Canadian Ballast Water Program on the Great Lakes

Enforceable Regulations based on International BW Convention, Binational Treaties and Binational Science

Great Lakes Panel

June 2009

Chris Wiley

Recommendations from the National Academy of Science Study

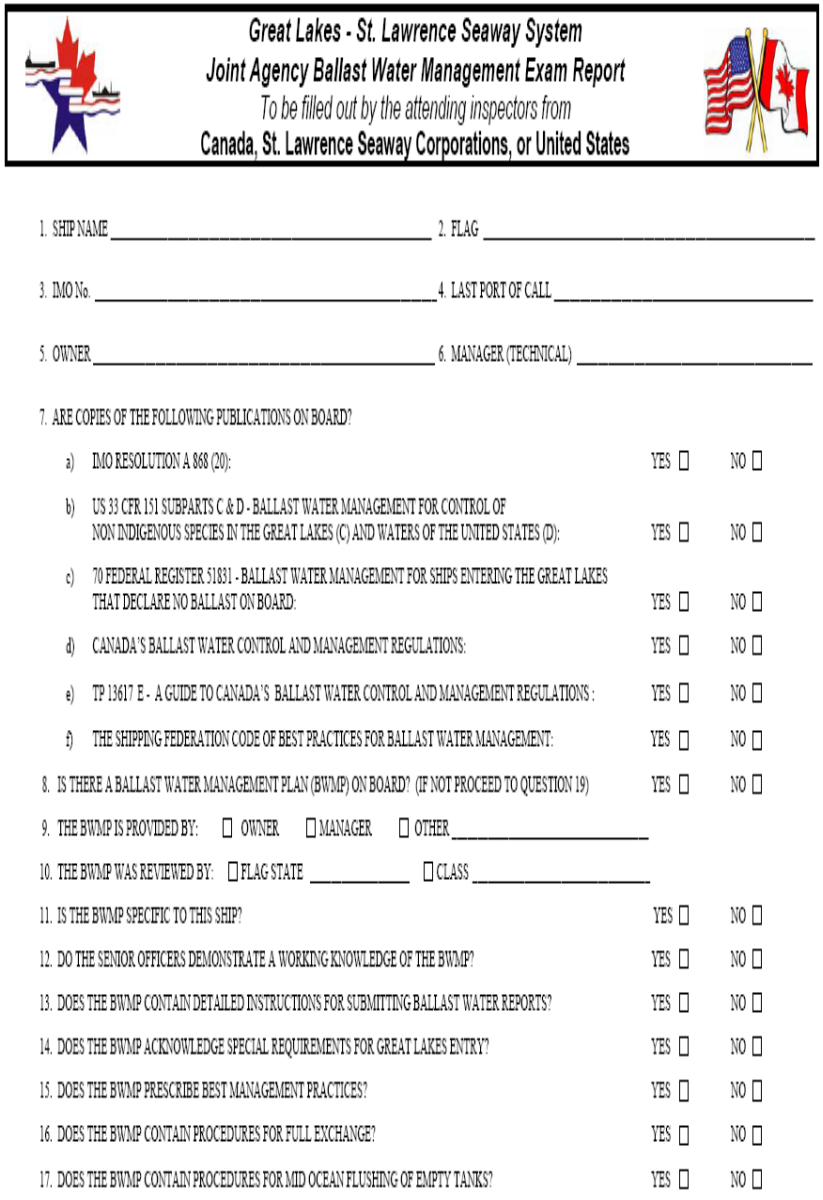
- Establish a uniform set of effective and enforceable standards for the Great Lakes basin – IMO standards;
- Conduct strict inspection and enforcement of standards;
- *Establish a surveillance program for early detection of ANS;*
- *Develop strategies for rapid response to control newly discovered ANS;*
- Continually evaluate, update and improve management programs over time.
- TC / DFO implementing – Compatible regulations required under the GLWQA Article VI (f), Annex 6

Science to Establish appropriateness of Treatment Standards for Great Lakes - IMO

