

MASTER'S PROJECT

A Retrospective Policy Analysis: Investigating Public Influence on the 2012 Ballast Water
Management Regulations

by

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Executive Summary

The purpose of this Master's Project is to determine whether the public materially influenced the U.S. Coast Guard's Final Rule (FR) establishing federal regulations for the Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters, found in 33 Code of Federal Regulations Part 151, Subparts C and D, and to provide recommendations for improving public influence and for future regulatory changes to address ballast water management.

For nearly two decades, the dominant method of ballast water management has been to exchange ballast outside the U.S. Exclusive Economic Zone (EEZ) prior to entering U.S. waters (Geoffrion, 2015), though this procedure was not required outside the Great Lakes region. As a result vessels routinely discharged ballast water from foreign ports into the waters of the U.S., thereby introducing potentially harmful aquatic nuisance species (ANS) into local environments.

In an effort to resolve these problems, the U.S. Coast Guard published a notice of proposed rulemaking (NPRM) in the Federal Register in 2009 (74 FR 44632) seeking to make changes to the way ships calling on U.S. ports and waterways manage their ballast water, as a way to prevent the introduction and spread of ANS.

This project reviewed and analyzed over 2,000 comments submitted by the public during the comment period for this Coast Guard rulemaking (docket number USCG-2001-10486). Using NVivo software, these comments were categorized into common influence groups, or nodes: regulatory bodies, non-governmental organizations, maritime industry, ballast water treatment system manufacturers, and the general public. The language of the NPRM and FR were compared to identify significant changes, which were created as additional nodes and cross referenced against the influence groups to determine which groups' comments influenced those changes in the FR. The underlying assumption of this project was that any comment that suggested a change in the rule had potential to trigger a change in the rule.

After analyzing the data, a subject matter expert (SME) from each influence group was identified and interviewed to collect insight on whether he or she felt their influence groups' comments did or did not influence the FR. Additionally, each SME was given an opportunity to

provide recommendations for future policy or regulatory changes with respect to the management of ballast water.

To justify recommendations for future policy or regulatory changes, a policy analysis matrix was created to compare recommended policy alternatives made by influence group SMEs. These recommended alternatives were measured against a status quo, and three alternatives which were identified during the SME interviews.

Overall, we can conclude that the public did materially influence the language of the FR. However, if we consider each of the influence groups and measure their individual influence, we can identify gaps amongst all five groups. Collectively there was significant change as a result of the public's involvement in the rule making process, but if the goal is to increase the influence of public comments we must use these types of analyses to determine how to better understand and endeavor to accommodate stakeholder's interests while still meeting the stated policy goal.

In particular, based on the content of the comments received from the majority of members in the General Public influence group, and the scientific and systematic nature of the topics considered, there appears to be a disconnect between the topic and the level of knowledge of this influence group. Because of this disconnect it could be misperceived that its influence is not valued. It is important for decision makers to include and involve the public during the policy making process so they feel valued (O'Faircheallaigh, 2010), and are better informed about the policies being implemented.

Many of the recommendations in the comments, which were validated and emphasized during SME interviews, pointed towards a uniform standard that would be accepted both here in the U.S., and internationally. Though the Status Quo provides a standard, the requirements placed on the industry to achieve that standard are met with opposition due to the lack of available resources to comply. The argument for alternative policy options discusses the current availability of resources on the international market, which are already accepted by the U.S. yet do not meet the U.S. Coast Guard type approved standards and therefore would not be acceptable for compliance in the U.S.

If we consider the problem to be how we can reduce discharges of untreated ballast water from ships into the waters of the U.S., thus reducing negative impacts on the environment and coastal community economies, we must evaluate what is the best, most effective policy option that is equitable and efficient for all parties involved.

Assessing various policy options in this project, it was concluded that a policy option that allows industry to install BWMS that currently exist is not only an effective alternative, but is also equitable, and in the long run efficient. Each stakeholder's interests are met to some extent by implementing this policy, thus making it the best, most neutral policy option.

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Glossary of Terms and Abbreviations

AIS aquatic invasive species

APA Administrative Procedure Act

AMS alternate management system

ANS aquatic nuisance species

BWDS ballast water discharge standard(s)

BWE ballast water exchange

BWM ballast water management

BWMS ballast water management system(s)

BWTS ballast water treatment system(s)

COTP Captain of the Port

EEZ U.S. Exclusive Economic Zone

EIS Environmental Impact Statement

EPA U.S. Environmental Protection Agency

ESA Endangered Species Act

ETV Environmental Technology Verification

FR final rule

GRT gross register tons

GT gross tons

IL Independent Laboratory

IMO International Maritime Organization

MSC Marine Safety Center

NANPCA Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990

NBIC National Ballast Information Clearinghouse

NEPA National Environmental Policy Act

NIS nonindigenous species

NISA National Invasive Species Act of 1996

NPDES National Pollutant Discharge Elimination System

NPRM notice of proposed rulemaking

STEP Shipboard Technology Evaluation Program

UV ultraviolet radiation

VGP Vessel General Permit

Introduction

Aquatic nuisance species (ANS) are a global problem placing significant strain on the environment and the ecosystems within that environment. It has been estimated that by 2005, there were over 50,000 non-native species in the United States, including land based species (Pimentel, Zuniga, & Morrison, 2005). Evidence shows approximately 10,000 of those were considered to be ANS (U.S. Fish & Wildlife Service, 2012). Over time, these species have placed an economic burden on communities which rely on the ecosystem services provided by the waters in which these ANS continue to be introduced.

A primary culprit contributing to the introduction of ANS in waterways worldwide is ballast water. Vessels use ballast water to maintain stability while at sea and, though this is necessary for safe voyage and transport of goods, it poses “serious ecological, economic and health problems due to the multitude of species carried in ships’ ballast water” (International Maritime Organization, 2015). On average, twenty-one billion gallons of ballast water are being discharged into US waters each year (ANS Task Force, 2011). As ships depart one port, they take on or discharge ballast. Upon arrival at the next port they do the same, which is one way ANS are transported and introduced globally.

The impact of ANS has been recognized globally over the years, and many countries have taken various measures attempting to prevent future introduction. Because vessels are a major contributor to this issue, a plethora of regulatory requirements -- both domestic and international -- have been established and continue to change.

Water is a common form of ballast used on ships to maintain stability while transiting the globe. It is often times loaded or taken on in a port where the ship may have offloaded its cargo, and then discharged in the next port where it takes on new cargo. It is calibrated based on the cargo loading characteristics of the ship at any given time. Over the years the process of taking on ballast water in one port and discharging in another has had negative impacts on aquatic and marine ecosystems and infrastructures.

Some common examples of ANS include zebra mussels, European green crabs, and the comb jelly to name a few. In the Great Lakes, zebra mussels have wreaked havoc on the ecosystem by

competing with native mussels for food and habitat, costing the local municipalities millions of dollars in monitoring and eradication efforts (Britton, 2005). Likewise, the comb jelly has had significant economic impact on the fishing industry in the Mediterranean due to its diet of zooplankton, wiping out entire fish populations (GloBallast, 2014). Invasive species have been listed as one of four greatest threats to coastal and marine environments (GloBallast, 2014).

For nearly two decades, an acceptable method of ballast water management has been to exchange ballast outside the U.S. Exclusive Economic Zone (EEZ) prior to entering U.S. waters (Geoffrion, 2015). Other methods included retaining the ballast on board, discharging to a shore-side facility or using an acceptable alternative management system (AMS) as found in 33 Code of Federal Regulations (CFR), Part 151.2000 (Subpart D). These methods, however, were only enforceable in certain areas of the U.S., specifically the Great Lakes and St. Lawrence Seaway as described in 33 Code of Federal Regulations, Part 151.1500 (Subpart C). Throughout the remaining U.S. these methods were encouraged but not required, (Geoffrion, 2015). As a result, other than in the Great Lakes and the St. Lawrence Seaway, vessels were routinely allowed to discharge ballast water from foreign ports into the waters of the U.S.

Most recently, in an effort to resolve these problems, the U.S. Coast Guard published a notice of proposed rulemaking (NPRM) in the Federal Register in 2009 (74 FR 44632) seeking to define a uniform approach to BWM throughout U.S. waters that reduces the impact of ANS.

The Coast Guard received over 2,000 individual comments in response to the NPRM, some of which were addressed in the Final Rule (FR). It also held six public meetings throughout the contiguous U.S. where comments were collected. In March of 2012, after considering these comments, the U.S. Coast Guard issued a Final Rule (FR), as found in Docket # USCG-2001-10486, establishing Ballast Water Discharge Standards (BWDS) along with changes to the allowable ballast water management (BWM) methods as a two-phase process. These recent changes are considered Phase I, while Phase II will be delayed until further research and analysis can be completed.

The FR incorporates all ports and waterways of the U.S. and updates the BWM methodology to include the use of U.S. Coast Guard type approved ballast water management systems (BWMS),

while removing ballast water exchange outside the EEZ as an option, as explained in Section III of the preamble to the final rule. Additionally, AMS will no longer be an acceptable means of BWM once a grandfathering period has expired (33 CFR § 151.2026(c)). It is estimated these updated requirements will affect upwards of 8,000 ships calling on U.S. ports each year. This impact is evidenced in the large number of comments received as a result of the NPRM.

Background

U.S. Regulatory Process

The general process for creating federal regulations begins with determining if the regulation is needed. The agency that seeks to create or change a regulation researches the issue and drafts a proposal. This step in the process is called a Notice of Proposed Rule Making (NPRM). This proposal is published in the Federal Register and allows for members of the public to provide comments pertaining to the proposed regulation. It is during this time the public has an opportunity to influence the regulation being proposed. There are no restrictions on who can provide comments, and often a wide range of public and private entities will respond.

Once the comment period closes, the agency proposing the regulation reviews and considers the comments submitted and makes any necessary revisions to the language. These changes are then published in the Federal Register as a final rule, which are then codified and added to the Code of Federal Regulations (CFR). All related documentation, comments, etc. are added to the official docket which is publicly available and searchable (United States, 2015).

U.S. Regulatory History

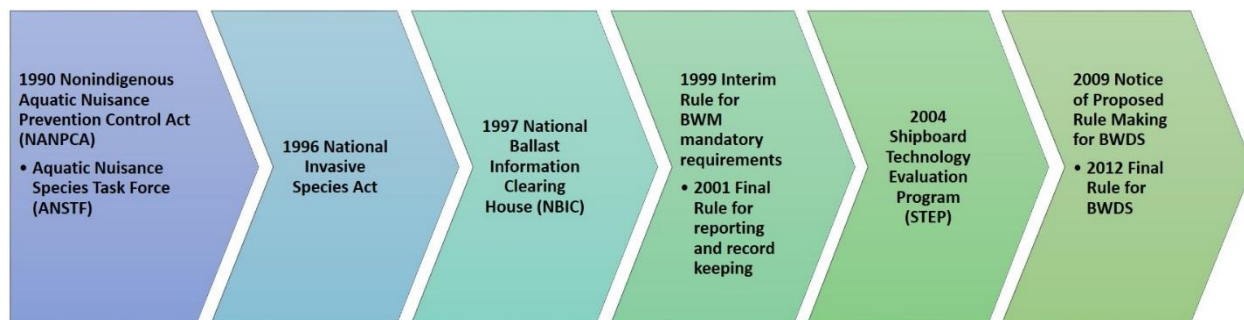


Figure 1. Timeline of US Regulatory History of Ballast Water Management

With the growing population of zebra mussels in the Great Lakes during the 1980s, U.S. leaders recognized a need for some form of collaboration and regulatory response to this influx of ANS. In 1990, Congress enacted the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990. The intent of this new legislation was to establish regulatory jurisdiction over Ballast Water Management practices of vessels entering the Great Lakes that may discharge ballast water from other locations, and subsequently introduce nonindigenous species into those waterbodies (United States, 1990).

