploy, Mittermeier said his own experience indicates otherwise.

"William Ford is as strong on this stuff as anybody in the organization," he said, "Gordon Moore is totally committed. He goes on every field trip, climbs every mountain."

The National Audubon Society welcomes corporate donations, too. "Somebody once had a great phrase when asked, 'Would you accept tainted money?' " said Dan Beard, the society's chief operating officer. "The response was, 'The only thing wrong with tainted money is there t'ain't enough of it.'

"What we ought to be doing is building an environmental ethic in corporate minds," Beard said. "We ought to be converting the world to an environmental ethic. If you just ignore people -- or point fingers at them -- that isn't going to do anybody any good."

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Capitol Alert

SACRAMENTO BEE NEWS

Taste Looking for

Environmentalists' tactics face review

By Tom Knudson
Bee Staff Writer
(Published May 3, 2001)

The House Resources Committee, sparked by last week's series of articles in The Bee, plans to hold hearings later this year on environmental fund-raising techniques and other matters.

The environmental movement "is a very powerful force. It has become an industry," said Resources Committee Chairman James Hansen, R-Utah, who said the committee plans oversight hearings examining the environmental movement.

"They've got buildings, automobiles, airplanes, batteries of lawyers," Hansen said, speaking of national environmental groups. "And they don't want to settle issues. They keep wanting more."

The Bee series -- Environment, Inc., published April 22-26 -- investigated the increasingly corporate nature of the nation's growing environmental movement, including its reliance on costly, crisis-related direct-mail fund-raising pitches and its use of litigation.

In 1999, environmental groups nationwide took in a record $3.5 billion in donations. But, according to charitable ratings organizations and IRS records, some groups spend substantial portions of donations not on conservation but on administrative overhead and fund raising.

"To my knowledge this is the first time any paper in this country has ever done this kind of report," said Rep. Richard Pombo, a Tracy Republican and member of the House committee.

"What most of these groups are -- are fund-raising machines," Pombo said. "They don't really care if they solve a problem. Their interest is in maintaining the battle because that is what funds their organization."

Environmentalists reacted coolly to such comments.

"Frankly, I don't think this is the government's business," said Dan Taylor, executive director of the National Audubon Society's California chapter. "Since (environmental) groups are funded and supported through the public, let the market decide."

John Passacantando, executive director of Greenpeace, said Congress is the problem.

"Congressmen, working with industry, have done their best over the last 30 years to block good environmental regulations," he said. "To say that somebody who cares about rising rates of cancer or global warming, to say there is some sort of greed motive in that is shameless."

Colorado Rep. Scott McInnis, another Republican committee member, said environmental groups have learned to sell fear.

"They have every right to tell their side," McInnis said. "But there ought to be a fundamental obligation to tell the truth."

Another sore spot is the use of "citizen suits" to compel federal agencies to enforce laws, such as the Endangered Species Act. While such suits have resulted in dramatic victories, Pombo said they are prone to abuse -- and are generating hefty taxpayer-funded attorney fee awards.

Tnsm Smith NPLA c-!

Congressional Record - U.S. Senate
May 4, 2001
[page S4403]

THE GREEN SCARE

Mr. MURKOWSKI. Mr. President, our collective national memory is still haunted by images from the so-called ``McCarthy Era.'' This was a time in the middle of the last century when ``The Red Scare'' came to dominate both the headlines and the national consciousness, a time when no stone was left unturned in the search for the Communists beneath them.

Truth took a back seat during ``The Red Scare,'' with the result that innocent and guilty alike had their rights trampled upon, and an entirely proper investigation became an exercise in hysteria. During ``The Red Scare'' we lost track of the facts and got wrapped-up in the emotions of the time.

The United States is now entering into an energy crisis. Demand for power is up and supplies are, if not down, at least not keeping up with that demand. As an example, gasoline prices are over $2 a gallon, and the hot weather and travel season aren't even here yet, Mr. President!

We all know there's a real power crisis in the State of California. How it came about is well-documented and need not occupy us here today. Suffice it to say, all the elements conspired to come together at the right time and in the right place--much like the events told in ``The Perfect Storm''--and this disaster is now upon us.

How are we going to get out of it, or, at least, mitigate the worst of its effects? How do we get there from here? I submit we are neither going to exclusively drill our way out of it, nor are we going to exclusively conserve our way out of it. Both those options may look good on paper, but they are doomed to failure in the real world.

