



## FISHERIES CENTRE

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The University of  
British Columbia

# FishBytes

**Volume 3 Issue 2 April 1997**

THE NEWSLETTER OF THE FISHERIES CENTRE AT UBC

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## **Fisheries Centre Nets Norwegian Partner**

In February, the Fisheries Centre, UBC (FC) and the Christian Michelsen Institute (CMI) at Bergen, Norway signed a Memorandum of Agreement (MOA). FC and CMI, having common interests in fostering research in fisheries resource management, entered into an agreement to cooperate in research, training and information utilizing their joint expertise. The Christian Michelsen Institute is a leading multidisciplinary development research institute in Scandinavia. Researchers at CMI are engaged in a wide spectra of activities ranging from the environment, natural resource management, macro-economic planning, ethics, morality and religion to demography.

Informal ties between the two institutes began in the summer of 1995 when a Ph.D. fisheries economics student and CMI Research Fellow named Ussif Rashid Sumaila visited and studied at the Fisheries Centre for one year. Having successfully defended his Ph.D. this past December, CMI Research Fellow Dr. Sumaila is now also an associate research member with FC and is an important link to this partnership. Rashid is currently at the Fisheries Centre until the end of May researching the bio-economics of marine reserves.

## **Murray A. Newman Awards**

On February 28<sup>th</sup>, the Vancouver Aquarium Association awarded two scientists, Ken Ashley and Kim Fulton, for their contributions to aquatic studies. The Murray A. Newman Award for Aquatic Conservation and Research was established in 1995 in recognition of Dr. Newman's outstanding contribution towards public awareness of the aquatic world. Dr. Newman was the Founding Director of the Vancouver Aquarium, Canada's Pacific National Aquarium.

Ken Ashley was the recipient of the 1997 Murray A. Newman Award in Aquatic Research. Mr. Ashley has helped establish the use of a technique called hypolimnetic aeration to enhance oxygen content in lakes for fish and their habitats.

Kim "Dr. Fish" Fulton was awarded the 1997 Murray A. Newman Award in Aquatic Conservation for the educational programs and materials he has created to educate the next generation of Stream Keepers. These programs help establish a lifelong interest in salmon conservation by involving hundreds of students from area schools hatching salmon in the classroom.

*For more information of events, public programs and exhibits at the Vancouver Aquarium,*

*please contact Paul Clarke at tel. 631-2505.*

## **HONG KONG MEETING**

In April, Drs. Tony Pitcher, Daniel Pauly and Tony Courtney visited Hong Kong for a week to present results of the Hong Kong inshore resources project to our Hong Kong partners, ERM Ltd., and the Agriculture and Fisheries Department representatives of the Hong Kong government. The UBC team have been working on data sent from Hong Kong for the past year (see *FishBytes* Vol. 2, No. 1). Along with the rest of the South China Sea, Hong Kong resources are severely depleted-there is a fleet of over 300 trawlers and many thousands of gill net, long line and trap fishermen. Up to the 1940s large barramundi, groupers and croakers were common, but the last (2m long!) giant croaker was caught in 1984. Nowadays the mean size of fish is measured in a few cms. This shallow tropical system is nevertheless quite productive, the total catch, including prawns, being at least 4 tonnes/km<sup>2</sup>. Based on a survey of biomass and catches carried out by the Hong Kong partners, the UBC team have completed stock assessments for about 25 species, the first time this has been done in Hong Kong waters. Otoliths have been read and ages combined with length frequency analysis to determine growth and mortality. Multispecies assessment and Ecosystem modelling have been used to examine the impact of harvesting on the inshore resources. A lot of problems in dealing with a data-sparse situation have had to be overcome, and two 'methods' papers will result. The main project, which finishes in June, will likely lead to five other publications. After that Dr. Tony Courtney will be returning to his home lab in Queensland, but there is a chance that UBC will be working on further projects in Hong Kong waters in the future. Everything depends on what happens after the take-over by the Peoples Republic of China though!

