

MINERALS MANAGEMENT ADVISORY BOARD
Agenda for the Outer Continental Shelf (OCS)
Scientific Committee (SC) Meeting
Tuesday, April 22, 2003
Hilton Anchorage
Aleutian Room
Anchorage, Alaska

8:30 a.m. - 8:50 a.m.	Welcome and Introductions and the Passing of the Gavel Dr. William Schroeder, Outgoing Chair, OCS SC to Dr. Lynda Shapiro, Incoming Chair, OCS SC
8:50 a.m. - 9:15 a.m.	Director's Presentation Mr. Robert LaBelle, Deputy Associate Director for Offshore Minerals Management and Acting Executive Director of the OCS SC
9:15 a.m. - 9:45 a.m.	Alaska OCS Regional Overview Mr. John Goll, Director, MMS Alaska OCS Region
9:45 a.m. - 10:15 a.m.	Overview of the MMS Environmental Studies Program Dr. James Kendall, Chief, Environmental Sciences Branch
10:15 a.m. - 10:30 a.m.	Break
10:30 a.m. - 10:50 a.m.	OCS Policy Committee Report Mr. Larry C. Schmidt, OCS Policy Committee
10:50 a.m. - 11:15 a.m.	Report from the OCS SC Mercury Subcommittee Dr. Will Schroeder, Subcommittee Chair
11:15 a.m. - 11:30 a.m.	MMS Coastal Marine Institute (CMI) Initiative Overview Dr. James Kendall for Mr. Jim Cimato, MMS Environmental Sciences Branch
11:30 a.m. – 12:00 noon	The Alaska Coastal Marine Institute, <i>Research and Education</i> Dr. Vera Alexander, Director
12:00 noon – 12:30 p.m.	Overview of the Coastal Marine Institute, Louisiana State University Mr. Larry Rouse, Director
12:30 noon - 1:50 p.m.	Lunch

MINERALS MANAGEMENT ADVISORY BOARD
Agenda for the Outer Continental Shelf (OCS)
Scientific Committee (SC) Meeting
Tuesday, April 22, 2003
Hilton Anchorage
Anchorage, Alaska
Aleutian Room
(Afternoon Session)

1:50 p.m. - 4:45 p.m.	Regional Priorities and Environmental Information Needs
(1:50 - 2:40)	MMS Sand & Gravel Environmental Studies Mr. Barry Drucker, MMS Leasing Division Comments on the Process for the Sand & Gravel Studies Program Dr. Robert Diaz, Chair, OCS SC Sand & Gravel Subcommittee Mr. Larry C. Schmidt, Chair, OCS Policy Committee Hard Minerals Subcommittee
(2:40 - 3:10)	Alaska OCS Region Dr. Cleve Cowles, Chief, Environmental Studies Section
(3:10 - 3:30)	Break
(3:30 - 4:00)	Pacific OCS Region Dr. Fred Piltz, Senior Scientist, Office of Environmental Evaluation, Pacific OCS Region
(4:00 - 4:45)	Gulf of Mexico OCS Region Dr. Pat Roscigno, Chief, Environmental Sciences Section
4:45 p.m. - 5:00 p.m.	Public Comment
5:00 p.m. - 5:15 p.m.	Scientific Committee Wrap-Up Discussion Dr. Lynda Shapiro, Chair, OCS SC
5:15 p.m.	Adjourn

Director's Presentation

As advisor to the Director, MMS, the Committee appreciates the opportunity to have a dialogue with the Director for Offshore Minerals Management on ongoing and future issues, policies, and activities of the Bureau. This exchange not only keeps the Committee apprised of MMS direction but also offers an opportunity for the Committee to provide direct advice and guidance on matters as they relate to the Environmental Studies Program.