This body is about to come to grips with designing a national energy policy. It will be an interesting time for us, as we work to blend effective conservation measures with ways to ensure that we have the power sources we need. It is my hope that this plan will be based on sound science, not on emotions or slogans. If it's not, it's eyewash, not worth the paper the headlines it would generate are written on.

Mr. President, there is a five-part series entitled ``Environment Inc.,'' which ran between April 22 and April 26, 2001, in the ``Sacramento Bee'' newspaper.

This series was written by a ``Bee'' reporter named Tom Knudson. Mr. Knudson has won two Pulitzer Prices for his writing on environmental issues.

This series examines the high-powered fund raising machine that now characterizes much of today's Corporate Environmental Culture, a machine that increasingly funds, not environmental conservation efforts, but an unceasing flow of litigation and a spreading spill of public relations efforts. Conservation organizations have, themselves, become big businesses, complete with fund raising consultants and tremendous salaries.

Annual salaries for the heads of 9 of the 10 largest environmental groups now top $200,000; one makes over $300,000 a year. In 1997, and I quote here: ``.....one group fired its president and awarded him a severance payment of $760,335.'' We don't see television ads of fat cats in their high-rise offices or swilling martinis in ritzy hotels. The article notes that some are now calling the Sierra Club, ``Club Sierra.'' John Muir would be appalled, I think.

Make no mistake about it, the Corporate Environmental Culture has raised a lot of money. Direct mail efforts. It boggles the mind to think that anyone would give money to a group that sends out millions of paper brochures asking for money to save the rain forest. Telemarketing efforts. ``Send us money or the Jenkins Warbler goes extinct on the 27th of next month.''

This series points out that, and I quote: "Six national environmental groups spend so much money on fund raising and overhead they don't have enough left to meet the minimum benchmark for environmental spending--60 percent of annual expenses--recommended by charity watchdog organizations."

Many--although, in fairness, not all--of these groups use an accounting loophole--and again I quote: "to classify millions of dollars spend on direct mail and telemarketing not as fund raising, but as public education and environmental activism!"

If a citizen wants to give a few bucks to Club Sierra, that's not properly any of our business, is it? But increasingly, this series points out, environmental groups are inundating the courts with endangered species lawsuits. Such suits have become one of their basic tools. Even if there's no chance they'll win, they can tie up projects in courts for years on end.

Every time the U.S. Fish and Wildlife Service misses a deadline, a lawsuit follows like a hungry duckling waddling after its mother. Increasingly, the Service will tell you they are devoting more and more of their time and resources to fighting lawsuits, which leaves less and less time for the wildlife biology that is the Service's proper business.

Why would groups suppposedly dedicated to conservation behave this way? Increasingly evidence suggests this onslaught of suits might well have its roots in the Almighty Dollar and the pursuit thereof. A lawyer who wins one of these ``citizen suits'' is entitled to a refund of his or her attorney fees from the taxpayers. These attorneys typically charge $150 to $350 an hour. The series notes that, and again I quote:

When California water districts won a suit.....last year, they submitted a bill for $546,403.70 to the government. The Justice Department was stunned.

It gets worse. There is increasing evidence that environmental groups are misusing science. They are behaving the way a fellow who tries to sell you a used toothbrush behaves, that is, they tell the truth, but they don't tell the whole truth. Here's an example from the series relating to necessary thinning programs in national forests.

The buildup of fuels in Western forests was a prominent topic in the 1996 Sierra Nevada Ecosystem Project report, a 3,187-page scientific assessment of the California mountain range.

Citing a remarkable accumulation of vegetation and deadwood, the $6.5 million, congressionally funded report warned of a fiery future--unless overcrowded stands were thinned soon.

One suggested remedy was small-tree logging, followed by prescribed fire. 'Logging can serve as a tool to help reduce fire hazard,' it stated.

Environmental groups overlooked that part of the report.

Instead, they plucked one sentence from thousands to argue that all logging is bad. Here's how the National Forest Protection Alliance, a consortium of activists, used the report last fall in an action alert, under the heading, ``What the Government's Own Scientists Say about Logging and Wildfires'': ``Timber harvest, through its effects on forest structure, local microclimate and fuels accumulation has increased fire severity more

than any other recent human activity."

One fire scientist who helped write the report notes that the excerpt refers to historic logging that left Western forests littered with woody debris--not modern thinning designed to clean up such debris. Informed of this, a network coordinator for the forest alliance, said: ``This is the most popular fact we have. It is a quote congresspeople have used."

