
2015 UPDATE for GFNMS & CBNMS (GF & CB) Advisory Councils on Sanctuary Actions in Response to SAC Report: *Vessel Strikes and Acoustic Impacts to Whales*

Recommendation 1: NOAA and USCG should pursue the modification of shipping lanes to avoid areas of whale concentration, beyond the shelf break

The Traffic Separation Scheme (TSS) was modified at the approach to San Francisco Bay on June 1, 2013. Sanctuary staff worked closely with the USCG to ensure chart updates were correct and published in a timely fashion.

ONMS continues to promote studies and collaborations to assess the conservation benefit of the lane changes. Thanks to continued monitoring by Applied California Current Ecosystem Studies (ACCESS), Cascadia Research Collective, satellite tagging, and AIS investigations we have a better understanding of the spatial and temporal patterns of ships and whales within the sanctuary and their probability of co-occurrence. In addition, NOAA and partners are working to produce more robust predictions of whale distribution using integrated models that leverage much of the work done by west coast researchers.

Recommendation 2: Dynamic Management Areas (DMAs) should be implemented in areas with high whale concentrations for at least one week or longer as the whale spatial and temporal distribution warrants. The implementation response should be that vessels slow down within the DMA, or preferably, choose alternate lanes where there would be no active DMA.

In 2014, GF & CB experimented with targeted voluntary speed reductions (VSRs). NOAA requested vessels slow-down to ten knots or less only in one of the three lanes at the approach to San Francisco Bay. The hope was that commercial vessels would be willing to cooperate with the VSRs, since they are based on near real-time data to decrease co-occurrence of ships and whales. Sanctuaries assembled a team of experts to consider current whale sightings, locations, behaviors, and seasonal trends to help inform dynamic management. Initial investigations of AIS data show little-to-no cooperation with voluntary speed reduction requests. Data collection to document whale abundance and distribution in the three lanes of the TSS was limited in 2014.

In 2015 GF & CB moved to a fixed-date voluntary Vessel Speed Reduction (VSR) request for all three shipping lanes at the entrance to SF Bay. The Central California sanctuaries are moving to this type of fixed-date voluntary VSR in order to:

- Reduce vessel strikes and the lethality of strikes to threatened and endangered whales in the marine sanctuaries;
- Establish predictable start and end dates for industry that bracket peak periods of whale abundance in the sanctuaries; and
- Address the lack of fine scale, real-time data documenting shifting distribution and abundance of whales in the area.

GF & CB staff considered the advice from NMFS, as well as data from the following sources:

1. CetMap, a mapping tool of the NOAA Cetacean and Sound Mapping Project (<http://cetsound.noaa.gov/cda>)
2. Blue whale tagging data, summarized in Irvine et al 2014. Irvine LM, Mate BR, Winsor MH, Palacios DM, Bograd SJ, et al. (2014) Spatial and Temporal Occurrence of Blue Whales off the U.S. West Coast, with Implications for Management. PLoS ONE 9(7): e102959. doi:10.1371/journal.pone.0102959
3. Unpublished data from Southeast Farallon Islands biologists (Point Blue Conservation Science) from whale surveys at the lighthouse. Data is entered into Spotter App and is uploaded to (website).
4. Cordell Bank Ocean Monitoring Program (CBOMP) was a CBNMS survey from 2004- 2010.
5. Unpublished analysis from Point Blue Conservation Science modeling ACCESS data.
6. Dransfield et al., 2014, Where the whales are: using habitat modeling to support changes in shipping regulations within National Marine Sanctuaries in Central California. Endangered Species Research. Vol. 26: 39-57.
7. Vessel Strikes to Large Whales Before and After the 2008 Ship Strike Rule; Van der Hoop et al. 2015. Though not directly coincident with SMA implementation, right whale vessel-strike mortalities significantly declined from 2.0 (2000–2006) to 0.33 per year (2007–2012).

Summary of findings: Long-term, large-scale regional data sets and models agree that abundances of humpbacks and blue whales are highest June or July through November. Although we are lacking in multi-year data sets at a fine temporal scale to evaluate the increase in abundances of whales locally, a recent analysis by Point Blue Conservation Science and observations by sanctuary staff indicate that in some years whales do arrive early in the Spring and that there may be a more recent shift to earlier arrivals and departures.

