

ISSUE 5: Progress from July to September, 2007

## World biodiversity site at Huntsman

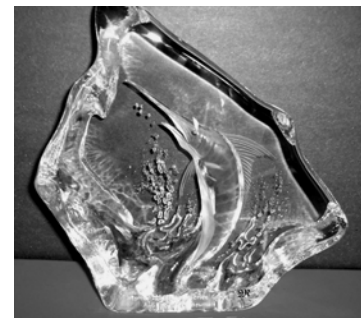
STARTED IN 2002, NaGISA is a world-wide, long-term collaborative effort to inventory and monitor coastal biodiversity. The project name is an acronym for Natural Geography In Shore Areas but comes from the Japanese word *nagisa*, referring to the narrow coastal zone where land meets the sea.

NaGISA is a program of the *Census of Marine Life* and aims to explain the diversity, distribution and abundance of marine life in the world's oceans, with efforts on the coastal zones. The goal is to discover, describe and record the changes in biodiversity within near-shore regions of the world over space and time.

The Huntsman joined NaGISA with the opening of an Atlantic Ocean regional office in January 2007, led by senior scientist and Associate Director Gerhard Pohle, and Curator of Fishes and Collection Manager, Lou van Guelpen.

[See page 3: World biodiversity site, NaGISA](#)

## Aquarium Raffle Winner!



CONGRATULATIONS TO CHRIS BURLEY of St. Andrews, winner of this season's aquarium raffle. This year's prize was a beautiful lead crystal sculpture depicting a marlin designed by Mats Jonasson. This year's raffle helped raise funds to maintain the Huntsman aquarium. Education and Aquarium staff are already planning for next year. Thank you to all who purchased raffle tickets this year and good luck next year.



## McGill students learn from younger kids

Over the years the Huntsman's Dr. Fred Whoriskey has changed how McGill University (Macdonald campus) students are tested on what they've learned during their stay. Instead of an in-class exam, university students are graded on ten-minute talks delivered to groups of elementary school students. In total 100 students from Vincent Massey Elementary School participated. It was an excellent way for the McGill crew to hone their teaching skills and learn from the kids. For the elementary students, the day was filled with the excitement of discovering a previously unimagined undersea world. This highly successful field program held in September is now in its tenth year.

## Cod Genome project hitting its marks

THE COD GENOMICS PROJECT (CGP) is meeting planned targets at the Huntsman.

The final reduction in numbers and PIT tagging was completed on Year Class 2 (YC2) 'Group 1' families, and these will be shipped out at the end of October. As was the case last year, two groups of 'Group 1' cod were tagged. One of these will be shipped to a New Brunswick sea cage site and the other will go to a land-based nursery facility to allow a good comparison of different rearing strategies.

There was an unfortunate loss of the YC2 'Group 2' and adjustments have been made for this. As in the year before, the

CGP produced a significant number of cod juveniles that were transferred to CGP industrial partners. YC2 juvenile cod have also been provided to a number of collaborators for research, primarily for vaccine development and assessing disease resistance. These initiatives help improve the economics of commercial cod aquaculture.

The construction of the Huntsman Marine Hatchery is nearing completion. It is expected that the rearing systems will be operational during the third week of November. This will allow technical staff to get things up and running and have live

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Last Quarter in Brief...

**Birding Update at the Huntsman**

THE HUNTSMAN IS STRATEGICALLY located on the fall passerine migration route along the coast. The St. Andrews Bird Banding Station (StABBS) at the Huntsman is entering its sixth season monitoring migration.

Daily monitoring using mist nets and field observations began in late August and will continue until mid October.

The clear skies and calm winds of September provided ideal netting conditions, but activity was relatively quiet. Catches and sightings were below average. The weather changed in October with light northwest winds, which moved large flocks of sparrows, juncos and goldfinches into the nets, and catches increased significantly.

The Station is also collecting tail feathers for Bird Studies Canada to help define "catchment areas". Delineating catchment areas of migrants will allow researchers to determine origins of migrants passing through any given station, as well as examine how the timing of movement of individuals from different origins may differ.

Researchers will also be able to determine to what extent the trend estimates from individual stations can justifiably be pooled. This increases the power and usefulness of migration counts for use in conservation applications.

Daily coverage has been achieved with the help of volunteer assistants supported by a grant from the New Brunswick Wildlife Trust Fund.

Data from the project is contributing to the Canadian Migration Monitoring Network, and StABBS is the only New Brunswick contributor.

**Ongoing Research at the ARC**

THE HUNTSMAN'S Atlantic Reference Centre (ARC) is currently working on a tidal power feasibility study for the New Brunswick Department of Energy.