Well, that settles that for all time, doesn't it, Mr. President?

I submit that our national energy policy is increasingly being affected not by scientific fact and the best interests of the country, but by the same type of hysteria and misinformation we saw when truth took a back seat during ``The Red Scare" of 50 years ago.

During ``The Red Scare" we lost track of the facts and got wrapped-up in emotion. During ``The Green Scare," which we're going through now, we're giving ourselves over to hysteria yet again. This present-day hysteria is fed by a bloated, inefficient environmental industry, absorbed by its pursuit of money and devoted to the preservation, not of the natural environment, but of its own high rise, martini-swilling corporate lifestyle. There is a sizeable body of evidence that Environment, Inc. is willing to abandon truth and science, even the very reason for its existence, in pursuit of a buck. It is a movement that has lost its soul.

There's a bright side to all this. First of all, the word is getting out. Thanks to people like Tom Knudson, the author of the ``Environment Inc." series and to concerned people in an out of the environmental movement, more and more people are coming to realize they've bought that used toothbrush we talked about before. As our population soars and demands upon our eco-system accelerate, there is much real environmental work to be done.

I will conclude where Mr. Knudson's series concludes, with the coming thing in environmentalism, a movement both new and rooted in the very origins of environmentalism. Everyday ``garden-variety" environmentalists are bringing ``more science, entrepreneurial skill, accountability, teamwork, and results to a movement they say has grown self-righteous, inefficient, chaotic, and shrill." The Nature Conservancy, the Conservation Fund, and other groups are focusing, not on their offices and attorney fees, but on protecting land and on restoring it. These groups are making allowances for necessary development.

This represents a maturing of the environmental movement, a realization

that it is fire not smoke that counts, results, not headlines. It is time for America to stand up to the lies and hysteria of ``The Green Scare'' and say: ``No. Not again.''

Mr. President, I ask unanimous consent that excerpts from the series ``Environment Inc.'' be printed in the RECORD.

I wish to also note that the entire series may be found at: www.sacbee.com/news/projects/environment.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

[From the Sacramento Bee, Apr. 22, 2001]

Fat of the Land--Movement's Prosperity Comes at a High Price

(By Tom Knudson)

As a grass-roots conservationist from Oregon, Jack Shipley looked forward to his visit to Washington, D.C., to promote a community-based forest management plan. But when he stepped into the national headquarters of The Wilderness Society, his excitement turned to unease.

``It was like a giant corporation,'' Shipley said, ``Floor after floor after floor, just like Exxon or AT&T.''

In San Francisco, Sierra Club board member Chad Hanson experienced a similar letdown when he showed up for a soiree at one of the city's finest hotels in 1997.

``Here I had just been elected to the largest grass-roots environmental group in the world and I am having martinis in the penthouse of the Westin St. Francis,'' said Hanson, an environmental activist from Pasadena. ``What's wrong with this picture? It was surreal.''

Soon, Hanson was calling the Sierra Club by a new name: Club Sierra.

Extravagance is not a trait normally linked with environmental groups. The movement's tradition leans toward simplicity, economy and living light on the land. But today, as record sums of money flow to environmental causes, prosperity is pushing tradition aside, and the millions of Americans who support environmental groups are footing the bill.

High-rise offices, ritzy hotels and martinis are but one sign of wider

change. Rising executive salaries and fat Wall Street portfolios are another. So, too, is a costly reliance on fund-raising consultants for financial success.

Put the pieces together and you find a movement estranged from its past, one that has come to resemble the corporate world it often seeks to reform.

Although environmental organizations have accomplished many stirring and important victories over the years, today groups prosper while the land does not. Competition for money and members is keen, Litigation is a blood sport. Crisis, real or not, is a commodity. And slogans and sound bites masquerade as scientific fact.

``National environmental organizations, I fear, have grown away from the grass roots to mirror the foxes they had been chasing," said environmental author Michael Frome, at a wilderness conference in Seattle last year. ``They seem to me to have turned tame, corporate and compromising."

This series of articles--based on more than 200 interviews, travel across 12 states and northern Mexico, and thousands of state and federal records--will explore the poverty of plenty that has come to characterize much of the environmental movement. Some of the highlights:

Salaries for environmental leaders have never been higher. In 1999--the most recent year for which comparable figures are available--chief executives at nine of the nation's 10 largest environmental groups earned $200,000 and up, and one topped $300,000. In 1997, one group fired its president and awarded him a severance payment of $760,335.