- Mesocosm Studies in Hamilton Harbour with high risk zooplankton indicate IMO standards will decrease invasions to the Great Lakes (Bailey et al. 2009. CJFAS)

- Dye Studies to measure spatial transport of discharged taxa
  – in enclosed port: Goderich 2008
  – in open port: Sarnia 2009 in partnership with GLOS & CIASN

Strict Enforcement of Current Standards – Exchange / Flushing



Great Lakes - St. Lawrence Seaway System
Joint Agency Ballast Water Management Exam Report
To be filled out by the attending inspectors from
Canada, St. Lawrence Seaway Corporations, or United States

1. SHIP NAME _____ 2. FLAG _____

3. IMO No. _____ 4. LAST PORT OF CALL _____

5. OWNER _____ 6. MANAGER (TECHNICAL) _____

7. ARE COPIES OF THE FOLLOWING PUBLICATIONS ON BOARD?

a) IMO RESOLUTION A 868 (20): YES ☐ NO ☐

b) US 33 CFR 151 SUBPARTS C & D - BALLAST WATER MANAGEMENT FOR CONTROL OF NON INDIGENOUS SPECIES IN THE GREAT LAKES (C) AND WATERS OF THE UNITED STATES (D): YES ☐ NO ☐

c) 70 FEDERAL REGISTER 51831 - BALLAST WATER MANAGEMENT FOR SHIPS ENTERING THE GREAT LAKES THAT DECLARE NO BALLAST ON BOARD: YES ☐ NO ☐

d) CANADA'S BALLAST WATER CONTROL AND MANAGEMENT REGULATIONS: YES ☐ NO ☐

e) TP 13617 E - A GUIDE TO CANADA'S BALLAST WATER CONTROL AND MANAGEMENT REGULATIONS : YES ☐ NO ☐

f) THE SHIPPING FEDERATION CODE OF BEST PRACTICES FOR BALLAST WATER MANAGEMENT: YES ☐ NO ☐

8. IS THERE A BALLAST WATER MANAGEMENT PLAN (BWMP) ON BOARD? (IF NOT PROCEED TO QUESTION 19) YES ☐ NO ☐

9. THE BWMP IS PROVIDED BY: ☐ OWNER ☐ MANAGER ☐ OTHER _____

10. THE BWMP WAS REVIEWED BY: ☐ FLAG STATE _____ ☐ CLASS _____

11. IS THE BWMP SPECIFIC TO THIS SHIP? YES ☐ NO ☐

12. DO THE SENIOR OFFICERS DEMONSTRATE A WORKING KNOWLEDGE OF THE BWMP? YES ☐ NO ☐

13. DOES THE BWMP CONTAIN DETAILED INSTRUCTIONS FOR SUBMITTING BALLAST WATER REPORTS? YES ☐ NO ☐

14. DOES THE BWMP ACKNOWLEDGE SPECIAL REQUIREMENTS FOR GREAT LAKES ENTRY? YES ☐ NO ☐

15. DOES THE BWMP PRESCRIBE BEST MANAGEMENT PRACTICES? YES ☐ NO ☐

16. DOES THE BWMP CONTAIN PROCEDURES FOR FULL EXCHANGE? YES ☐ NO ☐

17. DOES THE BWMP CONTAIN PROCEDURES FOR MID OCEAN FLUSHING OF EMPTY TANKS? YES ☐ NO ☐

Transport Canada / USCG Compatible program since 1989, Latest regulatory update June 2006 for TC, 2008 for Seaway.

