Regulatory Announcement

# Proposal of Emission Control Area Designation for Geographic Control of Emissions from Ships

**The United States and Canada have proposed designation of an area off our coasts in which stringent international emission controls would apply to ships. When adopted, this control program would dramatically reduce air pollution from ships and deliver substantial benefits to large segments of the population, as well as to marine and terrestrial ecosystems. This fact sheet contains an overview of the proposal.**

## Overview

In July 2009, the United States and Canada jointly proposed designation of an Emission Control Area (ECA) for specific portions of U.S. and Canadian coastal waters, reflecting common interests, shared geography and interrelated economies. In addition, France has joined the ECA proposal on behalf of its island territories of Saint-Pierre and Miquelon, which form an archipelago off the coast of Newfoundland.

Designation of this ECA would control the emission of nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM) from ships, most of which are flagged outside of the United States. These ships are significant contributors to our national mobile-source emission inventory. In the U.S. and Canada combined, the ECA is expected to reduce emissions of NOx by 320,000 tons, PM2.5 by 90,000 tons, and SOx by 920,000 tons per year, which is 23 percent, 74 percent, and 86 percent below current levels, respectively. The overall cost of the ECA is estimated at $3.2 billion. The ECA would be expected to save as many as 14,000 lives and provide relief from respiratory symptoms for nearly five million people each year. In total, the monetized health-related benefits of the proposed ECA are estimated to be as much as $110 billion in the U.S. in 2020.

EPA United States Environmental Protection Agency

Office of Transportation and Air Quality
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For the U.S., the proposed ECA designation is one component of EPA's coordinated strategy to address harmful ship emissions. Complementing the ECA proposal are final Clean Air Act (CAA) engine and fuel standards for ships that EPA issued December 2009.[1] These standards are similar in stringency to the new standards that will apply to all ships in the ECA.

The proposed area of the ECA includes waters adjacent to the Pacific coast, the Atlantic/Gulf coast and the eight main Hawaiian Islands.[2] The proposed ECA would extend up to 200 nautical miles from the coastal baselines of United States, Canada and France, except that it would not extend into marine areas subject to the sovereignty, sovereign rights, or jurisdiction of other States.

