

FISHBYTES

THE NEWSLETTER OF THE FISHERIES CENTRE – UNIVERSITY OF BRITISH COLUMBIA
VOLUME 9 ISSUE 1 JANUARY/FEBRUARY 2003

Witnessing Okhotsk Sea changes

By Tom Okey

Considerable ecological, economic and social changes are afoot in the Okhotsk Sea region and throughout the Russian Far East. I traveled throughout this unique part of the world during 2002, courtesy of the Cecil and Kathleen Morrow Scholarship, to witness these interconnected changes, and to directly explore the region's biota. My goal was to scope the potential development of an international collaboration to construct whole-ecosystem trophic models for helping to resolve the region's dilemmas.

The Okhotsk Sea covers 1.5 million km² between 45 and 61° N latitude. It is exceptionally productive, with



Woman selling dried salmon at the market in the city of Yuzhno Sakhalinsk
Photo by T. Okey

phytoplankton production in some areas reaching 10,000 t·km⁻²·year⁻¹ (and standing benthic biomass reaching 3,500 t·km⁻²). It is also dramatically seasonal, with ice forming over most of its surface during winter (Lapko and Radchenko, 2000).

Diverse ecological interfaces in the Okhotsk Sea have shaped a rich fauna. The region's native people have depended on this

fauna for millennia. European colonists pursued sea otters, seals, and whales during the 18th century, and the first European salmon and herring fisheries began during the 19th century. These exotic fisheries modified Okhotsk Sea ecologies, but conspicuous changes did not manifest until the industrial fisheries of the late 20th century. Overall catches from this sea are high (approximately 1.5 t·km⁻²·year⁻¹), but catches

from its more productive areas can be extremely high (approximately 22 t·km⁻²·year⁻¹; Lapko and Radchenko 2000).

Okhotsk Sea fisheries supply ~70% of the Russian Far East catch (Lapko and Radchenko 2000). The Far Eastern Fishery Committee, however, announced in 2002 that total regional landings declined by 20% in 2001. Herring, cod, halibut, navaga (another cod), and squid landings all declined by ~30-40%. Pollock landings fell by 17% and market prices for pollock plunged by 77%. About 3,500 fishermen became unemployed, meaning ~10,000 husbands, wives, and children lost their incomes (Pjotr Bolytsjev, *IntraFish*, January 30, 2002).

Overfishing and illegal fishing are widespread and these are exacerbated by three contributing factors: (1) the worsening economy, (2) high individual pay-off, and (3) ineffectiveness of enforcement (despite vessel confiscations and lethal attacks by the RF Coast Guard). The problem is underscored by the fact that illegal exports of Russian marine resources to Japan are around 20 times higher than legal exports (US\$ 5-7 billion vs. \$ 300 million) (Pjotr Bolytsjev, *IntraFish*, March 1 2002).

Another environmental concern is oil exploration. Over

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US \$25 billion is invested in new Okhotsk Sea oil prospecting, raising major concerns about potential impacts. Along the remote Sakhalin coast, development arrived like a cartoon of corporate disregard. The first of many oil platforms is positioned almost directly in front of Piltun Lagoon - the only known refuge of the last 80 or so gray whales (*Eschrichtius robustus*) in the western Pacific. Four spills have occurred since prospecting began, and more will likely come, especially as tankers navigate the spectacular Kuril Islands.

It is clear that whole-ecosystem computer models can be constructed by an international collaboration of scientists to better understand the ecological limits of Okhotsk Sea fisheries and other activities. This possibility is exemplified by the

existence of refined models for nearby systems (Okey and Pauly 1999, Aydin et al. 2002). Ongoing changes in the Okhotsk Sea make it imperative that these cutting-edge analyses be undertaken swiftly. This collaboration can become a reality with relatively moderate programmatic investment.

As a means to this end, BSc Honours student, Natalia Chaikina, (who is from Russia) will be working with Daniel Pauly and myself to build an ecosystem model of the Okhotsk Sea, using *Ecopath with Ecosim*.

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Tom Okey was the recipient of the 2001 Cecil and Kathleen Morrow Scholarship, which is awarded annually to a Fisheries Centre graduate student as the result of an endowment by Cecil B. Morrow.

Rimouski 2002: The importance of oceans in the economic and ecological balance of the planet

by

Lyne Morissette

The Association des Biologistes du Québec (ABQ) held its 27th Annual Conference on November 14-15 2002, in Rimouski, Québec, just before a major snowstorm paralysed the whole province. The conference was devoted to the role of the ocean in maintaining the planet's systems, reflecting current concerns in Québec regarding issues of sustainable development and biodiversity. The conference, which emphasized the role of the oceans, and particularly the Arctic Ocean, vis-à-vis issues of climate change, also made it possible to draw up a portrait of human exploitation of the oceans, including fishing and aquaculture, and the ways in which it impacts on ecosystem health and biodiversity. An overview of the new technological tools available to scan and study the oceans surface (e.g. remote-sensing) and underwater observations (e.g. hydroacoustics) was also presented, with the aim of better understanding the role of the oceans in the ecological and economic balance of the planet.

