



June 22, 2012

Mary Nichols, Chair  
California Air Resources Board  
1001 Street, Po Box 2815  
Sacramento, CA 95812

**RE: Use of Cap-and-Trade Auction Funds to Reduce GHG Emissions  
from Ships**

Submitted electronically via the [CARB Comment Submittal Form](#)

Dear Ms. Nichols and Board Members:

The Environmental Defense Center (EDC) is pleased to provide input on the use of Cap-and-Trade auction proceeds to reduce greenhouse gases (GHG) contributing to climate change. We support the request of the Santa Barbara County Air Pollution Control District (SBCAPCD) and Channel Islands National Marine Sanctuary (CINMS) to use some of the funds to develop an incentive program that will reduce the speeds of large marine ships traveling along the California coast.

EDC is a non-profit, public interest law firm and environmental organization which represents environmental and other community groups within Santa Barbara, Ventura, and San Luis Obispo Counties. Our mission is to protect and enhance the local environment through education, advocacy, and legal action. For more than five years, the EDC has been actively working and pursuing proactive mechanisms to reduce the incidence of ship collisions with large whales.<sup>1</sup> The urgent need to address ship strikes was tragically illustrated in 2007 when four blue whales were stuck and killed by large cargo ships within the Santa Barbara Channel during a three-week period. EDC has been seeking a comprehensive approach to this issue including advocating for the re-routing of shipping lanes and the reduction in ship speed.

An incentive based program using Cap-and-Trade funds to reward large marine ships for reducing ship speeds from 18-22 knots/hour (current speed) to 12 knots/hour

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<sup>1</sup> See "Whale of an Opportunity: Coast Guard Study of Los Angeles/Long Beach Port Access Routes Holds Great Potential for Reducing Ship Strikes within Santa Barbara Channel," 37 *Ecology Law Currents* 58 <http://elq.typepad.com/currents/2010/08/currents37-07-segee-2010-0816.html> (2010).

along the California coast would reduce carbon emissions and fulfill the goals of Assembly Bill 32 (AB 32). **Specifically, incentivizing vessels greater than 300 gross registered tons to travel at speeds 12 knots/hour or slower would reduce GHG emission, protect whales from collisions with vessel and noise pollution, and provide other benefits associated with reduced speed.** Benefits from an incentive based program are bulleted and details for each benefit are provided below.

- 1. Significantly Reducing GHG Emissions from Ships**
- 2. Providing Additional Air Quality Public Health Benefits**
- 3. Supporting the State's Economy and Efforts to Develop a Clean-Energy Economy**
- 4. Reducing the Lethality and Severity of Whale Strikes and Acoustic Noise Impacts**
- 5. Building on the Successful Existing LA Long Beach Green Ports Program**
- 6. Reducing Fuel Cost for the Industry**
- 7. Reductions are Measurable and Verifiable**

#### **1. Significantly Reducing GHG Emissions from Ships**

Research shows that global climate change emissions from large marine shipping vessel are directly proportional to fuel consumption, and the amount of fuel ships consume is directly and exponentially related to vessel speed. Studies have demonstrated that the most cost effective, feasible method to reduce emissions from ships is to slow them down.<sup>2</sup> Indeed, the International Maritime Organization (IMO) reports that a 10% reduction in speed would result in a 23.3% decrease in emissions.<sup>3</sup> At low speeds, ships are one order of magnitude more efficient than land transport and two orders more efficient than air transport.<sup>4</sup> However, as ship speeds increase much of these efficiencies are lost and very fast ships have been found to have similar energy demands to airplanes.

The SBCAPCD reported that reducing ship speeds to 12 knots/hour along the entire California Coast would reduce GHGs by 50%, resulting in 1.4 million metric tons of GHG reduction.<sup>5</sup> Thus, an incentive program that reduces GHG emissions through reduced ship speeds could substantially contribute to the GHG emission reduction goals in Assembly Bill 32 (AB 32).

