

BALLAST WATER TREATMENT METHODS

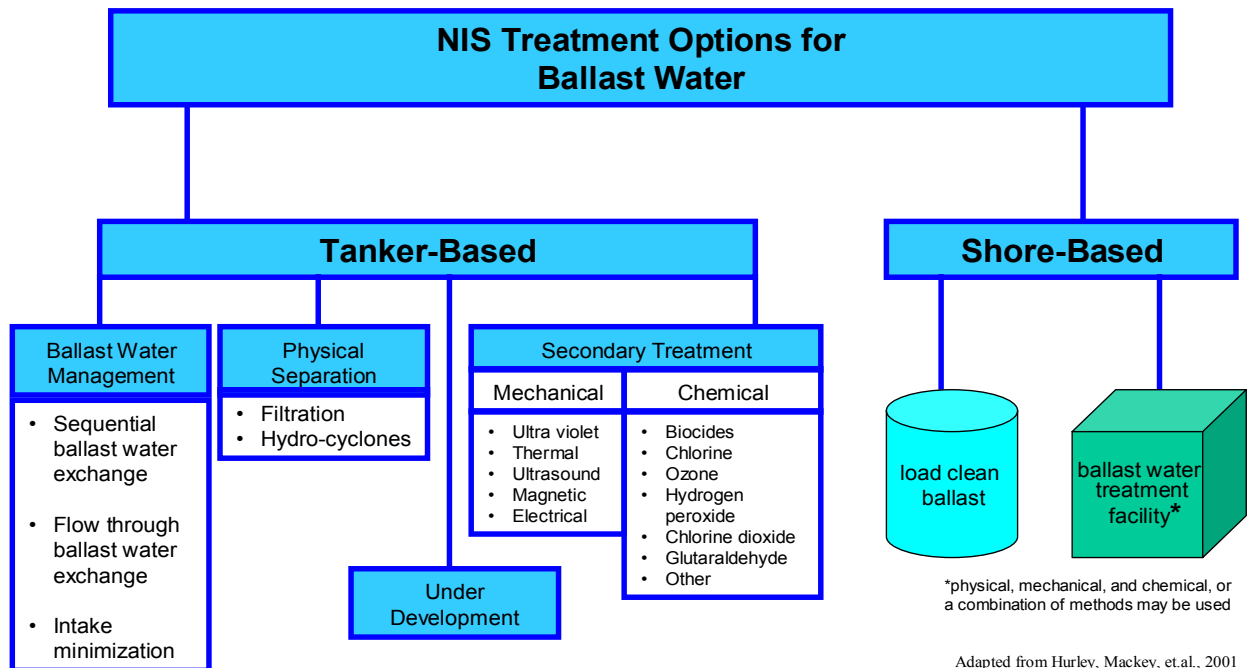
Fact Sheet 1

Overview

Prince William Sound, Alaska Crude Oil Tankers

Prince William Sound Regional Citizens' Advisory Council (PWSRCAC) is specifically interested in examining and identifying ballast water treatment technologies that may be successfully used to control nonindigenous species (NIS) introduction into Prince William Sound (PWS), Alaska via crude oil tanker ballast water.

Ballast water treatment methods are typically categorized as either tanker-based or shore-based treatment technologies. Treatment options can include ballast water management operational procedures, physical separation, or secondary treatment. There are also a number of new technologies emerging that are identified as "under development." As illustrated below, NIS can be managed by a variety of available technologies.



When selecting an appropriate ballast water treatment technology, one of the first steps in the evaluation process is to determine the targeted alien invader. You must know which NIS you are concerned about and what potential methods would be best suited to treat the NIS of concern, since certain technologies are better suited than others for treating particular NIS. For example, larger NIS typically require a filtration system to limit the amount of NIS initially taken into the ship's tanks; however, microscopic NIS typically require additional chemical, physical or heat treatment to kill organisms that bypass the filtration system. In selecting a technology for Prince William Sound, Alaska, a focused alien invader target, or range of targets must be identified. PWSRCAC's current research shows that NIS range in size from large NIS such as crabs to microscopic NIS (see the PWSRCAC NIS Species Fact Sheets for more information). It is expected that a combination of technologies may be required to address this wide range NIS for PWS Alaska.

As shown in the figure above, there are both tanker-based and shore-based treatment options available. While much of the Prince William Sound Alaska tanker company efforts have been focused on tanker-based treatment options, cost effective shore-based treatment options may also be an alternative. The Prince William Sound, Alaska tanker

trade route is unique; it is a dedicated and predictable trade route. Dedicated PWS tankers load oil in Port Valdez and transport it to various refineries on the West Coast of the United States. Those same tankers return to Port Valdez with ballast water. The ballast water is offloaded in Port Valdez and oil is again loaded on the tanker. The Valdez Marine Terminal in Port Valdez is already equipped with a Ballast Water Treatment Facility to treat oily un-segregated ballast water. Expansion and modification of the Ballast Water Treatment Facility to also treat segregated ballast for NIS may be a logical economy of scale for this particular trade route and warrants further evaluation. Shore-based treatment technology options are much more mature and readily available, which may make this a more cost effective and quicker option for consideration.

Tanker-based treatment options are full of technical and economic challenges; however, they may be the only option in unpredictable, widely varying trade routes that don't lend themselves to shore-based treatment options. Technical challenges for tanker-based treatment options include: vessel safety, fire hazards, corrosion, space limitations, vessel design limitations, inability to treat full volume during transit route, and "dead-spots" in tanks that remain untreated. While tanker-based ozone treatment has been studied as an option for Prince William Sound, research shows that ozone can be effective for disinfection of some organisms in ballast water, but may have a reduced effect on some mollusks and crustacean larvae and dinoflagellate cysts in the sediment.

The International Maritime Organization (IMO)¹ has found that treatment technologies should be: (1) safe; (2) environmentally acceptable; (3) practicable; (4) cost effective; and (5) biologically effective. Very few technologies at this current stage meet all five criteria. One of the most significant problems in evaluating technology options is the lack of technology standards. Researchers and entrepreneurs continually point out the need to develop and implement international standards and procedures for the evaluation and approval of new ballast water treatment systems.

In summary, most ballast water treatment technologies are still under development. Ballast water exchange remains the primary method in use worldwide. So far, the most effective and promising technologies involve a combination of technologies using primary treatment options (filtration or cyclonic separation) followed by an additional chemical or mechanical treatment.

Periodic searches of recently-published research will be conducted by PWSRCAC to keep abreast of current literature for new and emerging technologies. As national and international pressure to solve the NIS invasions problem continues, universities, government agencies and private companies are racing to develop commercially viable technologies to treat NIS in ballast water. The quality and quantity of technology treatment options will continue to expand and should be watched closely over the next couple of years, while the search for a viable treatment technology for the PWS Tanker trade continues.

Prince William Sound Regional Citizens' Advisory Council (PWSRCAC) Welcomes Your Input

PWSRCAC is a non-profit citizens' council that is actively examining and identifying ballast water treatment technologies that may be successfully used to control NIS introduction into Prince William Sound (PWS), Alaska via crude oil tanker ballast water.

If you have information on ballast water treatment technologies that may be successful in PWS, Alaska crude oil tanker trade, please send this information to the PWSRCAC NIS Project Manager, Lisa Ka'ahue at kaahue@pwsrac.org or contact us at 1-800-478-7221.

¹ www.imo.org