ESSAS 2011 Open Science Meeting — A Great Success!

ESSAS recently held its second Open Science Meeting (OSM) entitled "*Comparative studies of climate effects on polar and sub-polar ocean ecosystems: progress in observation and prediction"* (22-26 May, 2011) in Seattle, Washington, USA. Co-sponsored by the international organizations of PICES, ICES, IMBER, and GOOS as well as several U.S. marine science institutions, the OSM consisted of 98 oral and 61 poster presentations. It was attended by 195 scientists — of whom 23 were early career scientists and 28 were students — from 13 different countries.

Program & Book of Abstracts: http://www.pices.int/publications/book_of_abstracts/2011-ESSAS-Book-of-abstracts.pdf

Presentations: http://pices.int/publications/presentations/2011-ESASS/ESSAS-2011-presentations.aspx

Based on numerous comments from participants the ESSAS OSM was an overwhelming success for reasons ranging from: the high quality of the presentations; the congenial atmosphere; the effectiveness of the PICES Secretariat in running the meeting; the great food served at enjoyable social events; the inspirational involvement of students from the Pribilof Islands; and the musical session with Oded Ben-Horin and his group — "The Science Fair". A big thank you goes out to all who helped make the meeting a great event.

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Seattle Waterfront

The OSM began with 3 one-day workshops:

- A workshop on "*Biological consequences of a decrease in sea ice in Arctic and sub-Arctic seas"* was sponsored by the ICES/PICES Working Group on Forecasting Climate Change Impacts on Fish and Shellfish (FCCIFS). This workshop reviewed life history information and habitat associations to assess the risk of immigration and settlement of new biological populations in the Arctic and surrounding shelf seas in response to retreating sea ice.

Criteria necessary to establish new species in the Arctic Ocean and surrounding areas were discussed and compared to expected conditions based on climate scenarios.

- Another workshop, co-sponsored by ESSAS and ASOF (Arctic-Subarctic Ocean Fluxes), discussed "*Arctic-Subarctic Interactions"*, brought together several disperse groups studying fluxes between the Arctic and the Subarctic and their biophysical effects. Following presentations, discussion focused knowledge gaps, research needed to address these gaps, and how to better coordinate research on these issues.

- The workshop on "*Zooplankton life histories: Developing metrics to compare field observations and model results in order to predict climate effects"* brought together researchers interested in understanding how climate and life history patterns of zooplankton interact to produce observed distributions and abundances of key species found throughout the boreal sub-Arctic and Arctic seas, especially *Calanus* copepods.

<u>Two additional half-day workshops were held:</u>

- The ESSAS Working Group on Climate Effects at Upper Trophic Levels (WG-4) sponsored one entitled "*Comparative analyses of gadid and crustacean dynamics across sub-arctic ecosystems"* to summarize and synthesize their major findings thus far and discuss future directions;

- A second workshop on "*Comparative analyses of marine bird and mammal responses to climate change"* focused on how to integrate ongoing and new research on marine birds and mammals into programs to meet long-term PICES and ESSAS objectives.

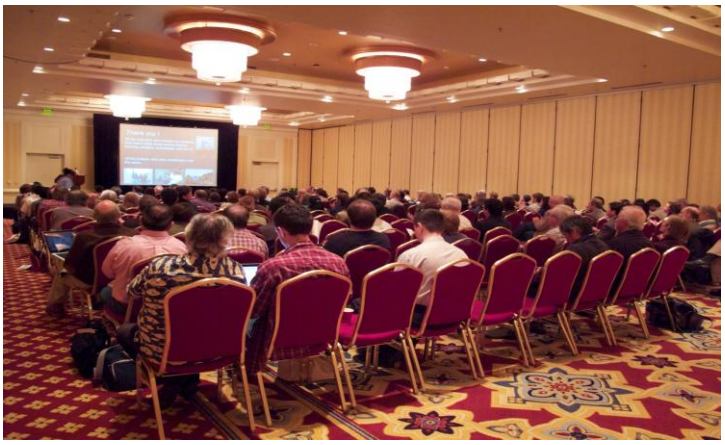
During the first day in Plenary, instead of the usual introductory speeches made by dignitaries, a group of 8 elementary and junior high students from the Pribilof Islands of St. Paul and St. George gave a joint presentation entitled "*Discovering the Pribilof Domain"*.