All ballast tanks must be exchanged or flushed with minimum salinity of 30ppt

Supported by Joint rigorous enforcement & binational science

Current examination of role of Coastal voyages outside St Lawrence Seaway system

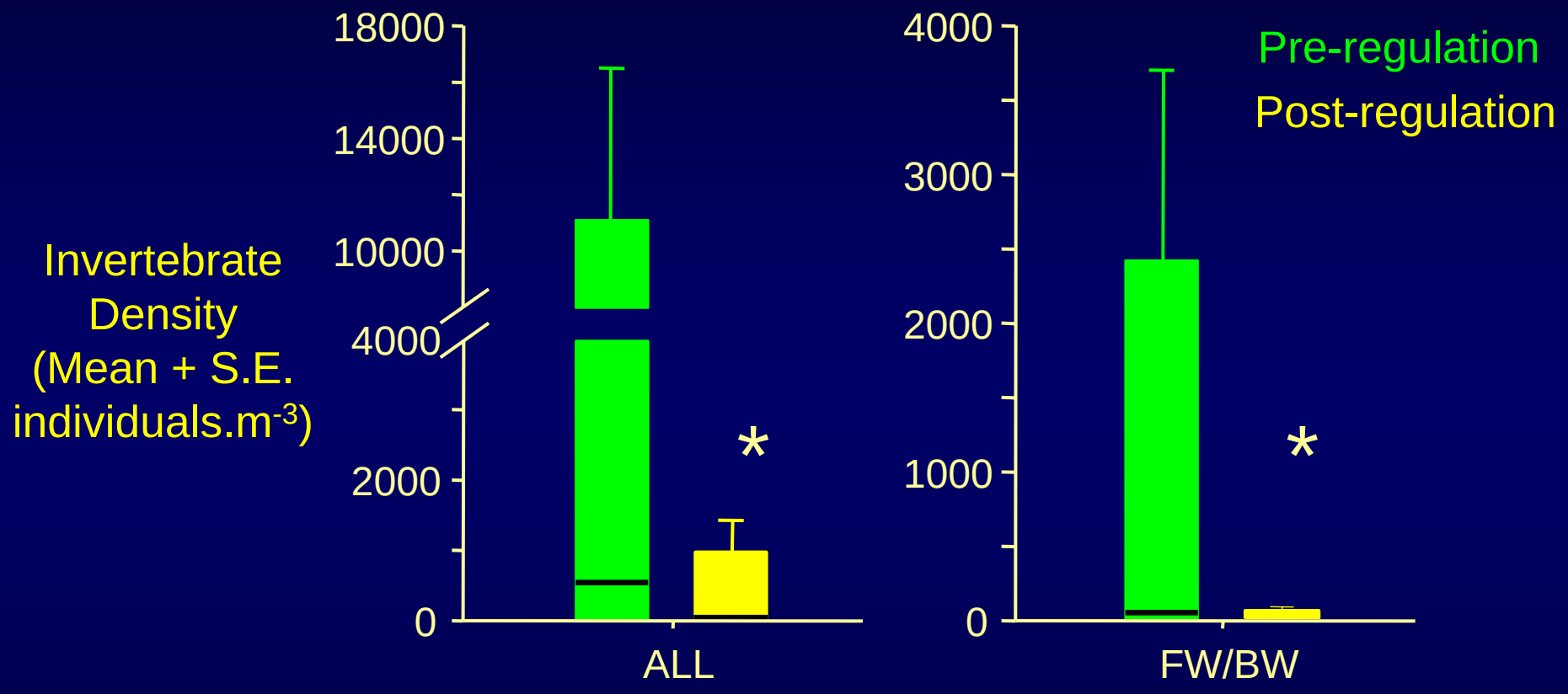
Current Risk of Foreign Ballast Water

Note: all published research on foreign ballast water of ships on the Great Lakes was conducted prior to revised management regulations

DFO and TC have a (limited) monitoring program in place:

