FRIEND OR FOE?

NOAA and the Global Maritime Industry

Kathy Metcalf
Chamber of Shipping of America

July 21, 2010


The “Lindy” Factor

IT IS BETTER TO ACT TOO QUICKLY THAN IT IS TO WAIT TOO LONG.

Jack Welch

TODAY'S MENU
THE SUBSTANCE

- Marine Air Emissions
- Discharges to the Water
- Marine Sanitation Devices (ACP)
- Ship Recycling
- Commercial Shipping and Noise
- Marine Debris
- Particularly Sensitive Sea Areas
- North Atlantic Ship Strike Reduction Program

TODAY'S MENU
THE PROCESS

How can federal agencies and the regulated community interact to produce real environmental benefits and maintain the free flow of ocean commerce?

Fundamentals of Marine Transportation

- Shipping is international... so should be the regulation of shipping.
- Consistency and predictability of requirements is critical.
- Global increase in marine transportation will be significant.
- Need for coordinated global initiatives to address maritime safety and protection of the marine environment.
- Potential tensions among international and domestic requirements.

Other Issues

- Maintain level playing field for international shipping
- General environmental statutes are not a “one size fits all” especially as regards the maritime industry
- Jurisdictional limits on sovereignty necessitate international instruments that are legally binding and global in scope (environmental management extends to high seas)

YOU CAN’T BUILD A REPUTATION ON WHAT YOU ARE GOING TO DO.

Henry Ford

AIR EMISSIONS

Air Emissions – The Fundamental Conflict

- Shipping is international and so should be control of air emissions (IMO) however…….
- Air quality is usually defined in national and sub-national terms and therefore emissions control strategies are best designed at national and regional levels
- Above relevance to conventional pollutants (SOx, NOx, PM) as well as GHGs

Air Emissions Control Strategies

- UNFCCC (Climate Change/GHGs)
- MARPOL Annex VI (original)
- MARPOL Annex VI (amendments)
- EU Marine Fuel Sulfur Directive
- US Clean Air Act and implementing regulations (EPA)
- Subnational – all states but especially California

Programs to Address Criteria Pollutants

Clean Air Act

IMO

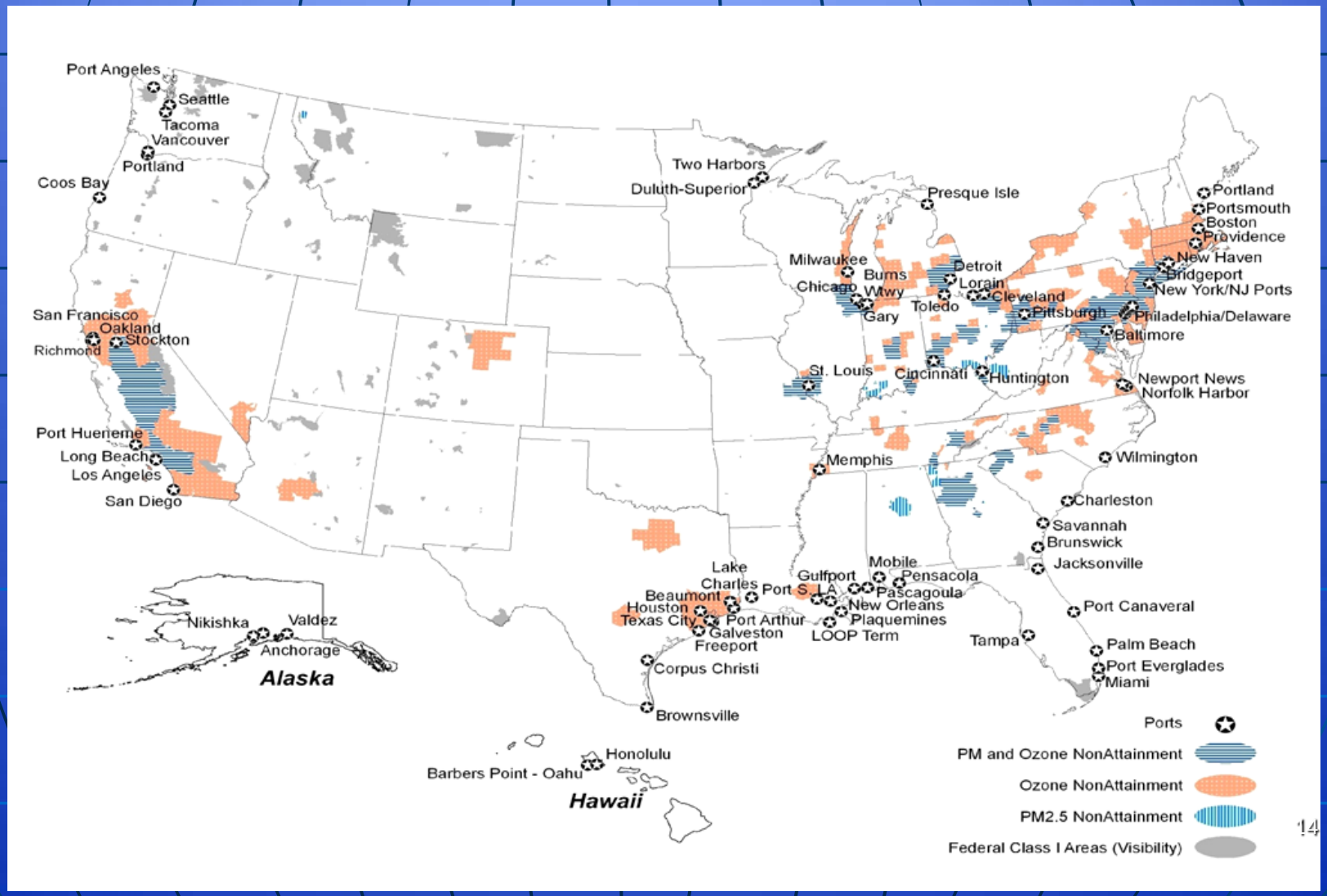
global

ECA

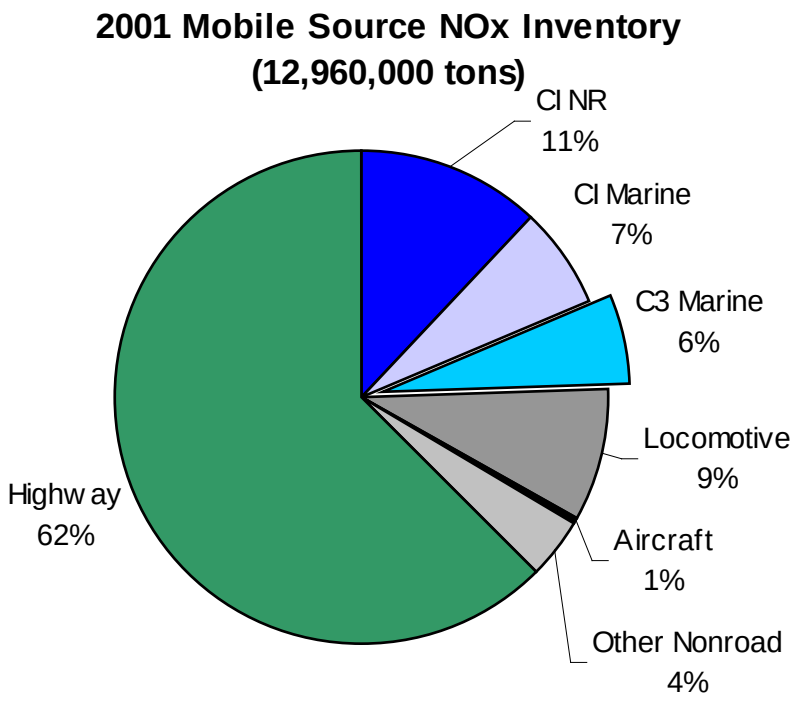
Policy Considerations

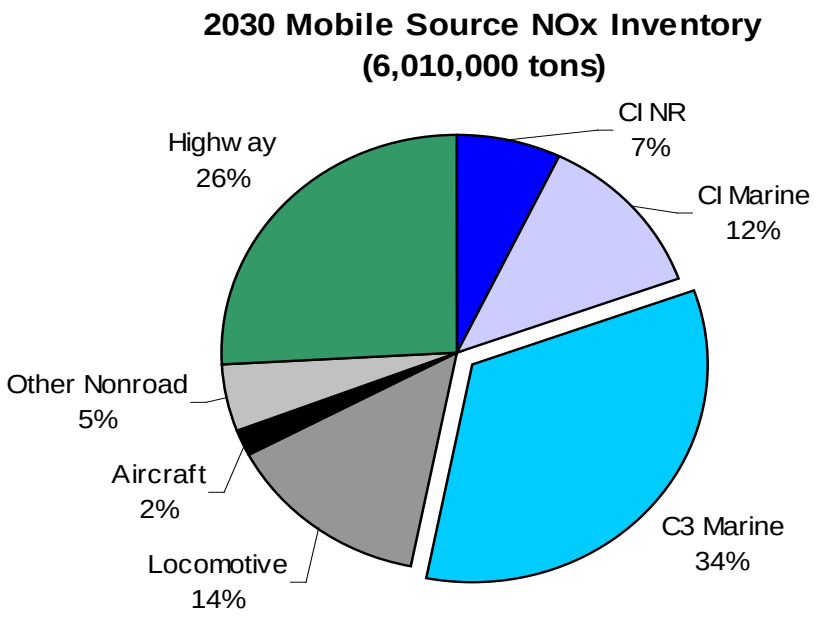
- All entities trying to regulate air emissions from ships have legitimate legal jurisdiction to do so to SOME degree
- All entities have ethical responsibilities to constituents to assure a safe and healthy environment for their citizens
- Vast percentage of international trade is carried in the global (non US flag) fleet
- Citizens want clean air AND cheap goods
- “Cookie cutter” approaches to ship emission controls will not provide the best balance of environmental benefit and the facilitation of trade

Need for Control: US Ports and Nonattainment Areas



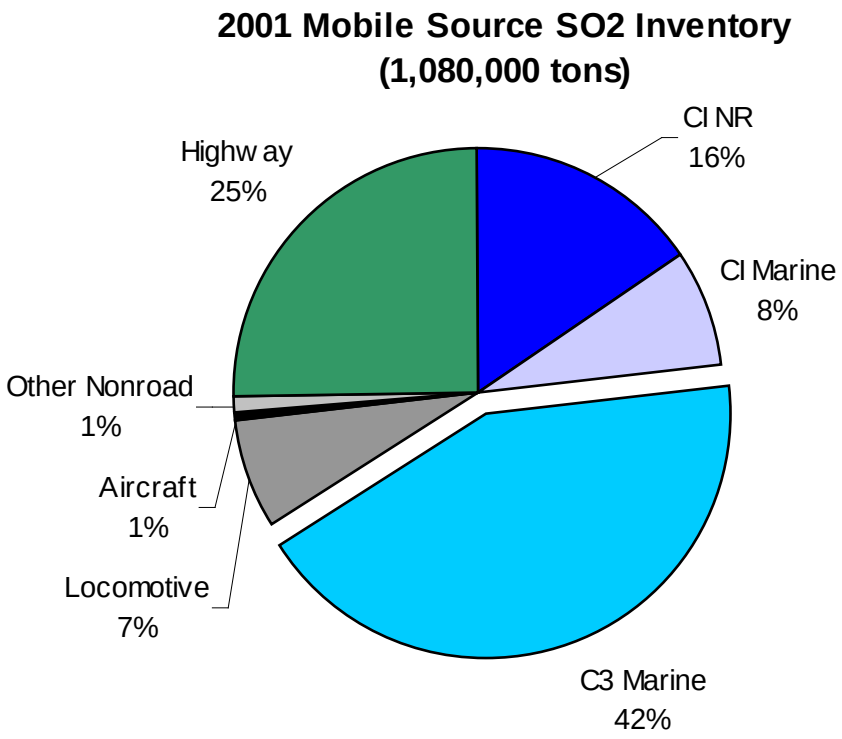
C3 Marine Contribution to NOx Inventory

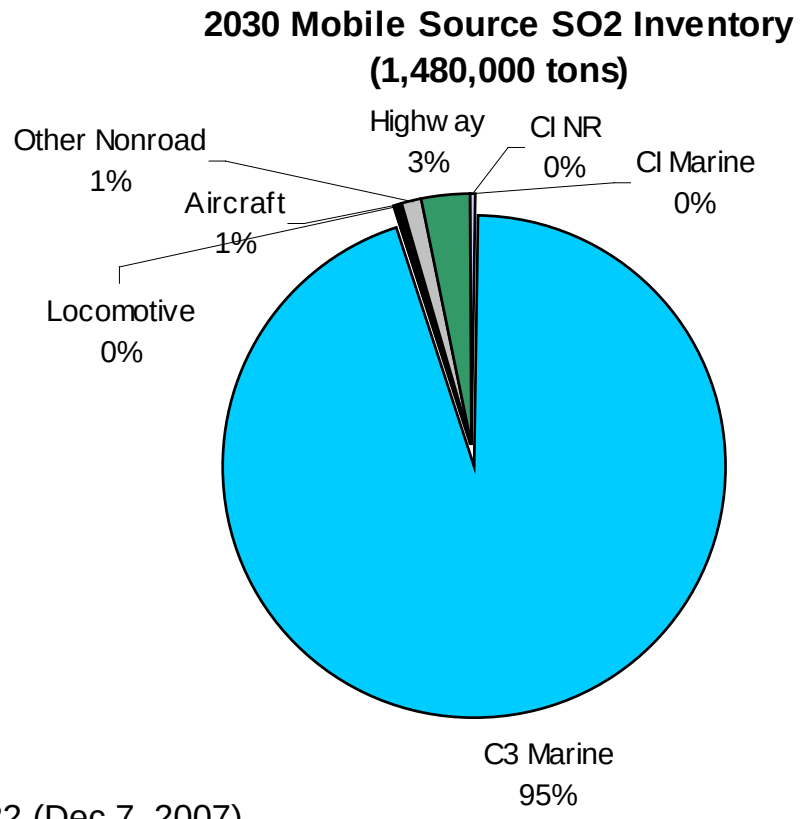




Source of inventory estimates: C3 Marine ANPRM, 72 FR 69522 (Dec 7, 2007)
Does not reflect IMO MARPOL Annex VI Amendments (October 2008)