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<sup>2</sup> Friends of the Earth International. 2007. Prevention of Air Pollution from Ships: Recent Findings on Global Warming Justifying the Need for Speedy Reductions of Greenhouse Gas Emissions from Shipping. Submitted to the Marine Environment Protection Committee, IMO (May 4, 2007). (pg 6)

<sup>3</sup> International Maritime Organization. 2000. Study of Greenhouse Gas Emissions from Ships: Final Report to the International Maritime Organization. Issue no. 2-31 (March 2000). Available at: [http://unfccc.int/files/methods\\_and\\_science/emissions\\_from\\_intl\\_transport/application/pdf/imoghmain.pdf](http://unfccc.int/files/methods_and_science/emissions_from_intl_transport/application/pdf/imoghmain.pdf) (accessed June 19, 2012). (at pg 17, Table 1-5)

<sup>4</sup> Isensee and Bertram 2004. Quantifying external costs of emissions due to ship operation. Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering of the Maritime Environment 218: 41.

<sup>5</sup> Santa Barbara Air Pollution Control District Letter, Submitted June 8, 2012. Re: Use of Cap-and-Trade Auction Funds to Reduce GHG Emission from Ships.

## **2. Providing Additional Air Quality Public Health Benefits**

In addition to significantly contributing to GHG emissions, ship emissions contain toxic air pollution that put people at risk of cancer, asthma and premature death. Health risk pollutants from ships include nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulate matter (PM). Locally in Santa Barbara County, marine shipping contributes over 54% of the total daily NO<sub>x</sub> emissions. This is more than all other sources combined including: stationary sources, on-road motor vehicles, other mobile sources, and are-wide sources. The table below demonstrates substantial emissions reductions for NO<sub>x</sub>, SO<sub>x</sub>, and PM pollutants if a 12 knot/hour speed limit was required within the Santa Barbara Channel. Should an incentive based speed limit program be implemented across the state, even greater air quality improvements could be achieved. An incentive based program to slow down ships would lead to measurable improvements to air quality and would contribute to AB 32's goal of long-term transformative effort to improve public health.

<b>Emission Reductions for a 12 knot/hour Speed Limit on Cargo Ships within the Santa Barbara Channel</b>		
<b>Pollutant</b>	<b>Emission Reductions (Tons/Year)</b>	<b>% Reduction</b>
<b>NO<sub>x</sub></b>	11,017	66%
<b>SO<sub>x</sub></b>	7,044	67%
<b>PM</b>	835	68%
Table adapted from SB APCD presentation "Air Quality and Marine Shipping" dated September 28, 2011. Accessed <a href="#">here</a>		

## **3. Supporting the State's Economy and Efforts to Develop a Clean-Energy Economy**

An incentive program for shipping could offset the initial upfront cost to the industry for scheduling adjustments, additional ships, and/or additional crew. In slowing ships down, the industry will also experience annual fuel cost saving. It is expected that these savings may provide sustained incentives for speed reduction into the future (see section below on "Lowering Fuel Cost for the Industry"). Depending on the response to the incentive program, the industry may also be able to avoid mandatory ship speed regulations that are being considered and evaluated by the Air Resources Board vessel speed reduction initiative for the California coast.

## **4. Reducing the Lethality and Severity of Whale Strikes and Acoustic Noise Impacts**

Scientific research has shown that there is a direct correlation between vessel speed and ship strikes resulting in whale mortality. Vessels traveling at 14 knots or faster

resulted in 89% of lethal or severe injuries to whales.<sup>6</sup> It was also noted in this study that none of the whales hit at a speed of 10 knots or less were killed. Vanderlaan and Taggart report that “as vessel speed falls below 15 knots, there is a substantial decrease in the probability that a vessel strike to a large whale will prove lethal,” but that only at speeds slower than 11.8 knots does the chance of a fatal injury to a large whale drop below 50%.<sup>7</sup> California hosts some of the busiest ports in the world, meaning that large commercial vessels regularly speed through these waters on their way to port. California waters also host some of the highest densities of marine wildlife including a wide variety of whales such as: blue, humpback, gray, fin, sperm, and killer whales. In fact, the Santa Barbara Channel, home to the largest seasonal population of endangered blue whales on the planet, is also host to one of the busiest shipping corridors in the country.

