

National Marine Sanctuaries
National Oceanic and Atmospheric Administration



NATIONAL MARINE
SANCTUARIES

MONTEREY BAY



Analysis of Vessel Traffic in MBNMS (2009-2012)

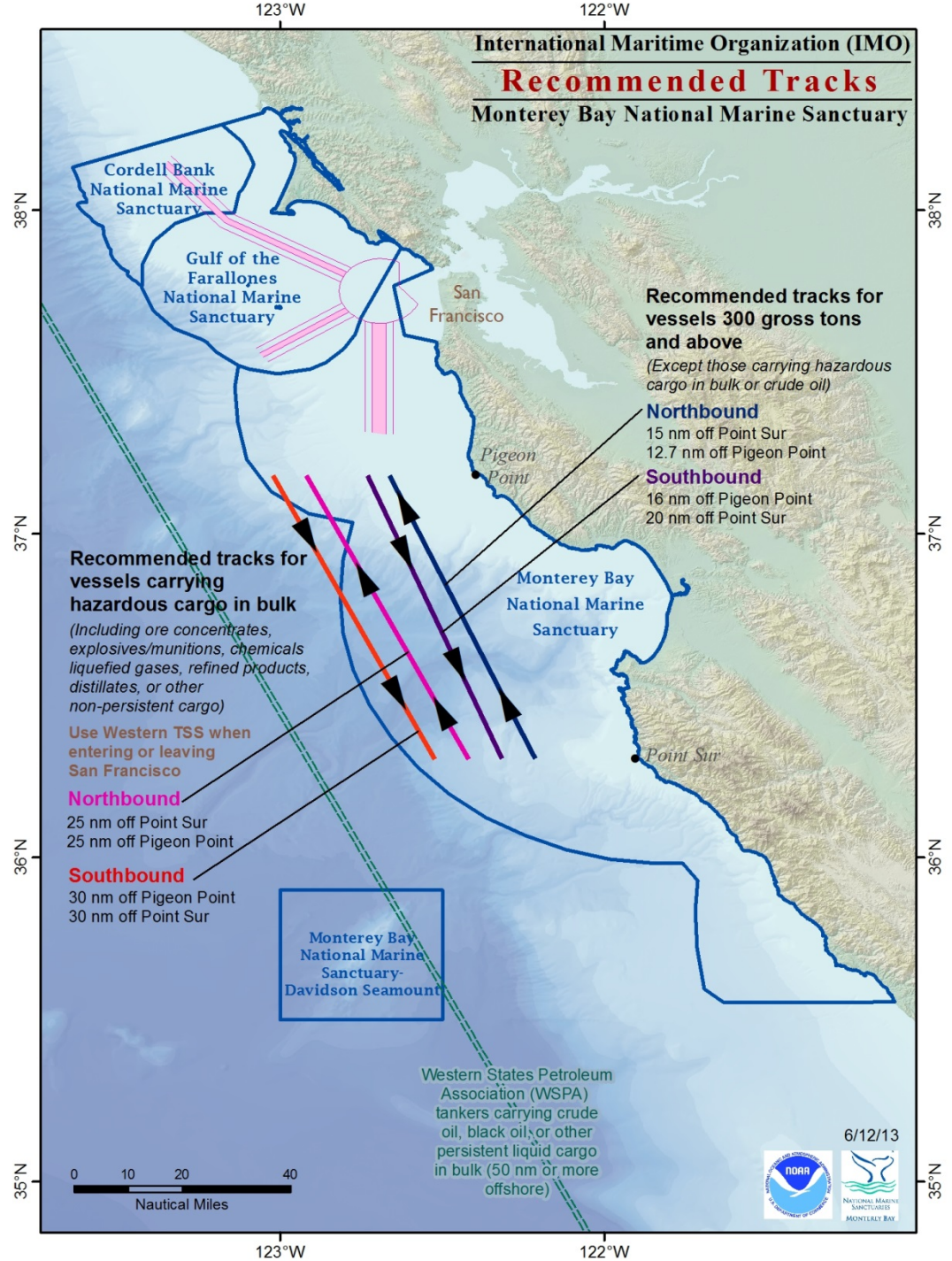
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Christopher Miller, Naval Postgraduate School
Thomas Moore, Southwest Fisheries Science Center

