

The Fisheries Centre's Annual Migration: North to Alaska!

By Daniel Pauly

In Alaska, the northernmost, resource-rich state of the USA, the annual Lowell Wakefield Symposia are the equivalent of what the ICES Science Meetings are to fisheries scientists working on North Atlantic fisheries: the place to take stock on the resources, and of the methods used to study them. Thus, for the scientists working on ecosystem approaches and/or with Ecopath at the UBC Fisheries Centre (FC), the 16th Lowell Wakefield Symposium, held in Anchorage, from September 30, October 3, 1998, was the right place to present the result of their studies of ecosystems in Alaska and elsewhere, and to compare these with the results of studies of systems elsewhere. This year was particularly appropriate for this, as the Symposium was devoted specifically to "Ecosystem Considerations in Fisheries Management".

Whereas previous trips to Anchorage have focussed solely on the Lowell Wakefield Symposium, this year FC members attended two other workshops, as well as a special concurrent session of the American Fisheries Society.

The first workshop took place at the Anchorage headquarters of the Aleutian/ Pribilof Island Association (A/PIA), on September 29, and was devoted to an exploration of the potential uses, by and/or for the Aleutian communities, of recently constructed Ecopath models of the Bering Sea and Prince William Sound (PWS). Following a welcome by Flore Lekanof (A/PIA), Daniel Pauly presented the Ecopath modelling approach to about 15 participants: members of the A/PIA, of federal or state agencies (NMFS, EPA, Alaska Department of Fish and Game, Sea Otter Commission, and others), and of NGOs, notably the Arctic Network.

This was followed by various presentations, by Fisheries Centre researchers. Tom Okey presented a detailed Ecopath model of Prince William Sound, while Andrew Trites presented models of the Eastern Bering Sea in the 1950s and 1980s. A small database of fish common names in the Aleutian language was presented by Dave Preikshot. The subsequent discussion reflected the strong interest of the Aleut community in the Bering Sea and adjacent ecosystems, which supply much of the fish and marine mammal meat consumed by Aleut and other coastal communities. In this context, much interest was expressed in the ability of Ecopath models to track the paths of persistent pollutants within food webs (see Dalsgaard et al. 1998. ICES C.M. 1998/V: 10, 16 p.). Our hosts were well aware that the Bering Sea is heavily contaminated with radionuclides, PCB, and other pollutants. As a result, it was decided that the Fisheries Centre and the Aleut community would investigate

the possibility of a joint study of this pollution issue, pending the further development of the Ecopath-based methodology documented in Dalsgaard et al (1998).

The 16th Lowell Wakefield Symposium, which began the next day, took a while to get to ecosystem modelling proper, most of the contributions in the first days consisting of unabashedly single species considerations, especially concerning salmonids and their habitats. Three presentations by Fisheries Centre members were made at the session on "Anthropogenic Influences" of Friday, October 2. Melanie Power, one of Tony Pitcher's doctoral students, presented a paper co-authored with Nathaniel Newlands and entitled "A Report on Historical, Human-induced Changes in Newfoundland's Fisheries Ecosystem." The paper tracked the 'fishing down marine food webs' trend in Newfoundland and charted management decisions and historical events which might have contributed to the trend. The second Fisheries Centre presentation, given by Daniel Pauly, was entitled "Back to the Future: a method employing ecosystem modelling to maximise the sustainable benefits from Fisheries" by Tony J. Pitcher, Nigel Haggan, David Preikshot Daniel Pauly. (see *FishBytes* 3(4))

This used examples from the Strait of Georgia, British Columbia, and from Hong Kong to illustrate how Ecopath can be used to re-express early scientific findings, historic and archaeological analyses and oral history into formal models of past ecosystems. These can then be used to articulate 'rebuilding' strategies centred around marine protected areas and other ecosystem management tools.

