

The 1998 ICES Annual Science Conference

By Johanne Dalsgaard

The ICES (International Council for the Exploration of the Sea) 86th Statutory Meeting was held September 16-19 in Cascais, Portugal. Cascais is a charming old fishing village approximately 20 km west of Lisbon - the host city of the 1998 World Exposition - Expo '98, dedicated to the theme "The Oceans, a Heritage for the Future".

The conference program was tight with 17 overlapping Theme Sessions addressing current research issues in ICES including fisheries management, stock assessment, temporal and spatial multispecies modelling, acoustics and shoaling behaviour, deepwater fish and fisheries, recovery and protection of marine habitats, fish genetics and aquaculture, fish ecology and population biology.

At this year's meeting, special attention was given to the "Report of the Bureau Working Group on Strategic Planning. ICES has recognised that it needs to move beyond conventional fisheries science if it wishes to keep and strengthen its role as a leading international science and advisory organisation. A Bureau Working Group with the purpose of formulating a strategic plan for ICES as it enters the new Centennial (ICES will be one hundred years old in 2002), was established following the 85th Statutory Meeting. Key points from the preliminary document were presented at the General Assembly by Dr Mike Sissenwine (Chairman of the Bureau Working Group), who emphasised the need for ICES to adopt a broader perspective on marine fisheries science, i.e., to consider whole ecosystems within social and economic contexts as well. Interdisciplinarity and collaboration with scientific communities outside ICES was also highlighted as was increased diversity (in terms of gender, race and ethnicity) in the ICES community, which has traditionally been dominated by (male) government scientists.

Four presentations were given by two students from the Fisheries Centre. Ph.D. student Steven Mackinson

delivered two excellent presentations on the distribution and behavioural dynamics of ocean-feeding Norwegian spring spawning herring, and using expert systems (i.e., local and scientific knowledge) to predict the distribution and structure of herring shoals. Besides giving a presentation on the modelling of persistent pollutants in aquatic ecosystems, I had the privilege (and unreserved trust!) to give a presentation on Ecospace on behalf of Dr Carl Walters, Dr Daniel Pauly, and Dr Villy Christensen.

University of Bergen Ph.D. student Leif Nottestad, who is a good friend and former visiting student at the Fisheries Centre (see FishBytes 3(5)), gave an entertaining presentation on fish farting, or more precisely "Extensive gas bubble release in Norwegian spring spawning herring (*Clupea harengus*) during predator avoidance".

Also at this conference, Dr Ole Arve Misund, well-known to many at the Fisheries Centre, was elected chair of the ICES Fishing Technology Committee.

Personally, this was my first international conference and public presentation. The experience was a combination of fear and excitement mixed with severe jet lag, and the latter was especially bad with the consecutive series of presentations.

In preparing for the trip, a useful document on preparing and delivering scientific talks came to my attention. It had some interesting statistics and citations that might sound familiar. One was that public speaking is the number one human fear with death rating as number six. Another was the citation by George Jesse1 that: "The human brain starts working the moment you are born and never stops until you stand up to speak in public." The document can be found at the web at: www.onr.navy.mil/onr/speak/

(Johanne Dalsgaard is an MSc student working with Dr Pauly. Johanne was awarded with the award for Best Young Scientist at the ICES conference. Congratulations, Johanne!)



Annual Fisheries Centre Welcome Party!

On Sunday, September 6, 1998, Nigel Haggan (shown at left preparing an Atlantic salmon caught off the British Columbia Coast!) and Pam Brown hosted the Fisheries Centre's annual welcome party. As usual, the party was well-attended and involved much food and merriment.

The party also marked the return of Tony and Val Pitcher from their sabbatical leave. Tony is shown at right opening a welcome-back present from the Centre's students - salmon-shaped chocolates and other decadent goodies. (Photos. v Pitcher.)



The British Columbia Coho Crisis: DFO and Coho

By Charles H. McKee

Of the five species of Pacific salmon, the one which is probably least understood is the Coho. Many environmentalists and fisheries researchers have been warning of an impending Coho crisis for years. Habitat destruction, native fishing, heavy commercial sports fishing and commercial fishing have been suspected in the decline of Coho. On the other hand, old time fishermen remember the same decline in Coho stocks the introduction of modern fishing methods. Coho basically are not predictable.

