

Alaska Fisheries Science Center
REFM Division
7600 Sand Point Way NE, Bldg. 4
Seattle, WA 98115

12 November 2003 F/AKC2:HZ

MEMORANDUM FOR: Distribution

FROM: Richard J. Marasco
Director, REFM Division, AFSC

SUBJECT: Cod pot research cruise

Attached are copies of the Scientific Research permit, the Cruise Announcement, and the Scientific Research Plan for a fishery research cruise that will be conducted by the Resource Ecology and Fisheries Management (REFM) Division of the Alaska Fisheries Science Center (AFSC) during 14 November 2003 through 22 November 2003. Research operations will occur entirely within Steller sea lion (SSL) critical habitat in the neighborhood of the Cape Sarichef trawl exclusion zone. The work will be conducted by the chartered fishing vessel *Auriga*. If you have questions concerning the research plans for this cruise, please contact me (206-526-4172) or Anne Hollowed (206-526-4223) directly.

Attachments

Distribution:

F/AKC - D. DeMaster
F/AKC4 - M. Dahlberg
F/EN4 - J. Passer (Juneau)
- G. Gailbreath (Anchorage)
- K. Hansen (Kodiak)
- R. Antaya (Sitka)
- J. Wisher, D. Thaute (Homer)
- R. Moore, C. Raterman, T. Newhouse (Dutch Harbor)
- G. Dudgeon (Yakutat)
USCG 17 (OLE) - LTJG E. Geraghty
USCG 17 (PO1) - YN1 - L. Weller
ADF&G - F. Rue
ADF&G - J. Barlow
NPFMC - C. Oliver

cc: F/AKR02 - T. Faris
F/AKC2 - R. Marasco
A. Hollowed
F/AKC1 - G. Stauffer
R. Nelson



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

SCIENTIFIC RESEARCH PERMIT (SRP) # 2003-26

Research on the Effects of Fishing on the Availability of Pacific Cod

Issued to: Douglas P. DeMaster, Science and Research Director
Alaska Fisheries Science Center (AFSC), NMFS
7600 Sand Point Way N.E.
Seattle, WA 98155 - 0070

This SRP authorizes the below named fishing vessel identified in the Cruise Plan dated November 10, 2003, (attached) as specified at 50 CFR 600.745 to conduct scientific research in the exclusive economic zone.

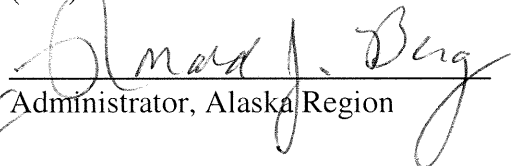
Vessel Name: F/V *Auriga*

Chief Scientist(s): Peter Munro, AFSC, NMFS

Effective Dates: November 15 through 22, 2003.

This SRP is separate and distinct from any permit required by any other applicable law. In order to facilitate identification of your activities as scientific research, you must carry a copy of your cruise plan and this SRP on board the research vessel while conducting scientific research activities. Generally, activities conducted in accordance with a scientific research plan permitted by a SRP are exempt from applicable regulations. This presumption may be overcome if it can be shown that an activity does not fit the definition of scientific research activity or is outside the scope of your scientific research plan. The activities planned include: 1. collection of data on capture processes and fish behavior using standardized research pots to catch Pacific cod, and 2. tag and release of Pacific cod in the vicinity of Cape Sarichef. Activities outside the scope of your permit that are in violation of the applicable regulations may be subject to sanctions.

For information regarding this SRP, contact Rich Marasco (206) 526-4172 or Anne Hollowed (206) 526-4223.

For 
Administrator, Alaska Region

11/12/03
Date



DETERMINATIONS

MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

Under the Magnuson-Stevens Act, scientific research activity conducted from a scientific research vessel is not fishing and, therefore, exempt from the requirements Magnuson-Stevens Act regulations. Research activity is exempt from any requirements of the Magnuson-Stevens Act as described in the submitted scientific research plans and modified by any requirements of this SRP.

NATIONAL ENVIRONMENTAL POLICY ACT

This action is categorically excluded from the requirement to prepare an environmental assessment in accordance with NAO 216-6 . This action falls within the general categorical exclusion provided for research by that order (6.03.c.3(a)).

ENDANGERED SPECIES ACT

I have determined that research activities conducted pursuant to this permit will not affect endangered and threatened species or critical habitat in any manner not considered in prior consultations on the Alaska groundfish fisheries.

MARINE MAMMAL PROTECTION ACT

I have determined that research activities conducted under this permit will have no adverse impact on marine mammals.