C3 Marine Contribution to SOx Inventory





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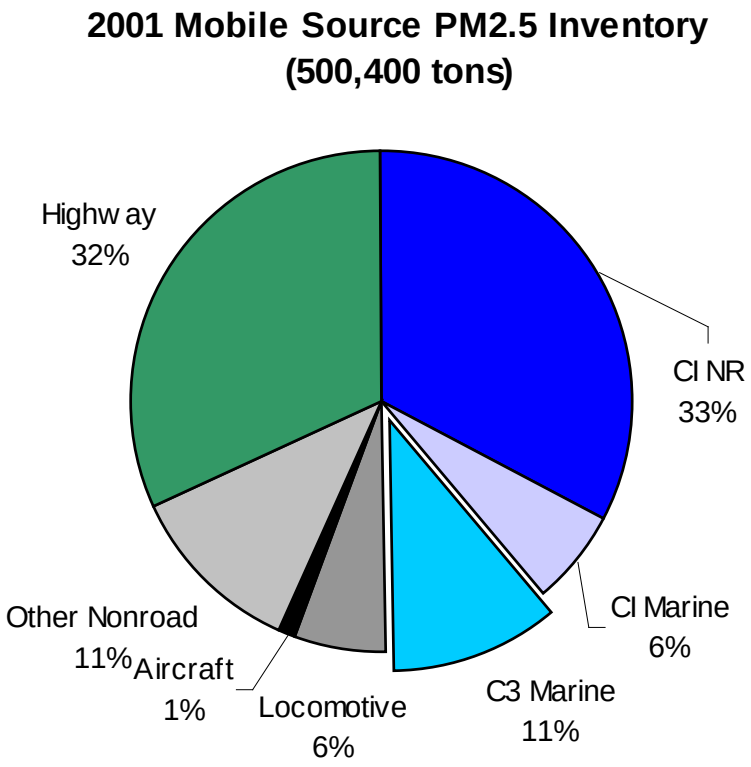
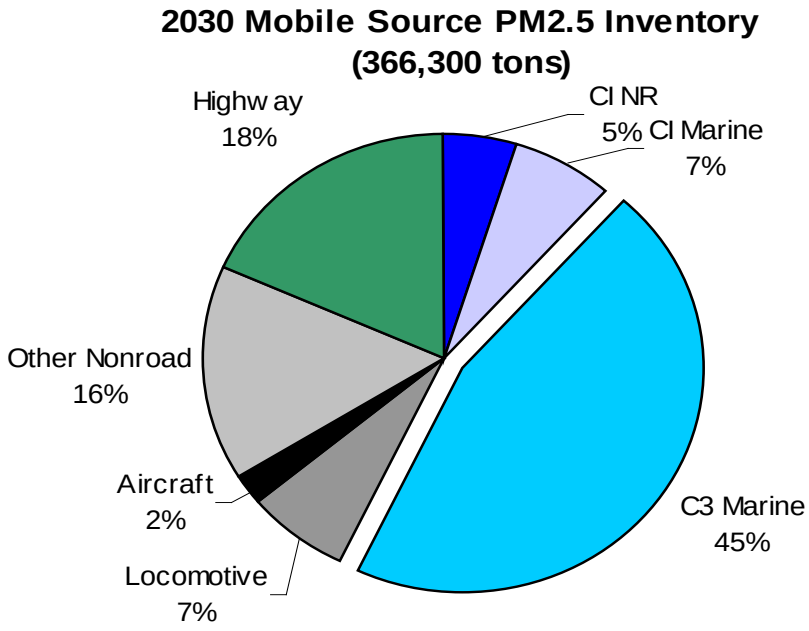
C3 Marine Contribution to PM Inventory





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Annex VI Amendments - SOx

GLOBAL

- 4.5% cap now
- 3.5% cap by 1/1/12
- 0.5% cap by 1/1/20
- Subject to fuel oil availability review
- Max extension to 1/1/25

ECAs

- 1.0% by 3/1/10
- .1% by 1/1/15

Annex VI Amendments - NOx

NEW ENGINES

- Tier I – current
- Tier II = 20% reduction by 2012
- Tier III = 80% reduction by 2016 (only in ECAs)

EXISTING ENGINES

- No controls currently
- Tier I would apply subject to emission upgrade system certification by flag state

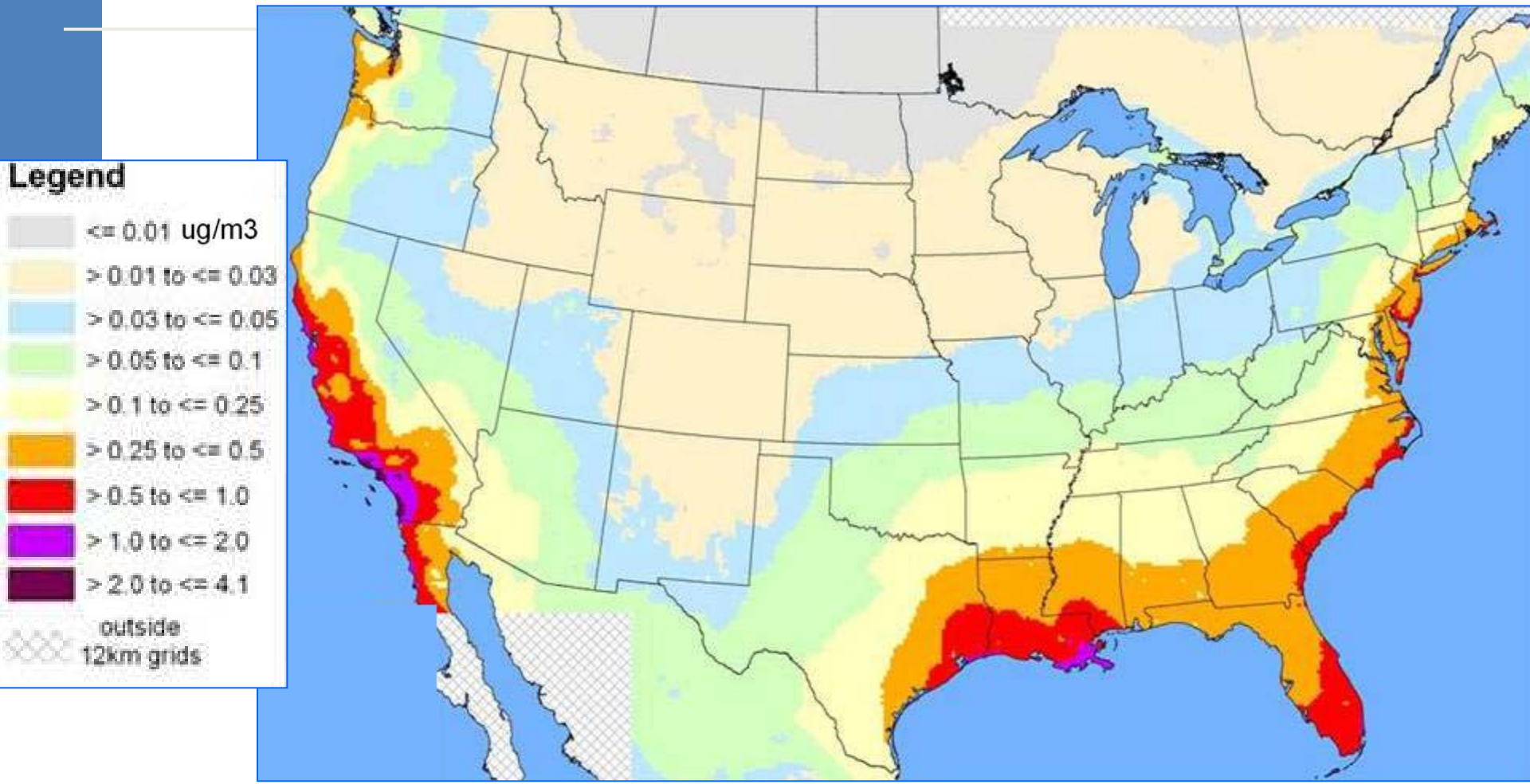
EPA C3 Marine Rule

- **Rule applies to US flag only**
- **With few exceptions, final rule + ECA proposal results in same requirements for vessels, regardless of flag**
- **Areas of concern**
  - Equivalency determinations (among technologies and where technology is substitute for low sulfur fuel)
  - Applicability to steamships (safety issues)
  - Availability of fuel when/where needed
  - Cost of fuel (50-100% increase projected)

U.S./Canada Emission Control Area (ECA)

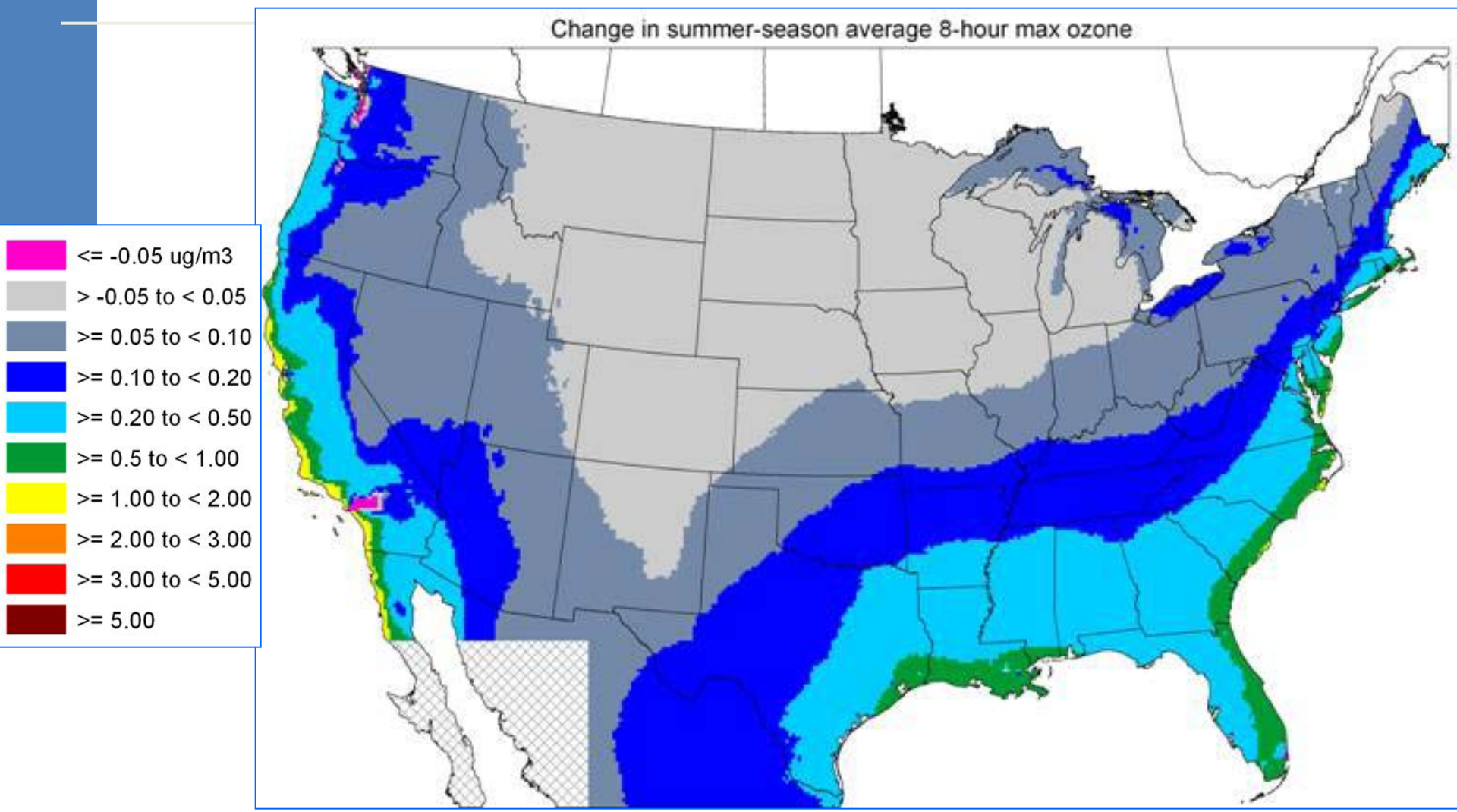
- Full benefits of Annex VI program realized through designation of Emission Control Areas (ECAs)
- US/Canadian submission to MEPC 59 in July 2009
- IMO approval at MEPC 60 in March 2010
- Entry into force August 2012
- Possible inclusion of Mexico at a later date

