

A white research vessel is shown from a side-on perspective, navigating through a dense field of sea ice. The vessel has a white hull with a dark lower section and a white superstructure. Several circular portholes are visible along the side. A yellow buoy is floating in the water in the foreground. The background shows a vast expanse of ice under a pale, overcast sky.

# EcoFOCI Summary

# Major Accomplishments of EcoFOCI since 2004

**Long-term, biophysical moorings on Bering Sea shelf** - Impacts: Primary source of data for providing oceanographic indices, documenting decadal variability, validating biophysical models, and developing ecosystem hypotheses.

**Adaptation of ocean model for the North Pacific** - Impacts: Primary physical tool for recruitment studies (e.g. jellyfish, flatfish, pollock, snow crab, Tanner crabs, salmon); core of the ecosystem model (climate to humans) for the \$60M Bering Sea Ecosystem study; and basis for future predictions within the planned Integrated Ecosystem Assessment for the Bering Sea.

**Evaluation and selection of climate model projections** - Impacts: Determination of the relative importance of interannual to decadal variability versus long-term warming; critical first steps toward prediction of rate and variability of warming in the Bering Sea; and prediction of the impact of climate change on the ecosystem for long-term management of fisheries and protected species.

**Aleutian Island ecosystem study** - Impacts: First ecosystem study of the Aleutian Islands; identification of importance of heat, nutrient and salt flux for the productivity of the Bering Sea; basis for the development of the Aleutian Islands Fishery Ecosystem Plan for the North Pacific Fishery Management Council.

**Pollock quota reduction for 2008** - Impacts: Total Allowable Catch of Bering Sea pollock altered after consideration of temperature and zooplankton data, setting a regional precedent for incorporation of ecosystem data into the management decision.

# Indicators of Quality of EcoFOCI Research since 2004

- 56 PMEL publications: ~9 per PI; 50% are external collaborations in ecosystem science
- NOAA Bronze Award
- 3 Affiliate Faculty members of University of Washington; 2 Joint Institute Fellows (UW & UAF)
- Positions on 13 national and international steering committees and working groups
- Guest Editor for 2 journal special issues; member of a journal advisory board
- Products: Indices for Ecosystems Considerations chapter of SAFE, indicators for Bering Sea Climate and Ecosystem web site, annual Gulf of Alaska pollock recruitment forecasts
- Participation in first census of basin eddies in N. Pacific with Inst. of Ocean Sci., Sydney, B.C., Canada; collaboration with scientists from 15 universities, 17 agencies and 6 nations.
- 47 proposals (30 from non-NOAA sponsors) - 90% success rate
- Regular delivery of data and information products to regional IOOS (AOOS) and NODC
- Co-chair of AOOS data management and communications committee that establishes AOOS standards
- Establishment of international standards for marine biophysical models

# Indicators of Relevance of EcoFOCI Research since 2004

- Contributions to mission goals for both the NOAA Ecosystem and Climate Goal Teams, while operating as one of the original matrixed programs
- Measurements of IOOS core variables (temperature, chlorophyll, zooplankton, etc.)
- Contributions to national needs for research on short and long-term forecasting for living marine resources populations
- Support for the North Pacific Fishery Management Council
- Research in the Bering Sea - the largest U.S. fishery and a barometer for climate change
- Two successful initiatives (NPCREP, LOSI) to NOAA incorporated into the President's budget
- Regular interactions with stakeholders to insure on-target research (NPRB, fishers and fishing industry, AOOS, Tribal Government of St. Paul Island, National Marine Mammal Laboratory and state organizations)
- 20 metrics / indices incorporated into the NPFMC Ecosystem Considerations chapter of the annual SAFE Report, 40 ecosystem indicators maintained for the Bering Sea Climate and Ecosystem web site.

# Indicators of Performance of EcoFOCI Research since 2004

- World leader in fisheries oceanography and ecosystems investigations
- Design and deployment of complex biophysical platforms (95% success) with real-time data delivery
- Data foundation for other ecosystem investigations in the Bering Sea and Gulf of Alaska
- Two NOAA initiatives shepherded through the PPBES
- Integration into NOAA's execution activities through Annual Operating Plan (AOP) milestones.
- Annual ecosystem information used by the North Pacific Fishery Management Council through Stock Assessment and Fishery Evaluation reports in Ecosystems Considerations chapter
- Continuous delivery of climate, atmosphere, ocean, biology and fishery indicators to stakeholders through the Bering Sea Climate and Ecosystem web site
- Contributor to the 2007 EIS Report for Polar Bears and 2008 EIS Report for Ribbon Seals
- Major contributor to PICES 2004 Ecosystem Assessment of the North Pacific

# The Future

- Understand the dynamics of the ecosystem of the northern Bering Sea shelf;
  - Understand and predict how climate change will alter Alaska's marine ecosystems;
  - Improve precision of and incorporate uncertainty estimates into ecosystem predictions.
  - Expand the geographic focus of climate studies northward (LOSI);
  - Improve instrumentation on observing platforms - real-time delivery and measure CO<sub>2</sub> and pH;
  - Expand use of ships of opportunity and new technology for remote sensing (e.g. moorings, gliders, etc.) to reduce dependence on large oceanographic ships;
  - Advance and improve numerical models (specifically ROMS) to assimilate data and better couple with biological models to generate reliable forecasts;
  - Improve the delivery of model simulations to stakeholders;
  - Refine indices of ecosystem status for ease of understanding by resource managers;
  - Participate in the Integrated Ecosystem Research Program planned by NPRB in the Gulf of Alaska;
  - Implement recommendations from the BSIEP/BEST/NOAA research program
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- Given that fisheries stock assessment models will soon assimilate environmental data, EcoFOCI will contribute to stock assessment models' capability of utilizing those data and provide significant portions of the necessary data.
  - As evaluation of impact of climate change is already required in many assessments (ESAs), EcoFOCI will continue to provide environmental information.

# PMEL EcoFOCI

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*Also recognizing our AFSC EcoFOCI partners and colleagues at the  
Alaska Fisheries Science Center*

<http://www.ecofoci.noaa.gov>



**Ecosystems & Fisheries-Oceanography  
Coordinated Investigations**