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE**

Alaska Fisheries Science Center
7600 Sand Point Way NE, Bldg. 4
Seattle, WA 98115

10 November 2003

MEMORANDUM FOR: F/AK - James W. Balsiger, Regional Director
FROM: F/AKC - Douglas DeMaster, Center Director *DD*
SUBJECT: Request for a Scientific Research Permit

We are requesting a Scientific Research Permit (SRP) for the Resource Ecology and Fisheries Management (REFM) Division to conduct a research cruise in late November 2003. This research is part of on-going investigations into possible effects of fishing on the availability of Pacific cod as prey for Steller sea lions and interactions between trawl fleets and spawning cod. The primary purpose of the cruise is to collect data on capture processes and fish behavior using standardized research pots to catch Pacific cod. The secondary purpose is to tag and release Pacific cod in the vicinity of Cape Sarichef to study small-scale and short-term movement. Copies of the Cruise Announcement and the Scientific Research Plan are attached.

The chartered fishing vessel *Auriga* will begin research fishing on or about 15 November 2003 and operations will be completed on or about 22 November 2003. All of the research fishing will occur within Steller sea lion (SSL) critical habitat. Study sites may be located in and around Unimak Pass on cod grounds commonly fished by cod pot vessels and cod trawlers. All fishing sites will be outside of Alaska State waters. All fishing gear will be provided by the Government. Catches are expected to consist almost entirely of Pacific cod. Total catch is expected to be low, approximately 20 metric tons. This expectation is based on a pilot study conducted April 2002, in which an average research fishing day saw 4.4 tons of cod caught. We anticipate there will be 11 fishing days in the gear trials cruise. A small number of frozen specimens will be retained for laboratory analysis of physiological parameters. All other catch will be returned to the sea.

If you, or anyone of your staff, have questions concerning the research plans for this cruise, please contact Rich Marasco (206 - 526 - 4172) or Anne Hollowed (206 - 526 - 4223) directly.

Attachments

cc: F/AKR02 - T. Faris
F/AKC3 - R. Marasco
A. Hollowed
F/AKC2 - G. Stauffer
R. Nelson



10 November 2003

F/AKC2:HZ

CRUISE ANNOUNCEMENT**Charter Vessel F/V Auriga****Cruise 2003-01****AREA AND PERIOD OF OPERATION**

The fishing vessel *Auriga* has been chartered by the Alaska Fisheries Science Center (AFSC) to conduct an 8-day scientific research cruise. The purpose of the study is to collect data on capture processes and fish behavior using standardized research pots to catch Pacific cod (*Gadus macrocephalus*). Cod will also be tagged and released Pacific cod in the vicinity of Cape Sarichef to study small-scale and short-term movement. This research is part of on-going investigations into possible effects of fishing on the availability of Pacific cod as prey for Steller sea lions and interactions between trawl fleets and spawning cod. The cruise will begin and end in Dutch Harbor, AK. The cruise will begin on or about 15 November 2003. Study sites may be located in and around Unimak Pass, on cod grounds commonly fished by cod pot vessels and cod trawlers. All fishing sites will be outside of Alaska State waters. All fishing gear will be provided by the Government.

Objectives, Methods, and Materials are described in the attached Scientific Research Plan.

ITINERARY

15 - 18 November	Load vessel in Dutch Harbor, AK. (Charter begins.)
17 - 18 November	Vessel departs Dutch Harbor, AK.
22 November	Off-load gear in Dutch Harbor, AK (End of charter).

SCIENTIFIC STAFF AND AFFILIATIONS

Peter Munro (Field Party Chief)	AFSC, REFM Div.
Sandi Neidetcher	AFSC, REFM Div.
Yun Bing Shi	AFSC, REFM Div.
Geoffrey Lang	AFSC, REFM Div.
Dan Foy	AFSC, REFM Div.
Erika Acuna	AFSC, RACE Div.

Key to acronyms:

AFSC - Alaska Fisheries Science Center, Seattle, Washington
REFM - Resource Ecology and Fisheries Management (a division of the AFSC)
RACE - Resource Assessment and Conservation Engineering (a division of the AFSC)

For further information, contact Dr. Richard Marasco, Director, Resource Ecology and Fisheries Management Division, Alaska Fisheries Science Center, National Marine Fisheries Service, 7600 Sand Point Way Northeast, Bldg 4, Seattle, Washington, 98115-6349. Telephone (206) 526-4172.