Some scientists love to dismiss facts and experience as anecdotal and without value. How could a native whose ancestors had been fishing for salmon for 10,000 years or a Japanese third generation fisherman know more than a biology graduate from UBC with one year of field work experience? Perhaps DFO remains deliberately ignorant. When trollers tried to improve salmon science, in conjunction with the UBC Fisheries Centre, Bud Graham of DFO phoned the provincial government and told them if they provided any funding the memorandum of understanding between the federal government and the province was off.

This spring, DFO mailed its Coho Backgrounder to all licensed commercial fishermen. One of the main objections and frustrations of Alaskan fishermen is with respect to DFO science. DFO, more often than not, distort or withhold information entirely. In this case, I do not know if information was been withheld, but what is published is certainly misleading.

Mortalities shown for the commercial fleet are DFO *estimates* of mortalities based on a factor applied to encounters. Sports fishery statistics are reported mortalities only and for only part of the season. No adjustment was made for mortalities of released fish, the portion of the season for which statistics were not kept or sports poaching. After the draft was seen by the Minister's political staff, sports mortalities were adjusted downwards.

The native catch was reported at 267 on the

Fraser River, yet the Sto:Lo band were selling Coho all through the fall of 1997 to anyone who wanted to buy. One small commercial smoker bought 500 Coho from a single Sto:Lo person.

Troll mortality was based on a guess and after a large random sample that guess proved to be 5 times greater than the actual mortality. I think this and the net fleet mortality were gross underestimates because of political influence of the buyers of net caught salmon. Galen Weston, a major financial supporter of the Prime Minister and majority owner of the largest processor in BC, is still selling "Product of Canada" canned Coho in all his many supermarkets. The net mortality reported by DFO would not have supplied a single large store for a whole year.

When the Coho plan was announced, areas surrounding sports lodges were exempted from conservation closures. DFO scientists had recommended that these areas be closed and were overruled by the Minister.

Although Fraser Coho returns are still not known, Alaskan scientists who stated that there was no crisis were totally vindicated by huge returns of Coho in northern BC waters and on Vancouver Island. Commercial sports catches were in the range of 25 or more Coho per day at Langara Island, many fish in the 12 to 15 lb. range. These catches were taking place before the usual start date of the commercial fishery. Anderson's closure had nothing to do with the abundance. Coho returns this year have been very good in coastal waters. Because of DFO, or despite DFO, is the question to be answered. The upper Thompson and Skeena Coho have not yet run the gauntlet of native fisheries and the jury is still out on their numbers.

Are DFO scientists acting as real scientists, or are they politically motivated?

(Charles H. McKee is a graduate of UBC's Commerce and Law Faculties, and is currently General Manager of Glendale Fisheries Ltd. He can be contacted at Suite 1601-700 West Pender Street, Vancouver, V6C 1G8, email wildfish@direct.ca)

Editor's Note: FishBytes welcomes contributions from our readers, with a right of reply. In this article, lawyer and salmon troller Charles H. McKee presents a uiewpoint on the Department of Fisheries and Oceans' management of British Columbia coho salmon fisheries. The Department of Fisheries and Oceans was approached for a response, unfortunately one could not be provided in time for the publication deadline. An article will appear in a future issue of FishBytes. Please note that the opinions presented do not necessarily reflect those of the Fisheries Centre, its members, or the University of British Columbia.

Pugnacious Prof. Pauly Pops Perfidious Perpetrator

By David Preikshot

The UBC Fisheries Centre has joined the sad community of offices that have been subjected to crime. The innocent habitants of our humble hut were carrying on a happy go lucky day, as we are wont to do, when a shout echoed off the peeling paint. Tony Pitcher, Director of our little family, called for help upon discovering an intruder in his office. This call for help was the unfortunate vehicle carrying us to crimesville.

Fortunately, the Sheriff was on duty that day. With wanton disregard (that, indeed, characterises much of his public appearances) Dr Daniel Pauly leapt into action. Abandoning his computer, he sprang from his office. Witnesses say that Dr Pauly's speed was not unlike that of Dr Walters going off to a smoke break.

While the malefactor sallied forth with invective and profanity, Sheriff Pauly stepped into the breach and apprehended the cussing cat burglar. A small amount of physical force was used to bring said criminal to ground (with only a small thud). There then ensued a brief bargaining session as the villain attempted to win his freedom by use of more profanity and empty threats.

One may surmise that, as Dr Pauly is a noted amateur linguist, he no doubt took advantage of this singular opportunity to study the colourful lexicon of of the Canadian underworld.