Based on this information and the application of the precautionary principle, GF & CB Superintendents have jointly agreed to implement a voluntary VSR request for May 1 through November 15.

GF & CB recognize the importance of sufficient monitoring provisions to support the efficacy of management measures. As such, CBNMS is collaborating with east coast colleagues at NMFS, who implemented NOAA's Ship Strike Rule. The team has extensive experience assessing commitment and compliance with spatial and temporal management measures.

Recommendation 3: The sanctuaries and NOAA Fisheries, working with external partners, should implement a real-time whale sighting and monitoring network with participation from commercial ships, to provide data on whale occurrence and inform the designation of the onset, duration and location of DMAs.

The West Coast Region Sanctuaries, with several partners (NMFS, Pacific Merchant Shipping Association, Point Blue Conservation Science, Conserve IO, International Fund for Animal

Welfare, Cascadia Research Collective, USCG, NPS and others) have been implementing a near-real time whale sighting and monitoring network. The data from the network can be viewed on the mapping tool at <http://westcoast.whalealert.org>. Developed by Point Blue Conservation Science, in collaboration with NOAA the network currently includes data from:

1. Citizen Science via smart phone/tablet applications including: Whale Alert 2.0, Whale Mapp & iNaturalist. The applications facilitate the report of sighting data with accurate positions in a user-friendly way. Mariners and the general public are using these apps to report whale sightings in near-real time. These programs help identify groups of whales, not previously observed by researchers and can assist management by identifying areas for targeted assessment. As of April 23rd, 2015, we have: 5,140 downloads of the Whale Alert app, with 158 whale observations in February & March of 2015, for a total of 618 since the applications release. While we would like to see a significant rise in sightings, the number of sightings submitted via smart phones and tablets continues to rise thanks to continued outreach to dozens of whale watch operators up and down the west coast through phone calls and direct [mailing of brochures](#).
2. Spotter Pro – a smart phone/tablet application being used by researchers and naturalists to document whale sightings in near-real time, along with search effort and other metrics. To date there are 10 Active Spotter projects, that have reported approximately 12,000 sightings across 2400 effort-based trips. Biologists on SE Farallon along with dedicated interpretative staff on a few whale watch vessels have provided the most sighting submissions for GF & CB.
3. Commercial Vessel Observations – NOAA Fisheries, working with Cascadia Research Collective, has conducted 6 ride-alongs on commercial vessels to assess the viability of commercial ships as sighting platforms and the ability to engage crews in reporting sightings. Preliminary data indicates that these vessels are valuable observation platforms. Full write up expected December 2015. In addition NOAA in collaboration with PMSA distributed hundreds of posters encouraging commercial mariners to report sightings through VHF radio, and via email. To date the Whales@noaa.gov has only received reports from one commercial operator, a NOAA vessel, and one whale watch operator.
4. ACCESS: continues to provide the most robust data in the network as part of its multi-disciplinary research to monitor distribution, abundance and demography of marine wildlife in the context of underlying physical oceanographic processes. Unfortunately, cruises only occur three times a year for six to eight days per cruise so data are limited.

In addition to the data listed above, NOAA's at-sea monitoring programs (targeted different temporal and spatial scales) have also been integrated into the sighting network database. While not real-time, the data sets add context to more recent sightings. Data from whale experts and opportunistic aerial surveys continues to provide NOAA with valuable information but are not currently integrated into the sighting network online data portal <http://westcoast.whalealert.org>.

Despite significant investment by NOAA and partners to create a real-time sightings network the submission of observations remains inconsistent across the geography of the sanctuaries. Therefore, the GF and CB Superintendents are unable to utilize real-time data to establish

voluntary or regulatory DMAs with confidence that the whales will be in the particular lane selected for a vessel speed reduction. Still NOAA and partner's continue to pursue better spatially and temporally explicit real-time data by engaging the maritime community, through targeted outreach, websites, talks, and presentations.

Recommendation 4: The sanctuaries should consult with other federal agencies on activities that would affect vessel traffic or vessel noise within sanctuary boundaries. This authority derives from the National Marine Sanctuaries Act § 304(d), under which sanctuaries are entitled to consult over federal agency actions, including licensing or approving private activities, that are likely to injure a sanctuary resource.