An important component to the NANPCA was the creation of the Aquatic Nuisance Species Task Force (ANSTF). Within the NANPCA, section 1201 established the specifications and guidelines by which the ANSTF would operate. The role of the ANSTF was, and still is, to prevent and control ANS through the NANPCA, while coordinating efforts with state, local, non-governmental, academia, and private sectors (U.S. Fish & Wildlife Service, 2012). The ANSTF is charged with, among other things, conducting studies and research to monitor current ANS in an effort to prevent future spread and introductions (16 USC § 4722).

As various ANS populations continued to grow and introductions of new species were identified, the NANPCA was amended and reauthorized as the National Invasive Species Act (NISA) of 1996. This amendment and rebranding expanded the NANPCA to include various other invasive species and created a national ballast water management program that would encompass all waters of the U.S., requiring all vessels to submit ballast water management reports (Corn & Johnson, 2013). The NISA also opened the door to global collaboration with foreign governments in an effort to develop consistent and equal ballast water management programs (16 USC § 4711(i)). It was at this time that the Coast Guard was tasked with leading a study to assess the effectiveness of shore-side ballast water facilities in preventing introductions of ANS by coastwise crude oil tankers calling on ports in Alaska (16 USC § 4711(k)(3)). In addition to several other studies, the NISA also established “civil and criminal penalties for certain violations” (16 USC § 4711(g)).

The requirement for submission of reports in the newly established NISA led to the Coast Guard and the Smithsonian Environmental Research Center’s (SERC) creation of the National Ballast

Information Clearinghouse (NBIC) in 1997. The role given to the NBIC is to collect and analyze ballast water management reports from vessels calling on U.S. ports, and to make the data available to the public. Reports submitted to the NBIC include information such as: type of ballast water management practice used, amount of ballast water loaded and/or discharged, and location of the loading and/or discharge. The data collected are used to track trends in shipping activities pertaining to ballast water management, which helps in determining best management practices and developing innovative methods for preventing future invasion and spread of ANS (National Ballast Information Clearinghouse, 2016).

In addition to facilitating the study of ballast water facilities, the Coast Guard was charged as the agency that would create the regulations and guidelines mandated by the NISA. After setting up the NBIC the Coast Guard began the regulatory process, publishing an Interim Rule in the federal register in 1999. This rule, titled "Implementation of the National Invasive Species Act of 1996", established the mandatory requirements for ballast water management reporting and record keeping, and provided voluntary best management practices for ballast water management on vessels who would enter U.S. waters after operating beyond the Exclusive Economic Zone (EEZ). After some changes, the final rule was published in the federal register on November 21, 2001 and was later codified in 16 USC Chapter 67.

After roughly five years, the Coast Guard submitted its first ballast water management report to Congress, using the data and analysis collected since the establishment of the NBIC (Geoffrion, 2015). What the report captured was the low compliance rate with the mandatory reporting requirements, which subsequently failed to produce an accurate depiction of the voluntary ballast water management program. As such, the Coast Guard was directed to return to the drawing board and continue taking actions to reduce issues associated with ANS (United States Coast Guard, 2004).

Upon receiving this direction, the Coast Guard began working on four separate projects pertaining to ballast water management:

1. Implement regulations to meet the mandates found in the NISA that allowed for penalties to be assessed on those parties who failed to submit ballast water management reports and maintain proper ballast water management records.
2. Make changes to the already established voluntary guidelines, making them mandatory for all vessels constructed with ballast tanks.
3. Promote development of innovative shipboard ballast water treatment systems, a completely voluntary and experimental program that continues to be facilitated today.
4. Develop a ballast water discharge standard (BWDS) that would determine “whether alternative BWM methods are environmentally sound and effective at preventing introduction of ANS” (United States Coast Guard, 2004).

In 2004 the Coast Guard implemented a voluntary Shipboard Technology Evaluation Program (STEP). This was the third of four projects the Coast Guard committed to implement after receiving direction from Congress to take further actions on preventing ANS in U.S. waters (United States Coast Guard, 2004). The program was intended to prompt manufacturers of ballast water treatment systems to develop and test their designs in an experimental setting. Vessel owners and operators who agreed to install these systems on board their vessels were monitored and evaluated to determine the effectiveness of their chosen system, and received certain regulatory exemptions pertaining to ballast water management while enrolled in the program (United States Coast Guard, 2004). Unfortunately, for reasons unknown, this program has not gained much traction as there are currently only four vessels enrolled in the STEP (United States Coast Guard, 2015).

Federal regulations remained stagnant for many years following the 2001 codification of the ballast water management regulations after enactment of the NISA. As a result, many states began establishing their own ballast water management laws and even went so far as putting into place BWDS that were more stringent than any existing federal or international regulation. It was not until the NPRM in August of 2009 that there was movement from the federal government. After two months of receiving comments and holding public meetings, the Coast Guard extended the comment period to the end of the year, and in December of 2009 the NPRM comment period ended (United States, 2009). It would take the Coast Guard two and a

half years to review and consider those comments and publish the final rule in the federal register.

International Regulatory History

While the United States considered ways to address ANS, the global impact from aquatic species invasions was becoming equally significant. In the late 1980s the International Maritime Organization's (IMO) Marine Environment Protection Committee (MEPC) was made aware of the invasive problems in international waters and became the facilitator for future guidelines and policies pertaining to mitigating the ANS issue on a global scale (International Maritime Organization, 2016).

The IMO works under the United Nations (UN) umbrella as a specialty agency focused on establishing standards in safety, security and environmental performance as they pertain to the global shipping arena. An example of those established standards includes Safety of Life at Sea (SOLAS) which provides standards for safety equipment and practices on board ships, anywhere from types of lights on lifejackets to how many navigational radars a ship should carry based on its gross tonnage, among many other things. Being influenced by its Member States, the international public and the shipping industry, the IMO establishes various standards in an effort to "protect the sea from the people, and the people from the sea" (Winter, 2010).

The framework for preventing ANS or invasive species on a global level in a collaborative manner is found in the UN Convention on the Law of the Sea (Article 196) (International Maritime Organization, 2016). It is this convention that requires:

"States to work together to prevent, reduce and control pollution of the marine environment including the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto" (International Maritime Organization, 2016)

It is with this direction that MEPC began to lead an international effort against ANS. In 1991, resolution MEPC.50 (31) was adopted, creating international guidelines for preventing invasive aquatic species (IAS) from being introduced via ships' ballast water discharged in various ports and waterways (International Maritime Organization, 2016). The issue and efforts by MEPC and

the IMO gained support from the UN at the Conference on Environment and Development (UNCED) where they listed ANS as a “major international concern” (International Maritime Organization, 2016).

With the momentum and support of the UN, the IMO continued building on this foundational convention. Over the next thirteen years it aggressively sought to develop an international treaty that would not only provide guidelines to the shipping industry, but also establish global standards for the management of ballast water. This collaborative document was titled the International Convention for the Control and Management of Ships’ Ballast Water and Sediments (BWM Convention) and was presented and adopted during a conference in 2004 (International Maritime Organization, 2016).

This new Convention would require implementation of ballast water management plans, record-keeping of ballast water management practices, and various other standards related to ballast water management (International Maritime Organization, 2016). A key component of this Convention was the language pertaining to ballast water discharge standards (BWDS) and approval of ballast water treatment systems (BWTS). This language would later set the stage for the Coast Guard’s proposed Phase I standard and NPRM in 2009.

Though many of the States were in agreement with the BWM Convention, it could not be entered into force until twelve months following ratification by thirty of the States who hold at least thirty-five percent of the world’s shipping tonnage (International Maritime Organization, 2016). As of December 2015, forty-seven countries had ratified the convention, however the tonnage numbers are still being calculated (International Maritime Organization, 2015). If these calculations meet the thirty-five percent tonnage requirement, the Convention could enter into force as soon as November 2016 (International Maritime Organization, 2015). Though the U.S. has not ratified the Convention, the language in the U.S. Coast Guard’s NPRM parallels that of the Convention.

Public Influence

The term *public* in the regulatory process includes anyone who has an interest in the regulation being proposed. Black’s Law Dictionary defines public as “Pertaining to a state, nation, or whole

community; proceeding from, relating to, or affecting the whole body of people or an entire community. Open to all; notorious. Common to all or many; general; open to common use” (Black's Law Dictionary, 2016). In the case of public influence, anyone who deems themselves affected by the regulation can be considered a member of the public and provide their comments. This includes both domestic and foreign members of the public.

Research shows benefits of involving the public in the regulatory process, specifically in the environmental policy arena. Many times regulators are not at the forefront of the environmental problems their policies intend to improve or solve. Casting a wide net and including the public in the decision making process presents opportunities for harnessing specific knowledge and expertise while expanding solution possibilities (O'Faircheallaigh, 2010).

When the public is given the opportunity to provide input to decision makers on policy changes they have a vested interest in the outcome. Additionally, by providing input they may gain a sense of community and be more inspired or motivated to act as champions for compliance of the newly established policies. Contrarily, if the public feels their input wasn't considered this could be detrimental for the decision makers in achieving compliance with new policy changes. It is important for decision makers to include and involve the public during the policy making process so they feel valued (O'Faircheallaigh, 2010).

Materials and Methods

The purpose of this Master's Project is to determine whether the public materially influenced the U.S. Coast Guard's Final Rule (FR) establishing federal regulations for the Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters (Department of Homeland Security, 2012), and to provide justified recommendations for future regulatory changes with respect to ballast water management.

This project reviewed and analyzed over 2,000 comments submitted by the public during the comment period for the FR (docket number USCG-2001-10486). Using NVivo software, these comments were categorized into common influence groups, or nodes: regulatory bodies, non-governmental organizations, maritime industry, ballast water treatment system manufacturers, and the general public. The language of the NPRM and FR were compared to identify significant

changes, which were created as additional nodes and cross referenced against the influence groups to determine which groups' comments influenced those changes in the FR. The underlying assumption of this project was that any comment which suggested a change in the rule had potential to trigger a change in the rule.

Once these data were evaluated and analyzed, a subject matter expert (SME) from each influence group was identified and interviewed to collect insight on whether they felt their influence groups' comments did or did not influence the FR. Additionally, each SME was given an opportunity to provide recommendations for future policy or regulatory changes with respect to ballast water management.