## **Fisheries Centre Marine Reserves Workshop**

**By Dave Preikshot**

On February 28, 1997, the Fisheries Centre at UBC hosted a Workshop on Design and Monitoring of Marine Reserves. Sponsored, in part, by the World Wildlife Fund for Nature, the workshop attracted over 60 researchers from around the world. Some of the organisations and countries represented included Atlantic and Pacific coast universities of both Canada and the U.S., the Department of Fisheries and Oceans, the BC Provincial Government, First Nations groups, commercial fishers and conservation groups, and scholars from Central America, Europe and Oceania.

Although not everyone who came was convinced of the use of marine reserves almost all saw them as an appropriate and effective tool for fisheries management by end of the wrap up session. The most significant principles of Marine reserves discussed were:

The terminology of a "marine reserve" should only be applied to a no-take area. Since all users refrain from harvesting when such an area is set up, all share the costs, and all later reap the benefits of the reserve in an equitable fashion.

Experience from pioneering work on marine reserves in New Zealand and the Philippines shows that even small areas increase biomass and diversity of marine species. More reserves and protected areas foster biological links that increase these advantages even further.

Marine reserves promote biodiversity, which has been threatened by humans, and will provide researchers with pristine ecosystems that contrast fished ones to help better understand how human activities shape the structure of the ocean environment.

One of the most significant participants in the workshop was Dr. Bill Ballantine from New Zealand, who was directly involved in the creation of the first no-take marine protected area in the world. The process involved much time and effort but succeeded for two reasons. First, scientists had to develop the principles, define the constraints and describe the benefits of marine protected areas to the general public. Secondly, when empowered with this information representatives were able to determine the order, rate of creation and location of marine protected areas in a democratic process. Dr. Ballantine stated that there is no mystery to many of the issues involved when creating marine reserves if their function is understood. It merely takes the will of the people to get on with the process. One of Dr. Ballantine's most poignant quotations came when he was challenged about the fact that precise benefits of marine reserves cannot be determined. He responded that since there is only one definition of a dead ecosystem any actions to the contrary are positive.

Dr. Tony Pitcher, director of the Fisheries Centre, summed up the lessons of the workshop:

"No-take marine reserves act like your RRSP. The immediate returns are low, but in the long term the accumulated interest on natural capital will pay back valuable and sustainable dividends. For politicians and decision makers, no-take marine reserves are win-win policies: in the long-term they will ensure that we have a fishing industry that maximises wealth, jobs and food at the same time as the conserving habitat, rebuilding the biodiversity of all ocean creatures and creating many recreational opportunities for humans. As natural ecosystems recover in the absence of harvesting in a no-take reserve, the abundance of large high-value fish species will gradually increase. Such fish and their offspring will be available to commercial and recreational fisheries outside of the reserve area. No-take reserves also act as an insurance policy against mistakes by science and management: for example they might have saved the Newfoundland cod."

"I believe that the first country in the world to have the courage to declare large parts of its ocean as permanent no-take marine reserves will be the country, and given present trends it may be the *only* country, with healthy fisheries in 50 years time."

The proceedings of the workshop will be published as a Fisheries Centre Research Report and will be available in 1997. Copies of this, or previous reports can be obtained by contacting the Events Officer at the Fisheries Centre, 2204 Main Mall, UBC., Vancouver, B.C. V6T 1Z4, tel. (604)-822-2731 fax. (604)-822-8934.

## **Salmon Workshop**

### **A Fishery in Transition**

This one-day workshop on Feb. 7<sup>th</sup> 1997, hosted by the Pacific Fisheries Think Tank and sponsored by DFO and the British Columbia Fisheries Secretariat, was held at the Harbour Centre campus of Simon Fraser University. The aim of this workshop was to allow managers, academia, environmental organizations, industry and First Native representatives to have a frank exchange of information, views and ideas on current and potential concepts on the conservation and fisheries management of Pacific salmon stocks. The Pacific Fisheries Think Tank is a partnership between the Fisheries Centre, UBC and the Institute of Fisheries Analysis, Simon Fraser University created to provide a forum where stakeholders can explore partnership options with the help of biological, economic and social scientists.