When GF & CB are aware of activities that will affect the sanctuary's resources, a required 304d consultation will be requested. For example, since the working group submitted its recommendations ONMS has engaged in consultation with the Navy regarding low and mid-frequency sonar testing and training during which they agreed not to exceed certain thresholds of sound entering sanctuaries.

Recommendation 5: The sanctuaries, together with NMFS and external partners, should work with the port authorities in San Francisco Bay, other west coast ports and industry to establish port-based incentives for the reduction of underwater shipping noise.

In 2014 and 2015 Channel Islands National Marine Sanctuary experimented with an incentive program to slow vessels down through a limited one-time grant. From July through November 2014, seven global shipping companies – COSCO, Hapag-Lloyd, K-Line, Maersk, Matson, Mitsui O.S.K. Lines and United Arab Shipping Company – slowed speeds of ships for 27 trips through the channel to 12 knots (from previous speeds of 14-18 knots) for an incentive payment of \$2,500 per trip. Slowing ships to 12 knots or less cut air pollution, and also reduced the risk of a lethal ship strike. The trial achieved a reduction of 16 tons of nitrogen oxide emissions over the 27 trips, and a reduction of 500 metric tons of greenhouse gas emissions. Both represent a 50 percent reduction from baseline emissions.

The Santa Barbara County Air Pollution Control District was actively supportive of this effort since nitrogen oxide contributes to the formation of ground-level ozone, a primary component of smog that is harmful to human health. Most of the ship transits occurred from July through October, a time period that coincides with the peak period of ozone air pollution and the peak whale feeding season in the Santa Barbara Channel.

While at this time the Central California sanctuaries have not been able to secure similar funds, the trial successfully demonstrated the willingness and ability of the industry to change its schedule with a modest incentive.

Recommendation 6: Implement a passive acoustic monitoring program within GF & CB sanctuary waters to better understand the abundance and distribution of marine mammal species in the sanctuaries, as well as the potential noise impacts from shipping on sanctuary resources.

CBNMS is working with NOAA's ocean noise reference station network to build and deploy a passive acoustic low frequency mooring that will be equipped to measure underwater ambient sound. NOAA's office of Ocean and Atmospheric Research is building the mooring. This project is compatible with the recommendations of the GF & CB Advisory Council's.

Additionally, NMFS is developing acoustic guidance for assessing the effects of anthropogenic sound on marine mammal species. The guidance provides acoustic threshold levels for onset of permanent threshold shift (PTS) and temporary threshold shifts (TTS) for all sound sources. GF & CB are tracking this process and intend to move forward with NOAA on this issue.

<http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>

Recommendation 7: The West Coast Region sanctuaries should draft an Education and Outreach Strategic Plan, with measurable outputs and an implementation schedule that will seek to inform all stakeholders on the issues as well as possible solutions. Education and outreach materials should first be focused on engaging and informing the commercial maritime industry.

GF, CB and the West Coast Region have communicated with shippers through the following methods:

1. Broadcast and Published Local Notice to Mariners
2. Whale Alert 2.0
3. AIS broadcasts requesting ships to slow down.
4. [Education/outreach poster for ship's bridge](#) developed and distributed in collaboration with NMFS and the Pacific Merchant Shipping Association that encouraged mariners to ID whales and report sightings of live and entangled whales.
5. Letters to agents and shipping lines asking for cooperation with voluntary speed restrictions.
6. Maintenance of an email list-serve that provides updates on whale season, sightings, strikes, and voluntary speed reduction requests.
7. Broadcasts over NOAA Weather Radio
8. [Brochure](#) and infographics have been produced to encourage mariners to report sightings and distributed through the listserve, email, and direct mail.
9. Presentations to various committees and groups including the bar pilots, harbor safety committee, Bay Area Planning Coalition, Port of Oakland.
10. Close collaboration with and USCG Vessel Traffic Service operators who have agreed to speak directly to the ship's crew in 2015.

Recommendation 8: The West Coast Region sanctuaries and NMFS should develop a regional education and outreach program to leverage scarce resources, avoid duplication of efforts in areas already addressed by other NMS (e.g. CINMS, Stellwagen Bank NMS), and recognize that commercial vessels often call or transit close to any one of the NMS on many voyages.