Students from the Pribilof Islands

Human inhabitants of these islands are mostly of Aleut descent, and depend almost exclusively upon the sea for their food and livelihood. With guidance from their teacher-scientist, Michelle Ridgway, the students have studied and conducted research on the marine ecosystem around their islands. At Marine Science Camps during the summer, they have used modern oceanographic techniques. Their presentation focused on climate and physical oceanography of the Pribilof Islands. They discussed critical components of the food web: phytoplankton; zooplankton; fish; shellfish; and marine mammals. They also described the life histories of commercially-important species, and the socio-economic consequences of

the fish and fisheries. During their studies of Pribilof fauna and flora, they discovered the second-known population of a new species of large brown marine algae, *Aureophycus*, near St. George Island. The students have explored both traditional knowledge and conventional scientific knowledge to learn about the Pribilof Islands marine ecosystem. Their presentation was both interesting and professional. They stayed for the entire OSM, presented a poster on their work, and asked questions during scientific sessions and during breaks.

The Pribilof students were followed in Plenary by presentations from 6 invited speakers on topics which complimented topics for the 3 parallel sessions that were held in the afternoon. This format of holding morning sessions in plenary and parallel afternoon sessions continued through Wednesday.



Morning Sessions were Held in Plenary

<u>Parallel sessions held during the afternoon covered eight different topics:</u>

1. Comparative studies of polar and sub-polar ecosystems
2. New observations and understanding of eastern and western Bering Sea ecosystems
3. Modeling marine ecosystem dynamics in high latitude regions
4. Nutrients, biogeochemistry and acidification in a changing climate
5. New insights from the International Polar Year (IPY) Studies
6. National ESSAS Programs: Recent advances and contributions
7. Anticipating socio-economic and policy consequences of global changes in sub-polar and polar marine ecosystems
8. Interactions between Gadoids and Crustaceans: The roles of climate, predation, and fisheries.

<u>Awards were given for the best young scientists' presentations</u>:

- Honorable mention was given to Kristin L. Laidre (University of Washington) for her talk entitled "*Climate Change and Baleen Whale Trophic Cascades in Greenland"*. She described tagging and tracking studies of bowhead and humpback whales off West Greenland done in conjunction with the Greenland Institute of Natural Resources.

- The award for best presentation went to Joel Heath from the University of British Columbia for his talk on *Winter Ecology of Common Eiders in Polynya and Floe Edge Habitats in Eastern Hudson Bay, Nunavut*. He gave a fascinating account using underwater video to help model the bioenergetics of the eiders. He also described changing environmental conditions for these birds around the Belcher Islands due to

changes in river runoff linked to hydroelectric developments. These changes threaten the eider populations and hence the Inuit people of the islands that depend upon them.

- Special awards were also given to the students from the Pribilof Islands for their presentation and participation.

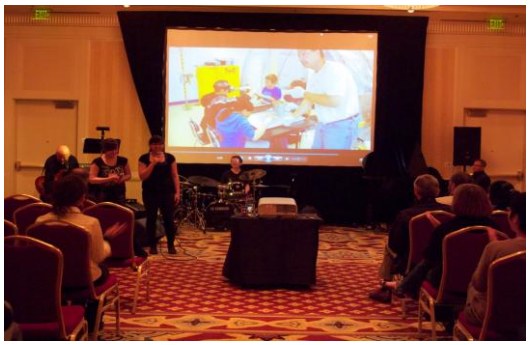
Awards were Presented

Sixty-one posters were on display throughout the meeting; each covering some aspect of a session topic; all sessions were represented. A dedicated poster session was held on Wednesday evening during which the many participants were able to discuss the science behind the posters and the results. The session with the most posters presented results from the Bering Sea, which was bolstered by a good turn out from the local oceanographic community in Seattle. Again awards were presented to the young scientist poster presenters:

- Honorable mention went to Laurinda Marcello at the University of Alaska for the poster "*Effects of Temperature and Gadoid Predation on Snow Crab Recruitment: Comparisons between the Bering Sea and Atlantic Canada"*. She and her co-authors found that temperature change seems to be a more important and consistent factor controlling snow crab recruitment than gadoid predation. It is still unclear whether the temperature effect is through direct forcing or indirectly, e.g. through temperature effects on their prey or predators.

- The award for best poster went to Xuehua Cui from the University of Tennessee for her study on "*Spatial distribution of groundfish in the northern Bering Sea in relation to environmental variation and feeding habitat"* that suggested strong linkages between physical conditions (*e.g.* water temperature and hydrography) and biological conditions (*e.g.* bloom status) in structuring fish communities in the northern Bering Sea.

Thursday, the last day of the OSM, began with brief reports from each of the parallel topic sessions in order to inform all participants about major findings for each session. Following these reports, a special musical presentation was given by a group from Norway known as "Science Fair". Led by Oded Ben-Horin (vocals), and with Svein Folkvord on bass and Stein Inge Brækhus on drums. This group performs science-inspired music at scientific meetings and conferences.