Daniel Pauly was an invited guest

speaker, and presented a talk on "Tendances globales des pêcheries marines: Impacts sur les écosystèmes et la sécurité alimentaire" ("Global trends in marine fisheries: impact on ecosystems and food security"). Also, because the conference was in my hometown, I took the opportunity to present a poster on my recent PhD work, titled "Les écosystèmes marins: équilibre précaire" ("Marine ecosystem: a precarious balance") which won the prize for the "most original work". My research involves the analysis and comparison of over one hundred Ecopath models, for which I examine the inter-relationships among complexity, stability, the impact of marine mammals, and the quality of input data. This work is part of the *Sea Around Us* project, as well as the *Comparative Dynamics*

of Exploited Ecosystems in the Northwest Atlantic (CDEENA) program. The project is a collaboration between the Fisheries Centre, UBC, and Maurice-Lamontagne Institute of DFO-Québec.

People were very impressed to see that research done at the Fisheries Centre was translated into French and made available for the scientific community in Québec. The next conference of the ABQ will be in November, in Québec City.



Lyne Morissette (left) poses in front of the conference poster with Hidetaka Yoneyama (centre) from Québec-Océan/University Laval and Vincent Le Fouest (right) from ISMER/UQAR.

Photo by Mario Bélanger

Seahorses set a precedent for international trade management

By Amanda Vincent

The 160 countries making up the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) voted November 13 in Santiago, Chile to list all 32 species of seahorses on Appendix II of the Convention. This decision means that, from May 2004, these countries must ensure that their exports are not detrimental to the long term persistence of wild populations.

Seahorses are the first fully marine fish species of commercial importance to be listed on Appendix II. In adding seahorses to its commitments, CITES implicitly acknowledged that marine fishes are wildlife too. For years a voluble minority of parties to the Convention had argued that economically important fish species fell under the purview of the Food and Agriculture Organization (FAO), and outside the remit of CITES. The decision to list seahorses indicates that delegates recognised the

competency of CITES with respect to fish and the value of the Convention's enforcement capacity. Indeed, Appendix II listings for two species of sharks followed forthwith.

Of all wildlife trade issues under international conservation management, seahorses will represent the greatest volume when the listing takes effect, with more than 25 million seahorses a year moving among at least 75 nations. Traditional Chinese medicine and its derivatives account for the largest consumption of seahorses. They are also fished for the aquarium and curiosity trades. Targeted fishing, incidental catch in non-selective fishing gear, and habitat destruction have led to severe population declines in many regions. Of 32 species of seahorses, 21 appear on the 2002 World Conservation Union (IUCN) Red List of Threatened Species while the other 11 are judged too data deficient to allow assessment.

Project Seahorse, which recently moved to the UBC Fisheries Centre (see *FishBytes* Issue 8-5), played a key role in obtaining this listing. We carried out all field surveys and analyses of the international seahorse trade (beginning in 1993), established the first conservation programs, and produced the identification guide that makes trade management for seahorses viable. We also chaired the CITES working group on these fishes and their pipefish relatives, and were very active at the meeting in Chile.

The Appendix II listing is a call to action. The challenge now is for countries to regulate the vast international trade so well that seahorse populations begin to recover. Such an ambitious effort will require all possible collaborations, with fishers, traders, consumers, resource managers, conservation colleagues, and policy makers.



Fishing for Info

By Tony Pitcher

The article above reports the success of new FC Faculty member Professor Amanda Vincent at the recent CITES meeting in Chile. Amanda has commented to me on the tremendous job done by FC International Advisory Board member, Dr Kevern Cochrane, in representing FAO at the convention. Fishbytes readers may therefore be interested in the following extract from the Editorial of INFOFISH International, issue 5, Sept/Oct 2002, Kuala Lumpur, Malaysia. INFOFISH was originally launched in 1981 as a project of the FAO. Since 1987, it is an Inter-governmental Organization, providing marketing information and technical advisory services to the fishing industry of the Asia-Pacific region.