SCIENTIFIC RESEARCH PLAN:

COD POT CAPTURE PROCESSES AND COD MARK RECAPTURE STUDIES

NOVEMBER 2003

Synopsis

The Alaska Fisheries Science Center (AFSC) will conduct a scientific research cruise in late November 2003 to collect data on capture processes and fish behavior using standardized research pots to catch Pacific cod (*Gadus macrocephalus*). Capture processes will be related to environmental conditions. Cod will also be tagged and released in the vicinity of Cape Sarichef to study small-scale and short-term movement. This research is part of on-going investigations into possible effects of fishing on the availability of Pacific cod as prey for Steller sea lions and interactions between trawl fleets and spawning cod. The cruise will begin and end in Dutch Harbor, AK. The cruise will begin on or about 15 November 2003 and run for 8 days. Study sites may be located in and around Unimak Pass, mostly in the neighborhood of the Cape Sarichef trawl exclusion zone, on cod grounds commonly fished by cod pot vessels and cod trawlers. All fishing sites will be outside of Alaska State waters. The research will be conducted from the chartered fishing vessel *Auriga*. All fishing gear will be provided by the Government.

Background and Justification

Management strategies for cod fisheries in the Bering Sea and in the Gulf of Alaska have been severely altered in recent years in response to the listing of the Steller sea lion as endangered under the Endangered Species Act. The Fisheries Interaction Team (FIT) of the AFSC has been charged with investigating the effectiveness of these changes in fishery management. The intent of the new harvest regime is to eliminate any jeopardy to sea lions that might result from changes in the availability of cod as a prey item. The FIT will conduct studies to determine if current fisheries strategies produce discernable changes in the local abundance and distribution of cod near sea lion rookeries and, if so, to what degree. (Other scientists, studying the biology and behavior of sea lions, will contribute to the definition of what degree of fishery effect can be considered negligible.) Modification of management strategies, either to better protect sea lions or to allow greater or more efficient harvest of cod, may result from experiments conducted in the course of FIT investigations.

Experiments are being conducted by the FIT to test for short-term, localized effects of a cod fishery on cod abundance. Local abundance before and after a fishery is expected to change, if for no other reason than seasonal effects, so effect of fishing will be confounded with other effects. However, data will be collected that permit comparison of *rates* of change in abundance. A number of sites (on the order of 80) have been chosen, half in grounds closed to trawling and

half in grounds that are open to trawling. In all other attributes the sites are to be as similar as possible. At each site, an index of abundance from before the fishery will be related to an index of abundance from after the fishery. It will be assumed that all other factors that affect change in abundance are constant between the fished and unfished sites. A difference in the rate of change of abundance between fished and unfished sites can then be interpreted to be a fishery effect.

Catches from research fishing with cod pots have been selected as the indices of abundance with which to evaluate a possible fishing effect. Cod pot catches were selected over research trawl catches because cod pots may provide a higher sample size, lower variances in catch, a finer spatial resolution, and the ability to sample in rough grounds. These expectations have been borne out in several cruises: a gear development cruise in June 2001, a study of variation and components of variation in cod pot catches in April 2002 using commercial cod pots, a gear trials cruise in October 2002 to test research pots, and a pilot study in winter of 2003 in which the experimental design was implemented and evaluated. The unit of observation (the cod pot catch) and its associated methods have been successfully developed, field tested, and the statistical characteristics of such data have been seen to be advantageous to inference about relative cod abundance. The experimental design to test the hypothesis of localized depletion, employing research pot abundance indices, has been validated in the field.

Conclusions drawn from research pot catches and a before/after experimental design depend on a number of assumptions. Among these assumptions three in particular must be evaluated if conclusions regarding localized depletion are to be less burdened by caveat and provision. These assumptions are 1) gear saturation either does not occur or can be accounted; 2) environmental effects are not confounded with trawling effects (if present); and, 3) effects on indices of abundance due to small-scale, short-term movement of cod are not confounded with possible trawling effects.

Assumptions Regarding Gear Saturation

A potential problem with any fixed gear methodology, including pot fishing, is that the gear can become saturated, meaning that it has an upper catch limit which can never be exceeded, even with increased abundance. If gear saturation occurs it means that the cod pot catch no longer correlates well with the abundance of cod in the vicinity of that pot. Four strategies will be employed to either avoid or compensate for gear saturation: 1) The research pots have a very large interior volume, the intent being to postpone saturation conditions by raising the upper catch limit. 2) The efficiency of the research pots has been reduced slightly from that of typical commercial pots by having a slightly smaller tunnel eye, a slightly shallower tunnel draw, and a "trigger" (the device that prevents escape from the pot through the tunnel eye and through which a fish must pass) which is slightly more resistant to fish entry; this reduction in efficiency is intended to slow the catch rate sufficiently to postpone the occurrence of saturation conditions. 3) Soak times will be limited to 8 hours or less so that the pot is removed before saturation can occur. 4) The time of entry of each fish will be recorded using trigger timers.