Money is flowing to conservation in unprecedented amounts, reaching $3.5 billion in 1999, up 94 percent from 1992. But much of it is not actually used to protect the environment. Instead, it is siphoned off to pay for bureaucratic overhead and fund raising, including expensive direct-mail and telemarketing consultants.

Subsidized by federal tax dollars, environmental groups are filing a blizzard of lawsuits that no longer yield significant gain for the environment and sometimes infuriate federal judges and the Justice Department. During the 1990s, the U.S. Treasury paid $31.6 million in legal fees for environmental cases filed against the government.

Those who know the environment best--the scientists who devote their careers to it--say environmental groups often twist fact into fantasy to

serve their agendas. That is especially true in the debate over one of America's most majestic landscapes: its Western evergreen forests. A 1999 report by the U.S. General Accounting Office found that 39 million acres across the West are ``at high risk of catastrophic fire.'' Yet many groups use science selectively to oppose thinning efforts that could reduce fire risk.

``A lot of environmental messages are simply not accurate,'' said Jerry Franklin, a professor of forest ecology and ecosystem science at the University of Washington. ``But that's the way we sell messages in this society. We use hype. And we use those pieces of information that sustain our position. I guess all large organizations do that.''

And sometimes when nature needs help the most, environmental groups are busy with other things.

As the tiny Fresno kangaroo rat struggled for survival in the industrialized farmland of California's San Joaquin Valley in the 1990s, for example, the environmental movement did not seem to notice.

As a fisheries conservationist tried to save rare trout species across remote parts of Oregon and Nevada, he found no safety net in major environmental groups.

As sea turtles washed up dead and dying on Texas beaches in 1993, no groups made the turtles their mascot.

``I contacted everybody and nobody listened,'' said Carole Allen, who rehabilitates turtles injured in fishing nets. ``Everybody wants to save dolphins. Turtles aren't popular. It really gets frustrating.''

Yet look closely at environmentalism today and you also see promise and prosperity coming together to form a new style of environmentalism--one that is sprouting quietly, community by community, across the United States and is rooted in results, not rhetoric.

``I'm so frustrated with the opportunism and impulsiveness of how groups are going about things,'' said Steve McCormick, president of The Nature Conservancy, which uses science to target and solve environmental problems. ``What's the plan? What are the milestones by which we can measure our success?''

Today's challenges are more subtle and serious than those of the past.

Stopping a dam is child's play compared to halting the spread of destructive, non-native species. Protecting old-growth forests from logging is simple; saving them from fire and disease is more difficult.

But as the Bush administration takes control in Washington, many groups are again tuning up sound bites--not drawing up solutions.

There is no clearinghouse for information about environmental groups, no oversight body watching for abuse and assessing job performance. What information exists is scattered among many sources, including the Internal Revenue Service, philanthropic watchdogs, the U.S. Department of Justice and nonprofit trade associations.

Sift through their material and here is what you find:

Donations are at flood stage. In 1999, individuals, companies and foundations gave an average of $9.6 million a day to environmental groups, according to the National Center for Charitable Statistics, which monitors nonprofit fund raising.

The dollars do not enrich equally. The nation's 20 largest groups--a tiny slice of the more than 8,000 environmental organizations--took in 29 percent of contributions in 1999, according to IRS Form 990 tax records. The top 10 earned spots on the Chronicle of Philanthropy's list of America's wealthiest charities.

The richest is The Nature Conservancy, an Arlington, Va., group that focuses on purchasing land to protect the diversity of species. In 1999, The Nature Conservancy received $403 million, as much as its six nearest rivals combined: Trust for Public Land, Ducks Unlimited, World Wildlife Fund, Conservation International, National Wildlife Federation and Natural Resources Defense Council.

Forty years ago, the environmental movement was a national policy sideshow. Today, it is a strong, vocal lobby that weighs in on everything from highway transportation to global trade. Some groups, such as the National Audubon Society and Environmental Defense, are generalists, dabbling in many things. Others, such as Ducks Unlimited and Conservation International, have found success in specialization.

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David Brower, the legendary former Sierra Club leader who led successful battles to keep dams out of Dinosaur National Monument and the Grand Canyon

in the 1950s and '60s, said success springs from deeds, not dollars.

"We were getting members because we were doing things," Brower said before he died last year. "Out (strength) came from outings and trips--getting people out. If came from full-page ads and books."

Today, there is a new approach--junk mail and scare tactics.

"Dear Friend, If you've visited a national park recently, then some of the things you're about to read may not surprise you!