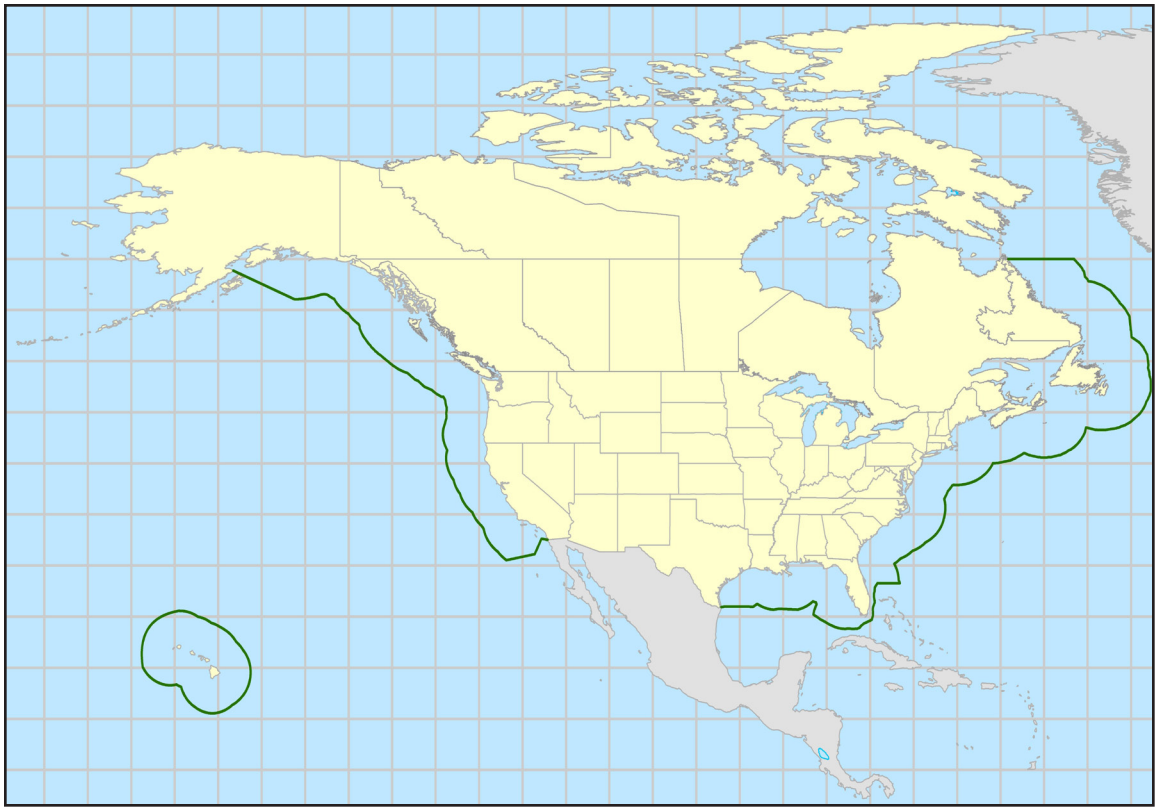

**Figure 1: Area Proposed for ECA Designation**

The proposed ECA does not include the Pacific U.S. territories, the smaller Hawaiian Islands, the U.S. territories of Puerto Rico and the U.S. Virgin Islands, Western Alaska including the Aleutian Islands, and the U.S. and Canadian Arctic. While these areas also experience the

[1]Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder (signed December 18, 2009). See www.epa.gov/otaq/oceanvessels.htm

[2]As used here, the main Hawaiian Islands include the islands of Hawaii, Maui, Oahu, Molokai, Niihau, Kauai, Lanai, and Kahoolawe. These islands are the main populated islands of the Hawaiian Islands chain, with the exception of Kahoolawe, which is an uninhabited nature reserve.

environmental impacts of ship emissions, further information must be gathered to properly assess these areas and determine how ECA controls will help. If further information supports the need for an ECA designation in any of these areas, a separate proposal would be submitted to the IMO, following the criteria contained in MARPOL Annex VI.

## The Need to Reduce Emissions from Engines on Ships

The large marine diesel engines on ships are significant contributors to our national mobile-source emission inventory. Today's Category 3 marine engines must meet relatively modest emission requirements and therefore generate significant emissions of fine particulate matter (PM2.5), NOx, and SOx that contribute to nonattainment of the National Ambient Air Quality Standards for PM2.5 and ozone. Emissions from these engines also cause harm to public welfare, contributing to visibility impairment and other detrimental environmental impacts across the United States.

Many of our nation's most serious ozone and PM2.5 nonattainment areas are affected by emissions from ships. Currently more than 40 major U.S. ports[3] along our Atlantic, Gulf of Mexico, and Pacific coasts are located in nonattainment areas for ozone and/or PM2.5

The contribution of these engines to air pollution is expected to grow even more over the next two decades. Without further action, by 2030, NOx emissions from ships are projected to more than double, growing to 2.1 million tons a year while annual PM2.5 emissions are expected to almost triple to 170,000 tons. Designation of the proposed ECA would significantly reduce emissions from ships and deliver substantial benefits to large segments of the population, as well as to marine and terrestrial ecosystems.

[3]American Association of Port Authorities (AAPA), Industry Statistics, port rankings by cargo tonnage