February 2014

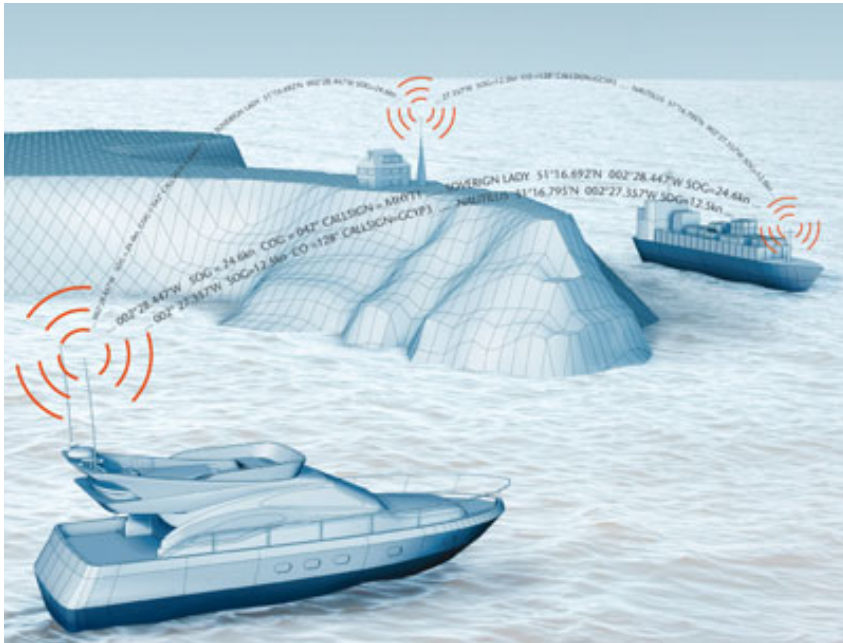
Outline

- Background
- Deviation analysis
- Density analysis
- Daily Monitoring
- Outreach

International Maritime Organization (IMO) Recommended Tracks

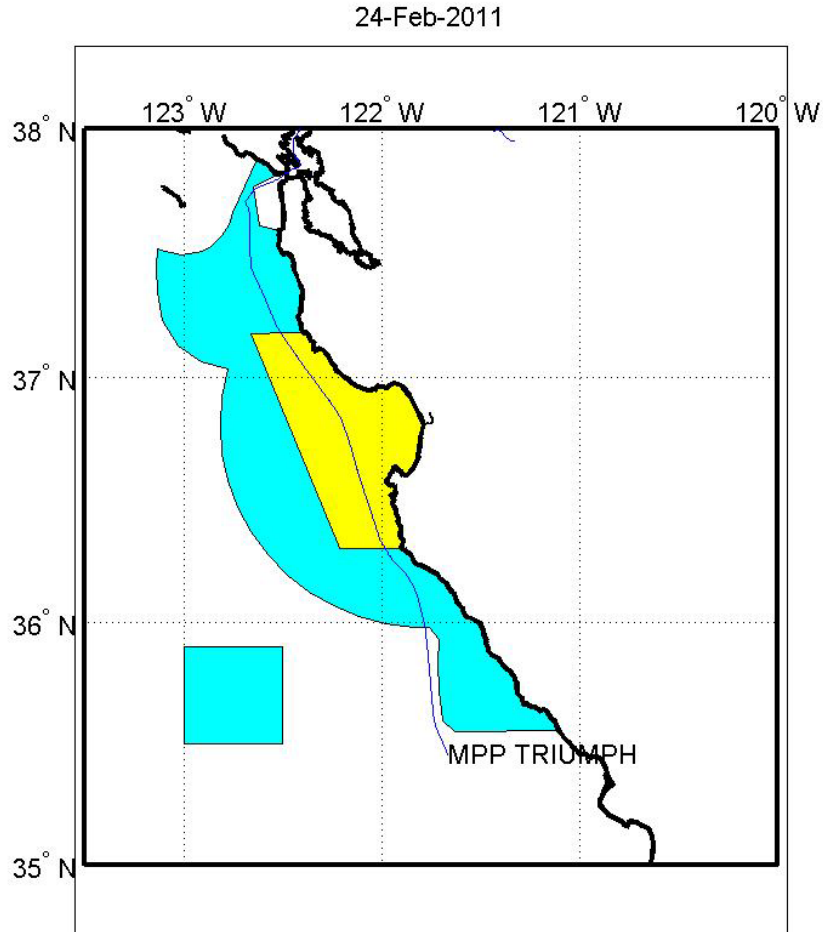


Automatic Identification System (AIS)



onboard device that transmits & monitors the location and characteristics of vessels in real time