The West Coast Region sites and NMFS collaborate regularly on outreach and education tools. For example this summer (2015) NMFS SWR and ONMS are working together to increase the

effectiveness of our voluntary sighting network. A joint outreach campaign facilitated by a COAST intern will refine what resources are necessary to collect large whale sighting data along the California coast. As part of this effort, a pilot study will be conducted during the summer of 2015 to test the functionality of a citizen science-based program for the collection of whale sighting data off of California and will allow for a better understanding of the advantages and limitations associated with this type of data collection from selected platforms. The intern will meet with participants to implement study protocols, retrieve data collected in the field, and facilitate ongoing communication between all partners.

Recommendation 9: The SAC recommends continued research on the following topics related to risk of ship strikes to whales:

Continue compilation and analysis of historical and new data (including from real-time sighting data) in terms of whale distribution and habitats to inform possible future modifications of shipping lanes. It is important that some of these data include whale movements and distribution at night to allow evaluation of how well daytime sightings accurately represent nighttime distribution.

GF & CB in partnership with Point Blue Conservation Science continue ACCESS cruises to compile and analyze daytime whale sightings data. Limited data on whale distribution and movements at night are available but more tagging data would improve our current understanding of whale activity at night.

Compile ship traffic data to determine emerging changes in ship traffic patterns and speeds over time, especially in the context of changes in CARB rules, IMO Emission Control Areas (ECA), and other management and economic factors.

GF & CB in partnership NMFS, SFSU & Point Blue Conservation Science have analyzed USCG AIS data to understand the response by shippers to voluntary vessel speed requests in 2012-2014, CARB & ECA compliance. The different data analyses are in various stages from being written up to final publication.

Using data on whale abundance, trends, distribution, duration of time in vulnerable areas, reaction to ships, and proportion and location of strandings involving ship strikes to evaluate the degree to which documented ship strike mortalities reflect true mortalities of whales and consider the relative risk of ship strikes to different species.

NMFS in collaboration with others has taken the lead on assessing ship strike risk for the SF TSS as well as for the entire west coast. For example data from a recently completed Master's thesis by Angela Szesciorka, shows that the majority of documented near misses (4 of 5) occurred at or near the northern end of the N TSS.

Continue monitoring whale population trends to provide data for the above calculations and to determine the conservation status of the potentially affected populations.

A number of independent Species Distribution Models (SDMs) have been developed using various methods and data sets, particularly for blue whales. NMFS is working on integrating the SDMs to produce a more robust prediction of whale distribution.

Ensure that stranded whales are systematically examined to determine whether they were hit by ships prior to death.

NMFS oversees the Marine Mammal Stranding Network, which performs necropsies on stranded whales to determine the cause of death as time and resources allow. In addition, ONMS staff has assisted in a variety of capacities including assisting with disentanglements through vessel support, training and the purchase of necessary equipment for responding to disentanglements to avoid stranding's when possible and also assisted with necropsies on an as needed basis.

Gather data on behavior of whales in and around shipping lanes relevant to vulnerability to ship strikes, including the proportion of time whales spend near the surface and how this varies by species, region, and time of day, and whether other whale species differ as dramatically in their diurnal behavior as blue whales.

The recommendation to gather data on whale behavior in and around shipping lanes to determine vulnerability to ship strikes and variability by season, time of day, species, sex, age, foraging behavior vs other behaviors, is partially being done through NMFS, Cascadia Research Collective, Moss Landing Marine Lab, and ACCESS. In order to best assess this, additional tagging work is needed.

Examine how whales react to approaching ships to determine differential vulnerability to collisions with ships, and how changes in noise levels from ships or speed changes alter vulnerability.

The recommendation to examine how whales react to approaching ships to determine vulnerability and how changes in noise levels (speed reduction or mechanical changes) alter vulnerability is a reasonable research question. At this time, GF & CB are unable to develop a research project to answer this question. In order to best assess this, tagging work in combination with at least one acoustic mooring would be needed along with support from NMFS. See update above on CBNMS acoustic mooring which might provide a valuable data towards answering this question