"America's National Park System--the first and finest in the world--is in real trouble right now.

"Yellowstone ..... Great Smoky Mountains ..... Grand Canyon ..... Everglades. Wilderness, wildlife, air and water in all these magnificent parks are being compromised by adjacent mining activities, noise pollution, commercial development and other dangerous threats ....."

So begins a recent fund-raising letter from the National Parks Conservation Association, a 400,000-plus-member organization. The letter goes on to tell of the group's accomplishments, warn of continued threats, ask for money--"$15 or more"--and offer something special for signing up. "Free as our welcome-aboard gift ..... The NPCA bean bag bear!"

Let's say you did send in $15. What would become of it?

According to the group's 1998-99 federal tax form, much of your money would have been routed not to parks but to more fund raising and overhead. Just $7.62 (51 percent) would have been spent on parks, less than the minimum 60 percent recommended by the American Institute of Philanthropy, a nonprofit charity watchdog group.

And the parks association is not alone.

Five other major groups--including household names such as Greenpeace and the Sierra Club--spend so much on fund raising, membership and overhead they don't meet standards set by philathropic watchdog groups.

It's not just the cost of raising money that catches attention these days. It is the nature of the fund-raising pitches themselves.

"What works with direct mail? The answer is crisis. Threats and

crisis," said Beard, the Audubon Society chief operating officer.

"So what you get in your mailbox is a never-ending stream of crisis-related shrill material designed to evoke emotions so you will sit down and write a check. I think it's a slow walk down a dead-end road. You reach the point where people get turned off." Then he hesitated, adding:

"But I don't want to say direct mail is bad because, frankly, it works."

Even some of those who sign the appeals are uncomfortable with them.

"Candidly, I am tired of The Wilderness Society and other organizations--and we are a culprit here--constantly preaching gloom and doom," said William Meadows, the society's president, whose signature appears on millions of crisis-related solicitations. "We do have positive things to say."

Many environmental groups, The Wilderness Society included, also use a legal accounting loophole to call much of what they spend on fund raising "public education."

In 1999, for instance, The Wilderness Society spend $1.46 million on a major membership campaign consisting of 6.2 million letters. But when it came time to disclose that bill in its annual report, the society shifted 87 percent--$1.27 million--to public education. The group also shrank a $94,411 telemarketing bill by deciding that 71 percent was public education."

The Wilderness Society's spokesman, Ben Beach, said that kind of accounting is appropriate because fund-raising solicitations are educational.

"No one is trying to do anything that isn't right by the rule book here," he said. "A lot of us don't particularly like getting (telemarketing) calls. But that's not to say you don't learn something."

Still, the accounting practice is controversial. Nine of the nation's 20 largest groups don't use it. "Playing games with numbers is not worth the effort or questions that would come from it," said Stephen Howell, chief operating officer at The Nature Conservancy.

"It should be called what it is," said Noonan, the Conservation Fund leader. "As we become larger and more successful, I worry about the ethics

of our movement. We need to think about self-regulation and standards. If not, the ones who make mistakes are going to hurt it for all of us."

Dollars can disappear in other ways, of course.

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Comfortable office digs and sumptuous fund-raising banquets are another drain on donor dollars. The Sierra Club spends $59,473 a month for its office lease in San Francisco. In Washington, Greenpeace pays around $45,000 a month.

In June 1998, The Nature Conservancy spent more than $1 million on a single fund-raising bash in New York City's Central Park. Carly Simon and Jimmy Buffett played. Masters of ceremonies included Dan Rather, Peter Jennings, Mike Wallace and Leslie Stahl. Variety magazine reported that the 1,100 guests were treated to a martini bar and a rolling cigar station.

"The goal was to raise (our) profile among high-dollar donors," Conservancy spokesman Mike Horak said in a statement. And it paid off: $1.8 million was raised.

Salaries gobble up money raised, too. In 1999, top salaries at the 10 largest environmental groups averaged $235,918, according to IRS tax forms. By contrast, the president of Habitat for Humanity, International--which builds homes for the poor--earned $62,843. At Mothers Against Drunk Driving, the president made $69,570.

Among environmental groups, Ducks Unlimited paid its leader the most: $346,882.

"Those salaries are obscene," said Martin Litton, a former Sierra Club board member, who worked tirelessly over a half-century to help bring about the creation of Redwoods National Park in 1968 and Sequoia National Monument last year. Litton did it for free.

"There should be sacrifice in serving the environment," he said.

END