

FISHBYTES

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THE NEWSLETTER OF THE FISHERIES CENTRE AT UBC

An Overview of the 49th International Conference On Tunas and Billfish

By Nathaniel Newlands

The 1998 conference was held May 18-21 in Lake Arrowhead, California. It provided a broad view of current research on tagging, tracking and surveying, fishery management and stock assessment, by-catch and gear selectivity, fisheries economics, population genetics, and the husbandry and physiology of tunas and **billfishes**. The conference also celebrated the 50th anniversary of the U.S. National Marine Fisheries Service's (NMFS) Honolulu Laboratory. Presentations regarding the past and present research conducted at this laboratory provided an interesting perspective on how outstanding questions regarding highly migratory species have directed particular research and technological initiatives, especially in recent years.

The use of the new archival, 'pop-up' satellite tags (PSTATs), which are replacing conventional ultrasonic tracking, is particularly significant in providing important information regarding such issues as migration, harvest impacts on fishes, and how environmental factors can influence distribution and catchability. This new technology is currently being used in an archival tagging project on **bigeye** tuna and swordfish (which have reasonably high recapture rates) at the Honolulu Laboratory. The PSTATs are externally attached to the fish as an intramuscular anchor, and are then released at predetermined times to 'pop-up' to the surface of the ocean, thereby transmitting a record of movements and habitat use via satellite. Automatic geopositioning is now being incorporated within this technology by commercial electronics manufacturers. M. Lutcavage (New England Aquarium) and collaborators, have initiated 'pop-up' satellite tagging of Giant Atlantic bluefin tuna in both New England and Canadian waters. They discussed their initial data, and its use in establishing spawning areas and the inter-regional and long-range movements of Atlantic bluefin tuna.

Considerable discussion also took place involving the potential detection of tuna using long-range acoustic systems and airborne Light Detection and Ranging Systems (LIDARs). LIDARs direct short pulses of laser

light toward a target which, upon reflection, an elapsed time (or target range) is then calculated. Fish LIDARs use the strength of the return signals to estimate the number of fish within a given section of the ocean. The technological advancement of imaging capabilities in the LIDARs may provide an important technique for the detection and monitoring of fish such as tuna.

The aim of collaborative research being conducted by myself and Tony Pitcher, between the Fisheries Centre and the New England Aquarium, is to investigate the mesoscale spatial dynamics of highly migratory species. An individual-based model which uses a variety of both computational and mathematical techniques related to fuzzy clustering and pattern recognition, cellular automata, neural network optimisation, and Lagrangian theory in physics is currently being developed. Using these methods, the individual, shoaling and migratory behaviour of tuna will be jointly investigated. Implementation and validation of the model will rely on data from various techniques which can be used to identify individual fish: image processing of aerial photographs, LIDAR-detection, and archival tagging.

From the various discussions at this conference, it seemed clear that the current emphasis of technological methods involving the assessment and monitoring of fishes (such as tuna) for management purposes, parallels the rapid advances of similar technology used for commercial fishing purposes. The high economic value of tuna and the increasing availability and advances in fishing technology has contributed to the intensification of fishing, and in turn, to the rapid depletion of certain **localised** aggregations or populations. As the use of technology competes in this way, research can be seen to provide a critical indication of the extent to which the application of technology without the key, accurate knowledge of its impact with respect to fish movement and life history, will likely produce devastating environmental outcomes.

(Nathaniel Newlands is a PhD student with Tony Pitcher. His research focuses on shoaling behaviour in tuna.)

Aboriginal Fisheries Programme Updates

By *Nigel Haggan*

The Fisheries Centre, First Nations House of Learning (FNHL) and the BC Aboriginal Fisheries Commission are working on several fronts to make UBC more responsive to the research needs and priorities of Aboriginal communities and accelerate the enrolment of First Nation students in graduate fisheries programmes.