- 2005-06: NOBOB samples collected
- 2007-08: BOB samples collected

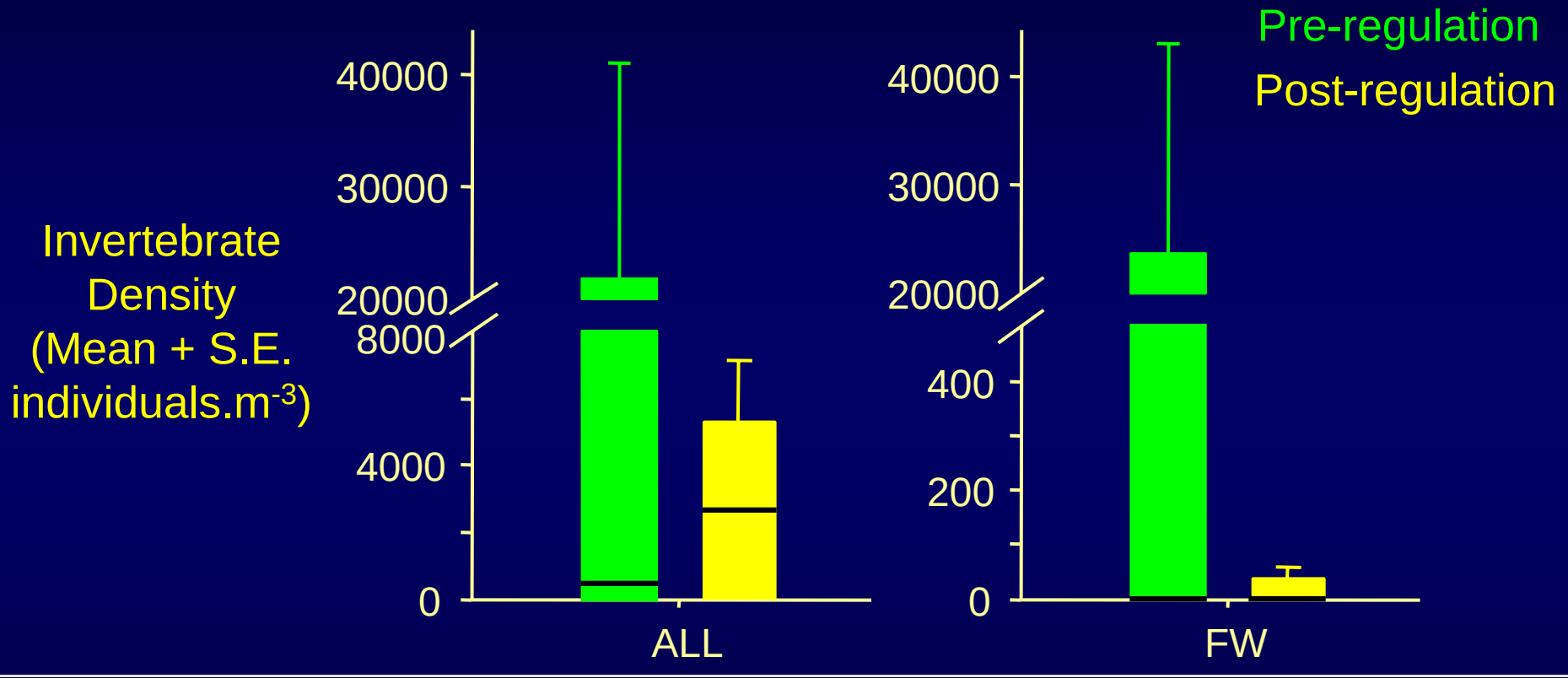
Current Risk of NOBOB water



Total density and number of high risk invertebrates in NOBOB water are significantly lower than 2001/02.

Duggan *et al.* 2005; Deneau et al. (in prep).

Current Risk of BOB water



Mean invertebrate density not statistically different, but variability has been greatly reduced

Bioenvironmental Sciences 1981; Locke et al. 1991; Deneau et al. (in prep).

Lakers - the Story so Far….

