

# INTERNATIONAL INVASIVE SPECIES WORKSHOP SUMMARY REPORT

AANS SCOTIAN PRIDE CONFERENCE  
27 & 28 JANUARY 2006, HALIFAX, NOVA SCOTIA



**Clean Mussel Lines**  
Photo Courtesy PQ Gov't



**Fouled Mussel Lines**  
Photo courtesy of André Mallet

**Prepared For:** Fisheries & Oceans Canada  
Aquaculture & Environmental Science Branch  
Moncton, New Brunswick

**Prepared By:** Rogers Consulting Inc  
Halifax, NS.



**January 2006**

## **INTRODUCTION**

Rogers Consulting Inc was retained to moderate the “*International Invasive Species Workshop*” at the annual AANS Scotian Pride Conference held 27 & 28 January 2006 in Halifax, Nova Scotia.

The author has attempted to capture the main points and this brief report is a summary of the highlights from the talks. In addition to this summary document, the presentations of all speakers are attached in their original PowerPoint Format. As well, the full ‘Agenda’ of the workshop is at the back of this document.

## **WORKSHOP SUMMARY**

### **GENERAL COMMENTS**

The focus for the future must be on **Biosecurity & Management**. Stopping invasive species may not be realistic or possible. Identifying invaders is tough as there are few studies available to document what is already here.

- Why worry? Because the impacts include the following areas :
  - Ecosystem Impacts
  - Human Health Impacts
  - Economic Impacts
  
- Potential Vectors & Victims include:
  - Major Vector - Marine vessel ballast water and hull fouling.
  - Aquaculture industry.
  - Traditional seafood industry.
    - i. Fishing Vessels & Gear both inshore and offshore.
    - ii. Commercial Fisheries.
    - iii. Processing Plant effluent.
  - Recreational boaters & tourism.
  - Small commercial nearshore vessels.
  - Large foreign going vessels - ballast control.
  
- Characteristics of invading tunicates:
  - Rapid growth.
  - Wide environmental tolerance.

- Fast reproducers.

## **INVASIVE SPECIES UPDATE FOR ATLANTIC CANADA**

- 130+ Species in Atlantic Canada currently.
- Large increase in the last ten years including the green crab and four tunicates, including the club tunicate.
- All maritime ecosystems are permanently changed.
- Humans must adapt.
  
- **Nova Scotia:**
  - *Ciona intestinalis* infestation started in 1997.
  - Spreading has been patchy.
  - Annual survey monitoring growers.
  - Highest levels in the south shore area.
  - Development of management options ongoing.
  
- **New Brunswick:**
  - No tunicates observed yet on eastern shore of the province.
  - Control: Coordinated effort between NBDAFA, DFO Moncton and St. Andrews Bio Station.
  - Focusing on:
    - i. Education & public awareness.
    - ii. Monitoring processing plants for product coming from outside the region.
    - iii. Rapid response plan to minimize impacts.
    - iv. Set up monitoring sites around the province.
  
- **Newfoundland & Labrador:**
  - No major invasions observed yet.
  - Disinfection protocols for seed and product movement.
  - Over 20 sampling areas set up around the province.
  - DFO ballast water initiative.
  - Developing contingency plans.
  
- **Prince Edward Island:**
  - 80 % of Canadian mussel production. Important economic crop supporting 3000 jobs.
  - 4 tunicates since 1997- Club tunicate, violet tunicate, golden star tunicate, the vase tunicate.

- Green crab – arrived in 1997 - appears to be spreading from east to west by larval production and fragmentation.
- Introduction unknown but pleasure boats and commercial boats suspected.
- Significant labour costs for handling and harvesting.
- Control: trying different techniques – certain crabs, vinegar (difficult to work with), New Zealand technology.
- IMPACTS:
  - i. Cancelled seed orders.
  - ii. Increased cost of labour & treatment.
- Eradication not likely an option.