Potential Benefits of US ECA Ambient $PM_{2.5}$ Reductions in 2020



- Results do not include benefits of Canadian ECA designation on US Air Quality.
- These results are presented on the same scale as the preceding slide.
- Significant A/Q benefits into the middle of the country

Potential Benefits of US ECA Ozone Reductions in 2020



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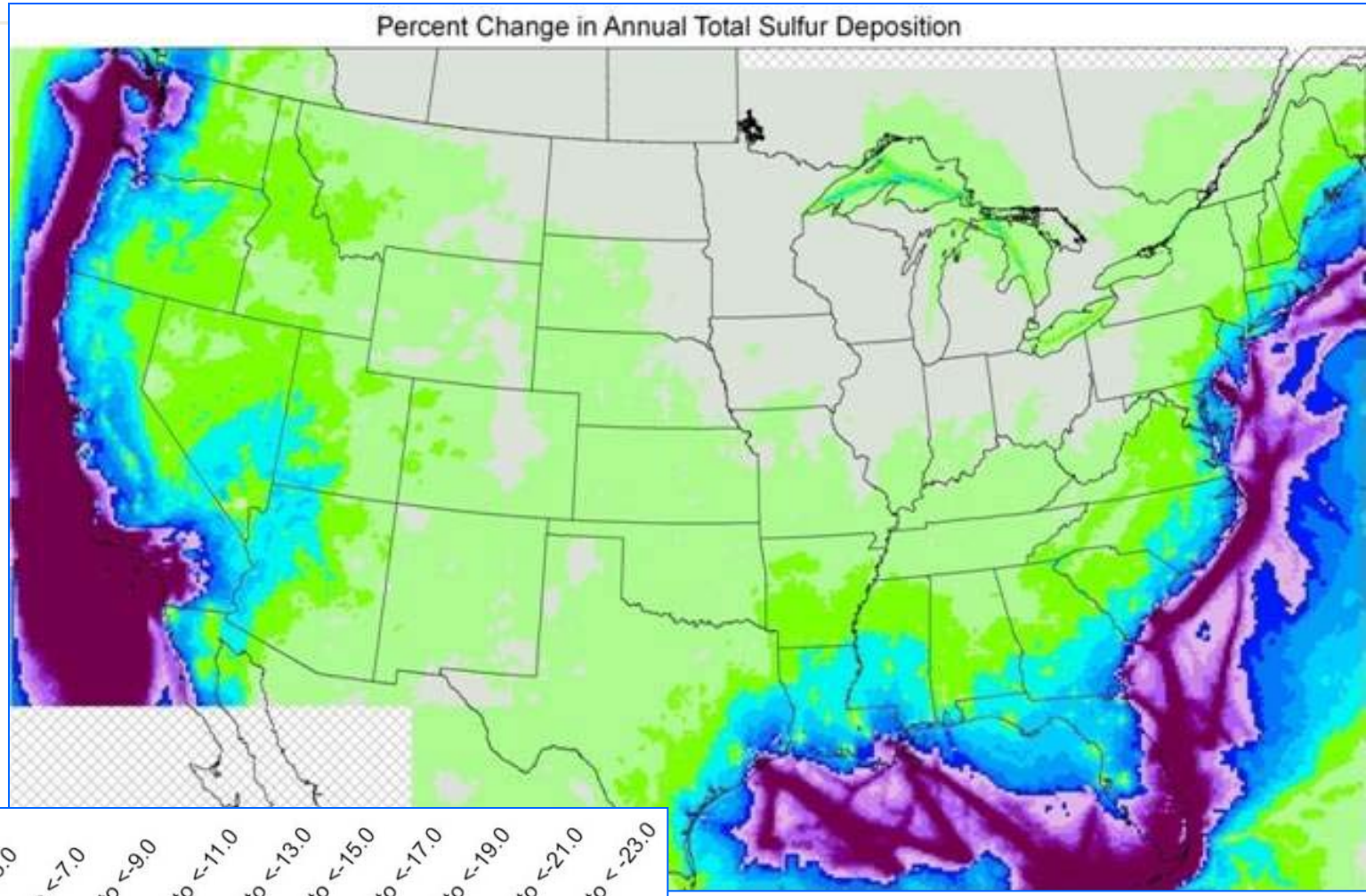
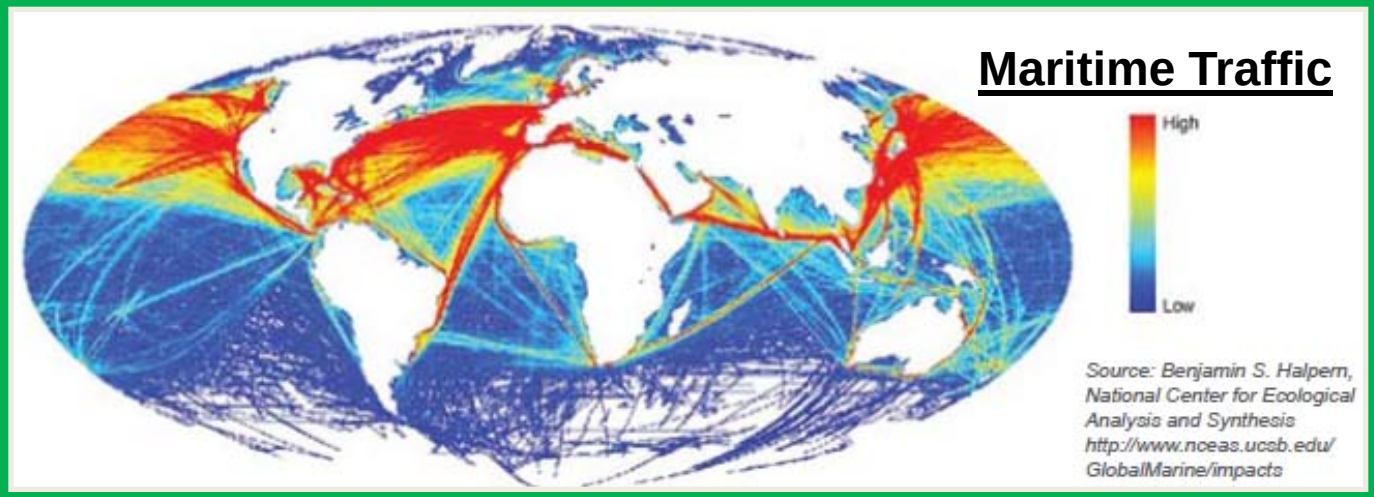
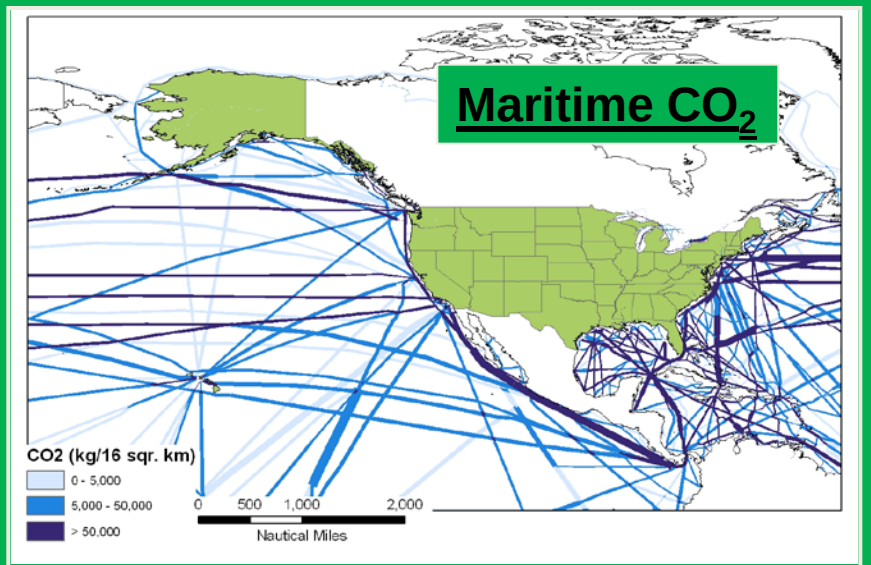
Potential Benefits of US ECA
Percent Change in Sulfur Deposition



International Ship GHG



- **2.7% of Global CO_2**
- **Traffic historically growing at 4% annually**



International Shipping

- **90% of world trade (by tonnage) is carried via ships**
  - **Sustainability of shipping is in all parties' national interests**
- **Ships provide the most efficient ton-mile mode of transportation**
- **Fuel accounts for ~60% of a ship's operating costs**
  - **Efficiency is already important**
  - **But some business practices limit incentives to optimize**
- **Marine engine emissions standards historically lag behind other transport sectors**

Clean Air Act

- EPA Advanced Notice of Proposed Rulemaking (ANPR) for GHGs
  - Signed July 11, 2008
  - Explores relevant sections of the CAA and implications of possible regulations of all stationary and mobile sources
  - Solicit public input and relevant information

IMO GHG Activities

- **1997 Cooperated with UNFCCC to undertake study to determine global ship CO_2 inventory**
- **2001-05 Considered control measures**
- **2006-2009 Developing mandatory and voluntary elements**
  - Updating inventory and considering baseline calculations
  - Finalizing Design Index (g/ton-mile emissions standard)
  - Finalizing Operational Index—similar to EPA SmartWay program
- **December 2009 – UNFCCC Copenhagen Conference**

Operational Index Technologies

- Slow Steaming
  - Immediate GHG reductions
  - 10% speed reduction = 23% efficiency gain
  - Might require engine retrofit kits
  - Already an industry response to fuel prices
- Weather routing, propeller/hull coating
- Optimal ballast and operations

Design Index Technologies

- Intermediate
  - Propeller design and surface treatment
  - Electrical loads: lights, ventilation, refrigeration
  - Exhaust waste heat recovery
- Long-term
  - Hull and rudder design for speed optimization
  - Lightweight materials
  - Alternative power
    - wind (kites)
    - solar
    - renewable fuel,

Indices and Baseline Setting

- Key issues relating to establishment of baselines, reduction levels and emissions cap
- Energy Efficiency Design Index (EEDI)
  - As applied to conventional and non-conventional propulsion systems
  - Need system that permits apples vs. apples comparison
  - Industry supports trial application then mandatory application
  - Trial application agreed for conventional propulsions systems
  - No member state support for mandatory application now
- Energy Efficiency Operational Indicator
- Ship Energy Efficiency Management Plan (SEEMP)
  - Guidelines for voluntary application adopted
- Market Based Initiatives (MBIs)
  - Cap and trade/bunker levy + US hybrid proposal based on application of EEDI to new and existing ships

Market-based Measures

- International nature of ships adds complexity to ownership and credit trading
  - Flag state versus country of ownership
- Bunker levy
- Emissions Trading Scheme
  - "Cap and trade"
- Cross sector issues

IMO Principles on MBIs

- Effective in reducing GHGs
- Binding and equally applicable to all
- Cost-effective
- Minimize competitive distortion
- Based on sustainable environmental development w/out penalty to global trade
- Goal based (not prescriptive) approach
- Incentive for technology development/R&D
- PRACTICAL, TRANSPARENT, FRAUD FREE AND EASY TO ADMINISTER