Pribilof Students Sang with the "Science Fair"

They treated the audience to a number of pieces, some performed for the first time, based on their impressions gathered during the ESSAS OSM. In addition, two of the Pribilof students joined in to sing a song about St. George Island (in English), and then one of them sang a solo in the Aleut language about going to gather blueberries in the fall.

The OSM closed on Thursday afternoon with 3 specially invited lectures:

- The first was given by Dr. Kevin Arrigo from Stanford University, who discussed the impact of climate change on lower trophic levels in polar and sub-polar seas in his talk "*Phytoplankton Production in the Bering Sea and Arctic Ocean: A Satellite Remote Sensing Study"*. He showed that sea-surface temperatures (SSTs) in the Bering Sea have warmed over last 30 years, but there has been no trend in sea-ice cover or primary production. The exception has been the Chirikov Basin, where annual primary production increased 40% from 1998 to 2007. He speculated that in the future, a warmer, more ice-free Bering Sea is likely to be more productive than today. In the Arctic, changes in sea-ice extent and duration have resulted in a 20% increase in primary production over the last 12 years, and with reductions in sea ice, Arctic productivity could increase even more in the future. He noted, however, that much work is needed before we will have reliable quantitative predictions.

- The second speaker was Dr. Steve Murawski from the University of South Florida who spoke on "*Understanding Ecosystem Processes: The Key to Predicting Climate Effects"*. He noted that global patterns and ecological gradients of — productivity, species richness, species distributions, and species variability — form the patterns of adaptation of biodiversity to the Earth's climate. He pointed out just how complicated it will be to forecast future warming-induced impacts. Complex co-evolved dynamics defy simple depiction with single drivers. He emphasized the value of the comparative approach for studying ecosystem responses to variations in ocean climate, and as a powerful method for inferring biophysical processes. He went on to state that much of the "first order" science done up to now has shown just how complicated things are; he pointed the way towards a mix of comparative studies, paleoecology, and laboratory analyses that are needed to advance the field – reductionistic approaches will not reveal complex interactions. Understanding is needed on how species respond not only on a taxonomic basis, but in the presence of other species, i.e. competitors, prey, and predators. He noted the need to assemble global patterns of environmental information and biological data, including biological responses to environmental change. He wondered who will take on this important work.

- The final speaker was Dr. Keith Criddle from the University of Alaska, Fairbanks, whose presentation was entitled "*Adaptation and Maladaptation: Factors that Influence the Fitness of Fisheries and Fishing-Dependent Communities"*. Using examples from salmon, halibut, and pollock fisheries off Alaska, he showed that the fitness of fisheries and fishery-dependent communities depend on the characteristics of social, economic, and legal systems that determine who is allowed to fish and how fishing takes place, as well as on characteristics of the stock. The unique legal foundations, culture, and traditions of

each nation or state affect the range of viable alternative fishery governance structures. There are tradeoffs between economic efficiencies gained through management measures such as single species individual fishing quotas (IFQs) and heightened exposure to factors that affect individual stocks, associated product markets, etc. In contrast, generalist fleets trade reduced economic efficiency and possible losses of management precision for reduced exposure to losses associated with variations in the abundance or value of any one species. Durable individual entitlements to shares of the allowable catch increase profitability, which in turn helps fishermen adapt to modest adverse changes in stock abundance, vessel prices, and input costs. Their vulnerability to larger perturbations, however, is increased. While catch shares increase choice — and therefore resilience from the perspective of individuals — catch shares can increase or decrease the resilience of fishery dependent communities.

In addition to the scientific presentations and discussions, participants and some family members enjoyed a wonderful reception at the Seattle Aquarium on the waterfront on Monday evening. Guests were encouraged to wander through the Aquarium, where Aquarium staff on hand to inform and answer questions. A large octopus that was actively moving around its tank and the seal feeding were big hits. Great food, entertainment from two local bands, catching up with old friends and colleagues, and the chance to meet new ones, all made for an enjoyable evening.

Results from the OSM:

The work of the OSM is not complete however; there are papers to write, review, and edit. Results from the OSM will be published in several special issues of scientific journals. Papers from many of the theme sessions will appear in a dedicated volume of the ICES Journal of Marine Science. This special issue will be dedicated to our colleague and good friend Dr. Bern Megrey, a long time member of the ESSAS SSC and co-leader of the Working Group on modelling, who unfortunately passed away unexpectedly last October. Papers from the session on gadid-crustacean interactions will appear together in a special section of the journal Marine Ecology Progress Series. Papers from the Bering Sea session will appear in a special of Deep Sea Research II, and papers from the modelling session will appear in the Journal of Marine Systems. The latter special issue will also be dedicated to Bern and modelling papers from some of Bern's former colleagues who did not attend the OSM will be considered for this special issue in addition to those from the meeting.