**Ballast Water Technology Demonstration Program**

- **Mission:** development, demonstration, and, ultimately, use of effective treatment technologies on ships
- **Primary mechanism:** annual grants competitions
- **Currently running 2 competitions:**
  - Treatment Technology Demonstration Project grants
  - Research, Development, Testing and Evaluation Facility grant
- **NOAA-FWS-MARAD partnership**
- **Federal help from USCG, USGS, EPA, DOD (Navy)**
Ballast Water Technology Demonstration Program

- NOAA and FWS provide funding
- MARAD provides access to MARAD fleet and expertise
  - Applicants contact MARAD for use of a fleet vessel prior to submitting the proposal.
  - Project costs for engineering onboard a MARAD vessel count towards the funding limit.
  - Necessary funds for this engineering are transferred directly to MARAD for use towards the project.
Ballast Water Technology Demonstration Program
Funding History

Dollars ($1000K)

- Non-Federal
- Other Federal
- Program

Program Year

0
500
1000
1500
2000
2500
3000
3500
4000
4500

Ballast Water Technology Demonstration Program: Funded Technologies (# of projects*)

**Chemical Biocides:**
- Carbon Dioxide (1)
- Chlorine / Chlorine Dioxide (1)
- Ferrate Ion (1)
- Glutaraldehyde (2)
- Halogens (1)
- Hydrogen Peroxide (2)
- Juglone (1)
- Menadione (2)
- Ozone (8)
- Peracetic acid (2)
- Sodium Hypochlorite (1)

**Energy:**
- Acoustic (6)
- Microwave (1)
- Thermal (4)
- Ultraviolet (6)

**Separation:**
- Filtration (including Media & Screen) (10)
- Vortex/Hydrocyclone (4)
- Centrifugation (1)

**Related Research:**
- Assessment (1)
- Microorganisms (6)
- Monitoring / Standards (5)
- No-ballast-on-board (NOBOB) (2)
- Outreach (2)
- Toxicity Analysis (1)

**Practices/Other:**
- Coagulation (1)
- Depressurization (1)
- Deoxygenation (5)
- Exchange (7)
- Onshore Treatment (3)
- Design of Ships or Tanks (4)

* Some projects investigated more than one type of technology
Ballast Water Technology Demonstration Program

- Treatment Technology Programmatic Priorities:
  - Project Necessity and Chance for Success.
  - Geographical distribution
  - Commercialization potential
  - Regulatory approval
Ballast Water Technology Demonstration Program

- Expect phased process of development.
- Funded projects generally cover only one phase.
- Categorize projects into four phases
  - Basic or applied research
  - Laboratory-scale to pilot-scale controlled experiments
  - Full-scale controlled experiments
  - Prototype or commercial ballast water field tests
Ballast Water Technology Demonstration Program

Treatment Technology Projects

Number of Projects

Program Year

- Prototype Field Test
- Full scale / Shipboard
- Lab - Pilot Scale
- Basic/Applied Research
Ballast Water Technology Demonstration Program

New vs Continuing Technologies

<table>
<thead>
<tr>
<th>Year</th>
<th>New (to Program) Technologies</th>
<th>Previously-studied Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2000</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2002</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>2004</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>2006</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>
Ballast Water Technology Demonstration Program

• The ultimate mission of the program is the implementation of effective ballast water treatment technologies.

• This process requires:
  – development of treatment technologies
  – the ability to test, evaluate, regulate and use these technologies.

• Appropriate projects for this funding opportunity can address any problem along this spectrum.
Ballast Water Technology Demonstration Program

"Other" Technology Projects

![Bar chart showing number of projects by year from 1998 to 2006]
Frequent Problems with Proposed Projects:

- Too expensive, with too little budget justification
- Proposal included multiple steps.
- Proposal skipped 'steps'.
- Too little experimental detail / too little scientific rigor
- Too little consideration of the ship environment.
- Too little 'homework'.
- Too little attention to standardized test methods
RDTE facilities will support ballast water technology development efforts by increasing:

- Long-term continuity in projects.
- Standardization and quality control in experiments.
- Independence between treatment technology vendors and investigators.
- Greater engagement of ship and port interests locally and regionally.
- Ease access to necessary physical infrastructure otherwise unavailable.
- Coordinated regional participation in the development and use of consensus standard ballast water test methods and protocols.
Ballast Water Technology Demonstration Program

• RDTE Programmatic Priorities:
  – National integration.
  – Local involvement.
  – Geographical Considerations.
  – Freedom of apparent conflict of interest.
Ballast Water Technology Demonstration Program

• **2006**
  - ONE AWARD for RDTE Facility (geographic priority: Great Lakes)
  - TWO STARTUP GRANTS for others to prepare for an application for an RDTE facility in the future
  - FIVE Treatment TechnologyDemonstration Grants

• **2007 (ongoing)**
  - 30 Letters of intent to submit grant proposals
  - 4 RDTE Facility Preproposals

• **The future**
  - Goal is to have provided viable technologies by the time they are required
  - When goal is achieved, current program will end
for more information:

contact: Dorn Carlson, manager

or

Melissa Pearson, coordinator

ballast.water@noaa.gov

or visit:

http://www.oarhq.noaa.gov/ballast/index.html

For information on the Coast Guard Step Program:

http://www.uscg.mil/hq/g-m/mso/step.htm
extra slides
Technology development is insufficient to achieve implementation of ballast water treatment technologies.

Need for standardized testing and evaluation of technologies.

To address this need, the Program implemented a new competition in 2005: to award grants for Research, Development, Testing and Evaluation (RDTE) Facilities.
Ballast Water Technology Demonstration program

- Multi-agency program to support research, development, test and evaluation of BW treatment technologies
- NOAA funding is from Congressional earmarks, sometimes with strings attached.
- Through 2005, the BWTDP funded 54 proposals with $11.8M in funds from NOAA ($10.2M) and FWS ($1.6M). MARAD has contributed use of its vessels.
- $3.5M in matching funds.
2005 BWTDP projects

- Treatment Technology (7 Projects)
  - Deoxygenation
  - Energy (microwave)
  - Filtration
  - Filtration, ozonation, sonic energy
  - Monitoring / verification technology (3 projects)
- Chronic toxicity testing for ballast water biocides.
- Technology assessment methodology.
- Computational modeling of flow in ballast tanks.
- Feasibility study of a treatment technology development site.
- Outreach campaign for BW best management practices.
2006 BWTDP plans

PROGRAM IMPROVEMENT GOALS

• Better long-term continuity in projects
• More use of common test protocols to facilitate results comparison across projects
• More, and more standardized, quality control in experiments
• More independence between investigators and vendors
• More engagement of ship and port interests
2006 BWTDP plans

A NEW INITIATIVE FOR 2006

• Competitive multi-year cooperative agreement to set up and operate a regional RDT&E facility

• Initial target region: Great Lakes

• Competitive startup grants for groups in other regions, to build capacity to establish other regional sites in future years

• Individual project grants are planned to continue