Other projects include:

- Processing of Mill Cove plankton samples for fish eggs and larva
- Identification of swordfish stomach contents to determine feeding habits.
- Using deep-sea research surveys to determine fish community structure.
- Documenting the seasonal population structure of soft-shell clam in the vicinity of Lepreau, NB.

See page 4 for a complete list of projects

**Taking a SWOT at new species development**

THE AQUACULTURE MANAGEMENT Directorate (AMD) of the Department of Fisheries and Oceans commissioned a review of evaluation tools to help determine new species for Canada's aquaculture sector.

Daniel Stechey, President of *Canadian Aquaculture Systems Inc.*, presented the review

results at the recent Aquaculture Association of Canada meeting in September. He recommends a custom SWOT-based technique.

Why SWOT? It is a robust strategic tool that reflects on a broad range of considerations. It can also reveal what is known and enables the development of a structured response to resolve underlying critical issues.

SWOT Phases I and II narrow the list of candidate species by reviewing the Product, Competition, Morphology, Physiology, Behaviour, Geography and Fisheries & Environment Policies. Phase III works on testing and validation (a pilot project), while Phase IV completes verification and tech transfer.

At the end of each Phase, the model calls for a review and a decision on whether to proceed or terminate the investigation.

Canada is currently working developing 24 new species, including cod, halibut, haddock, Arctic char and sturgeon in New Brunswick. The next step for this project, will be to test drive the SWOT model by conducting a comparative evaluation of the 24 target species.

Species	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
<b>Marine Finfish (8)</b>											
Cod							x	x	x		3
Grouper		x									1
Haddock							x	x			2
Halibut							x	x	x		3
Rockfish		x									1
Sablefish		x									1
Striped Bass								x			1
Wolf Eel		x									1
<b>Freshwater Finfish (8)</b>											
Arctic Charr							x	x			2
Baramundi			x								1
Burbot		x									1
Grass Carp			x								1
Perch					x	x	x				3
Sturgeon		x						x			2
Tilapia		x									1
Walleye					x	x					2
<b>Marine Shellfish (5)</b>											
Abalone		x						x			2
Geoduck		x									1
Scallops		x									1
Sea Urchin		x									1
Surf Clam						x					1
<b>Freshwater Shellfish (2)</b>											
Marron / Yabby							x				1
Prawns		x									1
<b>Others (1)</b>											
Leeches					x						1
<b>Total</b>	<b>11</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>5</b>	<b>6</b>	<b>0</b>	<b>2</b>	<b>24</b>

The Huntsman's Bill Robertson is one of the three consultants on Stechey's team

**Cod genome project hits from page 1**

feed in production in time for YC3 spawning beginning in the New Year.

The YC0 fish have been assessed at the sea cage site during September. A selection of these fish will be brought back to the Huntsman for use in the CGP Breeding Program. A group of wild cod was also obtained to improve the genetic base.

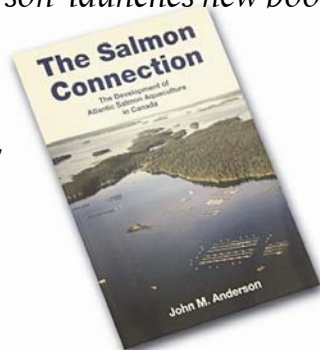
Overall, heritability for growth is very

high. This indicates that the elite and developed broodstock are expected to make significant performance gains. The Cod Genome Project results will make a significant contribution to commercial cod aquaculture.

The team is gearing up for late fall. Once the selected broodstock presently at the cage site and YC0 sampling is complete, YC1 groups will be assessed.

**Huntsman founder Dr. John Anderson launches new book**

If you've ever wondered how the worldwide aquaculture industry got started, and Canada's role, look no further than Dr. John Anderson's new book, "The Salmon Connection." As the back cover says, Dr. Anderson has spent his scientific career working with Atlantic salmon. What it doesn't say is how well the story is told from his perspective. To order your copy today... e-mail: gmp@eastlink.ca



## World biodiversity site: NaGISA here at the Huntsman

...from page 1

The NaGISA Atlantic Ocean office at the Huntsman is one of a few regional centres covering the globe, partitioned into eight sectors of coastal zones that are subdivided into boxes of 20° longitude and latitude. The international headquarters are at the University of Kyoto in Japan, while regional centers exist in Fairbanks USA, Pisa Italy, Caracas Venezuela, Mombasa Kenya, and now in St. Andrews, Canada!

NaGISA has taken an ambassadorial role linking *Census of Marine Life* goals and local interests, encouraging international cooperation and



increasing coastal monitoring and research. Inventorying and monitoring biodiversity are crucial for identifying and clarifying activities that impact ecosystems. NaGISA will provide baseline data for long-term monitoring, and information needed to answer questions concerning changes in biodiversity with latitude and longitude. NaGISA plans to complete a qualitative survey of the world's ocean shores.