## **INVASIVE SPECIES COMMENTS - INTERNATIONAL PERSPECTIVE**

### **■ New Zealand**

- 65,000+ tonnes of mussel produced in New Zealand.
- Problem since 1999 – 2000. Six known fouling species
- Control:
  - i. Industry code of practice.
    - 1. Develop by industry.
    - 2. Control movement of seed, product.
- Monitoring Management:
  - i. Control movements of seed and product.
  - ii. Control human vectors - movement.
  - iii. Study passive vectors – currents.
  - iv. Other vectors: recreational vessels, small fishing vessels, slow moving vessels (barges), intakes of larger vessels for ballast control.
  - v. Focus on prevention rather than cure.
  - vi. Industry & government must be active together.
- Mitigation Management – 4 Options:
  - i. Mechanical means
  - ii. Chemical means
  - iii. Biological means
  - iv. Avoidance

### **■ Tunicates in the North Atlantic**

- Rapid Assessment Survey varied locations since 2000  
MA/RI, 2003 MA/NY, 2004 Eastport, ME.

- Findings:
  - i. 34 introduced species.
  - ii. 35 cryptogenic species.
  - iii. 350 native species.
- Monitoring
  - i. Rapid assessment surveys.
  - ii. Fouling plates
  - iii. Port surveys
  - iv. Observant citizens & students.
- Actions:
  - i. Aquatic invasive species management plans.
  - ii. Ballast water initiative.
  - iii. Region wide outreach & education thru Sea Grant.
  - iv. [www.massbay.mit.edu](http://www.massbay.mit.edu)
  - v. [www.northeastans.org](http://www.northeastans.org)
  - vi. Google NEANS
  - vii. Prevention is the priority – there are numerous vectors.
  - viii. Research the life history.
  - ix. Are there any commercial uses for the invaders. Food (Korea).

## **TECHNOLOGY COMMENTS**

- **The closed loop Ballast Water Treatment process:**
  - Applicable for retrofit and new ship installation
  - Functional in a large variety of water qualities
  - Addresses a broad spectrum of invasive organisms (pathogens and non-pathogens)
- **New Zealand Tunicate Treatment technology:**
  - Designed to eliminate the tunicate *Ciona intestinalis* from mussels grown in continuous sleeving.
  - Make mechanical modifications to improve operational efficiency.
  - Identify operational settings to maximize the impact on various sizes and densities of tunicates.

- Compare effectiveness of treatment at various times of the year.
- **Airborne Digital Camera Systems:**
  - Mapping Marine Invasive Species in France.
  - Mapping Marine Invasive Species in Canada.
  - Mapping underwater vegetation in the USA.
  - Mapping Coral Reefs around the world.
  - Mapping benthic vegetation.
  - Producing detailed coastal zone habitat maps.

## **MANAGEMENT COMMENTS**

- **Aquatic Invasive Species Task Group:**
  - Created in 2002 by the CCFAM.
  - CCFAM Aquatic Invasive Species Task Group (AISTG) developing action plan for aquatic invasive species.
  - Priorities for further joint work
    - governance structure to implement *Canadian Action Plan*
    - early detection/rapid response program
    - development of biological/socio-economic risk assessment model
    - program to engage Canadians
    - AIS Action Program
    - legislative review (added in June 2005)
- **Canadian Aquatic Invasive Species Network:**
  - Partnership between universities, federal and provincial governments, shipping and aquaculture industries, & NGOs.
  - 3 theme areas:
    - i) Vectors & Pathways
    - ii) Factors Affecting Establishment Success of AIS
    - iii) Risk Assessment and Reduction
  - 3 regions (nodes) to be studied:
    - i) west coast Canada

- ii) Atlantic Canada (mainly Gulf of St. Lawrence)
- iii) Great Lakes - St. Lawrence River, inland lakes

▪ **Marine Biosecurity in New Zealand:**

- Biosecurity Act 1993
- Hazardous Substances and New Organisms Act 1996
- Operating Environment
  - Pre-border/pre-clearance (preventing entry)
  - Border (detect and intercept)
  - Post-border/Post-clearance (manage, control and eradicate)
- Eradication from NZ is not feasible
- Slowing of spread is most effective mitigation option
- Research and monitoring required to quantify the environmental and economic impacts, and to develop management tools for aquaculture
- Movements of vessels, marine equipment and aquaculture stocks present the primary means of further national spread.