Analysis of Influence Groups and their Impact on the FR

Data Analyses and Results

Though the docket contained 481 entries totaling over 2,000 individual comments, a percentage of these predated the 2009 NPRM. Additionally, a small percentage of these were submitted in response to the Environmental Impact Statement (EIS). The U.S. Coast Guard point of contact for the docket confirmed that these entries and comments were not considered in the 2012 Final Rule (Morris, 2016), and as such they were not included in the analysis of public influence for this project. In total, 429 entries and their subsequent comments were analyzed.

Influence Groups

The first step of this project was to categorize the comments from the public and divide them into influence groups to determine which might have had the most impact or influence on the FR. These comments were captured and categorized into five major influence groups.

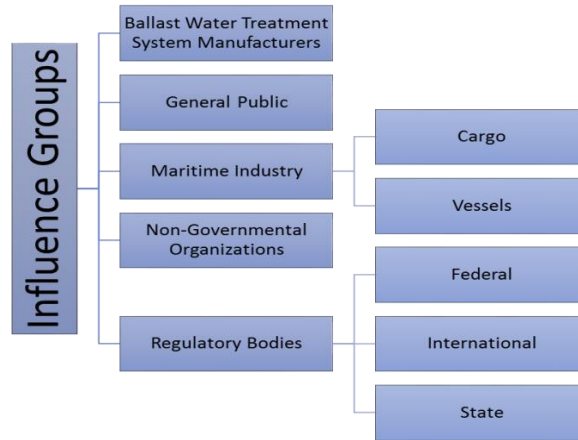


Chart 1. Influence Groups and sub-groups

The *General Public* influence group, ranged from the average community member to members of academia. The majority of the comments placed into the influence group were from homeowners in or near the Great Lakes region. A common complaint seen within their comments was the timing of implementation. The majority of these commenters wanted the U.S. Coast Guard to act immediately rather than provide a phase-in period. Additionally, a common recommendation was for zero tolerance in terms of a BWDS.

The *Ballast Water Treatment System Manufacturers* influence group included domestic and foreign companies who are involved in testing, developing and installing various types of BWTS both on land and on ships. The comments they provided primarily discussed the Phase II standards, arguing no technology exists to meet the proposed standards, which would subsequently render the new regulation un-enforceable. The majority, if not all, of the comments confirmed that the Phase I standards could be met with the currently technology on the market and the new technology being developed.

Similarly to the General Public influence group, *Non-governmental Organizations* included members of the community from the Great Lakes region, representing various demographics. Their comments were similar to those of the General Public influence group, however, their arguments and suggestions carried more statistical and scientific data to support their position on the NPRM than the General Public's comments had. In the end, their main arguments paralleled the General Public group:

- do not delay the implementation date, and
- zero tolerance BWDS.

The remaining two influence groups: the *Maritime Industry* and *Regulatory Bodies*, were broken down internally into sub-groups due to the broad categories in which the commenters were placed.

The Maritime Industry influence group consisted primarily of commenters who were owners and operators, representatives of trade organizations, and special interest groups or councils. Depending on where their primary interests were focused, this influence group was divided into the Vessels or Cargo sub-groups.

The primary concerns from the Vessels sub-group included the costs surrounding implementation and the lack of grandfathering upon implementation of the Phase II Standard. Many vessel owners and operators argued that if they installed systems under the Phase I Standard, and a Phase II Standard was implemented shortly thereafter, they should be grandfathered into the Phase II. Otherwise it would not be cost effective to implement the BWDS under either of the phases.

The Cargo sub-group's primary concerns involved the potential loss of revenue from clients affected by the BWDS. Because of the costs associated with implementing the new rules, they feared some vessel owners and operators would be shut down which would directly impact their businesses. They also argued in favor of a grandfathering clause that would allow their clients who install BWTS during Phase I to remain using those systems once Phase II Standards were implemented.

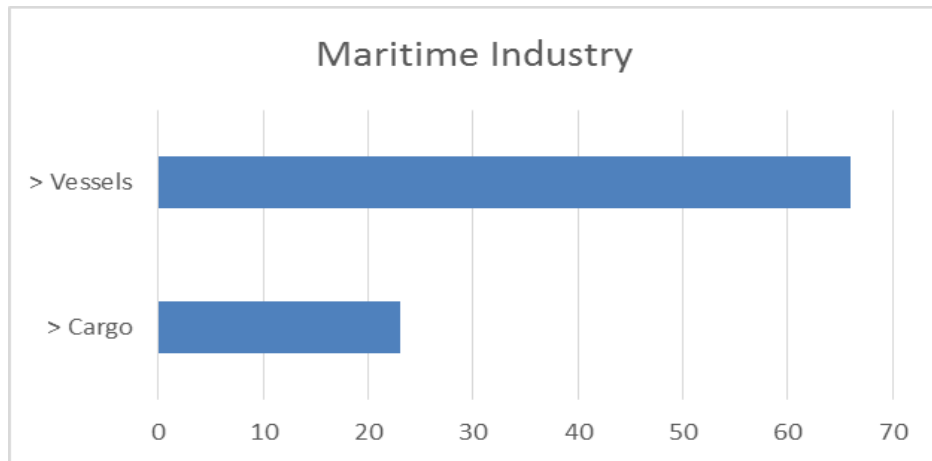


Figure 2. Breakdown of Maritime Industry sub-groups by # of comments

The Regulatory Bodies influence group was broken into three sub-groups: Federal, State, and International. This group consisted of commenters who might play the role of a regulator in some way shape or form. With this particular type of rulemaking, there was a clear delineation in the comments provided by the three sub-groups. It was within this particular influence group that politics came into the picture. There were few comments from within the Federal Government, but those that did provide comments pertained mostly to the competing demands of other regulations that would be impacted by a BWDS regardless of Phase I or Phase II.

There were very few comments from the International sub-group, and those that did participate or provide comments consistently referenced the IMO’s BWM Convention and urged the U.S. Coast Guard to follow the standards set forth in that Convention in an effort to create one international standard across the board. The majority of the comments from this influence group were provided by the State sub-group. The demographics of the State sub-group ranged from the Midwest and Great Lakes region, to as far as California and New York.

Their concerns were primarily related to reducing the proposed time frame for conducting practicability reviews, enforcement of the new requirements, and showed opposition to delaying compliance for new vessels.

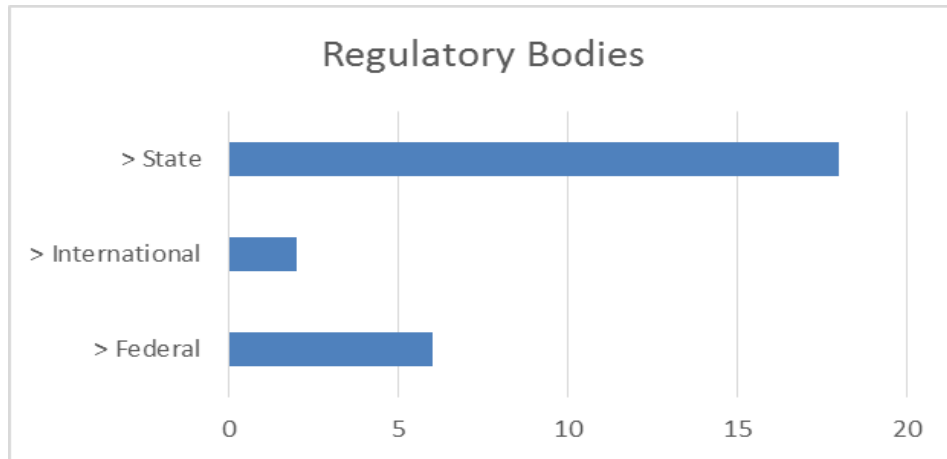


Figure 3. Breakdown of Regulatory Bodies sub-groups by # of comments

Top Three Influencers

While categorizing the comments into Influence Groups, it was found to be beneficial to identify the top three influencers by the number of comments submitted to the docket. Figure 3 provides a visual of the three highest commenting groups for this particular NPRM and FR, highlighted in green.

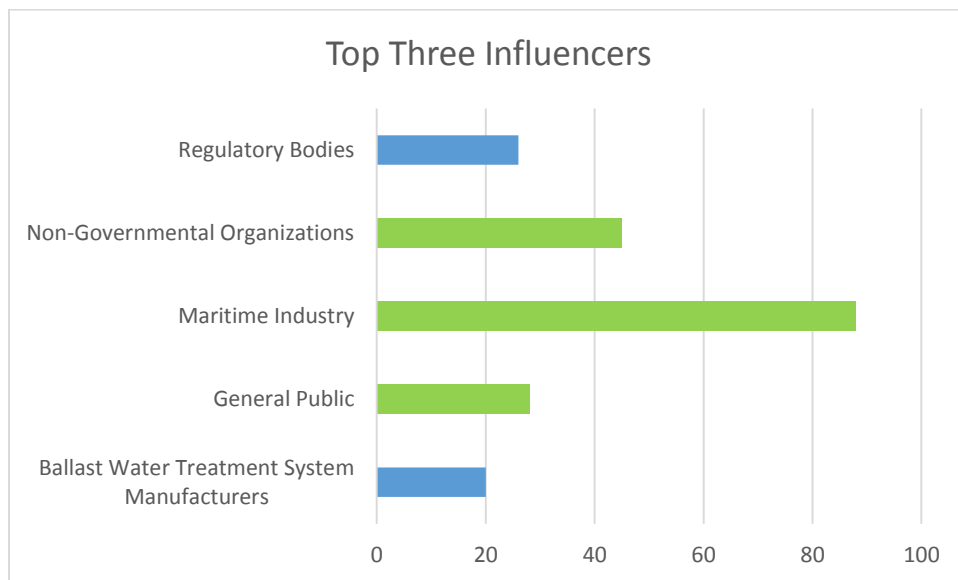


Figure 4. Top Three Influencers in the FR by # of comments

Changes made in the Final Rule

In the NPRM, the U.S. Coast Guard posed multiple, specific questions pertaining to changes and new policies it was proposing in regard to ballast water management. A significant change to the status quo at that time would be implementation of a ballast water discharge standard (BWDS). The proposed language divided the BWDS into two phases. The first phase, Phase I Standard, set discharge standards that mirrored the IMO's BWM Convention. The Phase II Standard was much more stringent and followed proposed state rules. Both phases of the BWDS were given implementation dates, however, if the Phase II Standards were shown to not be feasible after a practicability review due to lack of appropriate technology, the U.S. Coast Guard would revisit the implementation dates (NPRM, 74 FR 44632, 2009).