While initiated in the Pacific, NaGISA has spread globally over the last 5 years, with 128 sites among 51 countries in 2006. By 2010 it is anticipated that there will be 350 sites in 70 countries.

The strategy is based on the implementation of a simple sampling protocol that can be adopted by many researchers and countries.

The goal is a series of standard transects from the high inter-tidal zone to a depth of 20m covering the world, which can be repeated over a 50-year or more time frame. The two target habitats are rocky bottom algal and soft bottom sea-grass. Data collected through NaGISA will be incorporated in the Census Ocean Biogeographic Information System (OBIS).

NaGISA activities compliment another important biodiversity-related local initiative, the Biodiversity Discovery Corridor. The Corridor is a swath of ocean extending out to the deep sea, with the coastal waters of northern Maine and the Quoddy region at its origin. NaGISA work within those coastal waters will fulfill the near-shore component of the Discovery Corridor initiative – a win-win situation.

The great strength of NaGISA is the meeting of *Census of Marine Life* goals of global biodiversity coverage by locally vested interests around the world, while creating a standardized data matrix suitable for testing a wide range of ecological theories and solving practical problems. No other program has ever dealt with biodiversity information with such fine resolution at such a wide scale. Because of the large international and geographic scope of the program, NaGISA relies on regional offices to coordinate and implement activities.



The Atlantic Ocean office has formed cross-border partnerships with many individuals and

organizations.

While initial activities centred on establishing partnerships and funding, Pohle and Van Guelpen have spent much of the spring and summer of 2007 preparing for field and labora-



tory activities. This included participation in site selection within the Bay of Fundy and an on-the-job training workshop, led by Dr. Robin Rigby, from Japan. The field work was a success, with samples having been obtained from all inter- and sub-tidal stations. Processing of seaweeds has been completed, with benthic and planktonic fauna presently being analyzed in the laboratory.

Efforts are now underway to extend this work to other areas and involve other groups. As the jurisdiction of the NaGISA Atlantic Ocean office extends much beyond the local area to waters as far as off western Africa, partners are now being sought in that part of the world to start work there in 2008.

Overall, with less than a year in existence, the Atlantic Ocean office has certainly had a successful start in contributing to the global NaGISA initiative, with the Huntsman involved as a key player.

Photos courtesy ARC, September, 07

Top left: the NaGISA science team at the Huntsman's ARC facility; middle: on site collecting samples; right: unloading the Huntsman's service boat on shore

InDepth is published quarterly by the Huntsman Marine Science Centre.

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## The research continuum at the Huntsman

### Atlantic Reference Centre (ARC) Research Activities:

#### New Research Activities

- Ichthyoplankton of Mill Cove, Maine**  
Researchers: Lou Van Guelpen, Mary Greenlaw, Karen Ross
- Identification of swordfish stomach contents**  
Researchers: John Neilson and Sean Smith (SABS/DFO), Lou Van Guelpen
- Community structure of deep-sea bottom fishes in waters off Nova Scotia**  
Researchers: Ralph Halliday (BIO/DFO), Daphne Themelis (Mount Saint Vincent University), Lou Van Guelpen
- Assessment of planktonic and juvenile benthic stages of the soft-shell clam *Mya arenaria* in the vicinity of Lepreau, N.B.**  
Researchers: Jason Keys (ECW), Gerhard Pohle, Mary Greenlaw, Karen Ross