Alaska OCS Regional Overview

Mr. John Goll, Alaska Regional Director, will provide an overview of ongoing and planned activity in Alaska. The Alaska OCS is now producing oil, has a great oil and gas resource potential, and has a very ambitious lease sale schedule. But numerous challenges persist, including economic, technical, environmental, and sociological.

Overview of the MMS Environmental Studies Program

MMS Headquarters and Regional Studies presentations will outline the overall research needs and priorities of the National and Regional Studies Programs. Presentations will address current issues; information/knowledge gaps; the most pressing research needs; how the various disciplines fit together in the overall picture; and future Studies efforts, in terms of expenditures and prioritization.

OCS Policy Committee Report

Officers of the OCS Scientific Committee and the OCS Policy Committee routinely attend each other's meetings and give brief presentations on the various OCS issues they are involved with. Mr. Larry C. Schmidt will present the key discussion items from the OCS Policy Committee's October 2002 meeting.

Report from the OCS SC Mercury Subcommittee

The Subcommittee gathered and reviewed existing information to provide recommendations on the relevance and need for research regarding issues raised by the media suggesting that offshore oil and gas discharges and platforms in the Gulf of Mexico lead to mercury contamination in seafood. The Subcommittee report (November 2002) addresses the following questions:

- *Are high concentrations of total mercury observed in sediment at or adjacent to OCS oil and gas drilling sites associated with the drilling mud weighting agent barite?*
- *Are concentrations of methylmercury in sediments at or adjacent to OCS oil and gas drilling sites statistically higher than in sediments unaffected by drilling activities?*

- *Can increases in sediment concentrations of methylmercury at or adjacent to OCS oil and gas drilling sites be directly attributed to mercury introduced with barite?*
- *Do discharges at OCS oil and gas drilling sites create environmental conditions that enhance the conversion of mercury to methylmercury?*
- *Does the accumulation of organic matter (organic enrichment) beneath or adjacent to oil/gas platforms create environmental conditions that enhance the conversion of mercury to methylmercury?*
- *Does the development of a persistent (10^1 to 10^2 days) bottom layer of anoxic or extremely hypoxic bottom water result in conditions that promote methylation?*

MMS Coastal Marine Institute Initiative Overview

The MMS Coastal Marine Institute (CMI) initiative was proposed in 1991 as an MMS-State partnership to strengthen relationships with coastal states where OCS oil and gas activities take place and to improve the information flow to the affected States and the public. It accomplishes this by using State institutions to conduct research on issues of concern to both the State and MMS. This research is focused on environmental and socioeconomic aspects of OCS oil and gas and marine mineral development activities. Through the CMI's, increasing numbers of students and faculty are engaging in OCS related research, developing new skills, and developing new information and approaches to solving management issues.

In recognition of the mutual need for critical scientific information for resource management decisions, the CMI program leverages MMS funds with State funds (one-to-one matching is required) so that more research can be done than if MMS funded all the work itself. The first cooperative agreement under the CMI program was signed in 1992 with the State of Louisiana and Louisiana State University. A second cooperative agreement was signed with the State of Alaska and the University of Alaska in 1993. A third agreement was signed with the University of California at Santa Barbara in 1994. Approximately 18% of the Environmental Studies Program budget is allocated to research conducted through the CMI's.

The Alaska Coastal Marine Institute, *Research and Education*

The University of Alaska CMI was formed in 1993 as a partnership between the MMS and the University of Alaska Fairbanks to provide support for research addressing environmental needs in connection with offshore oil and gas development. A Technical Steering Committee oversees the program and designs the framework issues, which form the basis of a request for proposals. This Committee includes members from the MMS, the University, and the State of Alaska. We have also invited the Alaska Science and Technology Foundation to sit in on the meetings. Pre-proposals are reviewed and those sent back for development into full proposals receive external technical review and then are ranked by the Technical Steering Committee. A wide range of projects

have received support, including physical oceanography and circulation in the Beaufort Sea and Cook Inlet, modeling, biological studies and economic and social studies. Since the CMI is a University-based entity, students are involved in many of the projects, and several theses have been based on work conducted through the CMI. A brief glimpse of some of the projects is provided in this presentation.