Nevertheless, Dr Pauly, being an old hand at listening to fisheries negotiations, recognised the ploy for what it was and detained the guilty,..... urn,..... *accused*, until the brave boys in blue (AKA the RCMP, AKA would you like some pepper spray on that statement, sir??).

Oohs and ahhs were attendant upon this heroic act, although Dr Pauly, in his characteristic modesty, refused to discuss the incident unless pressed a bit (a very little bit). The adventure was relived later in the day with the traditional Friday libations and everyone felt a little bit safer (a very little bit).

We therefore issue a warning to all those who would seek to get ill-gotten gains from the good residents of the Fisheries Centre. Beware foul dogs. There's a new Sheriff in town and he can be biting sarcasm when called into action. Daniel, we salute you, you kicked butt.

(David Preikshot is a Masters student working with Daniel Pauly)

Third Larkin Lecture: March 4, 1998, UBC

At 5:30 pm on Thursday, March 4, 1999, the Third Larkin Lecture will be given by Dr Kevern Cochrane. The topic will be "Reconciling sustainability, economic efficiency and equity in fisheries: the one that got away?" and the lecture will be held at the University of British Columbia Fisheries Centre in the Woodward Instructional Resource Centre lecture hall 2. There will be an open forum with Dr Cochrane in the Ralf Yorke Room at the Fisheries Centre at 11:30 am on Friday, March 5.

Dr Cochrane has been working with the Fishery Resources Division of the UN Food and Agriculture Organisation since October 1995. In this position he is responsible for providing technical support to FAO fishery-related activities in the Caribbean area and the south east Atlantic. He is also involved in FAO activities to implement the Code of Conduct for Responsible Fisheries, a task which has included the production of technical guidelines for fisheries management in accordance with the Code of Conduct. The combined experiences at FAO and the SFRI have resulted in a particular interest in the improvement of fisheries management in order to be able to optimise consistently the potential benefits from fisheries in a sustainable manner, particularly within developing countries.

Dr Cochrane is also a member of the Fisheries Centre's International Advisory Council.

ABOUT THE LARKIN LECTURE

Colleagues, family and friends established the Larkin Lecture Fund to honour Dr Peter Larkin when he retired from the University of British Columbia, Vancouver, Canada, and later, when he passed away in 1996. The Lecture is held approximately biennially at the Fisheries Centre, UBC, and the manuscript is submitted for publication in *Reviews in Fish Biology and Fisheries*, subject to the normal refereeing process.

For More Information - call Gunna at (604) 822-0618, j-ax (604) 822-8934, or email her at events@fisheries.com. Details on this and all the Larkin Lecture can be found on our website, www.fisheries.com.

FIS HBYTES is now available on the web in .pdf format on the Fisheries Centre's website! Visit www.fisheries.com and follow the links. A link is also available to download the free Adobe Acrobat Reader software needed to read .pdf files.

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

(Continued on page 7 · Alaska Adventures)

The ICAMS Initiative – Development of an Integrated Coastal Analysis & Monitoring System

By Vardis Tsontos and Dale A. Kiefer

The dynamic nature of coastal environments and the range and complexity of bio-physical processes and human interactions that occur there pose significant challenges to the management of these ecosystems. Earth observation (EO) sensors potentially facilitate operational monitoring of coastal areas and the human activity that is increasingly shaping them by providing quantitative spatio-temporal series on key water quality parameters and information on coastal area usage. Yet despite the utility of EO data and the proliferation of both missions and available imagery, its promise as a tool for monitoring and management of coastal environments has yet to be realised, rendering it the domain of expert users in research establishments. Reasons for this include poor targeting of users of water quality information, poor access to data, insufficient integration with other data types, and costly, complex and hardware intensive environments for data visualisation and analysis. Recently, however, an initiative bridging the gap between the potential user community and the means of delivering coastal water quality and usage information has begun.