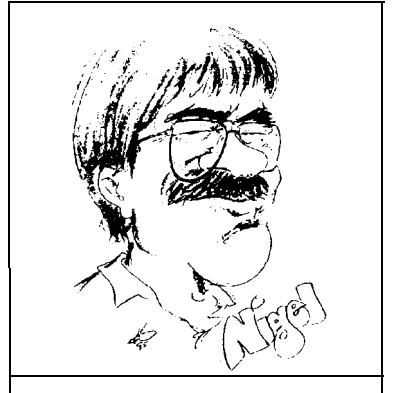
Endowed Chair – UBC has formally approved the Endowed Chair of Aboriginal Fisheries proposed by FC and FNHL (See *FishBytes* 4(1)). The next step is a feasibility study to assess the prospects for raising the \$3 million endowment needed for salary, secretarial support and modest seed funds for research projects. Check the Fisheries Centre's **website** for a description.

First Aboriginal Fisheries Graduate Student – Congratulations to Stephen Watkinson of Kitkatla, BC on being accepted into the MSc programme. Stephen is a member of the Tsimshian Nation whose traditional territory covers 1/3 of the BC coast and the lower 1/3 of the Skeena River. He will receive some funding

support from UBC to help co-ordinate First Nations' projects.

Review of FNHL – A 1997 UBC review of FNHL had this to say about the partnership between FC, FNHL and the BC Aboriginal Fisheries Commission: "The Review Committee found in the proposals for an Endowed Chair of Aboriginal Fisheries and 'Back to the Future project to Integrate Traditional Environmental Knowledge with Modern Fisheries Science' . . . a fully developed rationale for collaborative interdisciplinary research which would not only benefit First Nations but also serve the common interest of science, the BC economy, society at large and the environment." Thanks for those kind words!

(Nigel Haggan is a research associate at the Fisheries Centre)



Fisheries Centre Research Report Series

A reminder of the many research reports available from the Fisheries Centre:

- Commercial Whaling - the Issues Reconsidered
FCRR 1993, Volume 1, Number 1, 36pp
- Decision Making by Commercial Fisherman: a Missing Component in Fisheries Management?
FCRR 1993, Volume 1, Number 2, 75pp
- Bycatch in Fisheries and their Impact on the Ecosystem
FCRR 1994, Volume 2, Number 1, 86pp
- Graduate Student Symposium on Fish Population Dynamics and Management
FCRR 1995, Volume 3, Number 1, 33pp
- Harvesting Krill: Ecological Impact, Assessment, Products and Markets
FCRR 1995, Volume 3, Number 3, 82pp
- Mass-Balance Models of North-eastern Pacific Ecosystems
FCRR 1996, Volume 4, Number 1, 13 lpp
- Reinventing Fisheries Management
FCRR 1996, Volume 4, Number 2, 84pp
- The Design & Monitoring of Marine Reserves
FCRR 1997, Volume 5, Number 1, 47pp
- Preliminary Mass-Balance Model of Prince William Sound, Alaska, for the Pre-Spill Period, 1980- 1989
FCRR 1997, Volume 5, Number 2, 34pp
- Assessment of Hong Kong's Inshore Fishery Resources
FCRR 1998, Volume 6, Number 1, 148pp
- Use of Ecopath with Ecosim to Evaluate Strategies for Sustainable Exploitation of Multi-species Resources
FCRR 1998, Volume 6, Number 2, 49pp
- Graduate Student Symposium on Fish Population Dynamics and Management
FCRR 1998, Volume 6, Number 3, 40pp

Copies of any of these research reports may be obtained at a cost of ~~Can~~\$20.00, which includes surface mail. Payment may be made by Credit Card, cheque or money order. Please contact: Events Officer Fisheries Centre, University of British Columbia, 2204 Main Mall, Hut B-8, Vancouver, BC V6T 1Z4, phone (604) 822-0618, fax (604) 822-8934, e-mail events@fisheries.com

Looking Inside the Shell: The New 'Crabcheck' Machine By Gary Cross

An electronic device which is likely to have dramatic implications for the global crab industry has been developed at the Oceanarium in Britain's smallest city, St David's Pembrokeshire in Wales.