Regional Priorities and Environmental Information Needs

MMS Sand & Gravel Environmental Studies

The MMS Leasing Division's Sand and Gravel Unit recently prepared a document entitled, "*Sand and Gravel Environmental Studies within the Minerals Management Service, A Framework for Decisionmaking.*" The document provides background for the MMS management and staff on the role of sand and gravel environmental studies in decisionmaking for OCS marine mineral development and supports the Bureau's studies planning process, explaining to its constituencies how MMS uses sand and gravel-related science in its decisionmaking. This comprehensive document discusses in detail how the negotiated lease process is conducted and outlines environmental study areas to be pursued within the near-term and outlying years. Sand and gravel studies proposed for Fiscal Years 2004 and 2005 are supported by the discussion, summary, and conclusions within the plan.

Alaska OCS Region

Current information needs include the following topics: surface circulation radar mapping; improvements in the fault tree approach to oil spill occurrence estimators for the Beaufort and Chukchi seas; bird hazing/deterrent techniques; passive acoustic monitoring of whales in Lower Cook Inlet; survey of Stellar's eiders wintering in Lower Cook Inlet; movements and habitat use of harbor seals in Cook Inlet; review and monitoring ambient artificial light intensity in the OCS and the potential for effects on resident fauna; and communicating agency goals and processes with Alaskan coastal communities. These study needs are focused on the Beaufort Sea and Cook Inlet, while sales in the current 5-Year leasing programs include those two Alaska Planning Areas as well as the Chukchi Sea/Hope Basin, Norton Basin. The study needs in Fiscal Years 2004-2005 are diverse compared to Fiscal Year 2003, with post-sale emphases.

Pacific OCS Region

The Pacific OCS Region continues to produce oil and gas from 43 active leases but some of the fields are beginning to be depleted. The ESP in the Region continues to conduct a long-term intertidal biology monitoring program at areas adjacent to active oil and gas facilities in fulfillment of our mission responsibilities. The Region has begun to address the future decommissioning of oil and gas facilities by completing, implementing, and planning environmental research

related to the information needed for decommissioning these very large multi-well facilities located in deep water. The Region has proposed a new Decommissioning Studies Initiative focusing on partnering with other funding entities to address decommissioning information needs. In addition, the ESP in the Pacific Region is in the last years of a major physical oceanography program for the Santa Barbara Channel and Santa Maria Basin that has advanced our understanding of the oceanography in this area. The CMI with the University of California Santa Barbara continues with active research planned through 2005.

Gulf of Mexico OCS Region

The ESP provides information needed to predict, assess, and manage impacts from offshore oil, gas, and mineral exploration, development, and production activities on human, marine, and coastal environments. Current information needs include several diverse subjects: Platform Removal; Hydrates; Deepwater Corals; Chemosynthetic Communities; and Endangered Species. There is concern about dismantling of the world's largest artificial reef system because of accelerating lease abandonment activities. With hydrates being a potential energy source, greater understanding is needed about its relationship with seafloor stability and with chemosynthetic communities. Accelerated OCS activities in deepwater has resulted in the need to understand the sensitivity of deepwater corals to these activities and to understand the role of chemosynthetic communities in the deepest parts of the Gulf. Because the deepwater is home to the endangered sperm whale, impacts of OCS activities on this species must be considered and mitigated. Studies, ongoing and proposed, that address the Agency's informational needs, will be discussed.

MINERALS MANAGEMENT ADVISORY BOARD
Agenda for the Outer Continental Shelf (OCS)
Scientific Committee (SC) Meeting
Wednesday, April 23, 2003
Hilton Anchorage
Anchorage, Alaska

7:45 a.m. - 8:00 a.m. Charge to the Discipline Subcommittees
 Dr. Lynda Shapiro, Chair, OCS Scientific Committee

Physical Sciences, Biology, and Socioeconomic Disciplines meet separately to discuss national and regional studies plans.