The morning sessions had presentations and discussions focusing on conservation issues of BC salmon stocks. Topics discussed included the impact of habitat degradation on salmon survival, the potential impacts of the changing roles of provincial and federal management institutions on conservation, increasing stakeholder involvement in conservation through co-management and localized management schemes, using historical First Nations knowledge to better understand potential impacts of climate change, and approaches to risk averse management.

The afternoon session focused on fisheries management issues, such as, the role of advisory bodies, the division of federal and provincial power in fisheries management, alternative localized management licensing schemes, cooperative management systems, and the experiences of the Fraser River Basin Management program.

The proceedings of this workshop will be published by the Pacific Fisheries Think Tank. For further information on this and other upcoming workshops contact Patricia Gallaugher at tel. 291-4653, fax. 291-3851, e-mail <pgallaug@sfu.ca>.

## **"Release the Hounds!"**

by Steven Mackinson



Another year, another 1.5 hours and the Strait of Georgia roe herring seine fishery is over! 9365 tons were caught for a quota of 8449 t. The largest set was 530 tons, netting someone approx. \$1 million. Unfortunate for the processors, both Barkley sound and the Strait of Georgia were opened on the same day, meaning that some 15,000 tons of fish hit Vancouver at around the same time. Despite processors concerns as to freezing capacities, herring

managers called the shots the best they could. Unfortunately for Barkley sound this meant that the target was exceeded by over 60%.

For the duration of the pre-fishery survey I was on board the Kynoc, "Lady in Heaven" skippered by Bill Wilson. My intention was to record behaviour and distribution of herring schools as they mature in the period up to the fishery. I had the fortune to use some mapping software to accurately plot distribution of schools relative to topographical features and also the cruise track of the vessel.

Motivation to spawn appears to be a major driving factor in determining the size, shape and distribution of schools. Despite heavy predation by birds and sea lions, mature herring schools were found vertically extended to the surface during the day.

There is a huge amount of potential information on behaviour and distribution of herring. Pulling together these sources it is hoped that we may gain insight into fish behaviour to design better methods of harvest control. Conversation with the skipper and other fishers revealed a rich source of information on herring behaviour and distributions during spawning and other periods. This information cannot be overlooked and will be incorporated into developing and understanding of 'what herring do'. Fishermen clearly modify their search behaviour for fish depending on their knowledge of fish behaviour. We cannot consider search as a random process of encounters.

*Steven Mackinson is a Ph.D. student working under Dr. Tony Pitcher. His research topic deals with management aspects of volatile schooling pelagics.*

## **FC ACOUSTIC MODULE**

**by Steven Mackinson**

Some of the mystery of fisheries acoustics was recently revealed to students at the Fisheries Centre. Dr. Ole Misund, a leading expert in fisheries acoustics, from the Institute of Marine Research, Bergen, paid a brief visit to teach a course on fisheries acoustics. Dr Misund has extensive experience in fisheries acoustics in stock assessment and fish behaviour studies. Attention has been given to studying schooling fish species. Recently, Dr. Misund and colleagues have teamed up with Dr. Tony Pitcher in field behavioural studies of Norwegian spring-spawning herring (see *Fishbytes* Vol.2 No.3).

The module in acoustics was the first of its kind for the Fisheries Centre. Students easily grasped the familiar concept of fish represented as dots on a computer screen (what is a herring?). Once grounded in basic theory we were led through the practical aspects of applying acoustic technology including survey design and abundance estimation using the one fish, two fish... *dead fish, blue fish...* equations! Principles for the use of sonar for surveying pelagic fish schools close to the surface were outlined.