Lakers move approximately 70 Mt ballast water between Great Lakes ports annually

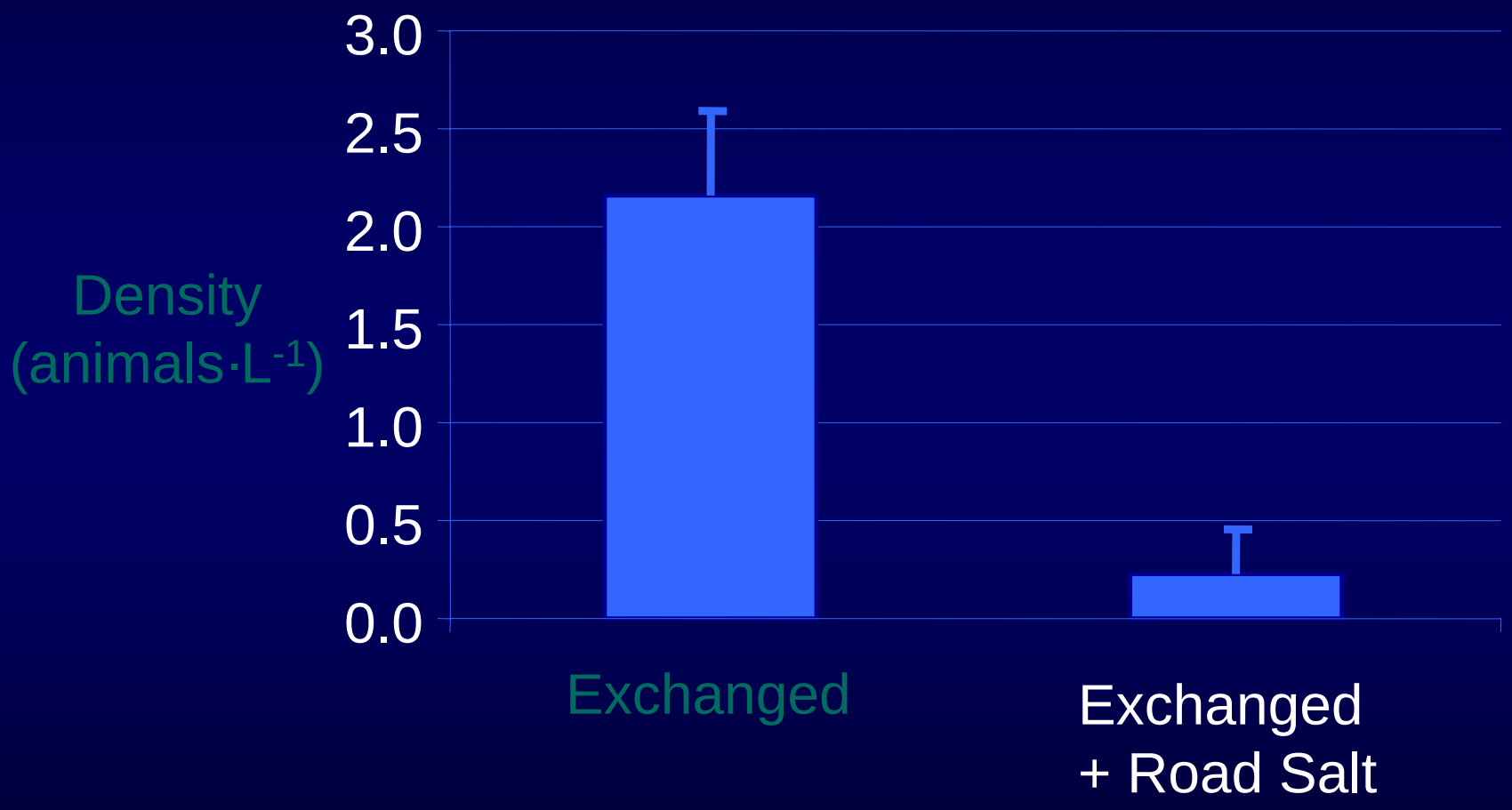
- Domestic ballast water is capable of transporting planktonic ANS
- Evidence exists of movement of (native) taxa beyond documented range
- IMO applies to ALL ships - regulations require science if any exempted after 2016

Rup et al. in prep.