	Ecology/Biology Spruce Room	Physical Oceanography Aspen Room	Socioeconomics Lupine Room
8:00 - 9:15	Alaska Region	Gulf of Mexico Region	Sand & Gravel, HQ
9:15 - 10:00		Pacific Region*	
10:00 - 10:30	Break	Break	Break
10:30 - 11:45	Sand & Gravel, HQ	Alaska Region	Gulf of Mexico Region
11:45 - 1:30	Lunch	Lunch	Lunch
1:30 - 2:45	Gulf of Mexico Region	Sand & Gravel, HQ	Alaska Region
2:45 - 3:15	Break	Break	Break
3:15 - 4:00	Chairs and MMS Recorder Finalize Recommendations	Chairs and MMS Recorder Finalize Recommendations	Chairs and MMS Recorder Finalize Recommendations
4:00 - 7:00	Local Interests	Local Interests	Local Interests

***Pacific Region representatives will be available in one room to discuss Studies issues as appropriate**

MINERALS MANAGEMENT ADVISORY BOARD
Agenda for the Outer Continental Shelf (OCS)
Scientific Committee (SC) Meeting
Thursday, April 24, 2003
Hilton Anchorage
Anchorage, Alaska
Aleutian Room
(Morning Session)

8:30 a.m. - 8:45 a.m.	Welcome and Introductions Dr. Lynda Shapiro, Chair, OCS SC
8:45 a.m. - 12:00 noon	Alaska Information Transfer Meeting (ITM) Highlights
8:45 - 9:00	Alaska ITM Overview Host, Dr. Cleve Cowles, Chief, Environmental Studies Section, Alaska OCS Region
9:00 - 9:25	The Minerals Management Service Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA) Program: Introduction to a Multi-Year Monitoring Program in the Nearshore Beaufort Sea Mr. John Brown
9:25 - 9:50	A Description of Potential Impacts of OCS Activities on Bowhead Whale Hunting Activities in the Beaufort Sea Dr. John C. Russell
9:50 – 10:15	Measurements of Temperature, Salinity and Circulation in Cook Inlet, Alaska Dr. Steve Okkonen
10:15 – 10:30	Break
10:30 - 10:55	Beaufort Sea Nearshore Under-Ice Currents & Summary of Workshop on Physical Oceanography in the Beaufort Sea Dr. Tom Weingartner
10:55 - 11:20	Bowhead Whale Feeding in the Eastern Alaskan Beaufort Sea: Update of Scientific and Traditional Knowledge Dr. W. John Richardson
11:20 - 11:45	Behavior of Ringed Seals and Re-Interpretation of Aerial Surveys Dr. Brendan Kelly
11:45 - 12:00	Open Discussion/Q&A's
12:00 noon - 1:30 p.m.	Lunch

MINERALS MANAGEMENT ADVISORY BOARD
Agenda for the Outer Continental Shelf (OCS)
Scientific Committee (SC) Meeting
Thursday, April 24, 2002
Hilton Anchorage
Anchorage, Alaska
Aleutian Room
(Afternoon Session)

1:30 p.m. - 1:35 p.m.	Plenary Session
	Dr. Lynda Shapiro, Chair, OCS SC
1:35 p.m. - 2:00 p.m.	Recommendations of the U.S. Commission on Ocean Policy Mr. Edward Rasmuson, Member, U.S. Commission on Ocean Policy
2:00 p.m. - 3:00 p.m.	Discipline Subcommittee Reports (20 minutes each)
	• Biology
	• Physical Oceanography
	• Socioeconomics
3:00 p.m. - 3:30 p.m.	Open Discussion
3:30 p.m. - 3:45 p.m.	Break
3:45 p.m. - 4:00 p.m.	Public Comment
3:45 p.m. - 5:00 p.m.	Committee Business
	• Discussion of Subcommittee Reports
	• Items for Letter to the Director
	• Emerging Issues/Topics of Interest
	• Other Business
	• Dates and locations for the next meeting
5:00 p.m.	Adjourn the meeting