The machine goes by the name of 'Crabcheck' and can gauge the quantity of marketable meat in a live crab. It is also likely to make a major contribution to fisheries conservation by allowing fishermen to check crabs on board and return rejected individuals to the sea unharmed. This process alone would greatly reduce the current wastage of 25% to 35% of crabs that are caught and landed being worthless because they are at a stage in the moult cycle with minimal meat content.

Oceanarium scientists report that trials in Ireland and Wales had shown that even the most experienced fisherman could not tell which crabs are in **mid**-moult. They were able to pick the very best crabs, but at intermediate stages success in quality selection was much more random. Crabs (and indeed all Crustacea) grow by reducing their muscles into a kind of 'puree'. This facilitates withdrawal from the old shell and allows for reformation of tissues after the moult. Once out of the old shell, the crab is extremely soft and will take about two months before the new shell is fully hardened. At this point, the crab has very little marketable meat within its body and the 'puree-like' meat inside of the crab at this stage will simply 'melt' if the crab is boiled (hence the expression coined by consumers that the crab is 'watery').

The 'Crabcheck' machine can identify which stage of the moult cycle the crab is in and will tell the operator the percentage of marketable meat inside of the crab. The machine can be set from 0 to 100% meat content (i.e. setting the machine at 0% will mean all crabs are landed and setting at 100% will mean only the best of the crabs will reach market). Landings of poor quality crab have driven down the price of crab at **first** sale, and we believe when the machine is introduced into the fishery it will guarantee a premium product once more and will push the price of this Crustacean resource up.

The machine is relatively cheap to make and will be sold on the market at a price of about £300. This should be within the price range of most fishermen, but initially, most fishery managers think that the machine should be targeted towards processors of crab products. Once they have decided upon the percentage meat content which is economical for them to process, the pressure on the fishermen to deliver the required standard of product will eventually mean that the fishermen would also then need to

purchase a machine. It may be envisaged that this would lead to processors only wanting to take 'full crabs', however, in recent tests only around 5% of all the crabs we tested had a 100% meat content (as each crab in any given catch will be at a different stage within the moult cycle). Preliminary tests have show that crabs below 50% marketable meat content are uneconomical, although this may vary in **different** species of crab.

(The author can be reached at: Oceanarium, St. David's Sea Life Centre Ltd., 42 New Street, St. David's, Pembrokeshire, Wales, UK, SA 62 6SS, Tel. (01437) 720453, email gary@sealife.demon.co.uk.)

Belize Barrier Reef: A World Heritage Site By Vincent Gillett

December 4th 1996, marked an important day in Belize's history, as it was the day on which UNESCO's World Heritage Committee finally adopted the nomination of the Belize Barrier Reef as a World Heritage Site. Specifically, with this nomination, seven sites will be provided with protection to maintain their integrity and the outstanding natural and cultural properties associated with them. This is Belize's first World Heritage Nomination and it has been widely accepted by the **Belizean** people.

The sites, which are collectively known as the Belize Barrier Reef Reserve System, includes the Bacalar Chico National Park and Marine Reserve, Blue Hole Natural Monument, Half Moon Cay Natural Monument, Glovers Reef Marine Reserve, South Water Cay Marine Reserve, Laughing Bird Cay National Park and the Sapodilla Cay Marine Reserve. Together they cover a total of 92,610 ha, which represent: about 12% of the total area of the Barrier Reef Complex, inclusive of the three Atolls. The spectrum of reef types, from **fringing** reef to atoll, are well represented within the area, which is also renowned for its exceptional beauty. Several species of **threatened** marine species, including three species of turtle, the West Indian manatee, and the red-footed booby bird are afforded protection within the reserve system. It is anticipated that the designation will also further promote the **complementarity** of nature and culture which together, identify people with their environment.

Belize's request was spearheaded by the Ministry of Agriculture and Fisheries. Indications are that the current nomination represents a first phase as further expansion of the site is likely to occur during a second phase of the country's reef management program.

(Vincent Gillett is a PhD student with Daniel Pauly.)