Other proposed changes or updates added to the NPRM included applicability and the approval process for ballast water management systems (BWMS). The U.S. Coast Guard proposed to apply the new BWM regulations as follows:

- *Vessels that operate in U.S. waters and are equipped with ballast tanks, unless they are in innocent passage. (As per 33 CFR § 151.2020, vessels in innocent passage are those foreign vessels that are merely traversing the territorial sea of the United States, unless bound for, entering or departing a U.S. port or navigating the internal waters of the U.S.)*
- *By statute, the following vessels are exempted from Coast Guard BWM regulations:*
 - *crude oil tankers engaged in coastwise trade, and*
 - *vessels of the U.S. Armed Forces as defined in the Federal Water Pollution Control Act (33 U.S.C. § 1322(a)) subject to the Uniform National Discharge Standards for Vessels of the Armed Forces (33 U.S.C. § 1322(n)). 16 U.S.C. § 4711(c)(2)(J), (L).*
- *By discretion, the proposed rulemaking would not apply to vessels that operate exclusively in one Captain of the Port Zone, due to the short nature of these voyages.*

Within the discussion of the approval process for BWMS, the U.S. Coast Guard proposed efficacy testing standards that would be conducted both on land by Independent Laboratories,

and shipboard to confirm the operating capabilities of the installed systems (U.S. Coast Guard, 2009). The proposal also emphasized compliance with the EPA's Vessel General Permit requirements under the Clean Water Act. These requirements are not specifically addressed in this project, but drew much attention in the public comments. Finally, there was a general discussion regarding a potential process for gaining U.S. approval of existing foreign type-approved systems (U.S. Coast Guard, 2009).

Within the FR, the U.S. Coast Guard highlighted and summarized the major changes that were adopted based on comments from the public. Additionally it provided a full discussion of the comments found further on in the FR.

A significant change from the NPRM to the FR was the removal or deferral of the proposed Phase II Standard (Department of Homeland Security, 2012: compare FR Preamble, Section V.A.1 with NPRM Preamble, 2009, Section V.B). This deferral provides an opportunity for the U.S. Coast Guard to further assess the availability and practicability of more protective BWMS, while allowing more time for accurate and appropriate cost benefit analyses to be conducted which were nearly impossible to address at the time the NPRM was published due to the lack of available technology and data (Department of Homeland Security, 2012).

The NPRM addressed timelines for practicability reviews that reflected on the implementation of the Phase I and Phase II Standards, but, because the Phase II Standard was deferred, the practicability reviews and their respective timelines were removed (Department of Homeland Security, 2012: compare FR Preamble, Section V.A.2 with NPRM Preamble, 2009, Section V.D.4). The FR did require the U.S. Coast Guard to publish a practicability review that would draw on the anticipated BWMS approval application packages submitted between the FR release date and January 1, 2016 and would consider numerous factors to include economic and environmental safety feasibility (Department of Homeland Security, 2012: FR Preamble, Section V.A.2).

The proposed applicability discussion drew attention from vessels who operate solely on the inland waters of the U.S. or work in coastwise trade, who were previously not included in the applicability pertaining to BWM. The FR clarified the applicability by dividing the types of

vessels into two categories – those vessels who already comply with ballast water exchange, and seagoing vessels who do not operate outside the EEZ, take on and discharge ballast water in multiple Captain of the Port zones, and are greater than 1,600 gross register tons (Department of Homeland Security, 2012: FR Preamble, Section V.A.3).

Previous regulations included exemptions for vessels that operated in one Captain of the Port (COTP) zone. These exemptions pertained specifically to BWM reporting and recordkeeping requirements. The language within the NPRM on this particular topic created confusion, though the intent was to state that all vessels meeting the previous exemptions would be exempt from meeting the BWDS requirements in addition to the reporting and recordkeeping requirements. In the FR, the change and appropriate language for the exemptions for these vessels is captured in the applicability section, to wit: vessels that operate in one COTP zone are exempt from the BWDS standards and reporting and recordkeeping requirements (Department of Homeland Security, 2012).

In the NPRM the U.S. Coast Guard set a compliance date of January 1, 2012 for new vessels to install Coast Guard type approved BWMS, yet, due to the anticipated lack of approved BWMS, the FR extended that date to December 1, 2013 (Department of Homeland Security, 2012). At the time of this research project, a Coast Guard type approved BWMS has yet to be put on the market and as such in February 16, 2016 the U.S. Coast Guard has issued over 4,000 extensions for compliance with this new requirement (U.S. Coast Guard, 2016).

The remaining topics that were analyzed were not all necessarily changes from the NPRM to the FR, but in some cases were additions to the language of the FR based on public comments. These additional topics included requirements for sampling ports on overboard ballast water discharge pipes to assist in the enforcement process, reducing the proposed shipboard testing time period for the installed BWMS from twelve months to six months, removing multiple geographic location testing requirements for the shipboard testing, and reducing the amount of test cycles that would be required for the shipboard testing (Department of Homeland Security, 2012: FR Preamble, Section V.A.9).

Top Three Changes

While cross-referencing the Influence Groups to the changes in the FR, it was found to be beneficial to identify the top three changes based on the total number of comments across all interest groups. Figure 5 identifies three changes that received the highest number of comments, highlighted in green.

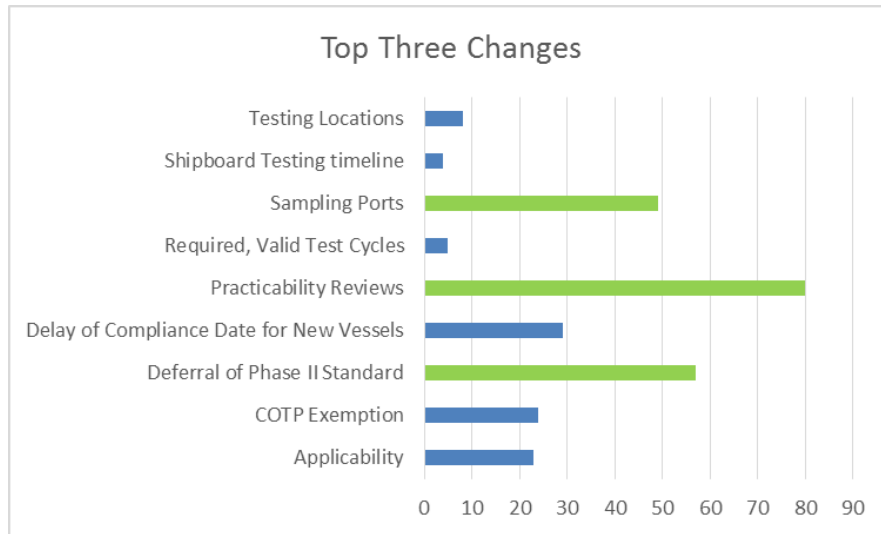


Figure 5. Top Three Changes in the FR based on # of comments provided

Influence Groups vs. Changes

Each of the previously mentioned changes made to the FR were cross-referenced against the comments provided by the public. The following figures represent an overall look at the changes made vs. the influence that each group had on those changes, and then a breakdown of each individual influence group's measurement of comments associated with each change to the FR.

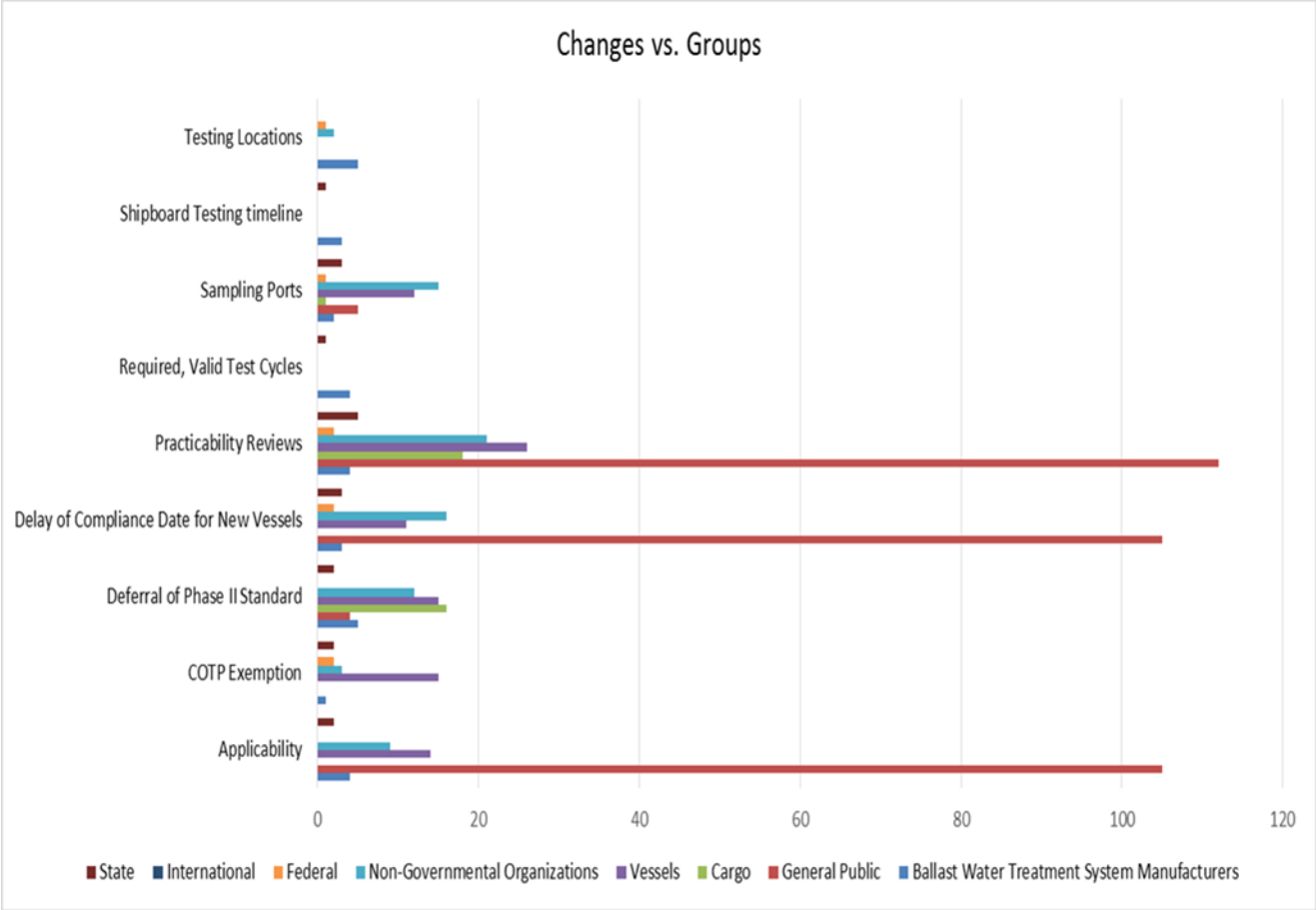


Figure 6. Correlation of all changes vs. all groups

Ballast Water Treatment System Manufacturers

Figure 7 shows the Ballast Water Treatment System Manufacturers influence group and the extent to which its comments influenced each of the changes. Though it could be considered one of the smaller influence groups in terms of the number of comments, it contributed to or had influence on each change in some way as shown below, with the most significant amount of comments contributing to the deferral of the Phase II Standards, and testing location changes. Based on the comments provided and the interview conducted with the BWTS Manufacturers SME, these data were positively validated, meaning that these data reflected the areas or changes in which the SME’s influence group had some impact.