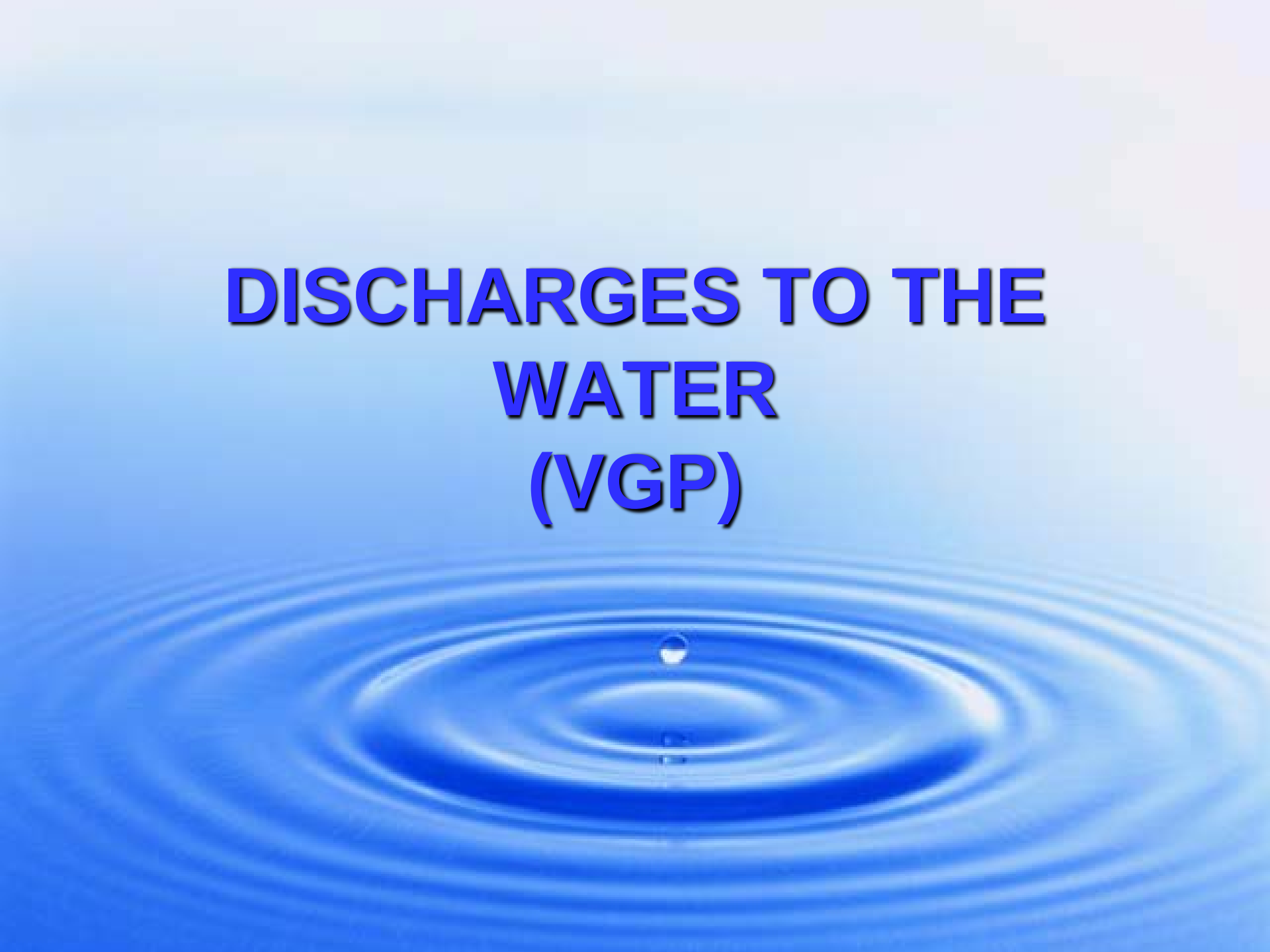
The GHG Bottom Line

- UNFCCC recognizes IMO expertise
- IMO must show sufficient progress or potential for UNFCCC to include marine (less now due Copenhagen “dud”)
- Conflict between IMO “no more favorable treatment” and UNFCCC “common but differentiated (CBDR)” principles
- If CBDR is applied, 70+% of world fleet would be accorded “developing nation” status

EVERYTHING SHOULD BE MADE AS SIMPLE AS POSSIBLE, BUT NOT SIMPLER.

Albert Einstein

DISCHARGES TO THE WATER (VGP)



VESSEL GENERAL PERMIT (VGP)

- **Why?** Court case (NW Environmental Advocates et al vs. EPA)
- **What?** Decision ruled that EPA's original regulation exempting discharges incident to the normal operation of a vessel exceeded agency's authority under the Clean Water Act
- **When?** Originally December 19, 2008 but extended to February 6, 2009

CLEAN WATER ACT

- "discharge of a pollutant" generally prohibited without a permit (CWA 301(a))
- National Pollutant Discharge Elimination System (NPDES) permits (CWA 402)
- Permit not to exceed 5 years
- State authorization to implement
- State may add more stringent requirements

Implications

- Permit coverage automatic for covered vessels on February 6, 2009
- Electronic Notice of Intent (ENOI) filing required by September 19, 2009 for vessels over 300 GT
- Permit in effect out to 3 nautical miles
- Includes ballast water and all other covered discharges to the water
- Does not apply to vessels outside 3 nautical miles or sewage discharges (also exempts graywater in Great Lakes)

Permit Structure

- Part 1 – Coverage
- Part 2 – Effluent Limits
- Part 3 – Corrective Actions
- Part 4 – Inspections, Monitoring, Reporting and Recordkeeping
- Part 5 – Vessel Class Specific Reqmts
- Part 6 – State 401 Certification Reqmts
- Part 7 – Definitions
- Appendices

Permit Effluent Limits (1)

Technology Based Effluent Limits (minimum requirements)

- 5 existing requirements apply to all vessels

  Material storage, toxic and hazmats, fuel spills and overflows, discharges of oil and oily mixtures, compliance with other laws and regs

- 28 specific discharge types

  Limits typically appear as narrative best management practices deemed practical

- 8 class-specific vessel requirements

  Large cruise ships, medium cruise ships, large ferries, oil or petroleum tankers, barges, research vessels, rescue boats, vessels with experimental ballast water treatment systems

Permit Effluent Limits (2)

Water Quality Based Effluent Limits

- Under CWA, individual States set water quality standards for protection of receiving waters
- Must meet these limits to protect water quality where technology based limits are not sufficient
- Each permittee must control its discharges as necessary to meet both types of effluent limits
- State specific requirements found at Chapter 6 of VGP
- Currently a number of varying requirements which may change during permit term if states petition and receive approval from EPA

Covered Discharges

Part 2 of VGP

- Deck Washdown and Runoff
- Bilgewater
- Ballast Water
- Anti-fouling Hull Coatings
- AFFF
- Boiler/Economizer Blowdown
- Cathodic Protection
- Chain Locker Effluent
- Controllable Pitch Propeller Hydraulics
- Elevator Pit Effluent
- Firemain System
- Graywater
- Non-Oily Machinery Wastewater
- Reefer and Air Condensate Discharge

Covered Discharges (cont'd)

- Rudder Bearing Lube Discharge
- Seawater Cooling Overboard
- Seawater Piping Biofouling Prevention
- Small Boat Engine Wet Exhaust
- Stern Tube Oily Discharge
- Underwater Ship Husbandry
- Graywater + Sewage
- Exhaust Gas Scrubber Washwater
- Materials (including Hazmat) storage

State/Tribal Specific Requirements

Part 6 of VGP

- Bishop Paiute Tribe
- California
- Connecticut
- Florida
- Georgia
- Guam
- Hawaii
- Hualapai Tribe
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Maine
- Massachusetts
- Michigan
- Minnesota
- Missouri
- Nebraska
- Nevada
- New Hampshire
- New York

State/Tribal Specific Requirements

Part 6 of VGP

- Ohio
- Pennsylvania
- Rhode Island
- Utah
- Vermont
- Wyoming

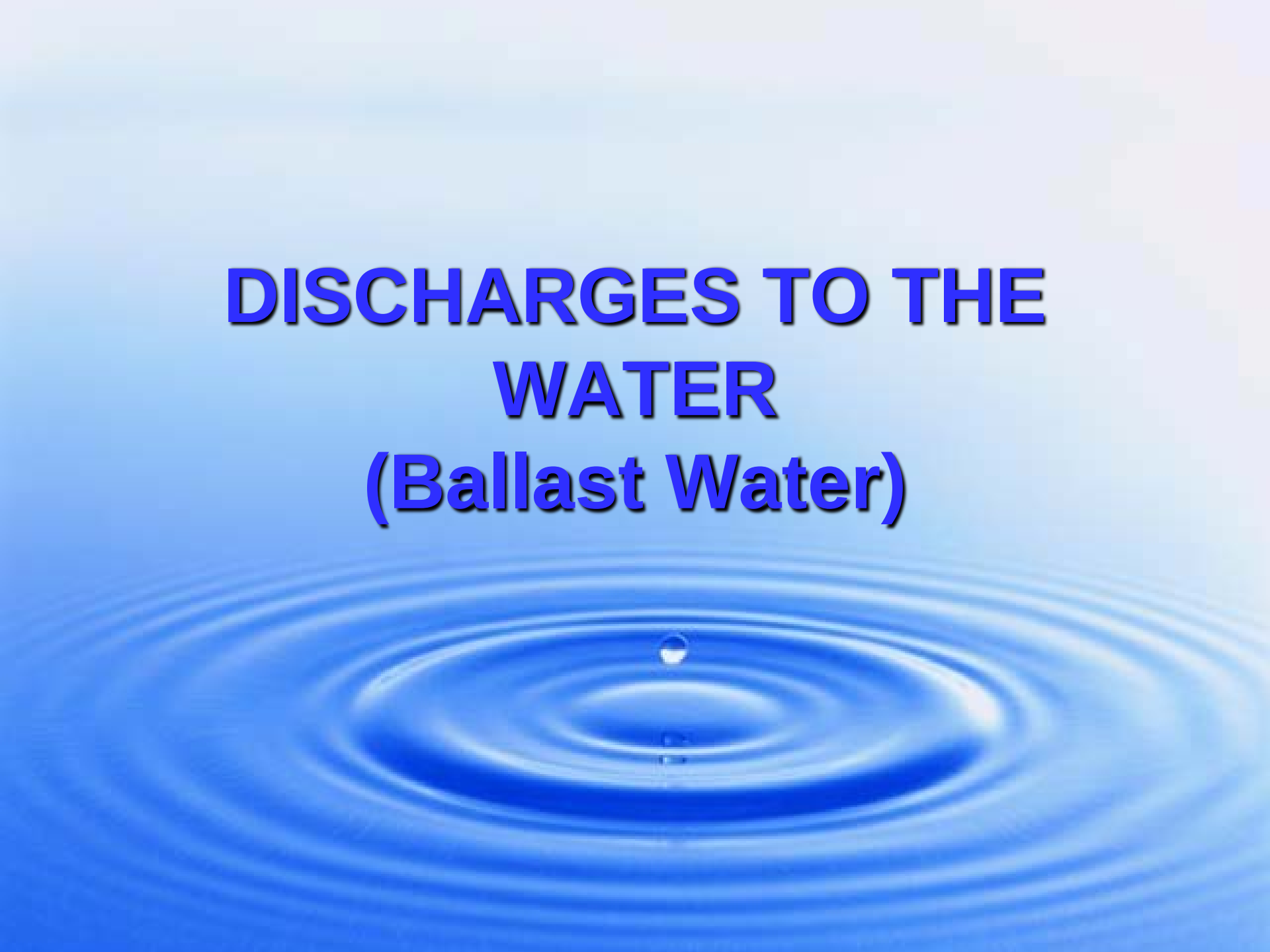
FOR MORE INFORMATION

EPA's NPDES website:

http://cfpub.epa.gov/npdes/home.cfm?program_id=350

Contains copy of permit, fact sheet, updated list of state and tribal certifications, hot links to other relevant documents (ENOI, discharge monitoring report)

DISCHARGES TO THE WATER
(Ballast Water)



The train wreck has occurred!

- Ballast water provisions of VGP (federal and state)
- USCG proposed rule on ballast water treatment standards
- IMO Ballast Water Convention
- Legislative action being considered

VGP Ballast Water Provisions

- Mirrors current USCG ballast water exchange requirements (federal)
- Widely varying provisions and implementation timing of individual state requirements
- Most have adopted requirements proposed in last Congress's legislative draft
- Some have or are proposing to adopt the California standard (zero discharge by 2020!)

USCG Proposed Rule on Ballast Water Treatment Standards (1)

- Two phase implementation
- Phase One: IMO Convention
- Phase Two: 1000 times IMO (US legislative proposal last Congress)
- Practicality review prior to Phase Two implementation
- If not practical, will calibrate with technology existing at time of review

USCG Proposed Rule BWTS (2)

Putting it in perspective

- 50 microns = .00197 inches
- Ten 50 micron particles =
  - 1 trillionth of a cubic meter
  - Equal to 1 second in 31,700 years
  - One drop of water in 20 Olympic swimming pools
  - 1 cubic meter of water weighs approximately 2,200 pounds (about the weight of a VW Bug)

USCG Proposed Rule BWTS (3)