After reviewing various mechanisms for preventing Atlantic right whale deaths from ship strikes, NMFS concluded that a mandatory speed limit for large vessels was imperative. Ship strikes are one of two major causes of right whale deaths off the U.S. east coast and, combined with mortalities caused by entanglement in fishing gear, have driven the species to near-extinction. In determining how to reduce ship strikes, NMFS examined operational measures and found that no other measure was as essential or effective as the establishment of a mandatory 10-knot speed limit.<sup>8</sup> NMFS found that instituting this speed limit would also benefit other whales, such as humpback, fin, sperm, and sei whales, as well as sea turtles.

After analyzing the whale strikes in the vicinity of the Santa Barbara Channel in 2007, Berman-Kowalewski et al. recommended that “mitigation measures developed for other species (i.e. the right whale) should be considered for blue whales off the California coast if further mortality is to be reduced.”<sup>9</sup> NOAA’s National Marine Sanctuary Advisory Councils have also identified policy recommendation that include slowing ships down to reduce ship strikes. In 2009, the CINMS Advisory Council adopted several recommendations to reduce the risk of ship strikes in the Santa Barbara Channel. Implementing ship speed limits and developing incentive based programs to slow ships down were both recommendations.<sup>10</sup> In 2012, the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries joint working group on vessel strikes and acoustic

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<sup>6</sup> Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M. 2001. Collisions between ships and whales. *Marine Mammal Science* 17(1): 35-75.

<sup>7</sup> Vanderlaan, A.S.M. and Taggart, C.T. 2007. Vessel Collisions with Whales: The probability of lethal injury based on vessel speed. *Marine Mammal Science* 23(1): 144-156.

<sup>8</sup> National Marine Fisheries Service (NMFS). 2008. FEIS to Implement Operational Measures to Reduce Ship Strikes to North Atlantic Right Whales (August 2008).

<sup>9</sup> Berman-Kowalewski, Michelle et al. 2010. Association Between Blue Whale (*Balaenoptera musculus*) Mortality and Ship Strikes Along the California Coast. *Aquatic Mammals* 2010, 36(1), 59-66, DOI 10.1578/AM.36.1.2010.59.

<sup>10</sup> Abramson, L., Polefka, S., Hastings, S., Bor, K. 2009. Reducing the Threat of Ship Strikes on Large Cetaceans in the Santa Barbara Channel Region and Channel Islands National Marine Sanctuary. Prepared and adopted by the Channel Islands National Marine Sanctuary Advisory Council. September 17, 2009. 73 pgs. Online at [www.channelislands.noaa.gov](http://www.channelislands.noaa.gov).

impacts also suggested slowing ships down in dynamic management areas (DMA's) to reduce the risk and lethality of ship strikes.<sup>11</sup>

In addition to collisions, shipping also results in ocean noise pollution that may have a range of impacts on marine life and cetacean species. There is increasing awareness that the potential for chronic exposure from shipping noise can have harmful impacts on marine ecosystems and wildlife. Noise-related stress can lead to disruptions in feeding, mating, migration, predator avoidance, navigation, or may trigger an abandonment of habitat.<sup>12</sup> Speed restrictions have been identified as a possible mitigation measure to reduce the potential impacts from shipping noise.<sup>13</sup> An incentive based speed limit of 12-knots/hour for large marine ships would accomplish both a reduction in the likelihood and lethality of ship strikes and reduction in underwater noise pollution.

## **5. Building on the Successful Existing LA/Long Beach Green Ports Program**

The Ports of Los Angeles and Long Beach already have a speed reduction scheme in place, providing incentives for ships to remain at or below a speed of 12 knots. The ports have seen program participation rates over 90 percent, which have resulted in significant reductions in ship emissions.<sup>14</sup> In 2007, the ports estimate that the vessel speed reduction program resulted in the following reductions: 1,345 tons of nitrogen oxides, 832 tons of sulfur oxides, 112 tons of particulate matter, and 55,502 tons of carbon dioxide.<sup>15</sup> As discussed above, these analyses illustrate another important point regarding regulations limiting vessel speed – they would have pollution reduction benefits extending to a variety of air emissions as well as GHG again contributing to multiple goals outlined in AB 32.