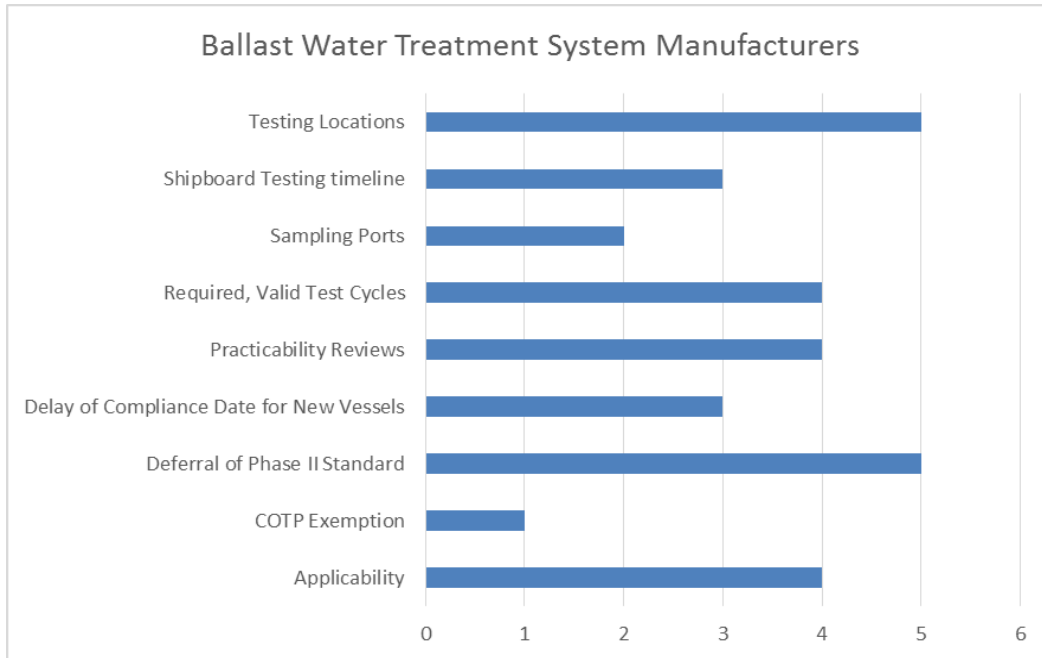


Figure 7. Correlation of comments on changes, made by BWTS manufacturers

General Public

The General Public influence group registered in the middle in terms of ranking and number of comments in response to the NPRM. In contrast to the BWTS Manufacturers, there is a clear indication in Figure 8 as to what the General Public influence group was most concerned with. The majority of this influence group's comments were in opposition to delays in compliance for new vessels, and they were not in favor of practicability reviews, yet their numbers for these changes to the FR were fairly significant compared to the other four influence groups.

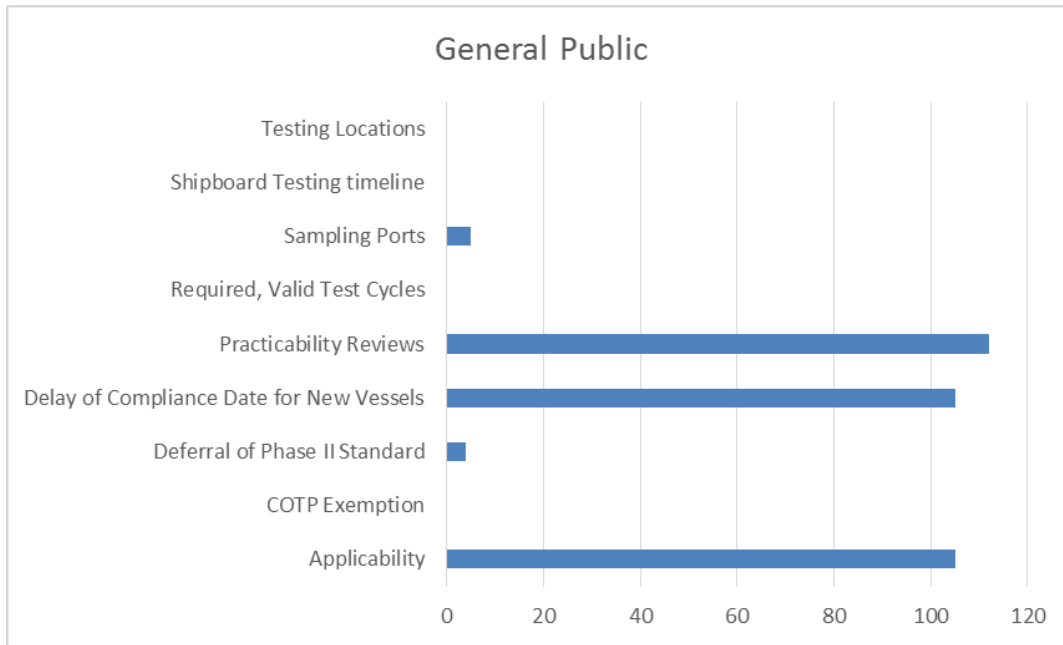


Figure 8. Correlation of comments on changes, made by the General Public

Maritime Industry – Vessels and Cargo

The Maritime Industry influence group was found to be the most vocal in terms of the number of comments provided in response to the NPRM. The delineation between vessel and cargo comments and influence within the Maritime Industry influence group is shown in Figure 9. Practicability reviews are shown to be of most concern to both vessels and cargo commenters which was validated by the Maritime Industry SME to have had significant influence on the FR. The changes to the deferral of the Phase II Standards, COTP exemptions, and applicability received fairly consistent comments from the vessel commenters, however, the cargo commenters were mainly concerned with the deferral of Phase II Standards and Practicability Reviews. This could be attributed to the implications of a Phase II Standard implementation on the cargo industry, as these vessels are their clients.

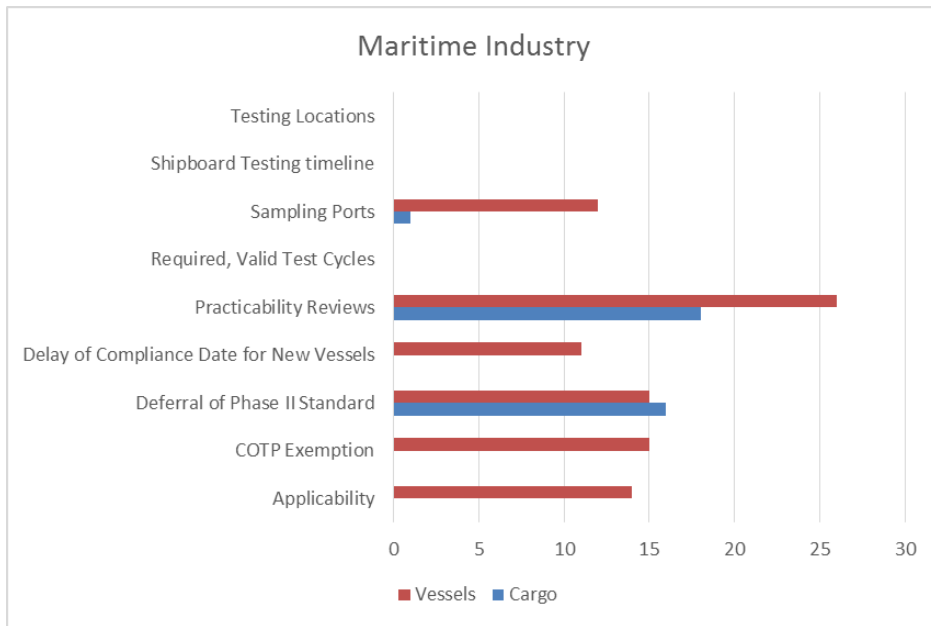


Figure 9. Correlation of comments on changes, made by the Maritime Industry

Non-Governmental Organizations

The Non-Governmental Organizations influence group came in just under the Maritime Industry influence group in terms of number of comments in response to the NPRM. The measurement of their concerns is displayed in Figure 10, and was similar in nature to that of the General Public influence group. The majority of their comments were in support of a Phase II Standards, and in opposition to delays in compliance for new vessels, as well as practicability reviews. They also provided comments questioning how the BWDS would be enforced, which triggered the addition of a Sampling Port requirement in the FR.

Their concerns with applicability were consistent with the General Public influence group in that they were unsupportive of any exemptions and felt that all vessels should be required to install BWMS.

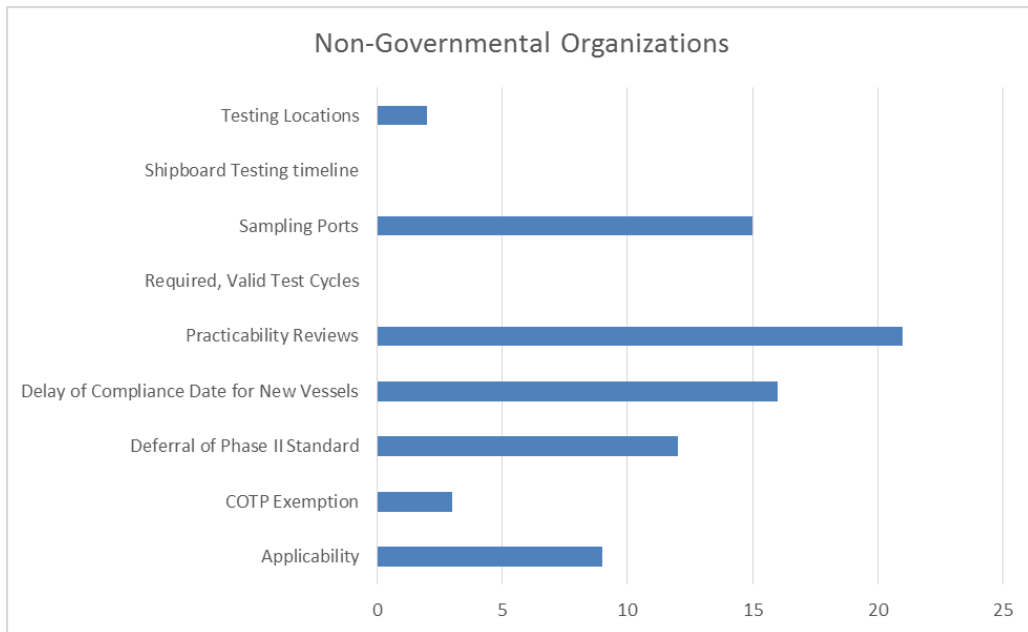


Figure 10. Correlation of comments on changes, made by NGOs

Regulatory Bodies – International, Federal, and State

The final influence group analyzed against the changes to the FR was the Regulatory Bodies influence group. As depicted in Figure 11, the comments submitted in response to the NPRM from this influence group were divided into three sub-groups: State, Federal and International. Based on the comments and the changes, the International sub-group of the Regulatory Bodies influence group did not provide comments that affected the FR language. This analysis is also mentioned earlier in this report and the extent of their comments were a form of recommendation to the U.S. Coast Guard to adopt and implement the similar, if not the same, standards as proposed in the IMO’s BWM Convention.

The majority of the comments from this influence group were provided by the State sub-group. The demographics of the State sub-group ranged from the Midwest and Great Lakes region, to as far as California and New York as mentioned earlier in this paper. Their concerns were primarily related to reducing the proposed time frame for conducting practicability reviews, enforcement of the new requirements, and showed opposition to delaying compliance for new vessels. Their concerns with enforcement had significant influence on the implementation of the sampling ports on board vessels added to the language of the FR. Because the language

regarding the original intent of practicability reviews was removed in the FR, their concerns with this topic most likely did not influence the FR as they also were in favor of implementing a Phase II Standard that would mimic the more stringent rules that some states had already begun implementing.