# **International Invasive Species Workshop Agenda**

Lord Nelson Hotel & Suites, Halifax, Nova Scotia

January 27 & 28, 2006

Presented by:

Aquaculture Association of Nova Scotia & ACRDP

## **Invasive Species Workshop**

**Friday January 27 - Imperial Ballroom**

Chair of Afternoon Session: **Jason Mullen**, AANS

Moderator: **Brian Rogers**, Rogers Consulting

### **Overview of Invasive Species in Atlantic Canada and Internationally**

2:00 – 2:05 **Introduction to Workshop** – Jason Mullen, AANS

2:05 – 2:35 **"Who's Who" of invasive species in Atlantic Canada: Seventy-five and counting...** - Andrea Locke, DFO

2:35 – 3:20 **Presentations from Atlantic Canadian Provinces on Status of Invasive Species** – Neil MacNair - PEI, (TBA)- NF, Andrew Bagnall - NS, Marie- Joséé Mailet, Bruce Thorpe – NB

3:20 – 3:35 **Discussion with Group on Invasive Species in Atlantic Canada**

3:35 – 4:00 **Nutrition Break** – Regency Ballroom

4:00 – 4:30 **Invasive Tunicates in New Zealand and South Africa**  
Kevin Heasman, Cawthron Institute

4:30 – 5:00 **Impacts and Implications of Successful Invaders: Tunicates in the North Atlantic** – Judith Pederson, MITSG

## **Invasive Species Workshop Con't**

**Saturday, January 28 - Imperial Ballroom**

Chair: **Jason Mullen**, AANS & **Andrea Locke**, DFO

Moderator: **Brian Rogers**, Rogers Consulting

8:00 – 9:00 **Nutrition Break** – Regency Ballroom

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## **Invasive Species – Introductions and Transfers**

- 9:00 - 9:20 **"One if by land, two if by sea": A story of ballast water and other vectors** – Andrea Locke, Gulf Fisheries Center, DFO
- 9:20 - 9:35 **Introductions and Transfers** – Darrel Harris, DFO Chair Nova Scotia I&T Committee
- 9:35 – 9:50 **Ballast Water Treatment: The Closed-Loop Option**  
Paul Brodie, Balaena Dynamics Inc.
- 9:50 – 10:05 **Trials of the NZ Tunicate Mitigation Technology in Mahone Bay Nova Scotia** - Claire Carver, Mallet Research Services
- 10:05 –10:20 **Detecting and Mapping Benthic Vegetation using Airborne Sensors** - Herbert Ripley, President, Hyperspectral Data International

## **Invasive Species Research Initiatives**

- 10:20 – 10:55 **Tunicate mitigation and Monitoring Research in New Zealand**  
Kevin Heasman, Cawthron Institute
- 10:55 - 11:10 **Nutrition Break** – Regency Ballroom
- 11:10- 11:40 **The Invasive Colonial Tunicate *Didemnum* sp. in New England Coastal and Offshore Habitats** - Page Valentine, U.S. Geological Survey
- 11:40 – 12:00 **Research Initiatives in Prince Edward Island** – Neil MacNair, PEIDAF
- 12:00 -1:30 **Lunch** (On Your Own)
- 1:30 – 1:50 **On-going research on *Ciona intestinalis* in Nova Scotia, Dalhousie University - DFO-BIO and Industry** - Remi Daigle, Erka Smith, Stephanie Howes and Christophe Herbinger, Dalhousie University, Benedikte Vercaemer, DFO-BIO, Peter Darnell and Dale Cook

## **Management of Invasive Species**

- 1:50 – 2:20 **Advancing Toward a Canadian Strategy on Aquatic Invasive Species**  
Murray Hill, NSDAF, Director of Inland Fisheries
- 2:20 – 2:50 **Progress in Predicting Occurrence of invasive species: models and the Canadian Aquatic Invasive Species Network** – Hugh MacIsaac, DFO Chair of Invasive Species, University of Windsor

2:50 - 3:20 **Marine Biosecurity in New Zealand: a post border perspective, and an update on a recent tunicate incursion (*Styela clava*)** – Brendan Gould, Senior Advisor (Marine) - Surveillance and Incursion Response  
Biosecurity New Zealand

3:20 – 3:45 **Panel Discussion**

3:45 – 4:00 **Nutrition Break** – Regency Ballroom

4:00 – 4:30 **Research and Management Priorities** – **Brian Rogers**, Rogers Consulting

4:30 – 5:00 **Wrap Up** – Jason Mullen, AANS