Alaska Information Transfer Meeting (ITM) Highlights

Alaska ITM Overview

The Alaska OCS Region held its 9th Information Transfer Meeting in Anchorage on March 10-12, 2003. Principal investigators gave 38 talks on ongoing or recently completed environmental studies. These studies included the spectrum of disciplines: physical oceanography, fate and effects, biology, protected species, social science and economics. One of the talks was by Dr. Vera Alexander, Director of the University of Alaska Coastal Marine Institute which gave an overview of five CMI studies. Six of the talks were on the introduction and five major components of the Arctic Nearshore Impact Monitoring in Development Area (ANIMIDA) study. Nine principal investigators from the ITM gave a talk on their study at an Information Update Meeting held in Barrow on March 14, 2003. In addition, we had an agenda item in Barrow on Arctic Cisco. MMS is starting two studies on this fish species of concern to stakeholders on the North Slope.

The Minerals Management Service Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA) Program: Introduction to a Multi-Year Monitoring Program in the Nearshore Beaufort Sea

Offshore oil and gas development and production activities have been initiated at Northstar Island and are proposed for the coming years at a modified Liberty prospect site in the nearshore Beaufort Sea. There is concern about the long-term effects of these developments, as well as long-term effects of any development associated with future offshore lease sales and exploration activities. Historical chemical and physical data have been collected in the region over several decades. Nevertheless, the sensitivity of the region adjacent to Northstar and Liberty, and the highly variable and complex environmental conditions, make further monitoring necessary. In response to interagency reviews of related environmental impact statements (EIS's) and development and production plans, the U.S. Department of Interior, MMS, initiated the ANIMIDA Program as a long-term study for monitoring potential impacts of the Northstar and Liberty developments. ANIMIDA Phase I was started in June 1999 and included hydrocarbon and metals chemistry measurements in sediment and tissue samples, as well as acoustic measurements adjacent to the Northstar and Liberty sites. Phase II of the ANIMIDA Program was initiated in July 2000 and incorporates seven tasks including hydrocarbon and metal chemistry studies, suspended sediment studies, an assessment of subsistence whaling at Cross Island, biota contaminant assessment, and a study of the "boulder patch" area. An overview of the ANIMIDA Program status to date will be presented.

A Description of Potential Impacts of OCS Activities on Bowhead Whale Hunting Activities in the Beaufort Sea

Subsistence hunting for marine mammals and especially bowhead whales has a long history as an organizing element of Iñupiat social, cultural, religious, and economic life. Archaeological evidence shows that Iñupiat dwellings were

sometimes made with whale ribs and other skeletal parts. Whales were prominent in religious beliefs, practices, and symbols and sharing of whale products among kinsmen and other Iñupiat defined and reinforced social bonds. Muktuk, whale meat, and other whale products also provided an essential source of protein and fat that Iñupiat believed essential for their diet and health.

When European and American whalers entered the Arctic they employed Natives as whalers and exposed them to new whaling technologies. Post-contact, whaling has remained essential to modern Iñupiat values and lifestyles: the Barrow High School mascot is the "Whalers;" employers allow time off for whaling crew members to hunt; Nalukataq and related whaling ceremonies are important cultural events; and muktuk and other whale products have cultural, economic, and health-values for community members.