As noted in Figure 11, the Federal and State-sub groups were relatively consistent with their concerns on the remaining changes and additions to the FR.

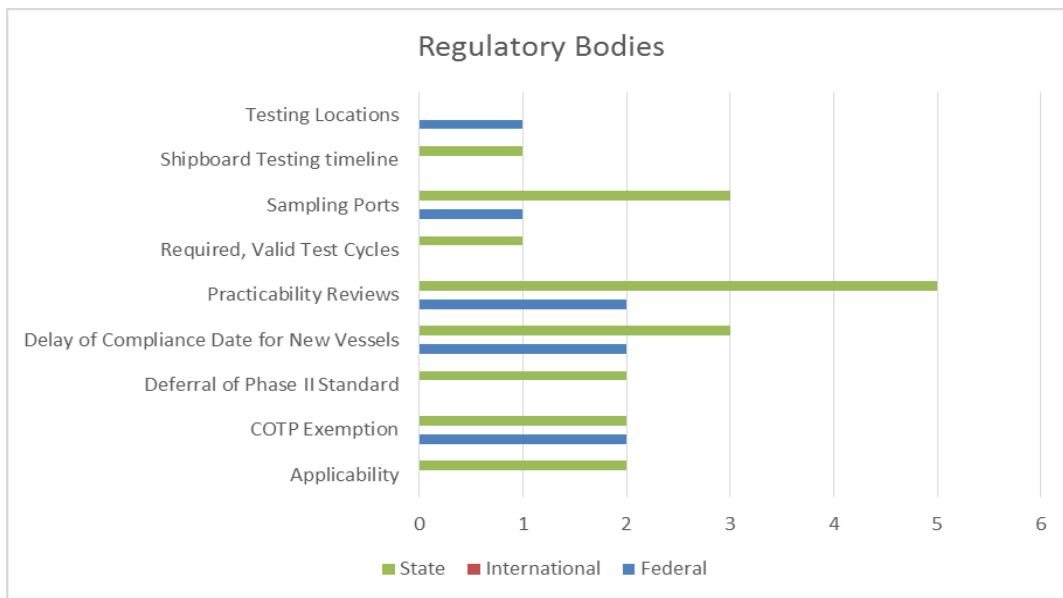


Figure 11. Correlation of comments on changes, made by Regulatory Bodies

Interviews

Upon completion of the data analysis, individual SMEs from each influence group were identified and requested to participate in an interview. Each SME was provided the data analysis prior to their respective interview, an Informed Consent form, and the list of questions which would be asked of them that were screened and approved through Duke University’s Office of Research Support, Research with Human Subjects division. The questions posed to each SME were identical in an effort to maintain consistency throughout each interview. The purpose of the interviews was to validate the data collected, and gain insight into how their respective influence group was involved in the regulatory process, the level of impact they felt

their influence group had on the final rule, and any recommendations for policy alternatives that could be analyzed for the future.

Due to the number of years that had passed since these comments were provided, the researcher was unable to identify SMEs from either the General Public or NGO influence groups who were available for interviews. As such, the interview data analysis was conducted using the remaining three influence groups: Regulatory Bodies, Ballast Water Treatment System Manufacturers, and Maritime Industry. It is important to note that each SME positively validated the Public Influence data analysis results provided to them prior to the interview.

Each SME was asked a set of either four or five questions, depending on their responses. These questions and the analysis and summaries of the SME responses are described below.

How has your influence group been involved with ballast water management policy or regulations in the past? Currently?

All three influence group SMEs stated their groups or industries were long time stakeholders in the BWM policy and regulatory process. Each consistently discussed their involvement since the infancy of the BWM program, through the NISA, NANPCA and now with the U.S. Coast Guard's FR. Additionally, each had some interaction on an international level with the development of the IMO's BWM Convention.

The Maritime Industry SME explained their current interactions with BWM policy involve clarifying compliance questions while working "closely and collaboratively with the Coast Guard, EPA and the maritime industry" (Maritime Industry SME, 2016).

The BWTS Manufacturers SME also discussed working closely with the U.S. Coast Guard and the EPA, but their involvement was slightly different than the Maritime Industry SME. The BWTS Manufacturers played a pivotal role in the development of the U.S. Coast Guard's voluntary Shipboard Testing Evaluation Program back in the mid 2000's, and continue to participate in monitoring the progress of this program now. Additionally, they were involved in providing comments for the Environmental Protection Agency's (EPA) Vessel General Permit (VGP) and

Environmental Technical Verification (ETV) program, both of which tie back to the U.S. Coast Guard's FR (Ballast Water Treatment System Manufacturers SME, 2016).

The interview with the Regulatory Bodies SME provided a different perspective into BWM policy and rulemaking. This SME shared the perspective of "the one with the pen" (Regulatory Bodies SME, 2016), or the decision maker. One particular role taken on by this influence group was to collaborate amongst each other, meaning State, Federal and International decision makers, to establish a meaningful standard that created an achievable foundation. This involved exploring the science behind BWM and comparing three policy approaches:

- a stretch goal meaning a rule that cannot currently be met, but hope technology will rise to the occasion;
- stick with what you know works or what we know can be met;
- or patchwork quilt policies amongst different regulatory bodies.

These options were brought to the table when first developing the FR (Regulatory Bodies SME, 2016).

Based on the data analysis results, and your knowledge of the Notice of Proposed Rule Making for the ballast water management regulations, do you feel your influence groups' comments were taken into consideration in the Final Rule?

This question was worded in such a way that it required a follow-up question because it was identified that by regulation all comments from the public are required to be considered but not necessarily incorporated. The intent of this question and subsequent follow-up was to identify whether each influence group thought their comments had influence on the changes made to the FR.

Both the BWTS Manufacturers SME and the Maritime Industry SME agreed that their group's comments were considered. In fact, it was mentioned that the discussion in the preamble of the FR explaining how the U.S. Coast Guard considered those comments was "thorough, precise, and some of the most they've ever seen" (Ballast Water Treatment System

Manufacturers SME, 2016), however, the amount of detail that went into the discussion was received neither negatively or positively, but neutral, at the industry level.

The answers given by the Regulatory Bodies SME provided a different perspective on the consideration aspect of rulemaking. In the decision making position there must be a fair and balanced adjudication of the public's comments, and this SME felt this was done. As decision makers, they must look and strive for "persuasion based on facts and science" (Regulatory Bodies SME, 2016). It was emphasized that the changes did make improvements to the program, and achieved a good balance.

If yes, what do you think contributed to your influence groups' positive impact?

The terms "collaboration, constant communication, and using resources" were consistent amongst the SMEs when asked what they attributed to positive impact by their influence groups. In particular, the BWTS Manufacturers SME suggested that the ability for the decision makers to attend vessels with installed systems on board provided firsthand education on the intricacies, limitations, and implications of implementing the proposed regulations. This SME felt this allowed the U.S. Coast Guard to prepare more appropriate requirements within the FR. This particular practice also assisted with understanding the importance of the practicability reviews, how the systems are installed, and provided realistic expectations of the systems (Ballast Water Treatment System Manufacturers SME, 2016).

If no, what do you think contributed to your influence groups' negative impact?

The only discussion of negative impact came from the BWTS Manufacturers SME, who explained that the topic of testing methodologies was not adequately addressed. The industry's perception in this area is that the decision makers relied heavily on certain influencers who did not provide sound scientific evidence to support their opposition to certain testing methodologies. This SME shared that the BWTS Manufacturers industry may have viewed the concept of testing methodologies as too simple a problem because they felt it was a common sense issue. They failed to bring stronger arguments or influence to the table to support the type of testing methodologies they were proposing in their comments, and are working on how

to make their influence much stronger in the future (Ballast Water Treatment System Manufacturers SME, 2016).

What recommendations do you have, if any, to increase your influence groups' impact on future policy or regulatory changes in this particular topic?

This question was posed as an opportunity for the SMEs to provide alternatives to the status quo policy, which were used as alternatives in the policy analysis matrix for this project to justify recommendations for future policy changes.

Each SME provided a different recommendation for policy alternatives, which made the policy analysis more diverse. The Maritime Industry SME suggested enacting the Vessel Incidental Discharge Act, Bill #373, which would be an overarching policy that would have the U.S. Coast Guard regulating the shipping aspects of the Act, and the EPA regulating the science. But overall it would create one standard throughout the U.S., and prevent states from making their own rules or standards that may require above and beyond what the federal regulations require, thus placing additional burdens on the shipping industry (Maritime Industry SME, 2016).

The BWTS Manufacturers SME made several suggestions, such as allowing the market to get moving and get do something rather than waiting for type approvals whilst still having untreated discharges of ballast water in the U.S. This SME's perspective was that while waiting for a type approved system, we have lost three years where we could have at least been treating ballast water to some extent. Their overall recommendation however was for the U.S. to adopt and ratify the IMO's BWM Convention, and accept IMO approved systems to be installed on ships (U.S. Coast Guard, 2009).

Because of the role that the Regulatory Bodies SME played in the process, their stance was that based on the way the laws are structured, there are no other alternatives available (Regulatory Bodies SME, 2016).

These policy alternatives and status quo recommendations are what were used for this project's final policy analysis and recommendations.

Conclusions

When returning to the original question posed in this paper, we must determine whether the public materially influenced the U.S. Coast Guard's Final Rule (FR) establishing federal regulations for the Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters.

If we base our conclusions solely on the number of comments provided by any particular influence group, one might argue that the Maritime Industry significantly influenced the language of the FR (Figure 4). However, we must look deeper into the data analysis which compares and contrasts the breakdown of actual changes and the comments that were provided for each change (Figures 6 thru 11). What we find is the contrast between the number of comments and the amount of influence those comments had on specific changes.

The General Public influence group was very vocal in their opposition to any delays for compliance, delays in practicability reviews of systems, and pushed the U.S. Coast Guard to impose the Phase II Standard much sooner than was proposed. As mentioned in the preamble of the FR, though their comments were taken into consideration as required by law, they had little influence on the FR. A common comment made by this group was "zero tolerance", meaning they wanted a BWDS that equaled zero rather than scientific measurements of living or non-living as the NPRM proposed. Because there are no data or evidence to support a zero discharge standard, the U.S. Coast Guard declined to incorporate any comments or suggestions of such a matter into the FR (Department of Homeland Security, 2012)(Section B.2.) The Non-Governmental Organizations influence group had similar comments to the General Public, however, their numbers were not as high, and it could be concluded that their comments also had little influence on the FR.

This was quite the opposite for the Maritime Industry and Ballast Water Treatment System Manufacturers influence groups, as they made very powerful comments in favor of the deferral of the Phase II Standard, which subsequently resulted in removal of the Phase II Standard language in the FR. Additionally their comments for delaying compliance for new vessels and applicability also had significant influence on the language of the FR.

Though one might consider the General Public and NGO influence groups' influence on FR limited, there was a significant concern for enforcement which influenced the requirement for sampling ports in the language of the FR.

Overall, we can conclude that all affected parties materially influenced the language of the FR. However, if we consider each of the influence groups and measure their individual influence, we can identify that the degree of influence is uneven between the five groups.