ICAMS is a two-year EU-funded collaborative project between FAO's Sustainable Development of Natural Resources group (SDRN), the EU Joint Research Centre (JRC, Italy), Earth Observation Science (EOS, UK), the National Centre for Marine Research (NCRM, Greece), and the Irish Marine Data Centre (ISMARE, Ireland). The objective of ICAMS is to develop, demonstrate and evaluate an operational system to monitor temperature, sediment, and chlorophyll concentration from multiple EO data sources and coincident standard surface measurements. Resulting validated outputs on water quality will be used in comparison with maps of resource distribution and data on human exploitation within the same waters. Such a comparison provides a decision aid for those end-users managing the often conflicting demands of human activities that impact coastal ecosystems. ICAMS develops the technical protocols required for the routine generation of such high level, integrated or "value-added" output products and provides software tools for the further exploration and analysis of coupled data sets. To be of relevance for operational coastal management, ICAMS has adopted a practical user/application-driven approach. Much emphasis has thus been placed on identifying potential user groups and involving them in decisions about system functionality and the form of required data product outputs. End-to-end operational viability of the ICAMS approach is demonstrated by pilot applications at

three European sites that address a range of coastal management issues: monitoring eutrophication in the Po Estuary (Adriatic), a study of fisheries oceanography in the Gulf of Strimonikos (N.Aegean), and risk assessment of red tide events in Bantry Bay (Ireland).

Although ICAMS is very much practically orientated, the need to address constraints that have hindered EO application for coastal monitoring has necessitated several technical innovations. These include: 1) Component integration for routine and intelligent data selection, ingestion and management from multiple sources. 2) Specification and development of inexpensive, practical buoy systems providing near real-time surface measurements. 3) Refinement of EO bio-optical algorithms for estimating water quality parameters for the more difficult case of coastal (Case II) waters, and ensuring that these make use of available high frequency *in situ* data inputs for local optimisation and calibration. 4) Development of *EASy*: a powerful data merging/ analysis software environment capable of handling multivariate data of differing time and space scales that has full GIS functionality, the 4-dimensional data representation capabilities required for oceanographic applications, dynamic data visualisation functionality, advanced statistical analysis tools, and spatially explicit process modelling capabilities.

The components of the ICAMS system and flow of information within it are illustrated in the figure on page 7. EO data from a range of sensors (SeaWifs, AVH RR, SAR), providing complementary information on bio-optical, thermal, and surface roughness properties of coastal waters, are obtained frequently for all test sites and transmitted to JRC for processing. *In situ* measurements at each site (eg. temperature, salinity, O₂, dissolved organic and Chlorophyll a concentrations, current fields) are continuously made by surface buoys and transmitted near-real time to EOS for calibration and then disseminated to partners. JRC uses this information to validate its imagery products, the fully corrected EO data being sent out to EOS for distribution, while all sites archive the independent time series of water quality data from buoys within *EASy*. Site project databases are further enhanced locally by importation of available supporting datasets. Coupling and analysis of multivariate data within *EASy* gives rise to the routine integrated water quality and resource assessment products that are then made available to end user groups for usage in their applications.

Development and integration of ICAMS system

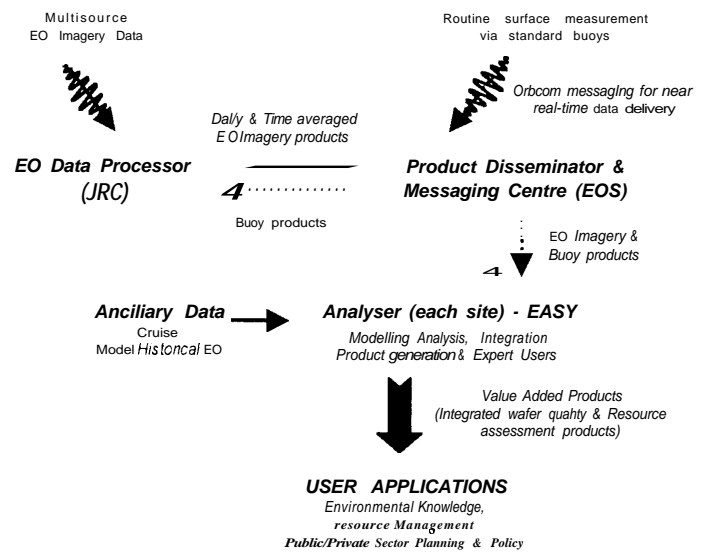
(Continued on page 7 - ICAMS)

(Continued from page 6 · ICAMS)

components is due to be completed early in 1999. This will ensure a full year's worth of testing and implementation under the pilot application work. But efforts are also underway to extend ICAMS to Egypt and Yemen to address Nile Delta and Red Sea coastal management problems. Such work may ultimately serve as a model for information system implementation in developing world contexts, where the need for operational coastal management is often great but for which the information infrastructure and knowledge-base are frequently lacking.