Applicability

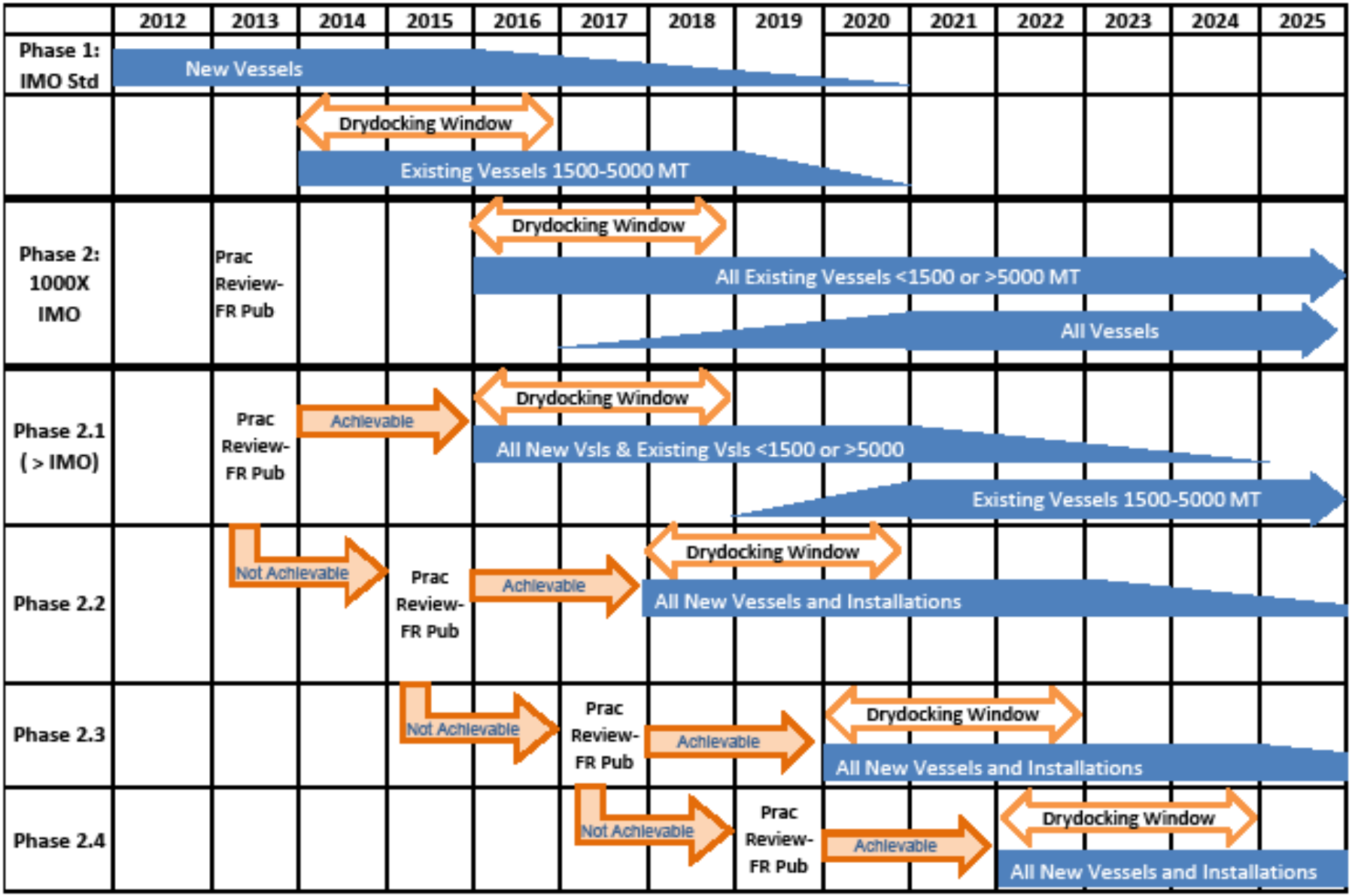
- Vessels that operate in US waters bound for US ports or places with ballast tanks
- Statutory exemptions include crude oil tankers in coastwise trade, military vessels
- Exempts vessels that operate exclusively in one COTP Zone

USCG Proposed Rule BWTS (4)

Phase One and Two Comparison

Tech Desc	Large Organisms >50 micron	Small Organisms Between 10 and 50 microns	Very Small Organisms Less than 10 microns	3 indicator microbes (Bacteria) All concentrations for 100 ml sample
Phase One	<10 per cubic meter	<10 per ml	N/A	<1 cfu Vibrio cholerae <250 cfu E coli <100 cfu Intestinal enterococci
Phase Two	<1 per 100 cubic meters	<1 per 100 ml	<1000 bacteria and <10,000 viruses per 100 ml	<1 cfu Vibrio cholerae <126 cfu E coli <33 cfu Intestinal enterococci

Phase 1 and Phase 2 Standards Implemention Schedule (5 year grandfathering)



If Practicability Review determines Phase 2 Standard is not achievable, but a standard which is more stringent than existing (IMO) is achievable, then that standard will be phased in 3 years following FR publication. Practicability reviews will be conducted every 2 years until full Phase 2 is achieved.

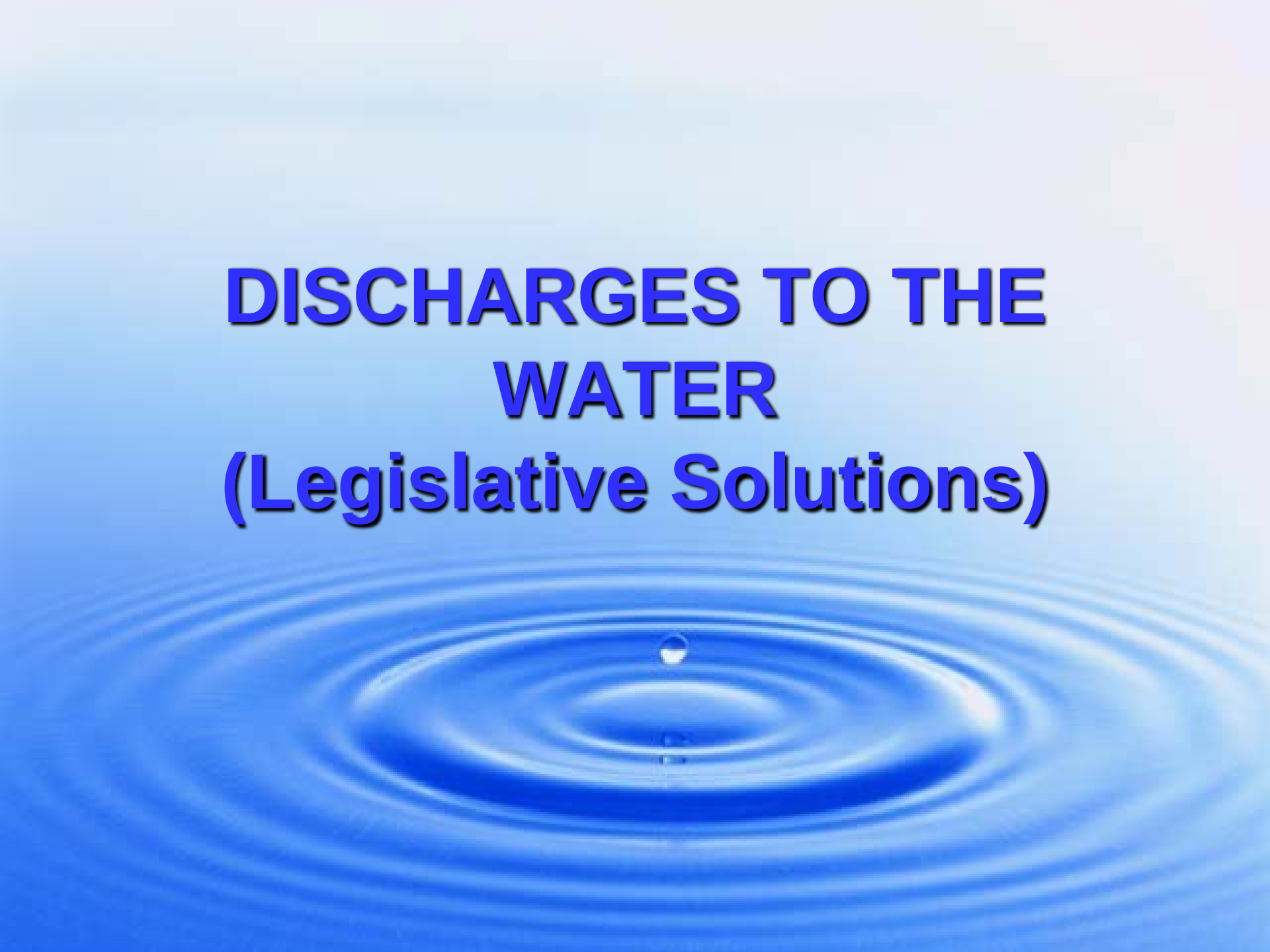
Procedures to Approve BWMS

- Biological efficacy
  - Land based (EPA-ETV verification protocol)
  - Shipboard (per IMO G8 guidelines)
- Engineering and operational reqmts
  - Electrical
  - Engineering
  - Piping
- Criteria for certification of independent labs
- Acceptance of BWMS approved by other countries (case by case basis)

NO Pre-emption of States or Clean Water Act

- States retain their authority under CWA to "adopt or enforce control measures for ANS"
- Vessels are still required to comply with VGP
- USCG and EPA are working to harmonize compliance requirements

DISCHARGES TO THE WATER
(Legislative Solutions)



INDUSTRY BASED ASSUMPTIONS

- Need for internationally accepted mandatory BW management program
- Consistency between international and domestic programs
- Solutions must provide real benefit to the environment
- We are experts in vessel operations, not marine/invasion biology
- Be careful what questions you try and answer!

LAY OF THE LEGAL LANDSCAPE

- Finalized IMO Convention
- Development of IMO Guidelines
- US Legislative Initiatives (Fed/State)
- Regulatory Initiatives (Fed/State/Local)
- Multitude of technology developers all assuring their “silver bullet”

IMO CONVENTION VS. US LEGISLATION

- IMO entry into force????
- Multiple US legislative efforts
- US legislation enactment expected ???
- Industry position to maximize alignment of national and IMO requirements
- 100% alignment unlikely (performance std.)

DEVIL IS IN THE DETAILS (IMO Guidelines)

- Sediment and BW Reception Facilities
- Sampling
- Equivalent Compliance for pleasure/SAR vessels
- BW Management Plans
- BW Exchange
- Additional measures and risk assessment protocols
- Approval of ballast water management systems
- Procedures for approval of “active” substances
- Prototype BW treatment technologies

PERFORMANCE BASED STANDARD

- Mandatory requirements “do able” by all vessels regardless of location, vessel type or weather/sea conditions
- New technology verified by standardized test protocols
- Timed phase-in differentiating between new and existing ships

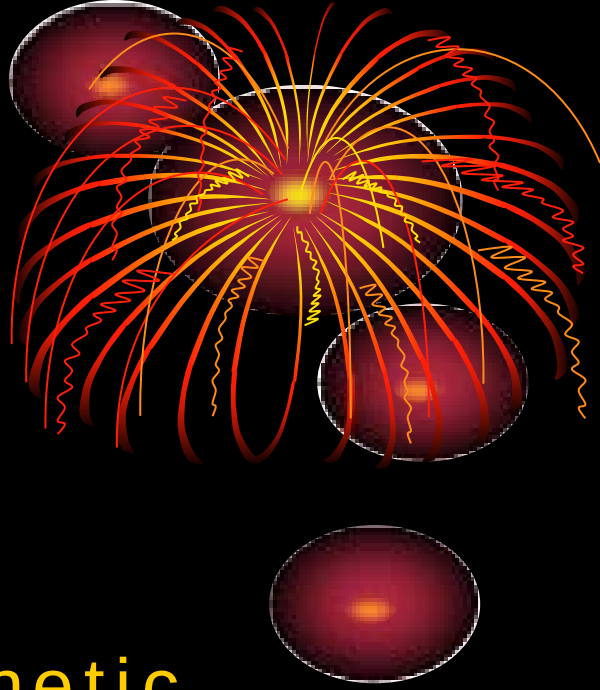
ALTERNATIVE BW MANAGEMENT TECHNOLOGY PROGRAM

- Must be transparent process
- Specified process for proposal submittal, evaluation and approval
- Specified format and content
- Use of technology verification protocols
- “Temporary” approval for testing program with final review and approval for successful test programs

FEDERAL PREEMPTION OF STATE REQUIREMENTS

- NISA 96 recognizes need for national and international consistency
- Equally applicable to federal and state programs
- Must have strong legal and policy justification to gain Congressional support
- Current evidence of “patchwork quilt” in varying state and national requirements

DEVELOPING TECHNOLOGIES



- Filtration
- Other physical separation
- UV/IR or other electromagnetic spectra application
- Thermal
- Chemical biocides
- Ozone
- But.....need performance standard to assess

TECHNOLOGY DEVELOPMENT CONSIDERATIONS

- Maximum operational flow rate (vessel)
- Maximum operational flow rate (application and/or residence time)
- Adaptability to shipboard environment
- Footprint
- Installation and maintenance feasibility
- Back-up capability and redundancy
- Sampling and monitoring needs

CHALLENGES

- Standardized test protocols
- Finalized IMO guidelines and domestic requirements
- Ramp-up from lab to pilot to shipboard
- Conversion of existing performance data (% removal to concentration based format)
- Sufficient funding (public and private)
- ACKNOWLEDGEMENT THAT THERE IS NO SILVER BULLET!

PENDING LEGISLATION (FEDERAL)

- None introduced as yet in current Congress
- Industry working with House staff on draft language
- Chairman Oberstar (House T and I) and Chairman Boxer (Senate EPW) classified as “high priority”
- Major conflict = preemption language

NATURE DOES NOTHING IN VAIN.