Trigger timers are data logging instruments that record the time that each cod enters a pot. Triggers are the mechanisms used to keep a cod from escaping a pot once it has entered. The research triggers are rigged with magnet based read-switches. When a cod moves past the trigger a circuit is broken and the time of the event is recorded in a data logger in an underwater housing.

Most importantly, the average time between entries may be an alternate index of abundance, with high abundance being correlated with a quick entry rate, low abundance being correlated with a slower entry rate. Catch timing has been shown to be functional alternative to standardized catches in other research fishing methods, in particular for long line armorhead catch rates and long line tuna and bill fish catch rates. Almost as important, another use of trigger timer data will be to simply correlate the period of catch activity with oceanographic conditions. Such correlations may allow further standardization of cod pot catch rates to oceanographic observations.

Development of trigger timers and triggers appropriate for research fishing has proceeded apace with the development of other cod pot research methods. Already the preliminary data, collected by prototype trigger timers, have provided valuable insight into the cod pot capture process and how that process is affected by various factors. However, trigger timer data are extremely sparse. In cruises to date we have not encountered catch rates that suggest gear saturation, however, should saturation conditions occur, we do not yet have sufficiently functional timer data to correct the problem. The timers themselves work extremely well. However, it has been difficult to develop trigger modified appropriately to provide consistent timer data. The most recent version of the modified trigger appears to be free of the features that lead to inconsistency in timer data from trigger to trigger and are ready to be tested.

Assumptions Regarding Environmental Effects

We mentioned earlier that constraints have been imposed on the experimental design to insure that trawled and untrawled sampling sites are as similar as possible so that factors affecting change in abundance are the same but for trawling effects. In particular, depths have been restricted to between 70 m and 100 m and the area of the entire experimental site has been kept small. These restrictions increase the likelihood that effects due to trawling are not confounded with effects due to movements of water masses, variation in tidal regime, or other environmental factors (which may, in turn, affect presence or absence of fish local to a particular research pot, the fishing efficiency of a research pot, the inclination of a cod to respond to bait, or any combination of these and other environmentally related consequences to research fishing).

The assumption that trawling effects are not confounded with environmental effects can be tested, at least in part. To that end we have developed a prototype oceanographic instrument array that can be deployed by a chartered pot fishing vessel as an on-going part of the research pot fishing. The array will provide data on current speed and direction, depth, temperature, conductivity, dissolved oxygen levels, turbidity, and light levels. The instruments provide observations on a very fine temporal scale (on the order of seconds and fractions of a second) that can be correlated with the temporally fine catch data provided by trigger timers. Using these arrays right among the research fishing gear will allow abundance index data to be linked with environmental data on a very small scale in both time and place (as needed for experiments regarding localized depletion).

The structure for deploying the oceanographic instruments can be handled by the pot fishing machinery that the chartered vessel is required to have. The array is intended to be launched and retrieved in the same manner as the research pots and as a normal part of the fishing process. The oceanographic instruments and the deployment structure need to be field tested and methods

for linking their data to trigger timer data must be established as protocols prior to deployment in the before/after experiment scheduled for winter of 2004.

Assumptions Regarding Small-Scale / Short-Term Movement Of Cod

Constraints in depth and area of the experimental site also serve to increase the likelihood that trawling effects are not confounded with movement of fish, in particular, the movement of fish from shallow to deep water. This is another testable assumption, at least in part. Direct study of cod movement may indicate the role of such movement in the variability of cod abundance indices, allowing a better interpretation of abundance indices provided by research pot fishing. To that end, we will tag and release cod in the vicinity of the experimental site. Two kinds of movement are of particular interest, from deeper to shallower water and movement along the contour, from southwest to northeast or vice versa.

Other Expected Cruise Benefits

Two other valuable benefits are expected to result from this cruise, observations of research catch rates in a different season than those of the before/after experiment and preparation and field trials of the chartered vessel prior to the 2004 execution of the before/after experiment. The latter benefit is of critical value since there is an absolute minimum of time in which to conduct the "before" portion of the before/after experiment (27 December 2003 through 11 January 2004) and sample size for that experiment will be at a premium. Since we are not sure of the seasonal timing of the aggregation of cod for spawning in this area, abundance index data from this time (late November) will be of immediate use in interpreting the experimental data to be collected in winter 2004.