Oil development activities in the late 1960's and early 1970's resulted in new change agents affecting Iñupiat communities: new sociopolitical institutions emerged; settlement and residence patterns began to change; transportation technologies such as snow machines became more available as did wage employment with the newly formed North Slope Borough. Modernization of Iñupiat communities accelerated with exposure to these and other change agents. OCS oil activities were perceived to present unique threats and consequences, including ones specific to whaling. Iñupiat expressed concern that OCS oil development activities could deflect whale migration farther off-shore, contribute to whale skittishness, and otherwise adversely affect whale behavior. These types of concerns are perceived to have negative influences on whale hunting and any threats to whale hunting also affect other aspects of community and personal life connected to whaling.

Using multiple data sources, this project examines Iñupiat assessments of the influences of development on participation in traditional activities, especially whale hunting and its related sociocultural components. A focus is to identify Iñupiat assessments of OCS activities as a particular type of development threat or opportunity and the perceived affects of OCS activities on whale hunting and related traditional activities. In addition to observational (ethnographic) and secondary source data, three surveys are being administered (whaling captains, randomly selected households, and high school juniors and seniors) to examine variation in these assessment among and within three North Slope communities (Barrow, Kaktovik, and Nuiqsut) and one "control" community in western Alaska. The data should assist communities to identify and plan for sociocultural problems related to ongoing development in the Arctic.

Measurements of Temperature, Salinity and Circulation in Cook Inlet, Alaska

Temperature and salinity measurements acquired in central and lower Cook Inlet during spring and fall 2002 show that the hydrographic structure of tide rip fronts varies spatially and seasonally. Increased river discharge during summer and fall

strengthens non-tidal, density-driven currents associated with the tide rip fronts. The hydrographic structure of the tide rip fronts also varies over the semidiurnal tidal cycle. These results illustrate the need to incorporate density effects in numerical oil spill trajectory models for Cook Inlet.

Beaufort Sea Nearshore Under-Ice Currents & Summary of Workshop on Physical Oceanography in the Beaufort Sea

MMS sponsored a 2.5-day workshop on the physical oceanography of the Alaskan Beaufort Sea held in Fairbanks, Alaska, in February 2003. The workshop reviewed knowledge of the physical oceanography of the Beaufort shelf and recommended studies to support MMS mission with respect to industrial development on this shelf. There are fundamental unknowns in the understanding of the ocean and ice circulation, ocean density field, and of the forcing mechanisms influencing the sea ice and oceanography. The study recommendations consist of a mix of field (observational) and idealized model studies to improve understanding of poorly understood physical processes and boundary conditions and to provide data sets necessary for the proper evaluation of regional pollutant transport models. Critical issues requiring study are the:

1. wind and surface stress fields established by mesoscale variations in the regional meteorology and sea ice distribution and deformation fields,
2. effects of freshwater discharge and freezing (convective) processes on the shelf circulation,
3. controls exerted on the circulation and water property fields by the lateral ocean boundaries of the Alaskan Beaufort Sea: the Chukchi shelf (western boundary), the Canadian Beaufort shelf (eastern boundary), and the shelfbreak and continental slope (offshore boundary), and
4. shelf/slope bathymetry.

These topics affect the time and space scales of the ice and ocean circulation, which have not been well-resolved in the Beaufort Sea. Consequently, the recommended studies are also designed to delineate the major scales of variability.

Bowhead Whale Feeding in the Eastern Alaskan Beaufort Sea: Update of Scientific and Traditional Knowledge

The *overall objective*, as specified by MMS, was as follows: “Based both on traditional knowledge and scientific studies (existing and new), assess the importance of the eastern part of the Alaskan Beaufort Sea [EAB] as a feeding area for bowhead whales, including its importance both to individual whales and to the bowhead population.” For many years it has been known that bowheads feed in the EAB near Kaktovik, AK, in late summer and fall. A 1985–86 MMS study concluded that the EAB provided only a small (but variable) part of the annual food requirements of the bowheads. Local residents and whalers thought

that the 1985–86 study underestimated the importance of the EAB to feeding bowheads. A follow-up study was conducted, mainly in 1998–2000. This included close collaboration with Native groups, specific efforts to incorporate local and traditional knowledge (LTK) into the planning and interpretation of the results, and integration of previous data and knowledge with three additional seasons of biological field studies. There was extensive consultation with Kaktovik hunters, the Alaska Eskimo Whaling Commission (AEWC), North Slope Borough Dept of Wildlife Management (NSB-DWM), and a Scientific Review Board (SRB) including both independent scientists and stakeholder representatives.