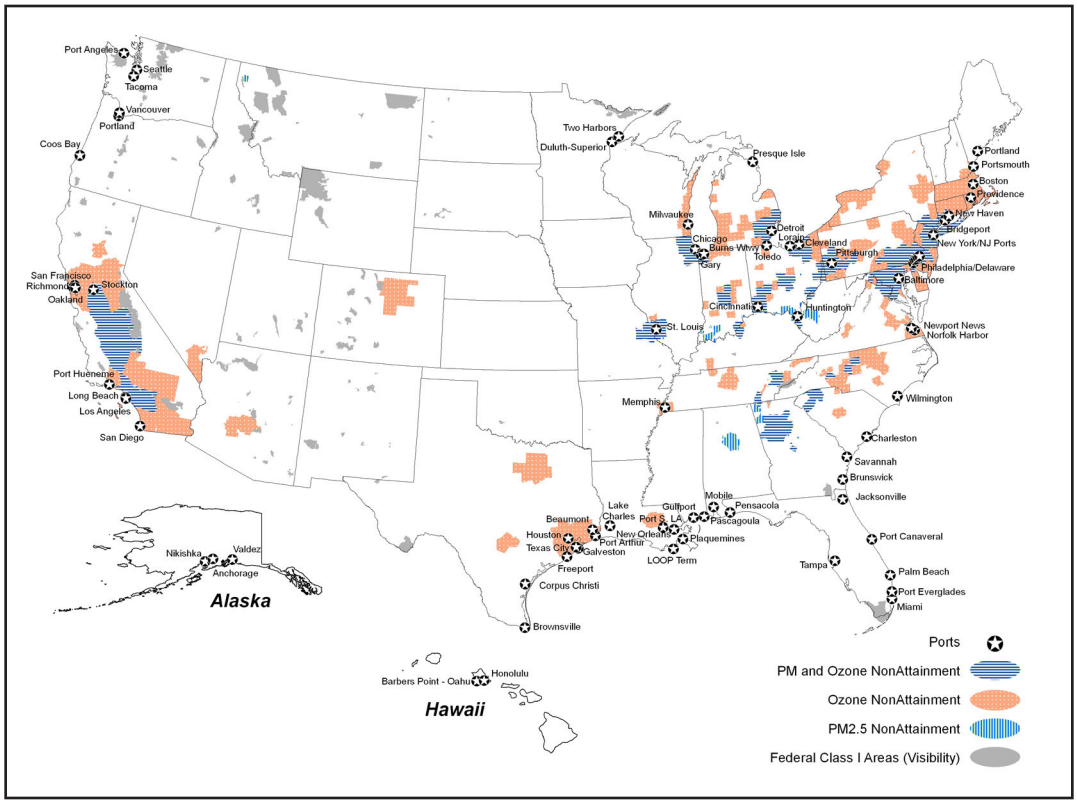


**Figure 2: U.S. Ports and Nonattainment Areas**

## Emission Control Area Standards

In October 2008, the IMO adopted stringent new standards to control harmful exhaust emissions from the engines that power ships. The member states of IMO agreed to amend Annex VI to the International Convention on the Prevention of Pollution from Ships (MARPOL), adopting new tiers of NOx and fuel sulfur controls. The most stringent of these new emission standards apply to ships operating in specially designated Emission Control Areas (ECAs):

- Beginning in 2015, fuel used by all vessels operating in these areas cannot exceed 0.1 percent fuel sulfur (1000 ppm) . This requirement is expected to reduce PM and SOx emissions by more than 85 percent.
- Beginning in 2016, new engines on vessels operating in these areas must use emission controls that achieve an 80 percent reduction in NOx emissions.

In most cases, ships already have the capability to store two or more fuels. However, to meet the 2015 requirement of 1,000 ppm fuel sulfur, some vessels may need to be modified for additional distillate fuel storage capacity. As an alternative to using lower sulfur fuel, ship operators may choose to equip their vessels with exhaust gas cleaning devices ("scrubbers"). In this case, the scrubber extracts sulfur from the exhaust.

## Costs

The costs of implementing and complying with the proposed ECA are expected to be small in comparison to the health and welfare benefits and within the costs of achieving similar emissions reductions through additional controls on land-based sources. We estimate the total costs of improving ship emissions from current performance to ECA standards while operating in the proposed ECA will be approximately $3.2 billion in 2020. The cost to reduce a ton of NOx, SOx and PM is estimated at $2,400, $1,100 and $10,000, respectively. In comparison, the 2007 heavy-duty highway truck rule cost $2,300/ ton for NOx and $15,000/ ton for PM. Improving current ship emission levels to ECA standards is one of the most cost-effective measures available to obtain necessary improvements to the air quality in the U.S. and Canada.

The economic impacts of complying with the program on ships engaged in international trade are expected to be modest. For example, operating costs for a ship in a route that includes about 1,700 nm of operation in the proposed ECA would increase by about 3 percent. This operating cost increase would raise the cost of transport of a 20 foot container by about $18.

## Benefits

The U.S. coastline and much of the interior of the country will experience significant improvements in air quality due to reduced PM and ozone from ships complying with ECA standards. Coastal areas would experience the largest improvements; however, significant improvements would extend hundreds of miles inland to reach nonattainment areas in states such as Nevada, Tennessee and Pennsylvania. National treasures such as the Grand Canyon National Park and the Great Smoky Mountains would also see air quality improvements.