Comparison of Different Policy Options

Policy Analysis

This project used a policy analysis matrix to compare recommended policy alternatives made by influence group SMEs to justify recommendations for future regulatory changes. The status quo was compared with three alternatives which were identified during the SME interviews. The problem that this policy analysis attempts to address is:

- identifying the optimal policy that will decrease the movement of invasive species through ship's ballast water,
- making best use of available technology,
- that doesn't place unrealistic costs on industry or communities,
- while reducing negative impacts on the environment.

Goals and Criteria

Policy alternatives were measured against three goals: effectiveness, efficiency, and equity. Four associated criteria were used to assess the prospect of whether the policy alternatives will meet those goals.

Effectiveness – First and foremost, the best policy alternative would reduce the frequency of untreated ballast water discharges from ships in U.S. waters. To measure the effectiveness, the policy alternatives were evaluated on whether the rule will increase the number of vessels who install ballast water management systems (BWMS) that meet certain ballast water discharge standards (BWDS). This will help determine whether there should be an expectation of

decreased untreated ballast water discharges in coastal communities. If the number of vessels installing BWMS increases, then it can be argued that the policy is effective.

Efficiency – A key goal of any policy is to insure that it does not unduly increase costs without providing a compensating benefit, however, in many cases where policies require new equipment, costs cannot always be avoided. So it is important to measure the efficiency based on whether the industry incurs significant costs as a result of implementing the policy. There is an expectation that any solution for this problem will incur costs, but in this case the ideal policy as recommended by the industry during the comment period before the FR, would be one that promotes a one-time cost to meet the policy. If industry is required to reinstall newer BWMS during the life of the vessel, the costs will be significant, or they will be severely limited in their operations. If the industry only incurs a one-time cost during the life of the vessel, then the policy can be considered efficient.

Equity – Decision makers have a responsibility to make policy that is reasonably fair to all stakeholders affected by such a policy, or risk a loss of trust and credibility from their constituents. The goal of equity addresses the fairness in the policy, and ensures that all parties share the benefit and the burden from the policy, meaning not one party benefits more than the other. Equity in this case will be measured using two criteria which focus on two separate stakeholder groups: industry and coastal communities:

1. The first criterion will measure whether the policy causes an unfair benefit or harm to any of the particular industry stakeholders who will be affected by the policy.
2. The second criterion will similarly measure whether coastal communities are unfairly benefited or harmed by the policy.

An equitable policy would prevent disproportionate attention to either of the identified stakeholders. If the interests of all stakeholders involved have been considered and met to some extent, then the policy is equitable.

Analyzing the Alternatives

The three policy alternatives listed below, in addition to the status quo, were assessed independently and measured against the criteria mentioned above. A policy matrix was used to capture these assessments, seen in Appendix 1, which were scored using a coding and color scheme developed in a previous policy analysis research project, written by Eileen Gallagher, DEL-MEM 2015. The cells in the matrix were coded high, medium or low indicating how that policy met the criterion associated with the goals. Within each criterion, a color coding was used to determine which policy alternative was either the most or least favorable, with red indicating the policy that would be least favorable and green indicating the policy that would be most favorable. The policy alternative with the highest number of green shaded cells could arguably be considered the best policy to address the problem (Gallagher, 2015).

Status Quo

In March of 2012, after an NPRM and extensive review period of comments from the public, the U.S. Coast Guard published its FR establishing requirements for Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters in March of 2012. This FR incorporates all ports and waterways of the U.S. and updates the BWM methodology to include the use of U.S. Coast Guard type approved ballast water management systems (BWMS), while removing ballast water exchange outside the EEZ as an option. Additionally, alternate management systems (AMS) will no longer be an acceptable means of BWM once a grandfathering period has expired. It is estimated these updated requirements will affect upwards of 8,000 ships calling on U.S. ports each year. To date there are no U.S. Coast Guard type approved BWMS.

Effectiveness (LOW) – The U.S. Coast Guard has yet to type approve a BWMS that can be used on board ships. Without a type approved system, this policy is essentially unenforceable. The other options available to the maritime industry are not practical, nor are they being used. Many ships have installed approved AMS, however these systems will be phased out in the near future leaving the only reasonable option as installing a type approved system that does not exist. Because of this issue, this policy is found to be ineffective based on the goals and criteria it was measured against. (See Appendix 1, Row 1, Status Quo.)

Efficiency (LOW) – Many ships operating in foreign ports are already using and installing IMO approved AMS. When a U.S. Coast Guard type approved system is placed on the market, these ships will eventually be required to replace those systems with type approved systems unless the manufacturers can obtain type approval. Additionally, in the event that a Phase II Standard is implemented in the future, these ships will be required to update their technology. This equates to a policy that does not promote cost-effective efficiency, and therefore this policy is found to have a low efficiency rating. *(See Appendix 1, Row 2, Status Quo.)*

Equity (MEDIUM) – Once a U.S. Coast Guard type approved system is put on the market, those who benefit from the policy include the manufacturers of the product, the environment, and the coastal communities affected by invasive species. The maritime industry might consider itself unfairly harmed due to the costly and limited options available under this policy's constraints, but its members could share the burden of cost with their clients, therefore providing a mid-range level of equity or fairness. The coastal communities may consider themselves unfairly harmed if the BWDS are not as stringent as they would prefer them to be, but they still benefit from the results of ships using these systems, and the policy does not prevent them from petitioning for stricter State discharge standards. *(See Appendix 1, Row 3, Status Quo.)*

Acceptance of IMO approved Alternate Management Systems (AMS)

Policy Alternative 1 would allow ships to install IMO approved Alternate Management Systems (AMS), which are BWMS that meet certain international BWDS. Currently there are fifty-five manufacturers with multiple models on the market that the U.S. Coast Guard has accepted as AMS for use in U.S. waters (U.S. Coast Guard, 2015). This number does not reflect additional manufacturers who have since developed systems that have received IMO approval.

Effectiveness (HIGH) – Due to the established and increasing market of BWMS, and the availability of acceptable systems, the number of vessels installing IMO approved AMS will increase, making this policy option highly effective. *(See Appendix 1, Row 1, Alternative 1.)*

Efficiency (HIGH) – Though the maritime industry will incur costs to install these AMS, they will not incur additional costs when operating in foreign ports because these systems are already

accepted and approved internationally. There would already be costs associated with installing some type of system to operate foreign, and this would eliminate additional costs if they would be required to install additional systems to meet different standards in different locations. Because of the one-time cost associated with this policy option, it carries a high efficiency rating. *(See Appendix 1, Row 2, Alternative 1.)*

Equity (HIGH)(MEDIUM) – Though BWMS manufacturers will ultimately benefit from this policy option, due to the current and increasing availability of AMS industry will have many options and can choose the best, most cost effective system that is right for them. Coastal communities will benefit sooner than later if this policy option is put in place, however, the BWDS that the AMS meet may not reach the more stringent standards they were originally seeking from the policy. Even with the LOW equity rating for coastal communities, there is somewhat of a middle range of fairness for all parties with this policy option, therefore overall this option was assigned medium equity. *(See Appendix 1, Row 3, Alternative 1.)*

Enact the Vessel Incidental Discharge Act (VIDA)

Policy Alternative 2 enacts the Vessel Incidental Discharge Act (VIDA) which was introduced to the Senate in February of 2015, sponsored by Senator Marco Rubio. This policy requires the U.S. Coast Guard to establish standards for regulating ballast water discharges from ships, establishing best management practices and establishes a certification requirement for ballast water technology. The Act would eliminate states' authority to establish their own, more stringent standards for discharges, however, it allows states to petition for enforcement of local statutes (U.S. Senate, 2015).

Effectiveness (MEDIUM) – The number of vessels installing BWMS would increase with this particular policy option, so long as the U.S. Coast Guard would continue to allow IMO approved AMS, or when a U.S. Coast Guard type approved system became available. If AMS were not part of the allowances with this particular policy option, then it would be as effective as the Status Quo. *(See Appendix 1, Row 1, Alternative 2.)*

Efficiency (MEDIUM) – In terms of cost, if ships are given the option to install IMO approved AMS, they could potentially only incur a one-time cost to install a system that meets the

international standards and they would be able to operate in foreign ports with these systems on board. In the event the U.S. Coast Guard requires type approved systems under the VIDA, this policy option would not be effective until those type approved systems were made available. *(See Appendix 1, Row 2, Alternative 2.)*

Equity (LOW)(LOW) – Under the VIDA states will no longer have authority to enforce more stringent standards unless they successfully petition for this authority. As a result, the equity of this policy is unfairly beneficial to some and harmful to others. *(See Appendix 1, Row 3, Alternative 2.)*

Ratification of the IMO's Ballast Water Management (BWM) Convention

As mentioned earlier in this report, the IMO adopted the BWM Convention which, once entered into force, would require implementation of ballast water management plans, record-keeping of ballast water management practices, and various other standards related to ballast water management (International Maritime Organization, 2016). A key component of this Convention is the language pertaining to ballast water discharge standards (BWDS) and approval of ballast water management systems (BWMS). This heavily influenced the U.S. Coast Guard's 2009 NPRM.

Effectiveness (HIGH) – This policy alternative's effectiveness is similar to our first alternative's assessment. The number of vessels installing BWMS that are approved by the IMO and meet international standards would increase as they are already expected to comply with the BWMS requirements when they operate in foreign ports. Those ships already meeting the international standards would not be affected, and those who have not yet installed any BWMS would be expected to do so. With an increase in ships installing BWMS, the frequency of untreated ballast water discharges in U.S. waters would decline, making this an effective policy. *(See Appendix 1, Row 1, Alternative 3.)*

Efficiency (HIGH) - Though the maritime industry will incur costs to install BWMS, this policy would eliminate the need to purchase additional systems when traveling to the U.S. Because of the one-time cost associated with this policy option, it carries a high efficiency rating. *(See Appendix 1, Row 2, Alternative 3.)*

Equity (HIGH)(Medium) - Though BWMS manufacturers will ultimately benefit from this policy option, due to the current and increasing availability of BWMS industry will have many options and can choose the best, most cost effective system that is right for them. Coastal communities will benefit sooner than later if this policy option is put in place, however, the BWDS that the BWMS meet may not reach the more stringent standards they were originally seeking from the policy. Even with the LOW equity rating for coastal communities, there is somewhat of a middle range of fairness for all parties with this policy option, therefore this policy option was assigned medium equity. *(See Appendix 1, Row 3, Alternative 3.)*

Conclusions

Many of the recommendations in the comments, which were validated and emphasized during SME interviews, pointed towards a uniform standard that would be accepted both here in the U.S., and internationally. Though the Status Quo provides a standard, the limitations or restrictions placed on the industry to achieve that standard are met with opposition due to the lack of available resources to comply. The argument for alternative policy options discusses the current availability of resources on the international market, which are already accepted by the U.S. yet do not meet the U.S. Coast Guard type approved standards and therefore would not be acceptable for compliance in the U.S.

The Status Quo puts the shipping industry at risk for non-compliance internationally, which could potentially create hardships and cause owners and operators to make hard business decisions on whether to trade with the U.S. or countries that may not have policies for preventing the movement of invasive species through ships' ballast water.