Aristotle

MARINE SANITATION DEVICES

USCG Alternative Compliance Program and EPA Request for Comments

MARINE SANITATION DEVICES

Alternative Compliance Program (1)

- Changes to MARPOL Annex IV….
- Eliminates prior equivalency between US and MARPOL Annex IV requirements
- US is not a party to Annex IV
- Non-party may not issue International Sewage Pollution Prevention Certificate (ISPPC) as authorized under Annex IV
- Potential port state control problem for US vessels trading internationally to countries which are parties to Annex IV

MARINE SANITATION DEVICES

Alternative Compliance Program (3)

- Annex IV changes include (new) designation of three different classes of sewage systems
  - Sewage treatment plant (Type I and II MSD) - new more stringent effluent requirements for new installations (on/after 1/1/2010)
  - Sewage comminuting and disinfecting system with holding tank (Type II MSD with holding tank) – no discharge within 3 nm
  - Sewage holding tank (Type III MSD) – no discharge within 12 nm + max discharge rate based on ship's speed

MARINE SANITATION DEVICES

Alternative Compliance Program (4)

- Existing certified systems (prior to 1/1/10) can still be used e.g. compliant with both US law and MARPOL Annex IV
- “New” designation triggered either with new vessel or with replacement of existing system on existing vessel
- All systems subject to initial, renewal (5 year intervals) and “special” (triggered by repairs or renewals) surveys

Marine Sanitation Devices

- EPA request for comments on current performance and technology capabilities
- Agency response to petition filed by Friends of the Earth
- Advocates for increase in performance standards based on best available technology
- Advocates for additional reporting, monitoring and compliance programs
- FOE petition based on cruise ship study

EDUCATION MUST, THEN, BE NOT ONLY A TRANSMISSION OF CULTURE BUT ALSO A PROVIDER OF ALTERNATIVE VIEWS OF THE WORLD AND A STRENGTHENER OF THE WILL TO EXPLORE THEM.

Jerome Bruner


SHIP RECYCLING

IMO Ship Recycling Convention

"Hong Kong Ship Recycling Convention"

- Adopted May 2009
- Entry into force – 24 months after 15 nations representing 40% of world's gross tonnage ratify (no ratifications to date)
- Coordinated effort between IMO and the Parties to the Basel Convention (transboundary movement of hazardous waste)

IMO Ship Recycling Convention

"Hong Kong Ship Recycling Convention"

- ship and recycling facility requirements
- "cradle to grave" approach – "green passport"
- design/construction, operating reqmts for life of vessel, preparation for delivery to recycling facility, recycling yard activities
- ship inventory of hazardous materials
- "ready for recycling" certification
- recycling facility certification

IGNORANCE OF ENVIRONMENTAL ISSUES IS SIMPLY BAD BUSINESS. DISREGARD OF THEM IS EVEN WORSE.

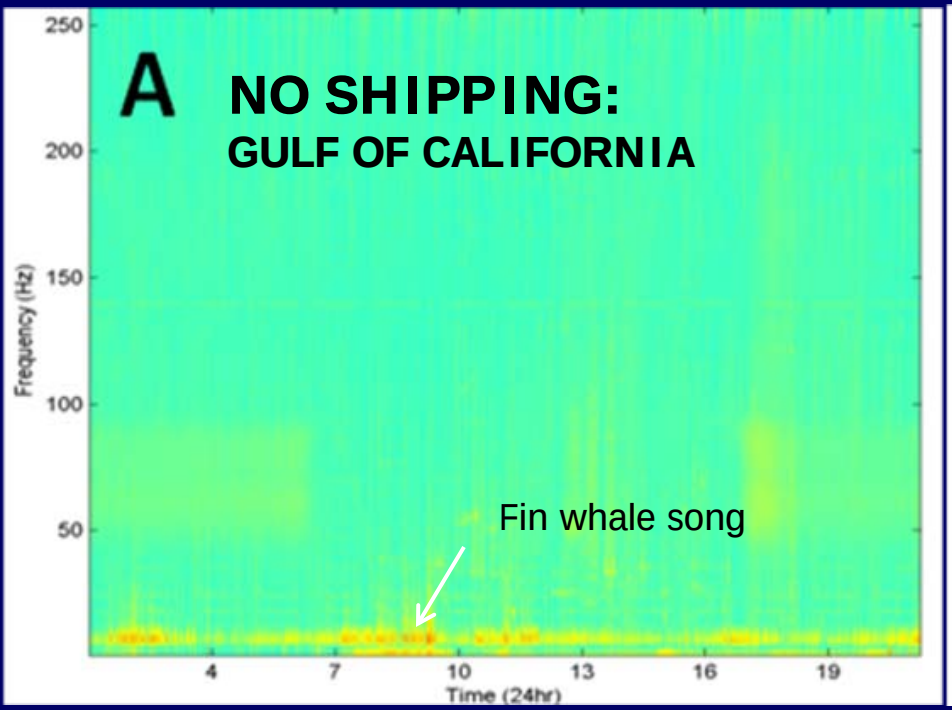
Capt. John Henry Bates

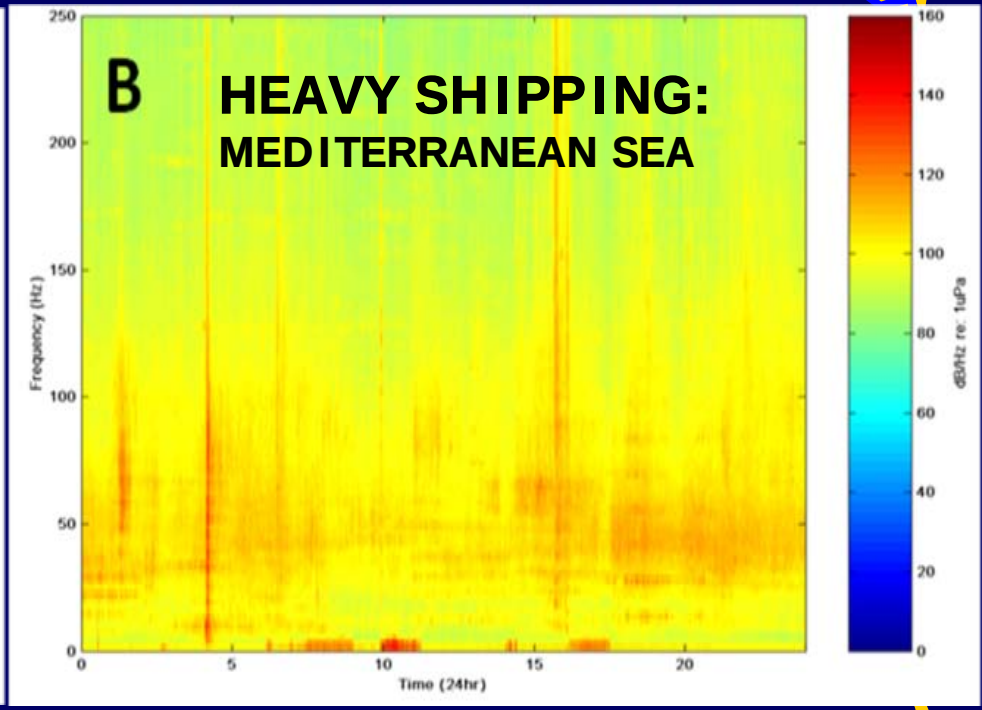
Commercial Shipping and Noise

Human Commerce is Noisy

Chronic Background Noise (*i.e.* Commercial Shipping)

24 hours in two fin whale acoustic habitats

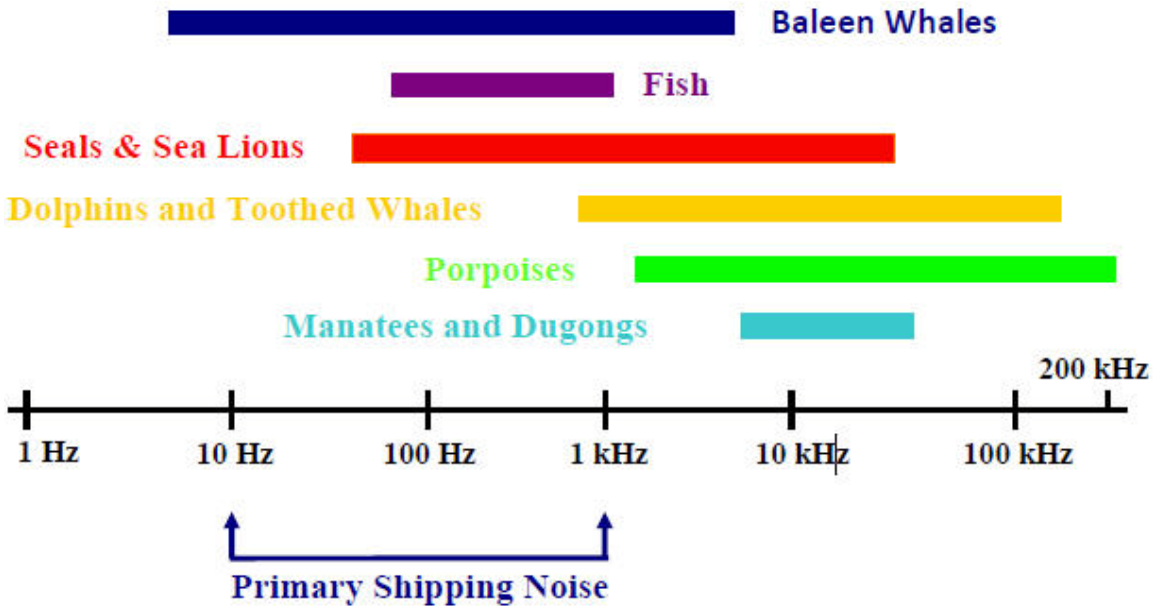




Clark, Ellison, Southall, Hatch, Van Parijs, Frankel, Ponirakis, (2009) *Marine Ecology Progress Series*

MASKING

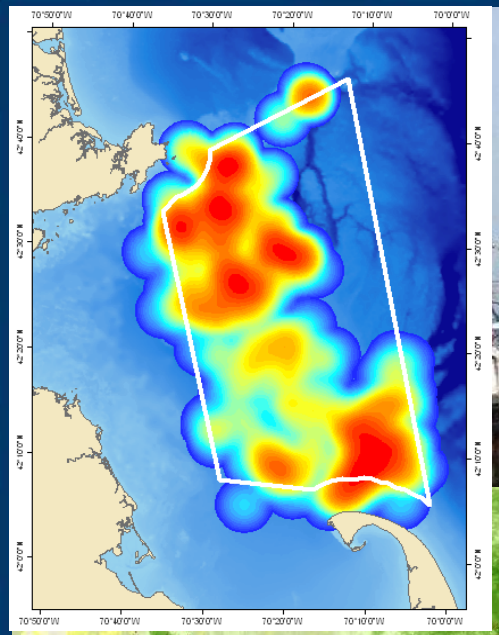
- Frequency overlap between marine animal communication and shipping noise

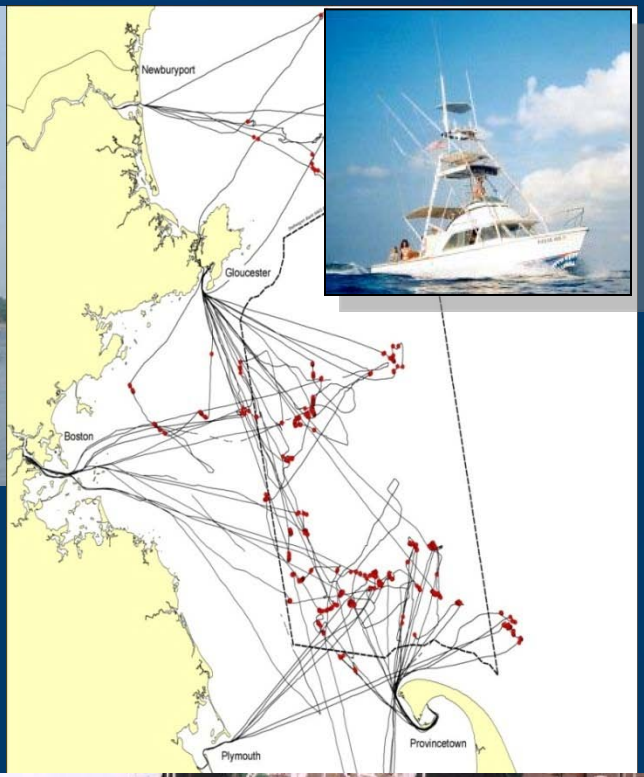


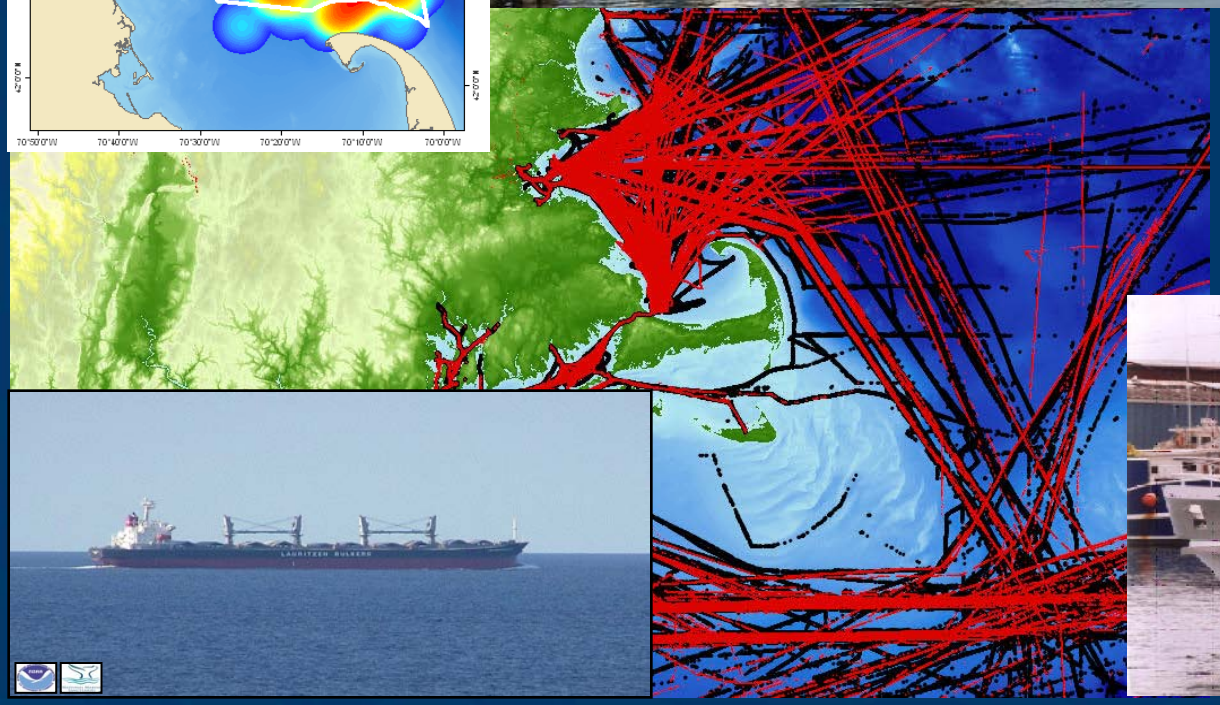
- Predicted reduction in a blue whale's communication range between ~1950 & today