News and Notes



Congratulations to Dr Ratana (Ying) Chuenpagdee. A student of Dr Pauly, Ying successfully defended her PhD thesis *Scales of Relative Importance and Damage Schedules: A non-valuation approach for natural resource management* on June 26, 1998. Ying's doctoral research focused on two coastal areas of Thailand and involved an empirical test of the feasibility of developing damage schedules. In the weeks preceding her doctoral defence, Ying made presentations to the Environmental Studies Association of Canada (ESAC) of the Congress of the Social Sciences and Humanities, and to the Seventh International Symposium on Society and Resource Management: Culture, Environment and Society.

The "Walters' Point" – a new Fisheries Centre Datum

Preliminary definitions:

1. That level below which anyone pouring a cup of coffee has a choice of sneaking off or making a fresh pot.
2. Make a fresh pot.

Further definitions welcome!

(For the benefit of the coffee-addicted, courtesy of Nigel Haggan)

Conference Calls

Coastal Zone Canada – To be held in Victoria, BC, August 30 through 3 September 3, 1998. Fisheries issues, especially as related to coastal communities, make up a significant component of the conference. The Minister of Fisheries and Oceans, David Anderson and the BC Minister of Fisheries, Dennis Streifel, will open the conference. Miles Richardson, former Chairman of the Council of the Haida Nation, is the Conference President. Further information, including complete on-line registration, is available at www.ios.bc.ca/ios/czc98/.

Creating a Sea Change: Resolving the Global Fisheries Crisis.

A WWF Endangered Seas conference to be held September 14-15, 1998, in Lisbon, Portugal, and coinciding with the International Year of the Ocean. Keynote addresses include "Politics and Science in Fisheries Management", "The Ecological Consequences of Unsustainable Fishing, and "Securing the Future of the Seafood Industry". For more information contact Daniela Maimone, Event Manager, WWF Endangered Seas Campaign, Branksome House, Filmer Grove, Surrey, GU7 3AB, UK, (01483) 419294, fax (01483) 427965, email 102060.343@compuserve.com, www/panda.org/angeredseas/.

Canadian Conference for Fisheries Research (CCFFR) – To be held in Edmonton, Alberta, January 8- 10, 1999. The major themes of the conference include: "Effects of land use on stream fish and their habitat"; "Impacts of endocrine disrupters and contaminants"; "Changes in climate and ecosystems"; and "Innovative applications of genetics in fishery management". Papers addressing the major themes are encouraged, although submissions on other themes related to fisheries and aquatic habitat biology are also welcome. The deadline for abstracts is September 11, 1998. Submit abstracts to Dr Dick Beamish, Pacific Biological Station, Nanaimo, British Columbia, V9R 5K6. For general information, contact the CCFFR Secretary Treasurer? Dr Howard Powles, 200 Kent Street, Station 12032, Ottawa, Ontario, K1A OE6, or by email at powlesh@dfompo.gc.ca.

Publications

Bivalves of Alaska – This two-sided poster shows the various bivalve species commonly found along Alaska's shores. Information is included on each species' distribution, habitat, size, identifying characteristics, and toxicity when contaminated with paralytic shellfish toxin. The poster also has information on how to recognise symptoms of PSP and provide first aid to victims. Contact: Alaska Sea Grant College Program, University of Alaska Fairbanks, PO Box 755040, Fairbanks, Alaska, 99775-5040, phone (907) 474-6707, fax (907) 474-6285, email fypubs@uaf.edu, or visit www.uaf.edu/seagrant.

FishBytes is the newsletter of the Fisheries Centre at the University of British Columbia. Contributions and queries should be sent to Melanie Power, *FishBytes* Editor, Fisheries Centre, 2204 Main Mall, UBC, Vancouver, BC, Canada, V6T 1Z4, or by email to melanie@fisheries.com.

Be sure to visit the Fisheries Centre's website, www.fisheries.com, and follow the links to *FishBytes*. There, you'll also find information on upcoming Fisheries Centre events.