(Vardis Tsontos is a Postdoctoral Fellow at the University of Southern California and currently based at the UN Food and Agriculture Organisation. He can be reached at SDRN, FAO, Via della Terme di Caracalla, 0100 Rome, Italy, or email vardis.tsontos@fao.org. Dale Kiefer is a professor at the University of Southern California, and may be contacted at Department of Biological Science, University of Southern California University Park, Los Angeles, California 90089-0371, USA, or email kiefer@rcf.usc.edu)

ICAMS: System Component & Information Flow



(Continued from page 5 · Alaska Adventures)

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.

News and Notes

Conference Calls

Pacific Fisheries Technologists Annual Meeting – to be held February 7-10, 1999, in Parksville, BC. Topics include seafood quality and safety, aquaculture, stock management, marine toxins, regulatory issues, and government roles. Paper proposals are due by December 15, 1998, to Tim Durance, Food Science, Faculty of Agricultural Sciences, University of British Columbia, phone (604) 822-4425, fax (604) 822-3959, or **email** durance@unixg.ubc.ca. For registration information, contact Devon Knight, phone (604) 983-3173, fax (604) 983-3 183, or **email** dke@istar.ca.

Reminder for the **19th Northeast Pacific Pink and Chum Salmon Workshop**, to be held in Juneau Alaska March 3-5 1999. For more information, contact one of the workshop co-chairs at the Auke Bay Laboratory in Juneau, Alaska, USA: Sharon Hawkins (907)789-608 1, Christine Kondzela (907)789-6084, Charles Guthrie III (907)789-6093, or Richard Wilmot (907)789-6079.

Evaluating the Benefits of Recreational Fishing – to be held June 1-4, 1999, organised by the Fisheries Centre and to be held at the University of British Columbia Conference Centre. Featured speakers are Oysten Aas (Eastern Norway Research Institute), Ian Cowx (Humberside Institute, University of Hull), Robert Ditton (Texas A&M University); Robert Kearney (University of Canberra) and Carl Walters (University of British Columbia Fisheries Centre). Topics will include ecological benefits, sociological benefits, and legal and policy aspects. Abstracts are due by December 7, 1998 (note extended deadline), and are limited to 300 words. **Email** abstracts to events@fisheries.com. For more information, contact Gunna Weingartner, Events Officer, UBC Fisheries Centre, 2204 Main Mall, Vancouver, BC, V6T 124, or **email** her at the above address.

Fourth International Symposium on Flatfish Ecology – to be held October 18-23, 1999 in Atlantic Beach, North Carolina, USA. The symposium will involve a critical evaluation of the extent and reliability of our knowledge of **flatfish** biology. The objective is to develop a framework in which we can apply that knowledge to understanding the factors regulating recruitment variability, the implications for future fluctuations in population abundance, and how the information can be used to develop sustainable management perspectives. Such knowledge could form the basis for advice to managers and legislators on the impacts of climatic and anthropogenic factors on **flatfish** populations. Topics will include hydrodynamics, trophodynamics, habitat quality, evolutionary biology and **systematics** and recruitment and management perspectives. Registration will be limited to about 175 participants. For more information, contact Susan Marchalk, **Flatfish** Symposium, North Carolina State University Zoology Department, Box 76 17, Raleigh, NC 27695-76 17, USA, phone (919) 515-2741, fax (919) 515-527, **email** flatfish@ncsu.edu.

17th Lowell Wakefield Symposium: Spatial Processes and Management of Fish Populations – to be held October 27-30, 1999, in Anchorage, Alaska, USA. Topics will include the use of marine reserves to achieve fishery management objectives; variations in key population parameters within the geographic range of a stock; spatial management to protect **bycatch** species or to protect critical habitats; spatial management of sessile organisms particularly vulnerable to overfishing. Abstracts are due on February 15, 1999, and should be sent as part of an **email** message to FNBRB@uaf.edu. If **email** is not available, and for more information, contact Brenda Baxter, Coordinator, Alaska Sea Grant College Program, University of Alaska Fairbanks, PO Box 755040, Fairbanks, Alaska, USA, 99775-5040, phone (907) 474-6701, fax (907) 474-6285. More information can be found at www.uaf.edu/seagrant/Conferences/symposia.html. (See page 5 of this issue for an article on the 16th Symposium, and *FishBytes* 3(5) for a report on the 15th Symposium.)

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 124, 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 details on Fisheries Centre projects, publications, faculty and students, as well as information on upcoming Fisheries Centre events.