While there is no doubt that destructive, wasteful utilisation of resources has to be discouraged and checked, there is growing resentment

on rigid conservationist approaches to resource management, which is believed to affect trade and the fishing communities ... there is growing resentment on the dogmatic approach of some conservationists to further their cause, which many in the industry believe is not based on scientific facts and figures but on guesstimate and bizarre extrapolations. Thus it is natural for some to question the CITES move to place basking sharks and whale sharks in its Appendix II, though continued commercial use of these "gentle giants" needs further assessment and study. ... such a move is highly unnecessary, when the Fisheries Committee of the IFAO has already recommended a comprehensive action plan for managing shark populations there is growing concern in the global fishery industry

on the move by CITES to widen its powers to cover fish species of commercial importance. Some believe the proposal ... if adopted, would ultimately influence the whole fisheries sector, as it would have powers to act as yet another regulator of commercial fisheries.

As a timely response to this, we would like to draw readers' attention to a recent article in *Science* (Baum et al., 2003. *Science* Vol 299 pp 389-392), which reports drastic declines in Atlantic shark populations over the past 15 years. The authors identify over-exploitation as the major cause of the decline and suggest that the problem may so severe that some populations are facing large-scale extirpation. Controlling trade in shark parts therefore seems to us to be an essential step in reversing this decline.



Back to the Future in the Sea of Cortez

By Cam Ainsworth and Hector Lozano

In November 2002, the *Back to the Future* (BTF) team went to La Paz, Mexico to attend a workshop with members from the Mexican *Instituto Nacional de Pesquerias*, *Centro Interdisciplinario de Ciencias Marinas* and *Centro de Investigaciones Biológicas del Noreste*. Presentations and



How about a workshop in La Paz Sheila?

posters were delivered in Spanish and English and included a breadth of topics (e.g., applications of BTF around the world, modelling case-studies from the Gulf of California, and other specific fishery and management concerns of the region. The

usefulness of the BTF approach in this region seems clear when we consider the extreme environmental changes that have occurred in the upper Gulf as a result of human water-use (see *FishBytes* 8-6). Hector Lozano will continue to liaise with our Mexican colleagues as his thesis develops.

Daniel Pauly in the spotlight

According to the *New York Times* (January 21, 2003), Daniel Pauly, Fisheries Centre professor and head of the *Sea Around Us* project, is an "iconoclast" - a medieval term for those who destroyed religious icons in the name of reform. Dr Pauly's work has certainly captured the attention of the world's media and his 'big-picture' approach to solving the problems of world fisheries seems, at last, to be catching on. In another recent interview in *Nature's* Lifelines section, we hear that his greatest job satisfaction comes from "interacting with the creative, hardworking colleagues I have coerced into joining the *Sea Around Us* project". And what would he have become, if not a scientist? "Another scientist. Seriously. This is the best". The interview with a (sort-of) lifelike cartoon can be found in *Nature*, Vol 421, January 3, 2003, p23.

News and Notes

Sixth Larkin Lecture and Fisheries Centre Open House - happening this month!

The **Sixth Larkin Lecture** "Trouble on the reef: tackling a vulnerable and undervalued fishery", by **Dr Yvonne Sadovy**, from the Department of Ecology & Biodiversity, University of Hong Kong, will be held at UBC at 5pm in Rm 1005, Forest Sciences Centre, UBC, on **February 20, 2003**. On the same day, at 1 pm, the Fisheries Centre (2204 Main Mall, UBC) will hold a public Open House as part of the review week with our International Advisory Council (details at <http://fisheries.ubc.ca/events/workshops/>). The open house will include posters, exhibits, and interactive activities, representing all the research projects within the Fisheries Centre. So please spread the word, invite your colleagues and friends, and come and find out what we are all about!

Welcome

Dr Ben Wilson has recently joined the Fisheries Centre's Marine Mammal Research Unit and will be working on sea lion foraging tactics. He was previously at the Behavioural Ecology Research Group at SFU, where he studied herring behaviour relative to threats from echolocating marine mammals. He also held the Scientist in Residence position at the Bamfield Marine Science Centre and currently sits on the International Whaling Commission's Scientific Committee and the IUCN Cetacean Specialist Group.

Visitors

Dr Sylvia Opitz, former student of Daniel Pauly, visited from the Kiel Institute of Marine Research in November, to begin a collaborative project with Dr Pauly. **Thomas Leiter** and **Gerhard Lindner**, from the University of Agricultural Sciences, Vienna joined us for an extended visit to to work on their theses studying habitat selection in coho salmon. We would like to thank **Julie Hofer** for her volunteer work with Dr Deng Palomares. Also **Patrice Provost**, from the Museum of Natural History, Paris, joined us in January to work on an ecosystem model of the Kerguelen Islands.

FishBytes is the newsletter of the Fisheries Centre at the University of British Columbia, and is published six times per year. Subscriptions are free of charge.

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