Tom Okey also made a presentation at this session with his co-author Gretchen Harrington of the US National Marine Fisheries Service (NMFS), in which they developed a decision framework for resource managers to determine the appropriate type of experimental management design to employ in any given management situation. These 'types' include unconstrained experimental management and precautionary experimental management and they are distinguished by the presence or absence of destructive treatments.

The session entitled "Whole Ecosystem Approaches" on Saturday, October 3, also included several papers by Fisheries Centre members. Tom Okey made his second presentation of the conference, "A mass-balance model of trophic flow in Prince William Sound: de-compartmentalising environmental knowledge", a paper co-authored with Daniel Pauly. This presented one of the most detailed Ecopath models constructed so far, with emphasis on the human

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interactions involved in assembling the required data. Andrew Trites of the Marine Mammal Unit presented "Ecosystem Considerations and the Limitations of Ecosystem Models in Fisheries Management: Insight from the Bering Sea", which he co-authored with Marcelo Vasconcellos, Steve Mackinson and Daniel Pauly of the Fisheries Centre, as well as Patricia Livingston of NMFS and A.M. Springer of the University of Alaska Fairbanks.

Alida Bundy, a Fisheries Centre graduate who now works with the Department of Fisheries and Ocean, (see FishBytes 3(5)) presented "Fishing in Ecosystems: a mass-balance approach and the Eastern Canadian context". She co-authored this paper with P. Fanning, G. Lilly and P. Sheldon, all of DFO. This was a modelling effort guided, but also constrained, by a large amount of prior knowledge, some of which is politically sensitive, and which makes balancing of biomasses and flows difficult. However, these constraints will make the resulting balanced model much more interesting to various stakeholders.

James Kitchell of the University of Wisconsin presented the final paper of the Symposium, entitled "Apex Predators in the Central Pacific Ecosystem: Food Web Responses Due to Fishery Dynamics". This paper was co-authored with the Fisheries Centre's Carl Walters and Christofer Boggs of the US NMFS and reminded us of the non-linear interactions within food webs.

The Symposium's Poster Session also included a Fisheries Centre contribution. Dave Preikshot was present to discuss "Fisheries Management Implications of Constructing Historic Ecosystem Models in the Strait of Georgia". The poster documented changes in the Georgia Strait ecosystem, quantified through the 'Back to the Future' approach, and was co-authored with Daniel Pauly, Tony Pitcher, Johanne

Dalsgaard, Scott Wallace and Silvia Salas, all of UBC. (See FishBytes 3(4))

Following the Wakefield Symposium, a one-day workshop was held on Oct. 5, in the office of the Exxon Valdez Oil Spill (EVOS) Restoration Council, in Anchorage. There, Tom Okey and Daniel Pauly, and Stuart Pimm and Robert Powell of the University of Tennessee presented the Prince William Sound food web model that was constructed in the course of a project funded by the Council, starting in the Fall of 1997. The workshop participants consisted mainly of experts who had attended a previous workshop, during which the architecture of the model was agreed upon, but also included staff of various agencies operating in Alaska.

Concurrent with the Lowell Wakefield Symposium was a special meeting of the American Fisheries Society. Lisa Thompson, a PhD student with Carl Walters, presented a paper based on her doctoral research and entitled "Effects of Nutrient Additions to Kootenay Lake, BC, on Kokanee Salmon: Density, Distribution and Diet." Lisa was rewarded for her efforts with a prize for Best Student Paper at the AFS Sessions. Congratulations to Lisa on her accomplishment!

The strong presence of the Fisheries Centre at all of these events demonstrates an increasing strength in ecosystem approaches at the Centre. This is particularly evidenced by the popularity of the Ecopath approach in numerous papers given at the conference, by Fisheries Centre members and others. The general conclusion from these three events in Alaska is that Ecopath (including Ecosim and Ecospace) now represent the state-of-the-art in ecosystem modelling even in areas such as the Pacific Northwest, where fisheries research traditionally had high standards. Ecopath can therefore be used - along with other approaches where available - to engage constructively in ecosystem analyses and policy exploration.