Figures: B. Southall, US NOAA & C. Clark, Cornell University

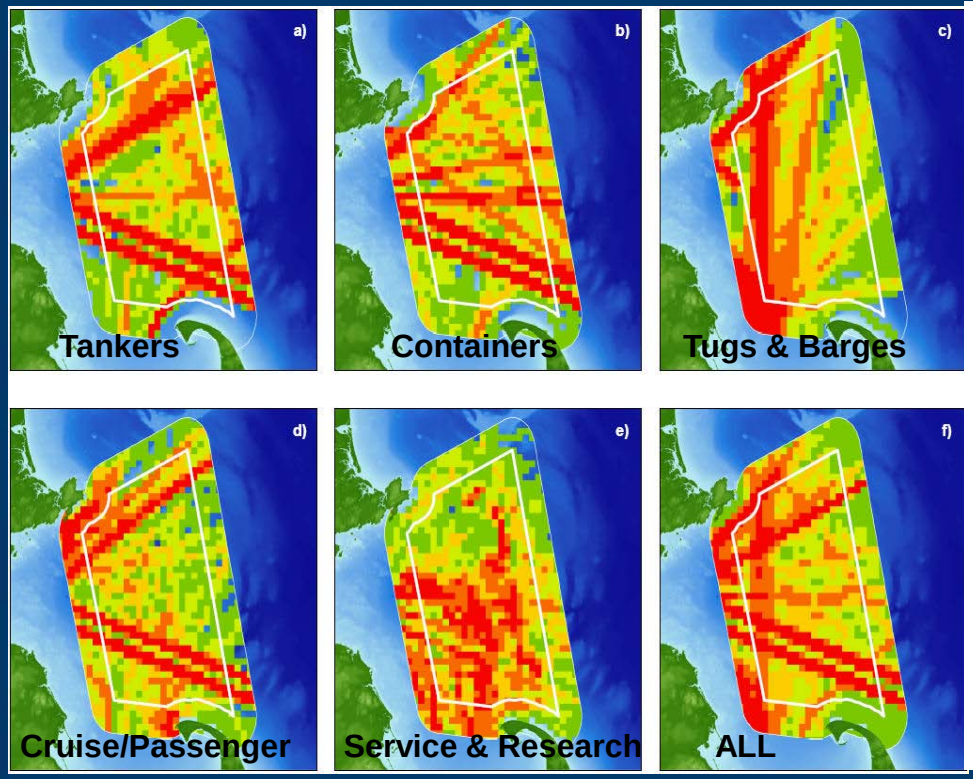
Gerry E. Studds Stellwagen Bank National Marine Sanctuary

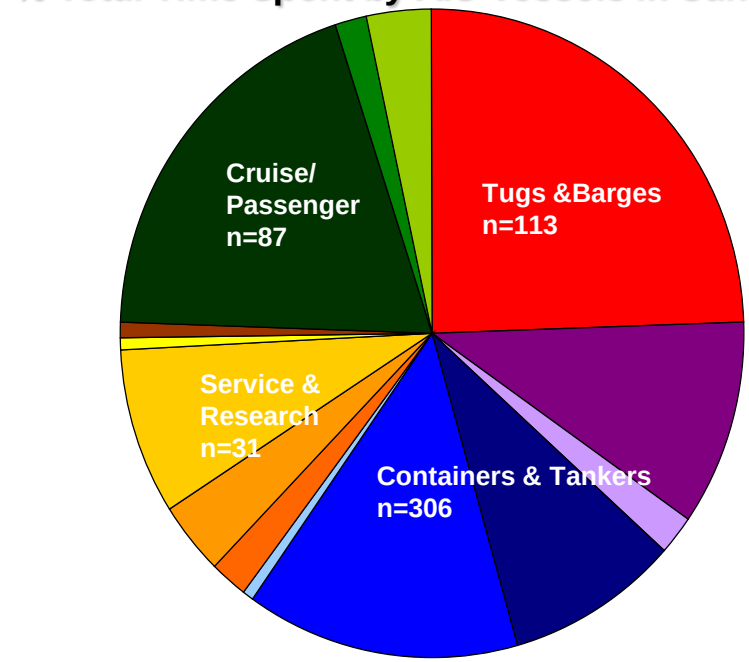






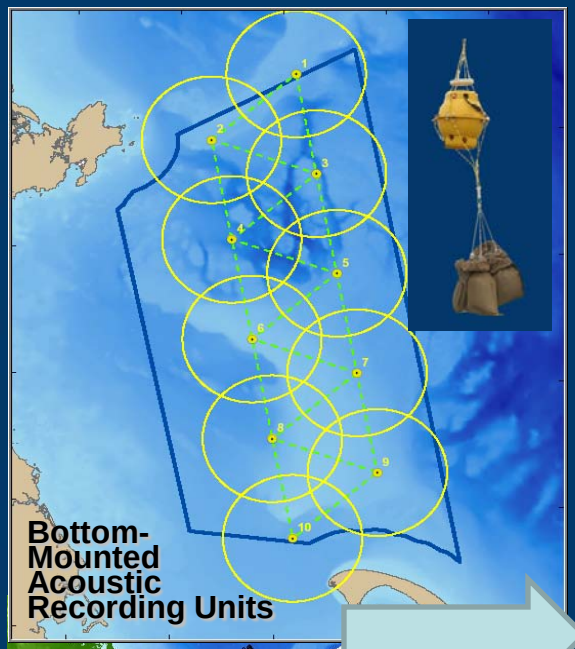
Shipping Noise: Variation in Space and Time

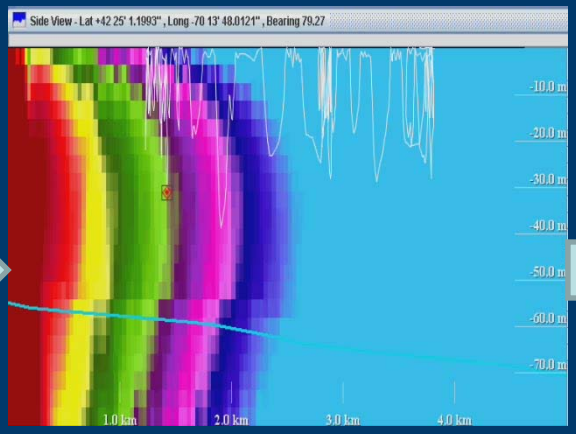




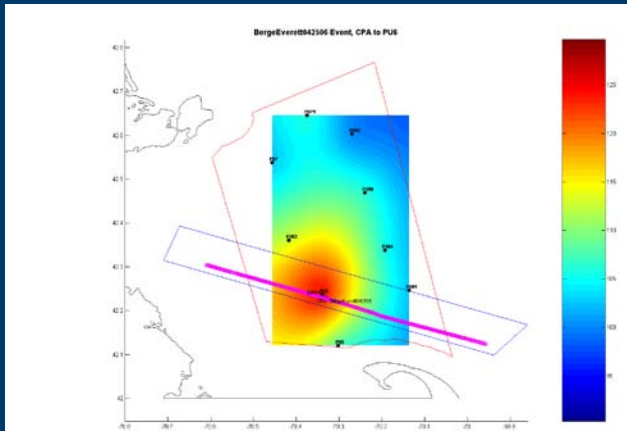
Hatch, Clark, Merrick, Van Parijs, Ponirakis, Schwehr, Thompson & Wiley (2008)
Environmental Management

Shipping Noise: Variation in Frequency and Amplitude

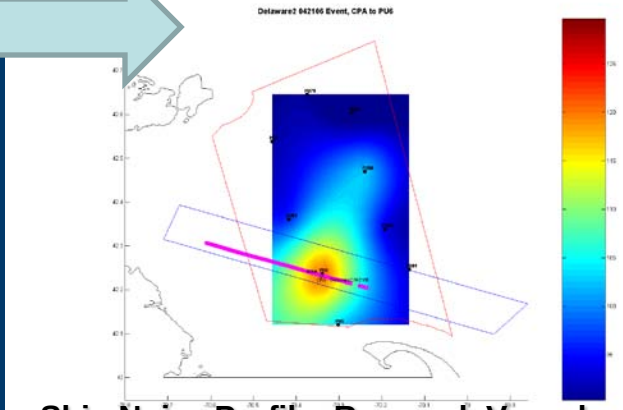




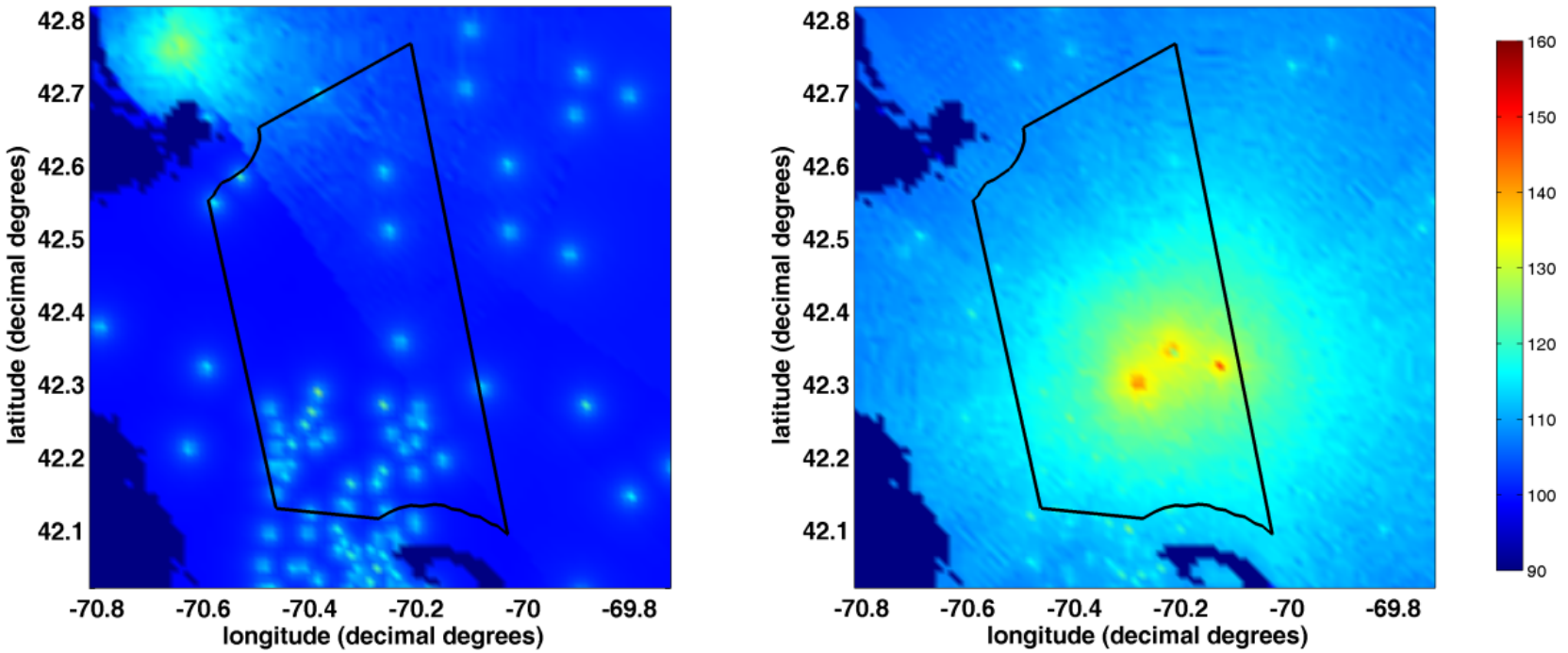
Acoustic Propagation Modeling



Ship Noise Profile: LNG vessel



Ship Noise Profile: Research Vessel



Received sound levels (71-224 Hz, dB re 1µPa) during a time with one distant (left) versus three central (right) AIS-tracked commercial ships.