Project participants included the following: *LGL Ltd.* (zooplankton and bowhead studies; energetic calculations, integration), *Applied Sociocultural Research* (local coordination and assembly of LTK), *Alaska Dept of Fish & Game* (stomach contents of harvested bowheads), *Univ. Alaska Fairbanks* (stable isotopes in bowheads and prey), *Dalhousie Univ.* (pilot study of fatty acids in bowheads and prey), *WEST Inc.* (sensitivity analyses), in consultation with the Kaktovik hunters, AEWC, NSB, and SRB.

Local and traditional knowledge (LTK) was assembled during meetings and individual discussions with local hunters and residents, including interactions during fieldwork involving Kaktovik residents. LTK and whaling records are summarized in the final report; transcripts of individual discussions are also included. LTK relevant to various technical chapters of the report is brought into each of those chapters.

Field studies of food availability were done using net-sampling and quantitative echosounder surveys of zooplankton in the EAB during September of 1985-86 and 1998-2000, providing data on geographic and among-year variation. The sampling was done from a 13-m boat, and included both broad-scale surveys of the EAB and specific sampling around locations where bowheads were observed feeding (and at nearby reference sites without feeding whales). The average zooplankton biomass available at locations near feeding whales was $\sim 2 \text{ g/m}^3$ (wet weight), much higher than the overall average in the EAB. Copepods were the dominant zooplankton taxon on a biomass basis.

Aircraft-based studies of bowheads during the five field seasons included the following:

- Systematic aerial surveys to assess distribution and numbers (and their variability).
- Aerial observations of bowhead behavior to derive correction factors for whales missed during aerial surveys and to characterize the frequency and nature of feeding
- Aerial photogrammetry to assess size/age segregation in use of the EAB, and to determine residence times of recognizable individual whales. Data from MMS BWASP surveys

(1979–2000) were also used; the broader areal and temporal coverage of BWASP provided important perspective. Bowheads were found to feed for an average of 47% of their time in the EAB, but average residence times were relatively short (~3.8 d).

Stomach content analyses of whales harvested in fall at Kaktovik, and at more westerly locations in the Beaufort, showed that the majority had been eating shortly before death. At Kaktovik, 83% of 29 stomachs contained food, and 39% (7 of 18) had >20 L. Copepods dominated the diet near Kaktovik.

Stable isotope analyses of bowhead tissue continue to suggest that bowheads acquire most of their annual energy intake from the Bering–Chukchi system, not the eastern and central Beaufort. This conclusion is based on the small spring-fall differences (and strong Bering–Chukchi signature) in isotopic composition of bowhead tissue, in comparison with the isotopic composition of potential prey in the Bering–Chukchi vs. eastern Beaufort areas. On the other hand, bowheads apparently have larger circumferences and more fat when leaving the Beaufort in fall than when arriving in spring, and they are known to feed for much of the summer in the Canadian Beaufort and during fall migration across the Alaskan Beaufort.

The most parsimonious (though incomplete) *seasonal feeding scenario* is this:

- Bowheads feed and become “fatter” in the eastern and central Beaufort during summer and early fall.
- They feed even more when in postulated richer prey concentrations occurring in fall in Bering–Chukchi water in the Barrow, western Chukchi, and perhaps northern Bering regions.
- They feed little if at all in winter, such that they are thinner when they return to Beaufort in spring than when they left in fall.