#### Ongoing Research Activities

- Ocean Energy project**  
Researchers: Bill Robertson, Dr. Gerhard Pohle, Lou Van Guelpen, Suzanne Taylor, Gerald McEachern Literature review and on site ROV development.
- Gulf of Maine coastal ichthyoplankton**  
Researchers: Lou Van Guelpen, Mary Greenlaw. Processing coastal Maine plankton samples
- Compilation of biodiversity research in Discovery Corridor waters**  
Researchers: Lou Van Guelpen, Erin Herder; Bob Branton (BIO/DFO). Website development in progress
- Arctic zooplankton taxonomy** (for Woods Hole Oceanographic Institute)  
Researchers: WHOI: Dr. Karin Ashjian, Nancy Copley; ARC: Dr. Gerhard Pohle, Mary Greenlaw, and Karen Ross. Completed in August.
- Newfoundland zooplankton taxonomy** (for Department of Fisheries and Oceans (DFO) Newfoundland. Researchers: DFO: Dr. Pierre Pepin; ARC: Dr. Gerhard Pohle, Mary Greenlaw and Karen Ross. Sample processing ongoing.
- Ecology of passive pockmarks in Passamaquoddy Bay**  
Researchers: Dr. Gerhard Pohle, and Dr. David Wildish (ARC Research Associate)
- NaGISA**  
Researchers: ARC: Dr. G. Pohle and Lou Van Guelpen. See article (pg 3)
- Marine Species registers for the western North Atlantic as a standard for DFO datasets, and for DFO Maritimes research surveys**  
Researchers: Lou Van Guelpen, Dr. Gerhard Pohle, Dr. Edward Vanden Berghe (Flanders Marine Institute), Bob Branton (DFO) and Mary Kennedy (DFO)
- DNA barcoding of Canadian Atlantic fishes**  
Researchers: Lou Van Guelpen, Sara Kohler, Suzanne Taylor, Dr. Stephen Clifford (Dalhousie U.), Dr. Paul Bentzen (Dalhousie U.) and Dr. Ellen Kenchington (DFO). A summer student was hired to assist in the project, and other summer students participated as needed.
- Biodiversity informatics: metadata** (Gulf of Maine Ocean Data Partnership)  
Researchers: Bob Branton (DFO) and Lou Van Guelpen
- Benthic invertebrates found in muddy bottoms of the deep waters of Jordan Basin**  
Researchers: Ashley Holmes, Dr. Gerhard Pohle and Mary Greenlaw

### Christofor Research Lab (CRL) Research Activities

#### New Research Activities

- Phenotypic variation in *Littorina obtusata* as a result of environmental variables.**  
Researchers: Dr. Remy Rochette, Jennifer Cuillerier, Monica Shaver and Mark Wilcox (UNBSJ).
- Development of prophylactic measures to minimise the effect of potential pathogens of aquacultured cod. (NBIF Grant).**  
Researchers: Dr M.D.B.Burt (UNBF), Dr J.W.Smith (UNBF & WLU), Dr D.K.Cone (SMU), A.Frenette (UNBF)
- Ontogeny of larval *Bothriocephalus scorpii* in calanoid copepods (NSERC Discovery Grant).**  
Researchers: Dr M.D.B.Burt and G.D.Brodersen (UNBF)
- Determination of cestode biomass in *Hemiripterus americanus* in relation to size of fish (NSERC Discovery Grant).**  
Dr M.D.B.Burt (UNBF)
- Host specificity of parasites in 2 sympatric perciform fishes (White perch, *Morone americana* and Yellow perch *Perca flavescens*) (NSERC Discovery Grant).**  
Researchers: Dr M.D.B.Burt and G.K.Cox (UNBF)

#### Ongoing Research Activities

- Diseases of wild and captive gadoids (NSERC CRD Grant)**  
Researchers: Dr. MDB Burt (UNBF), Dr. J.W. Smith (UNBF and Wilfrid Laurier University), Dr. D.K. Cone (SMU), H. Randhawa, G. MacLean, A. Frenette and G.D. Brodersen.
- Parasites of sympatric species of *Fundulus*: *F. heteroclitus* & *F. diaphanous* (NSERC Discovery Grant)**  
Researchers: Dr. MDB Burt (UNBF), G. MacLean and G.Cox (UNBF).

### International Aquatic Innovation Centre (IAIC) Research Activities

- Atlantic Cod Genomics and Broodstock Development project: NB Program.**  
Researchers: Dr. Jane Symonds, Dr. Seumas Walker, Dr. Amber Garber, Dr. Ed Trippel (SABS), Dr. Andy Robinson (University of Guelph), Frank Powell (Cooke Aquaculture Inc), George Nardi (GreatBay Aquaculture), Keith Were (Genome Atlantic)

#### Ongoing Research Activities

- Atlantic Salmon Feed Trials**  
Researcher: Keng Pee Ang, Ph.D. (Northeast Nutrition Inc.)

### Ongoing Education Research Activities

- Passerine Migrations Monitoring**  
Researcher: Tracey Dean
- CRYSTAL Project**  
Researcher: Peter Morrison (in association with UNB)
- Huntsman Oceansciences Education Project**  
Researchers: Tracey Dean and Peter Morrison  
The Education Project has finally taken shape as the first high school groups meeting the criteria of the study were surveyed this spring. Two surveys have been completed by each school: a preliminary survey meant to capture baseline data before they arrive on campus, and a second survey meant to capture any changes in their attitudes and interests towards science or with regard to post secondary institutions after completion of the field course at the Huntsman. We have completed our first year of data collection as the last high school group of the season departed two weeks ago. The challenge of analyzing the data now begins.



Research starts early: kids discover a "hands-on" approach to learning about sea creatures at the touchpool in the Huntsman Aquarium/Sealab this summer.