## **6. Reducing Fuel Cost for the Industry**

Restrictions on vessel speed would reduce the emissions of pollutants per ton of cargo carried but also have the added benefit of improving fuel efficiency for ships. The shipping industry increasingly has recognized the economic value of reducing vessel speed.<sup>16</sup> In order to lower costs and environmental impacts, some within the shipping industry have voluntarily implemented “super slow steaming” – the practice of operating a ship at a greatly reduced speed in order to burn less bunker fuel. In 2007, Maersk, a

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<sup>11</sup> Abramson L. 2012. Vessel Strikes and Acoustic Impacts- Report of a Joint Working Group of the Gulf of the Farallones and Cordell Banks National Marine Sanctuary Advisory Councils.

<sup>12</sup> Popper, A.N. 2003. Effects of anthropogenic sounds on fishes. *Fisheries* 28(10): 24-3

<sup>13</sup> Merchant N.D., Witt M.J., Blondel P., Godley B.J., Smith G.H., Assessing sound exposure from shipping in coastal waters using a single hydrophone and Automatic Identification System (AIS) data. *Marine Pollution Bulletin* (2012), <http://dx.doi.org/10.1016/j.marpolbul.2012.05.004>

<sup>14</sup> Port of Long Beach. 2008. Green Flag Incentive Program Monthly Report, (1/1/10 to 12/31/10), Operator Compliance at 20 nm. Available [www.polb.com/civica/filebank/blobload.asp?BlobID=8182](http://www.polb.com/civica/filebank/blobload.asp?BlobID=8182) (accessed June 19, 2012). (page 6)

<sup>15</sup> See <http://www.cleanairactionplan.org/strategies/vessels/vsr.asp>

<sup>16</sup> Rosenthal, E. Feb. 17, 2010. “Slow Trip Across Sea Aids Profit and Environment.” *New York Times*. Vidal, John. July 25, 2010. Modern cargo ships show to the speed of the sailing clippers. *The Guardian*. White, Ronald D.. July 31, 2010. Ocean shipping lines cut speed to save fuel costs. *Los Angeles Times*.

major international shipping company, initiated a comprehensive study of 110 vessels that proved, contrary to the traditional policy of running vessels with no less than a 40-60% engine load (a measure of how hard the engine is working), that its container ships can run safely with as little as a 10% engine load. In other words, Maersk found that its vessels could travel safely and efficiently at lower speeds. This makes it possible for vessels to travel at half-speed while realizing a 10 to 30% savings in fuel costs and carbon dioxide emissions. By implementing slow steaming, Maersk experienced significant overall saving even after the costs of adding another container ship to their fleet was taken into account.

## **7. Reductions Are Measurable and Verifiable**

Currently, the California coast has a network of monitors known as the Automated Identification System (AIS) that are used to track ship position and speed. In addition, ships over 300 gross tons are required to carry AIS. Thus, data for vessels over 300 gross tons can be easily attained. Locally, the CINMS monitors ship traffic around the Channel Islands and Santa Barbara Channel using the AIS system to track their compliance and behavior with a voluntary season speed limit of 10-knots/hour. Unfortunately, compliance is very low; hence the potential role for an effective incentive based program. The existing state wide AIS system can serve as a platform for data collection on a daily basis to track compliance with the incentive program. Furthermore, ship fuel consumption data could also be reviewed to verify AIS data and track GHG and other emission reductions.

## **Conclusion**

EDC is working in partnership with the CINMS, the CINMS Sanctuary Advisory Council, SBAPCD and other NGOs to implement a variety of management strategies to protect whales from ship strikes. The Cap-and-Trade auction fund provides a unique opportunity to develop an incentive based program to reduce the speed of large marine cargo ships to 12 knots/hour or slower along the entire California coast. It is important to recognize that this is a rare instance in which the Air Resources Board can address multiple environmental concerns and fulfill multiple objectives in AB 32 through a single mechanism. Implementing a simple measure to incentives commercial vessel speed reductions can reduce GHG and other emissions while also protecting human health and marine wildlife like blue, gray, humpback, and other whales.

Thank you for your consideration of these comments. Please do not hesitate to contact me or Linda Krop, EDC Chief Counsel; at (805) 963-1622 should you have further questions or concerns.

Sincerely,



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