Vessel Speed Reduction

What is this measure?

This measure would provide incentive funding to reduce the speed of large marine vessels transiting offshore of Santa Barbara County. Although the District cannot require these ships to use newer, cleaner burning engines that meet the most recent emission standards, we can incentivize them to travel at slower speeds, which will reduce their fuel consumption and corresponding GHG emissions.

Why would someone do this as mitigation?

Large marine vessels operate less efficiently, and burn more fuel per nautical-mile-traveled, when they are cruising at higher speeds. The amount of load that is placed on the engine is greatly reduced when the vessel is slowed to a more fuel-efficient operating speed. This concept has been studied, documented, and applied in the shipping industry. It follows then that reducing the speed of ships that typically travel at higher speeds through the Santa Barbara Channel will result in less fuel consumption, with a corresponding reduction in GHG emissions.

Marine Vessels account for more than half of NOx emissions in Santa Barbara County and for more than a quarter of NOx emissions in Ventura County. Ship strikes are also a major threat to recovering endangered and threatened whale populations, including blue, humpback, and fin whales.[1] Slowing ship speeds reduces criteria air pollutants and the risk of fatal strikes on whales, as well reduced GHG emissions since less fuel will be combusted in the ship's engines.

In 2014, the District and its partners launched a voluntary Vessel Speed Reduction (VSR) Trial incentive program to reduce ozone precursors (primarily nitrogen oxides, or NOx) and reduce the risk of fatal whale ship strikes. This program was modeled after successful programs at the Ports of Los Angeles and Long Beach, and due to its success, the program was expanded and re-implemented in 2016 and 2017. [2]

How would you implement this measure?

Implementing Agency

The program could be modeled on the existing VSR program administered by the District and partners. For this VSR measure, the District could be a lead implementing agency. Agreements to participate in the program would require a contract between one of the implementing agencies or organizations and each marine shipping company. The contract would need to specify the area along the California Coast in which the ships need to reduce their speeds below a certain speed threshold (such as 12 or 10 knots).

Enforceability

Each shipping company that registers their ships and transits with the program will be eligible for incentive funding. The incentives will not be distributed until the District and partners evaluate the ship's AIS (Automatic Identification System) data and verify that the ship did in fact transit the designated region below the specified speed.

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[1] doi.org/10.1371/journal.pone.0183052

[2] SBCAPCD VSR Program: www.ourair.org/air-pollution-marine-shipping/

Interaction with Existing Programs

This program would supplement and expand on the District's existing VSR program.

How would you quantify the benefits?

To establish a baseline scenario for this expanded program, we could assume that without the VSR program, the ship would have travelled at the average speed for its vessel size and type in the region. The GHG benefits could be based on the difference between the average speed of the vessels in the region and the speed of the qualifying vessel. The qualifying vessel will have a lower engine load at the VSR speed, and will therefore be burning less fuel during its transit when compared to the baseline scenario where the vessel operates at the faster average vessel speed. To perform these calculations, we would need to identify the max rated speed and the max rated power of each ship that participates in the program. This information can either be obtained from the shipping company or from Lloyd's database, which maintains engine information on each ship.[3]

It should be noted that an expanded VSR program would achieve GHG reductions on a short-term, per-transit basis. In addition, significant speeding up outside the VSR zone could negate the GHG reduction, and even increase GHG emissions. The District and partners could require additional verification from the shipping agency that the participating vessel did not speed up during other portions of their transit outside of the VSR zone. In order to consider this option for GHG mitigation, additional caveats may be needed to ensure the emissions are real, quantifiable, and permanent, and not offset by increased speed once the vessel moves beyond the incentive range.

Questions for Discussion

- Will enough shipping companies be interested in slowing down their transits without speeding up outside the VSR Zone?
- What data will we need to demonstrate that the shipping company didn't speed up after travelling through the Santa Barbara Channel region VSR zone?
- How could short-term GHG reductions be used for GHG mitigation over a longer term, and what would be the cost?
- Which partner agencies should be included in this GHG VSR program? [Example: Neighboring Air Districts, NOAA Marine Sanctuaries, National Marine Sanctuary Foundation, Ports of Los Angeles and Long Beach]
- Should the program operate only during the summer ozone and whale season, or could it operate year round for the GHG benefits?

Input Received

Comments Made at Workshops

Opportunities:

- Achieves significant co-benefits in NOx emissions reductions.

[3] Lloyd's List: www.lloydslistintelligence.com/

- Consider fuel alternatives: renewable diesel, renewable H2, LNG.
- Consider ways cruise ships can plug in to power when visiting Santa Barbara (barge with large battery or H2 fuel cell?).
- Consider year-round VSR, no fast season/slow season, whale and ozone seasons are changeable.

Challenges:

- Temporary and short-term program.
- Expensive compared with other strategies.
- Speeding up outside VSR areas negates the GHG benefit.
- Overall would be difficult to make it work as GHG mitigation.