Clark, Hatch, VanParijs, Ponirakis and Frankel (in prep)

CSA Historical Involvement

- Industry advisor on US delegation to IMO
- Involvement in marine ecosystem issues associated with normal operating scenarios
- “Lonely” marine industry representative on US federal advisory committee on Acoustic Impacts on Marine Mammals
- Steering Committee and presenter at both NOAA conferences (2004, 2007)

Federal Advisory Committee on Acoustic Impacts on Marine Mammals

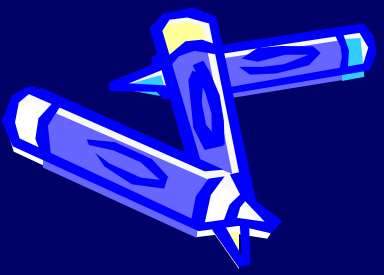
- Broad stakeholder representation (scientists, environmental groups, government, military, E&P, marine)
- Broad scope e.g. all sound producers
- Science based disagreements
- Sound producer based disagreements
- 90% agreement, but 10% disagreements
- Missed goal of consensus based report
- Caucus reports only

Marine Industry Caucus Report

- Refusal to engage in “finger pointing exercises” among sound producers
- Recognition of precautionary approach
- Recognition of need for future work but…
- Belief that current state of knowledge is sufficient to pursue possible solutions
- Need for international focus e.g. IMO
- Need for education of industry stakeholders

NOAA Outreach Conferences

- 2004 – focus on science and management
- 2007 – focus on vessel quieting technologies
- With few exceptions, both resulted in "preaching to the choir"
- Continuing need to outreach to entire industry (owners, naval architects)



Recent Developments

- MEPC 57 – March 2008 (US Information Paper)
- Hamburg Conference – April 2008
- MEPC 58 – October 2008 (Added as agenda item; correspondence group established)
- MEPC 59 – July 2009 (1st CG report)
- MEPC 60 – March 2010 (2nd CG report)
- ISO Working Group (all sources including commercial shipping)

International Workshop on Shipping Noise and Marine Mammals Held By Okeanos - Foundation for the Sea Hamburg, Germany, 21st-24th April 2008

- Stakeholders with expertise in the areas of underwater acoustics, naval architecture, marine engineering, ship building, marine mammal bioacoustics, marine operations, noise control, and international maritime and environmental law .
- Marine mammals are acoustic specialists and depend on sound for survival.
- Relationship between commercial shipping and the amount of underwater noise. Increased shipping results in increased ambient noise levels and thus negative impacts on marine mammals.
- This is a global problem. Sound propagation respects no jurisdictional boundaries….neither due marine mammals!

International Workshop (cont'd)

- Noise is non-persistent, therefore reduction of noise provides immediate benefits.
- Goal is to mitigate or eliminate the impacts of noise on marine mammals.
- **"To achieve this goal we call for initial global action that will reduce the contributions of shipping to ambient noise energy in the 10-300 Hz band by 3dB in 10 years and by 10dB in 30 years relative to current levels. This goal would be accomplished by reducing noise contributions from individual ships."**

MEPC Correspondence Group (US Chair – NOAA)

- Focus on definition of problem
- Consolidation of science
- Consolidation of technical (design) issues
- Now focusing on ship design and construction process to assess whether noise quieting is considered, where in process and by whom
- Includes survey of vessel owners, shipyards and modeling basins

Key Considerations

- Mariners are not marine biologists
- Mariners are not acoustical engineers
- Mariners generally are not aware of negative impacts of sound
- Mariners do want to operate in an environmentally responsible manner
- Progressive approach to assess alternative vessel designs

MEPC Expectations

- minimize the introduction of incidental noise from commercial shipping
- reduce potential adverse impacts on marine life
- emphasis on practical, effective solutions
- **develop non-mandatory technical guidelines on potential design and construction technologies**
- also look at potential navigation and operational practices

Ship Design and Construction

- Large customized vessels based on owner specifications (but note smaller vessels engaged in coastwise and offshore applications)
- Design criteria including propulsion systems, cargo capacity, operating equipment and economics
- Water borne noise generation is NOT yet a design criteria in new ship construction
- Reduced cavitation = increased fuel savings?
- Reduced GHG/CO2?
- Win/Win situation?

Sound Producing Activities

- Propeller cavitation
- Propulsion machinery including engines and power train
- Auxiliary machinery including generators, pumps, fans, blowers
- Cargo equipment
- Hydrodynamic flow over hull
- Depth finders

Ship Generated Noise Characteristics

- Ships as point source and collective contributors to background noise
- 85% of ship radiated noise due to excessive cavitation
- Geographic patterns depend on transoceanic and coastal routing
- Other variations due speed, load and onboard operations
- Sound respects no legal boundaries

Policy and Legal Considerations

- Variations in vessel and engine design
- Shipbuilding industry practices
- Existing international and national treaty, legislative and regulatory frameworks
- Legal jurisdictions e.g. high seas, EEZ, territorial sea

What's Next?

- Continue to quantify impacts
- Assess technological feasibility of possible solutions
- Assess economics associated with alterative design processes
- Integrate solutions into normal ship operating and design scenarios
- Pursue rational and cost effective solutions at IMO

WHERE IS THE KNOWLEDGE WE HAVE LOST IN INFORMATION?

T. S. Eliot

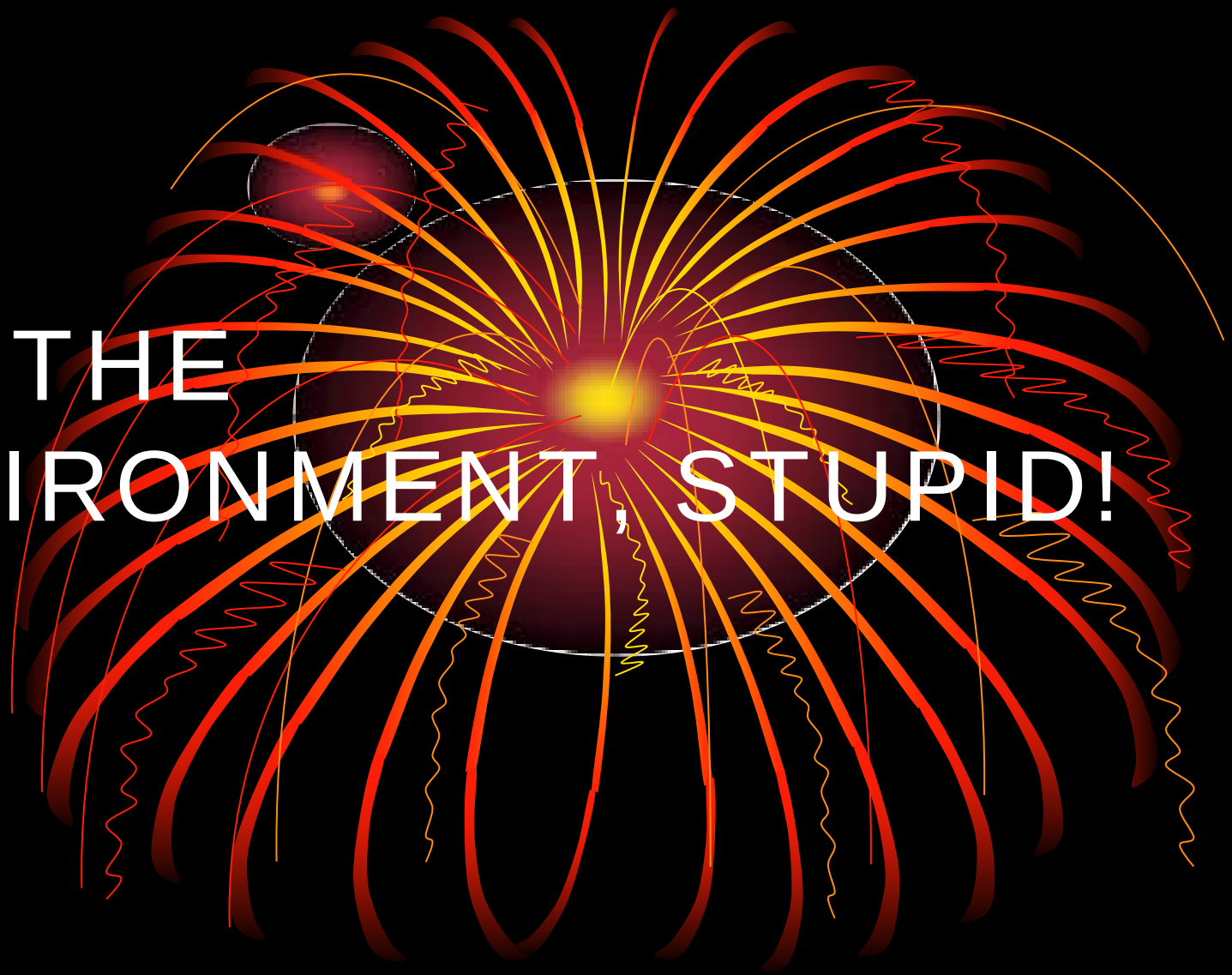
Marine Debris

What's the big deal?

- Perception that ocean's are limitless
- Garbage from one ship won't have an impact
- What about garbage from 120,000 ocean going ships?
- Hundreds of thousands of fishing vessels e.g. nets/fishing gear?
- Millions of recreational boaters?
- Annual cleanups note increasing volumes
- "garbage patch" in Eastern Pacific the size of Texas

MARPOL ANNEX V - Garbage

- NAS Study recommendations
- Work continues by Correspondence Group tasked by MEPC
- General support for prohibition of discharge of garbage and incorporation of waste minimization principles (paradigm change!!!)
- Outstanding issues include cargo residues, cargo hold wash water, adequate reception facilities and derelict fishing gear
- Also focus on need for adequate reception facilities globally



IT'S THE ENVIRONMENT, STUPID!

Kathy Metcalf

Particularly Sensitive Sea Areas (PSSAs)

- IMO created program
- Slow start, but ever growing number
- US instrumental in development of rigid guidelines for application (Lindy!!)
- Key component is linkage of that which is to be protected with appropriate protective measures

PSSAs (cont'd)

"an area that needs special protection through action by IMO because of its significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities"

- IMO resolution A.982(24)

PSSAs (cont'd)

- ecological criteria (unique or rare ecosystem, diversity of the ecosystem or vulnerability to degradation by natural events or human activities)
- social, cultural and economic criteria significance of the area for recreation or tourism)
- scientific and educational criteria (biological research or historical value)

PSSAs (cont'd)

- When approved, specific measures can be used to control the maritime activities in that area
- routing measures
- strict application of MARPOL discharge and equipment requirements for ships, such as oil tankers
- installation of Vessel Traffic Services (VTS)

PSSAs Where?

- Great Barrier Reef, and Torres Strait, Australia/Papua New Guinea (1990/2005)
- Sabana-Camagüey Archipelago, Cuba (1997)
- Malpelo Island, Colombia (2002)
- Sea around the Florida Keys, US (2002)
- Wadden Sea, Denmark/Germany/Netherlands (2002)
- Paracas National Reserve, Peru (2003)

PSSAs Where?

- Western European Waters (2004)
- Canary Islands, Spain (2005)
- Galapagos Archipelago, Ecuador (2005)
- Baltic Sea , Baltic Coastal States (2005)
- Papahānaumokuākea Marine National Monument, United States(2007)
- More in process!

AS FOR THE POSSIBLE HEREAFTER OF THE WHALES; A CREATURE EIGHTY FEET LONG WITHOUT STOCKINGS, AND THIRTY FEET ROUND THE WAIST BEFORE DINNER, IS NOT INCONSIDERATELY TO BE CONSIGNED TO ANNIHILATION.

Herman Melville

North Atlantic Right Whale Ship Strike Reduction Program

- vessels 65 ft or longer must travel at 10 knots or less in Seasonal Management Areas
- Dynamic Management Areas based on real time sightings
- East coast of the US

North Atlantic Right Whale Ship Strike Reduction Program

- Extensive NOAA outreach to all ocean users including…
- July 2008 NOAA sponsored workshop to ID and assess technlogies to reduce ship strikes
- Commercial maritime industry
- Fishing industry
- Recreational boaters
- Whale watching vessel operators

North Atlantic Right Whale Ship Strike Reduction Program

- Computer based interactive guide for commercial mariners
- Regular communications with industry for SMA and DMA notifications
- Automatic response to ship's entering SMAs
- Industry communication of DMAs globally

OCEANS OF HOPE

"Grand Teton"
Right Whale # 1145
Age: 40+
Mother of Seven, Grandmother of Four

"Lindy S. Johnson"
Right Whale Champion
Age: 40+
Mother of Ocean Protection

Grand Teton and Lindy Johnson
Two remarkable gals making right whale recovery happen!

CONTACT INFORMATION

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