If we consider the problem to be how we can reduce discharges of untreated ballast water from ships into the waters of the U.S., thus reducing negative impacts on the environment and coastal community economies, we must evaluate what is the best, most effective policy option that is equitable for all parties involved and efficient.

Recommendations

Encourage More Public Inclusion through Education and Collaboration

During the comment period, the U.S. Coast Guard conducted multiple public meetings where it provided an overview of the proposed rules for ballast water management. These meetings gave the public opportunities to ask questions and provide testimony on their position regarding the proposed rules. Though members who would be categorized in the General Public influence group attended these sessions, documented comments show the most vocal members came from the various industry influence groups.

Based on the content of the comments received from the majority of members in the General Public influence group, and the scientific and systematic nature of the topics considered, there seems to be a disconnect between the topic and the level of knowledge of this influence group. Because of this disconnect it could be misperceived that their influence is not valued. As previously mentioned, if the public feels their input was not considered this could be detrimental for the decision makers in achieving compliance with new policy changes. It is important for decision makers to include and involve the public during the policy making process so they feel valued (O'Faircheallaigh, 2010).

The question then becomes - *How?* During the development of this NPRM and FR, many decision makers were given the opportunity to inspect shipboard installations of BWMS to gain a better perspective on the limitations and intricacies this policy may have on the industry, thus providing content that would subsequently assist them in making a more informed decision.

If this same knowledge sharing principle was extended to the remaining public influencers, their foundational understanding would be that much more informed and though this new knowledge may not necessarily change the way they respond to a policy proposal, they can respect that they were duly informed and that their opinions were valued by allowing them to contribute to the knowledge sharing.

Consider Additional Policy Alternatives

Assessing various policy options in this project, it was concluded that a policy option that allows industry to install BWMS that currently exist is not only an effective alternative, but is also equitable, and in the long run efficient. To certain extents, each stakeholder's interests are met by implementing this policy, thus making it the best, most neutral policy option.

Appendix 1. Policy Analysis Matrix

GOALS	CRITERIA	STATUS QUO: Installation of CG type approved BWMS that meet the BWDS	ALTERNATIVE 1: Acceptance of IMO approved Alternate Management Systems (AMS)	ALTERNATIVE 2: Enact the Vessel Incidental Discharge Act (VIDA)	ALTERNATIVE 3: Ratify the IMO's BWM Convention
1) Effectiveness: Frequency of untreated ballast water discharges from ships in U.S. waters declines.	The number of vessels installing BWMS that meet the BWDS increases.	LOW: CG type approved BWMS do not exist, therefore vessels cannot install them. (pg 34)	HIGH: The number of vessels installing BWMS will increase because the AMS market is established and continues to grow. (pg 35)	MEDIUM: The number of vessels installing BWMS will increase as long as the CG allows IMO approved AMS; or a CG type approved system becomes available. (pg 36)	HIGH: The number of vessels installing BWMS will increase as they are already complying with BWMS and BWDS requirements internationally. (pg 37)
2) Efficiency: Policy doesn't increase costs	Industry only incurs a one-time cost during the life of the vessel.	LOW: Industry may still be required to install other BWMS for international ports, and therefore incur costs. Once CG type approved systems are on the market, these vessels will also have to install those systems, and therefore incur more costs. (pg 35)	HIGH: Industry will incur costs associated with installing BWMS that are approved AMS but won't have to incur separate costs when operating in foreign ports. (pg 36)	MEDIUM: Industry will incur costs associated with installing BWMS required by the Act, and possibly incur additional costs associated with international requirements. (pg 37)	HIGH: Industry will incur costs associated with installing BWMS but won't have to incur separate costs associated with operating in foreign ports. (pg 37)
3) Equity: All parties share the benefit and the burden from the policy	Industry stakeholders are not unfairly benefitted or harmed by the policy.	MEDIUM: Once there is a CG type approved BWMS on the market, BWMS manufacturers will benefit most, and burden placed on ship owners can be shared with their clients. (pg 35)	HIGH: BWMS manufacturers will benefit from the requirement for the maritime industry to install their systems on board their vessels, however, the maritime industry will have more options in products. (pg 36)	LOW: States will no longer be able to enforce stricter rules, which will benefit the industry due to removing multiple requirements. (pg 37)	HIGH: BWMS manufacturers will benefit from the requirement for the maritime industry to install their systems on board their vessels, however, the maritime industry will have more options in products and benefit from one international standard. (pg 38)
	Coastal communities are not unfairly benefitted or harmed by the policy.	MEDIUM: Once a CG type approved BWMS becomes available, coastal communities will benefit from the results, however the BWDS may not be as stringent as they would prefer them to be. This doesn't prevent them from enforcing stricter standards. (pg 35)	MEDIUM: Coastal communities will benefit sooner than later if vessels are authorized to install IMO approved AMS, however, the BWDS may not be as stringent as they would prefer them to be. This doesn't prevent them from enforcing stricter standards. (pg 36)	LOW: Coastal communities may benefit from the affects of the policy, however they will be at a disadvantage due to their state water rights being taken away. (pg 37)	MEDIUM: Coastal communities will benefit sooner than later if the U.S. ratifies and adopts the IMO's BWM Convention, however the BWDS may not be as stringent as they would prefer them to be. This doesn't prevent them from enforcing stricter standards. (pg 38)

References

- ANS Task Force. (2011). *ANS Task Force*. Retrieved from Aquatic Nuisance Species Impacts: http://anstaskforce.gov/more_impacts.php
- (2016, February 4). Ballast Water Treatment System Manufacturers SME. (M. Schopp, Interviewer)
- Black's Law Dictionary. (2016). *The Law Dictionary Featuring Black's Law Dictionary Free Online Legal Dictionary 2nd Ed*. Retrieved from The Law Dictionary: <http://thelawdictionary.org/letter/p/page/164/>
- Britton, D. K. (2005). *Zebra Mussels and Quagga Mussels*. Retrieved from ANS Task Force: http://www.anstaskforce.gov/spoc/zebra_mussels.php
- Corn, M. L., & Johnson, R. (2013). *Invasive Species: Major Laws and the Role of Selected Federal Agencies*. Washington: Congressional Research Service.
- Department of Homeland Security. (2012, March 23). Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters. *Federal Register*, pp. 17254-17320.
- Gallagher, E. (2015). *A Policy Analysis to Reduce Climate Risk in Chicago's Most Vulnerable Communities*. Durham: Nicholas School of the Environment.
- Geoffrion, S. (2015, January). Ballast Water Examinations. *Port State Control Course*. Yorktown, Virginia: US Coast Guard Training Center Yorktown.
- GloBallast. (2014). *GloBallast Partnerships*. Retrieved from Examples of IAS: <http://globallast.imo.org/examples-of-ias/>
- International Maritime Organization. (2015, September 22). *International Maritime Organization*. Retrieved from Ballast Water Management: <http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Pages/Default.aspx>
- International Maritime Organization. (2015, December 21). *Press Briefings: Ballast Water Convention ratifications by Morocco, Indonesia and Ghana welcomed*. Retrieved from International Maritime Organization: <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/56-bwm.aspx>
- International Maritime Organization. (2016). *Ballast Water Management*. Retrieved from International Maritime Organization: <http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Pages/Default.aspx>
- (2016, January 28). Maritime Industry SME. (M. Schopp, Interviewer)
- Morris, J. (2016, January 19). Email.

- National Ballast Information Clearinghouse. (2016, January 24). *National Ballast Information Clearinghouse*. Retrieved from NBIC Research & Development: <http://invasions.si.edu/nbic/research.html>
- O'Faircheallaigh, C. (2010). Public participation and environmental impact assessment: Purposes, implications, and lessons for public policy making. *Elsevier*, 19-27.
- Pimentel, D., Zuniga, R., & Morrison, D. (2005). Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological Economics*, 273-288.
- (2016, January 28). Regulatory Bodies SME. (M. Schopp, Interviewer)
- U.S. Coast Guard. (2009, September 15). *Ballast Water Management Program*. Retrieved from Homeport: <https://homeport.uscg.mil/mycg/portal/ep/channelView.do?channelId=-18366&channelPage=%252Fep%252Fchannel%252Fdefault.jsp&pageTypeId=13489>
- U.S. Coast Guard. (2015, June 1). *Alternate Management Systems for Ballast Water Treatment*. Retrieved from Homeport: https://homeport.uscg.mil/mycg/portal/ep/contentView.do?contentType=2&channelId=-18366&contentId=454699&programId=455440&programPage=%2Fep%2Fprogram%2Feditorial.jsp&pageTypeId=13489&BV_SessionID=@@@@1970464092.1456021009@@@&BV_EngineID=ccccadgillefjkc
- U.S. Coast Guard. (2016, February 16). *Extended Compliance Dates - Application, Guidance, and Approved Vessels*. Retrieved from Homeport: https://homeport.uscg.mil/mycg/portal/ep/contentView.do?channelId=-18366&contentId=466465&programId=13065&programPage=%2Fep%2Fprogram%2Feditorial.jsp&pageTypeId=13489&contentType=EDITORIAL&BV_SessionID=@@@@1844425377.1455755790@@@&BV_EngineID=cccfadgiikf
- U.S. Fish & Wildlife Service. (2012, November 20). *U.S. Fish & Wildlife Service*. Retrieved from Invasive Species: <http://www.fws.gov/invasives/faq.html#q21>
- U.S. Senate. (2015, February 4). *S. 373 - Vessel Incidental Discharge Act*. Retrieved from Congress.gov: <https://www.congress.gov/bill/114th-congress/senate-bill/373>
- United States. (1990). *Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990*. Washington: Government Printing Office.
- United States. (1996). *National Invasive Species Act of 1996*. Washington: Government Printing Office.
- United States. (2009, December 9). *Regulations.gov*. Retrieved from Docket: USCG-2001-10486, Standards for Living Organisms in Ships Ballast Water Discharged in U.S. Waters: <http://www.regulations.gov/#!docketDetail;D=USCG-2001-10486>

United States. (2015, November 17). *United States Environmental Protection Agency*. Retrieved from Laws & Regulations: The Basics of the Regulatory Process: <http://www.epa.gov/laws-regulations/basics-regulatory-process#regulation>

United States Coast Guard. (2004). *NVIC 01-04: Shipboard Technology Evaluation Program (STEP): Experimental Ballast Water Treatment Systems*. Washington: United States Coast Guard.

United States Coast Guard. (2004). *NVIC 07-04, Change 1, Ballast Water Management for the Control of Aquatic Nuisance Species in the Waters of the United States*. Washington: United States Coast Guard.

United States Coast Guard. (2015, March 5). *Homeport*. Retrieved from STEP Application 2010: https://homeport.uscg.mil/mycg/portal/ep/contentView.do?channelId=-18366&contentId=456963&programId=455441&programPage=%2Fep%2Fprogram%2Feditorial.jsp&pageTypeId=13489&contentType=EDITORIAL&BV_SessionID=@@@@1699523890.1453680582@@@@&BV_EngineID=cccfadgigg

Winter, J. (2010, September 5). LCDR, USCG, Retired. (M. Schopp, Interviewer)