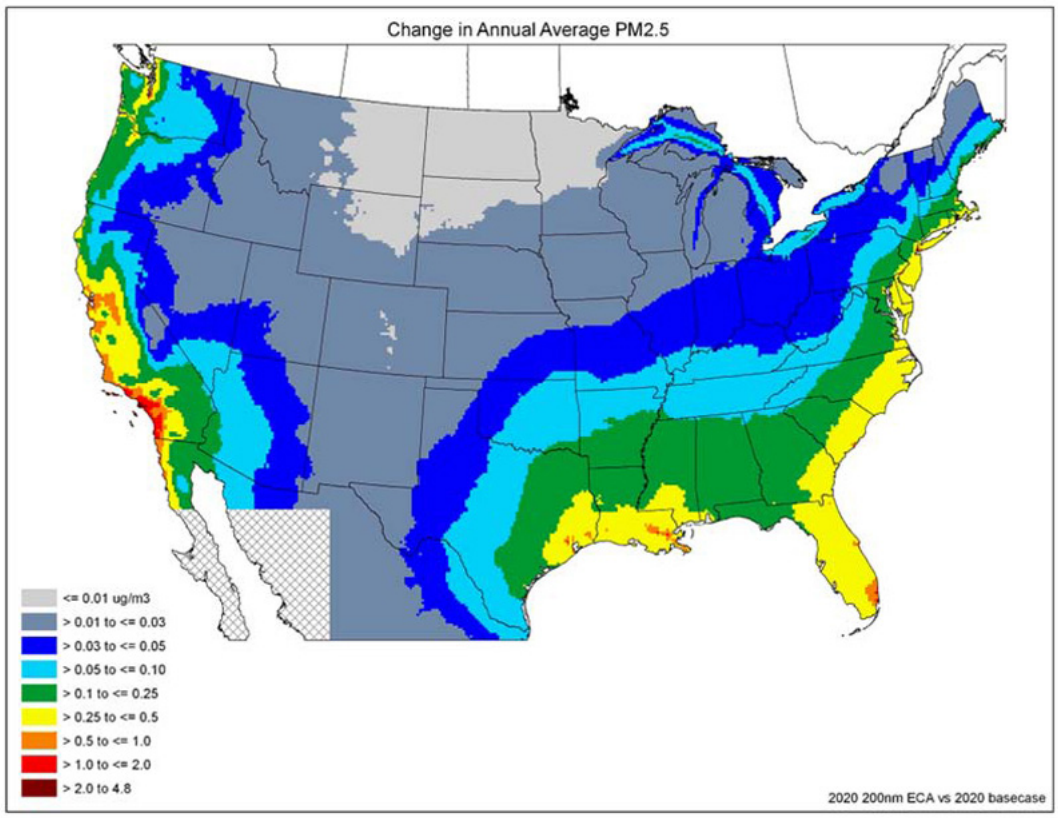


**Figure 3: Potential Benefits of U.S. ECA Ambient $PM_{2.5}$ Reductions in 2020**

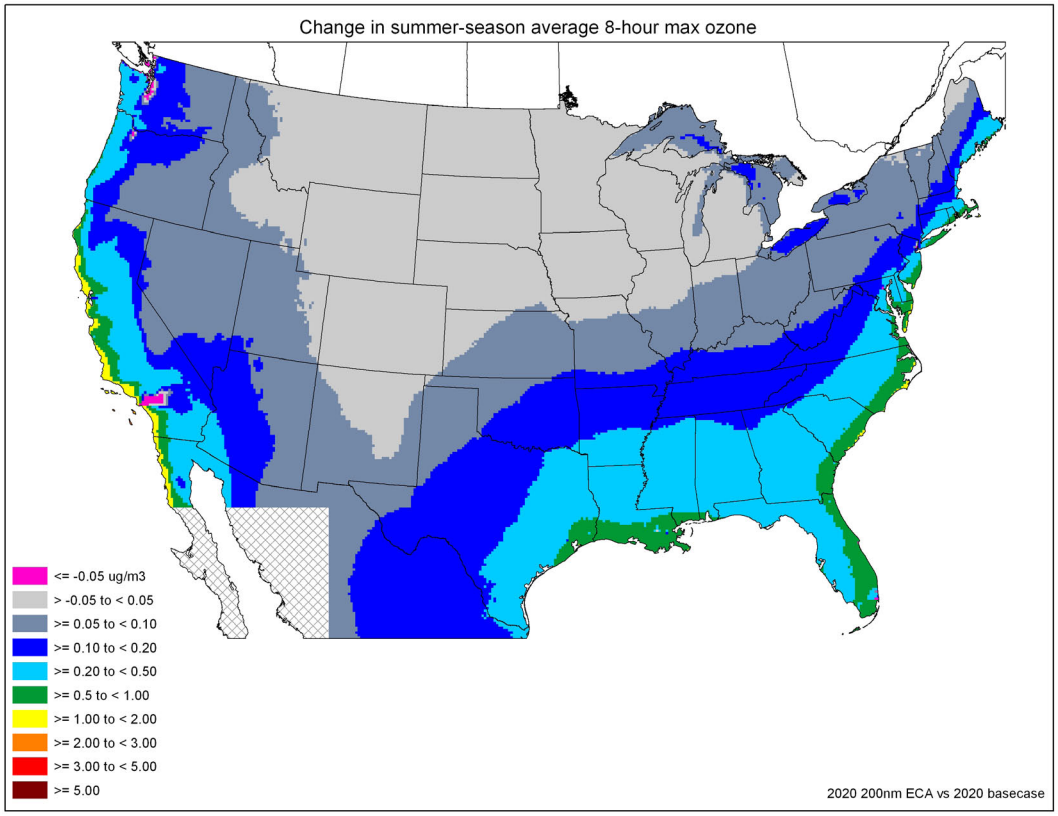


**Figure 4: Potential Benefits of U.S. ECA Ozone Reductions in 2020**

Table 1 presents the estimated annual reduction of ship-related adverse health impacts in 2020 that would result from applying the ECA standards. The figures in this table clearly illustrate the health benefits of designating the proposed ECA for the U.S. and Canada. Our analysis shows that as many as 14,000 lives will be saved and nearly five million people will experience relief from acute respiratory symptoms each year

**Table 1: Estimated $PM_{2.5}$- and Ozone-Related Human Health Impacts Associated with Ship Emissions in the U.S. and Canada**

| Health Effect | 2020 Annual Ship-Related Incidence | 2020 Annual Reduction in Ship-Related Incidence with an ECA[a] |
|---|---|---|
| Premature Mortality[b] | 8,100 – 21,000 | 5,500 – 14,000 |
| Chronic Bronchitis | 5,500 | 3,900 |
| Hospital Admissions[c] | 11,000 | 4,800 |
| Emergency Room Visits | 6,700 | 3,800 |
| Acute Bronchitis | 13,000 | 9,300 |
| Acute Respiratory Symptoms | 8,900,000 | 4,900,000 |
| **Total U.S.-Related Monetized Benefits** | | $47 - 110 billion [b,d] |

[a] Based on ship emission inventory reductions due to switching from 2.7% sulfur residual fuel to 0.1% sulfur distillate fuel and an overall fleet NOx reduction in the ECA of 23%, in 2020, from Tier II levels. In the long term, a 75% reduction in NOx emissions from Tier II levels would be expected in the ECA.

[b] Includes both PM2.5- and ozone-related estimates of premature mortality. The range is based on the high- and low-end estimate of incidence derived from several alternative studies used to estimate PM2.5- and ozone-related premature mortality in the U.S.

[c] Includes estimates of both cardiovascular- and respiratory-related hospital admissions.

[d] The monetized benefits, presented in year 2006 dollars, are for the U.S. only, and reflect the use of a 3 percent discount rate in the valuation of premature mortality and nonfatal heart attacks.

## Next Steps

On July 17, 2009, the joint U.S.-Canada proposal was accepted in principle at MEPC 59. The amendments to MARPOL Annex VI designating this ECA will circulate among member states until March 2010, when MEPC 60 will be held. At MEPC 60, member states who are Parties to MARPOL Annex VI (those who have ratified the treaty) will vote on the adoption of these amendments. Given the MARPOL amendment acceptance process and the lead time specified in the regulations, an ECA adopted at MEPC 60 could be expected to enter into force as early as August 2012.

## For More Information

You can access the U.S. proposal and related documents on EPA's Office of Transportation and Air Quality web site at:

www.epa.gov/otaq/oceanvessels.htm

For additional information, please contact the Assessment and Standards Division at asdinfo@epa.gov, 734-214-4636, or:

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