Goals And Methods

The cruise has several goals:

- 1) prepare the chartered vessel for conducting the before/after experiment scheduled for winter 2004,
- 2) deploy and test most recent trigger-timer prototypes,
- 3) deploy and test oceanographic instrument arrays and refine deployment methods and data management methods,
- 4) tag and release cod to the end of studying short-term, small-scale movement of fish in the vicinity of the Cape Sarichef trawl exclusion zone,
- 5) collect abundance index data in the experimental site in the period of the year just prior to the formation of cod spawning aggregations.

All these goals should be achievable with the expected number of sea days. However, the order in which they are listed also represents their priority should time be lost to weather, mechanical, or other difficulties.

Cruise Timing And The Basic Strategy

The cruise will consist of two parts, set up and at sea. The process of setting up the vessel for research fishing operations and data collection will occur in Dutch Harbor in the first two or three days of the charter. The vessel will then proceed to the experimental site off the Cape Sarichef trawl exclusion zone. There research pots will be set to catch cod to tag and release. In the course of this fishing all the instrument testing will occur. Pots used to test instruments or purely to provide cod to be tagged and released will be baited more heavily and may receive different soak times than is required by the protocols of the before/after experiment. Other pots will be set on stations in the experimental design using methods that strictly follow the protocols for the before/after experiment; these pots will provide abundance index observations that are comparable to those collected in both previous and future cruises. Whenever possible, captured cod will be tagged and released.

Station Location For Tagging And Releasing Cod

The two type of cod movement of immediate interest are from deeper water to shallower water and movement along the contour in from the southwest to the northeast or vice versa. We will not try to address the latter question other than to release tagged cod in the vicinity of the Cape Sarichef experimental site. This site is located to the northeast and southwest of both trawl and pot fishing grounds. To detect movements from deeper to shallower water (and vice versa) strings of pots will be run in 120 meter depths (just outside the experimental site) and in 70 meter depths (the inner bound of the experimental site). Only one depth category will be fished on a single fishing day, alternating deep and shallow.

Data Management

Methods for recording, transcribing, and managing data have been evolving over previous cod pot research cruises. The templates for processing the different categories of data may need further refinement to maximize efficiency and free up energy for collecting data rather than managing it. The current state of our data methods will be adjusted as needed, both during and after the cruise.

Schedule And Areas Of Operations

The cruise will begin on or about 14 November 2003 and last for 8 days. Study sites may be located in and around Unimak Pass, on cod grounds commonly fished by cod pot vessels and cod trawlers. All fishing sites will be outside of Alaska State waters.

Personnel

Peter Munro (Field Party Chief)	AFSC, REFM Div.
Sandi Neidetcher	AFSC, REFM Div.
Yun Bing Shi	AFSC, REFM Div.
Geoffrey Lang	AFSC, REFM Div.
Dan Foy	AFSC, REFM Div.
Erika Acuna	AFSC, RACE Div.

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**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

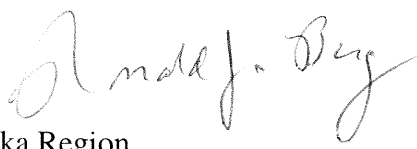
National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

November 13, 2003

MEMORANDUM FOR: The Record

FROM: James W. Balsiger 
Administrator, Alaska Region

SUBJECT: Informal Endangered Species Act Section 7 Consultation Regarding
the Effects of Scientific Research Permit 2003-26

The Administrator, Alaska Region, has determined that research being done by Alaska Fisheries Science Center scientists aboard the research vessels named in the above permit is not likely to adversely affect any listed species or designated critical habitat under the Endangered Species Act (ESA) for which NMFS has jurisdiction. Brief synopses of the planned activities are as follows:

- Collection of data on capture processes and fish behavior using standardized research pots to catch Pacific cod in and around Unimak Pass.
- Tag and release of Pacific cod in the vicinity of Cape Sarichef to study small-scale and short-term movement.

The activities proposed are not likely to result in any direct take of Steller sea lions, or harvest of fish of an amount that would measurably affect prey availability for Steller sea lions. Other listed endangered species that are found in the area include some great whales and Pacific salmon stocks that generally feed on small schooling fishes, squid, and crustaceans. The proposed actions are, therefore, not likely to adversely affect ESA listed Steller sea lion, cetaceans or Pacific salmon.

This concludes informal consultation on these actions pursuant to section 7 of the ESA.

cc: AKR Administrative Records
AKR Protected Resources Division