Alternative Compliance "Salting Up" Experiment

- In April 2007, an opportunistic "salting up" experiment was conducted on an operational ship - 5 tanks were below the 30 ppt requirement
- TC Inspectors approved treatment to increase salinity in consultation with partner agencies
- Use of bulk salt – confirmed with EC and manufacturer - free of toxic anti clumping agents
- Follow up Research – both lab and full scale

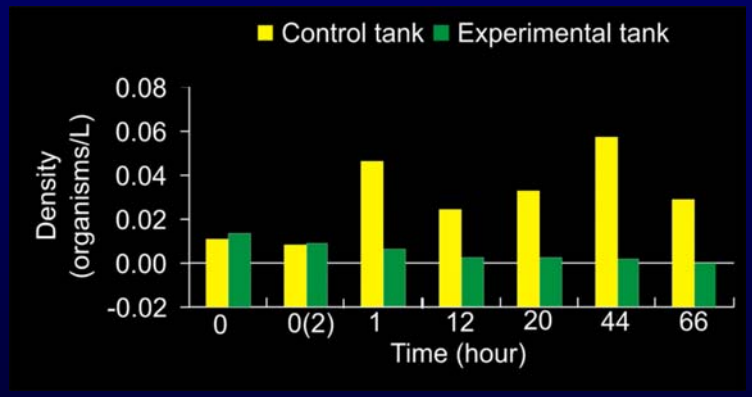
Salting Up - Biological Results



Mann-Whitney U test, p = 0.053

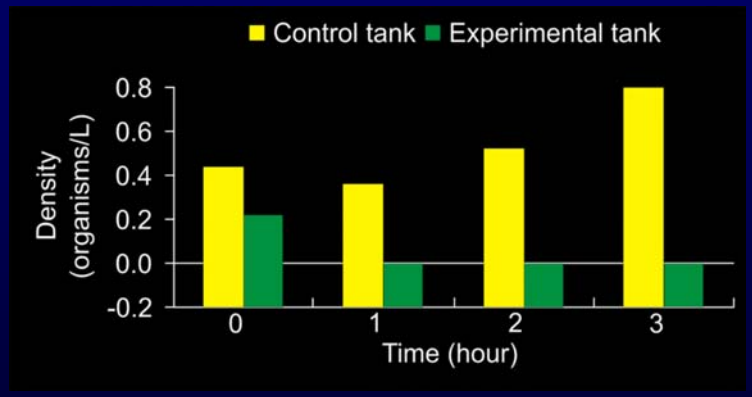
(Bailey & Wiley, unpublished data)

2008 Low Salinity – longer exposure



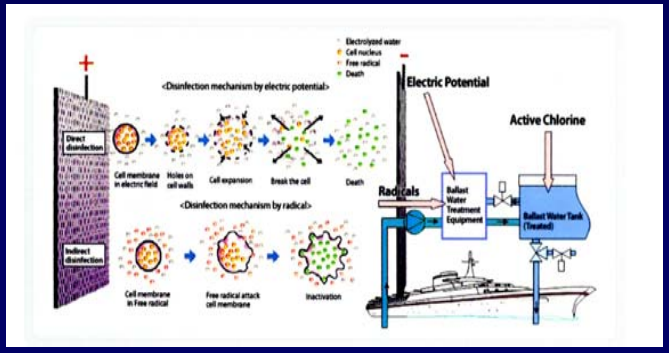
- Toronto to Thunder Bay
  - BOB vessel
  - 230 ppt diluted to 40 ppt
  - Sampled enroute
  - 6 days
  - 100% taxa dead

2008 High Salinity – short term exposure



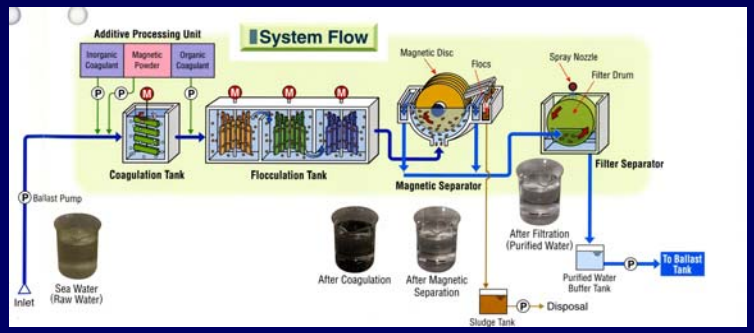
- Sarnia
  - NOBOB
  - 230 ppt to 109 ppt
  - 3hours exposure
  - 100% all taxa dead in 1 hr