Some of the limitations of acoustics were addressed. Although differences in

the spatial distribution of fish may account for differences in estimations, the greatest uncertainty comes from the estimation of target strength. Differences in fish morphology, behaviour and anatomy contribute to this uncertainty.

Despite the abundance of equations, Dr. Misund managed to provide a thorough and digestible account of fisheries acoustics. Students had the opportunity to ask many questions in a relaxed atmosphere. If you missed it this year, perhaps you may get the opportunity in the future. Acoustics is a rapidly expanding field which most of us will probably become involved in, one way or another.

After the module was over on the eve of Dr. Misund's departure we were all treated to a Chinese meal by Tony Pitcher and superbly organized by Val.

## **Grad Student Symposium**

**by Dave Preikshot**

On Friday March 21 to Sunday March 23 the third fisheries graduate student symposium was held at the Ralf Yorque room of the UBC Fisheries Centre. Attendees included representatives from the University of Washington, Simon Fraser University, and the University of Victoria. This year's festivities were organized by Marcelo Vasconcellos and Dave Preikshot, both students of the UBC Fisheries Centre.

The symposium was organized in four general subjects, ecosystems and fisheries, fish population dynamics and behaviour, climate and fisheries, and fisheries management. There was much discussion and an open exchange of views as the participants took advantage of an opportunity to discuss their research without the perception of pressure from advisors, faculty, or established researchers. All of the papers were illustrative of the high quality of fisheries research that is being conducted in the Pacific Northwest.

Most significantly this forum allows new members of the fisheries research community, grad students, the opportunity to meet the people they will know as colleagues in the future. This is one of the most important aspects of the profession of science, the communication of ideas among its members. The conference was a success, although the liberal use of malted barley products doubtless played a part promoting some late comers Saturday morning. As well, an informal foraging experiment clearly showed the rate limiting influence of excess cinnamon bun density on the feeding behaviour of graduate students. Next year's symposium will take place at either SFU or UW. For copies of the Symposium report, which will contain all papers presented contact Marcelo (ph: 604 822-3323, e-mail: marcelo@fisheries.com) or Dave (ph: 604 822-0618, e-mail: preikshot@fisheries.com).

## **Fisheries Centre Seminars**

On November 1<sup>st</sup>, **Dr Michael Healey** from the Westwater Research Institute, presented a talk entitled "**Ludwig's ratchet and the demise of New England groundfish**". The American groundfish fisheries on George's Bank was used to review the Ludwig's ratchet effect and to evaluate the relevance that fisheries scientists had on management. Harvesting of fishery resources

is often subject to a ratchet effect: during relatively stable periods harvesting rates tend to stabilize at positions predicted by steady-state bioeconomic theory. Then a sequence of good years encourages additional investment in vessels or processing capacity. When conditions return to the normal or below normal, the industry appeals to the government for help; often substantial investments and many jobs are at stake. The government response is typically direct or indirect subsidies. These may be thought of initially as temporary, but their effect is to encourage overharvesting. The ratchet effect is caused by the lack of inhibition on investments during good periods, but strong pressure not to disinvest during poor periods. The long-term outcome is a heavily subsidized industry that overharvest the resource. The recent 25 years of history of the George's Bank groundfish fisheries shows the typical signs of the ratchet effect: science was usually not heard and often ignored; harvest is negotiated between political and economic interests; no compliance by fishers; and government incentives to increase the number and power of the boats in response to the increasing signs of overfishing and decrease in catch rates. From the experience with the demise of New England groundfish some roles for science in discommissioning the ratchet are elaborated; firstly improve the information provided on stocks through better systems of communication and better advice; secondly strengthen the paradigm of the "limited ocean"; thirdly debunk the myth of the technological solution to fisheries; and finally, fourthly expand the boundaries of scientific investigation to include the fishery science.