In conclusion, the results show that bowhead whales feed commonly when in the EAB in late summer and early fall. The EAB is, without question, a feeding area for bowhead whales. However, few individuals linger there for more than a few days, and food availability in that area is not unusually high compared with other regions (e.g., the main summering range in the Canadian Beaufort Sea, farther east). Subject to many assumptions and approximations, it was estimated that in an average year, about 2.4% of the annual food requirements for the Bering–Chukchi–Beaufort population may be obtained in the EAB. The best estimates for the five years of study varied from 0.2% to 7.5%. Despite the uncertainties, it is implausible that the bowhead population consumes more than a few percent of its annual food requirements in the EAB in an average year. However, the EAB is more important to some individual whales that linger in the area for longer than the average residence time. This project has been notable because of its extensive collaboration with Native groups during planning, conduct, and interpretation. Traditional knowledge was taken into account. The project provided a better understanding not only of bowhead feeding in the EAB, but also of the annual nutritional needs and feeding cycle. The methods developed and applied here could be used to assess bowhead feeding elsewhere, providing

better comparative data on the importance of feeding in different areas. The results have been used in MMS's recent Beaufort Sea EIS, and will be of value for future endangered species consultations. The results will be of use to all those participating in discussions about the impacts of potential development in the EAB, and in devising mitigation measures for any proposed developments.

Behavior of Ringed Seals and Re-Interpretation of Aerial Surveys

Ringed seals spend much of the year hidden from view in snow caves (lair) on the shorefast ice of the Arctic Ocean. Each spring, as the snow melts, seals abandon their snow caves and rest on the surface of the ice. In the past, aerial surveys have been used to relate seal numbers to ecological variables and industrial activities. Aerial surveys, however, count an unknown proportion of the population that is visible on the surface of the ice and assumes that the proportion does not change over time.

We are testing the implicit assumptions of aerial surveys and investigating how the proportion of visible seals changes over time and between years. The results will be used in a reanalysis of past ringed seal surveys.

From 1999-2002, we tagged 48 ringed seals (8, 10, 14, 16 respectively) in Prudhoe Bay. During May and June each year, we recorded hourly the proportion of tagged seals in the water, hidden in snow caves, or visible on the surface of the ice. The proportion of tagged seals that were visible 1) had a strong diurnal pattern, peaking at 3:00 p.m. and 2) was highly variable, changing from as much as 100% to 13% by the next day. Lastly, the timing of lair abandonment varied greatly from year to year.

In 2001 and 2002, in conjunction with the Jet Propulsion Laboratory, we found that spaceborne Ku-band scatterometer data were sensitive to snow deterioration and remotely indicated the timing of lair abandonment. We are continuing to test the utility of scatterometer data and we plan to model the effects of environmental covariates on the proportion of seals visible. The model will then be used in a reanalysis of previous ringed seal surveys.

Recommendations of the U.S. Commission on Ocean Policy

Established by the Oceans Act of 2000, the U.S. Commission on Ocean Policy is charged with reviewing federal ocean-related programs and laws and making recommendations to the President and Congress for a coordinated and comprehensive National Ocean policy. During its investigation, the Commission will examine such issues as responsible stewardship of living and non-living resources; protection of the marine environment; impact of, and protection against, natural and manmade hazards; the role of oceans in climate change; and enhancement of oceanographic science, to name but a few. As the Commission moves toward completing its mandate during 2003, a number of recommendations are beginning to take shape and be discussed

openly. What will be presented here are only “draft” recommendations, not official or approved recommendations, but rather ideas that are being explored or more fully developed for further consideration.

Discipline Subcommittee Reports

Each Subcommittee will report on the national and regional studies plans that were discussed during the breakout sessions yesterday.

Committee Business

- The Committee will discuss and comment on the Subcommittee Reports.
- Items for the Letter to the Director will be submitted.
- Emerging Issues/Topics of Interest.
- Other business will be discussed.
- Possible dates and locations will be discussed for the next SC meeting.