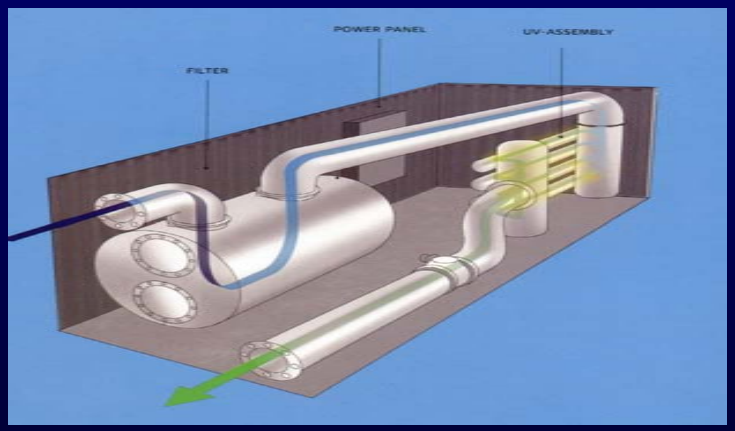
Current specific Great Lakes "Issues" that need to be addressed



- Consensus on the definition of "Fresh Water", - eg Techross system on Greenwing
- "Cold Water" Active substances tested at room temperature – Results of Periclean Ocean - Hamann
- Compatible discharge standards for active substances
- Binational acceptance needed for alternate means of compliance - eg salt water discharge / Brine

IMO BW Convention





- Canada will Ratify
- 14 Guidelines for uniform implementation
- Provides a vetting process for each system
- Active substances (G9)
- All land & ship trials (G8)
- Type Test – Flag State
- As of July – Final Approval for 9 systems
- 2 tested for Fresh Water

IMO Guidelines for Uniform Implementation

- (G1) Sediment Reception Facilities
- (G2) Sampling for Enforcement
- (G3) BW Management Equivalent Compliance
- (G4) BW Management Plans
- (G5) BW Reception Facilities
- (G6) BW Exchange
- (G7) Risk Assessment
- (G8) Approval of BW Management Systems
- (G9) Active Substance Approval
- (G10) Prototype BW Treatment Approval
- (G11) BW Exchange Design & Construction
- (G12) Sediment Control Design & Construction
- (G13) Emergency
- (G14) Designating BW Exchange Areas

GESAMP

- Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
- Working Group on Ballast Water Treatment Systems using active substances
- World experts on toxicology, ballast water biological risk
- Evaluate independently of IMO, Vendors or Flag States
- Opinion to BW Review Group
- Terms of reference set out in (G9)

G9 Approval

- **Basic Approval - (GESAMP) Documentation to show BW treatment System will not harm the Environment, or Ships Personnel**
  - **Permission to do Ship Board Tests**
- **Final Approval - (GESAMP) Proof that the system actually works in the context that it was evaluated on.**
- **Once Final Approval at MEPC – Type Test Certificate by Flag State**

Freshwater Specific Proposal to use Exchange plus Treatment to IMO Standards for Ships arriving from outside EEZ

- Currently only 2 of 9 vendors with final approval tested for fresh water
- Allows shipowner to use IMO approved treatment system – not different one for the Great Lakes
- Standardize Port State Control Regime
- Science suggests immediate 10 x decrease in risk over IMO standard
- TC, DFO and USCG to test
- Mitigates toxicological and safety threat estimated for proposed higher standards (GESAMP)

Update: Management Steps

- For the Great Lakes, BiNational Science is the key to sensible management
- Risk assessments are needed to determine where limited resources would be most effectively applied. With current enforcement regime in place – science suggests Ballast Water is likely a low risk vector
- Non Shipping Vectors of introduction should be re-evaluated to determine relative risk and next course of action