### **In House Announcements**

Dr. Daniel Pauly has received from Dr. Claude Roy, of ORSTOM, France, a 5 CD-ROM set of the **Comprehensive Ocean & Atmospheric Data Set (COADS)** based on ship's reports of surface temperature and winds covering the entire globe since the end of the last century. The CD-ROMs and the windows software allowing extraction of data will be made available to Centre's students and faculty through David Preikshot, who should be consulted for details.

The Centre has just purchased two copies of **ArcView**, a Geographic Information System software package. For further details contact Tony Courtney or Tony Pitcher.

### **FOR YOUR DIARY.....**

#### **Fish Biologist Position**

A fish biologist is required for 6-8 months (**starting in June 97**) to develop a habitat protection/restoration plan for Nooksack Dace and Salish sucker. Applicants should have a M.Sc. in fish ecology or some equivalent experience. Interested applicants should forward a resume to Jordan Rosenfeld at the Ministry of the Environment, 2204 Main Mall, Vancouver, B.C. V6T 1Z4. E-mail: [jrosenfe@ubc.env.gov.bc.ca](mailto:jrosenfe@ubc.env.gov.bc.ca); or at the phone: (604) 222-6767

### International Courses

The Center EPOMEX - Universidad Autonoma de Campeche is organizing 4 courses on the management of natural resources and coastal zones:

**July 2-12, 1997:** Elements for integrated management of coastal zones

Coordinator: Evella Rivera Arriaga (e-mail: [evrivera@epomex.uacam.mx](mailto:evrivera@epomex.uacam.mx)).

**July 7-19, 1997:** Contamination and environmental impact on tropical coastal zones.

Coordinator: Leticia Alpuche Gual (e-mail: [lalpuche@epomex.uacam.mx](mailto:lalpuche@epomex.uacam.mx)).

**July 21 - Aug. 2<sup>nd</sup>, 1997:** Remote sensing and GIS applied to coastal ecosystems

Coordinator: Gerardo Palacio Aponte (e-mail: [gpalacio@epomex.uacam.mx](mailto:gpalacio@epomex.uacam.mx)).

**Aug. 18-30, 1997:** Fisheries resources assessment and dynamics.

Coordinator: Luis Ayala Pérez (e-mail: [luaayala@epomex.uacam.mx](mailto:luaayala@epomex.uacam.mx)).

Applicants should have a graduate degree or professional experience in related area. Course fee is U\$400.00. More information can be accessed in the www at: <http://epomex.uacam.mx> or at the Centro EPOMEX - UAC; Av. Agust'in Melgar y Juan de la Barrera s/n; Apartado Postal 520 Campeche 24030; Campeche, Mexico; Tel: (981) 116 00; Fax: (981) 659 54

### Aug. 24-30, 1997

The *9th Societas Europæa Ichthyologorum (European Ichthyological Society) Congress "Fish Biodiversity"* is to be held at Trieste, Italy. The aim of the Congress is to provide a world-wide overview on the past history and present status of marine and freshwater fish fauna. For more information please contact: Pier Giorgio Bianco, Executive Secretary of SEI, Dipartimento di Zoologia, Via Mezzocannone, 8 I-80134 Naples, Italy tel. ++39 81 5527089 fax. ++39 81 5526452

### Oct. 8-11, 1997

The 15th Lowell Wakefield Fisheries Symposium on *Fishery Stock Assessment Models for the 21st Century: Combining Multiple Information Sources* is to be held at Anchorage, Alaska, USA. For more info. contact: Brenda Baxter, Symposium Coordinator, Alaska Sea Grant College Program, University of Alaska Fairbanks, P.O. Box 755040, Fairbanks AK 997775-5040 USA. tel. (907) 474-6701, fax. (907) 474-6285, e-mail [FNBRB@aurora.alaska.edu](mailto:FNBRB@aurora.alaska.edu)

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