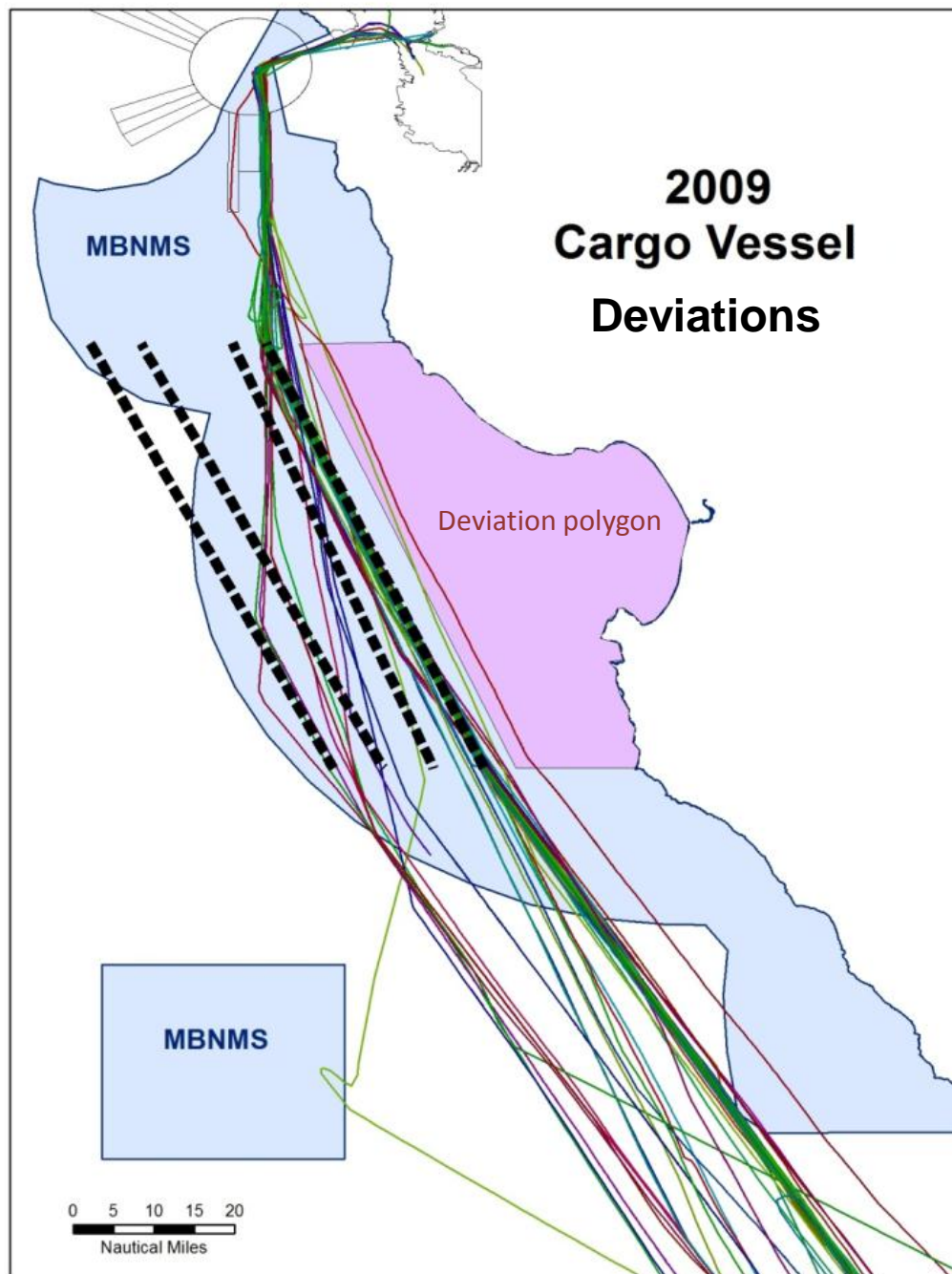
Deviation Analysis by Naval Postgraduate School (NPS)



- Deviation polygon
- AIS data (9/2009-12/2012) collection and processing
- Cargo vessel and tanker analyses

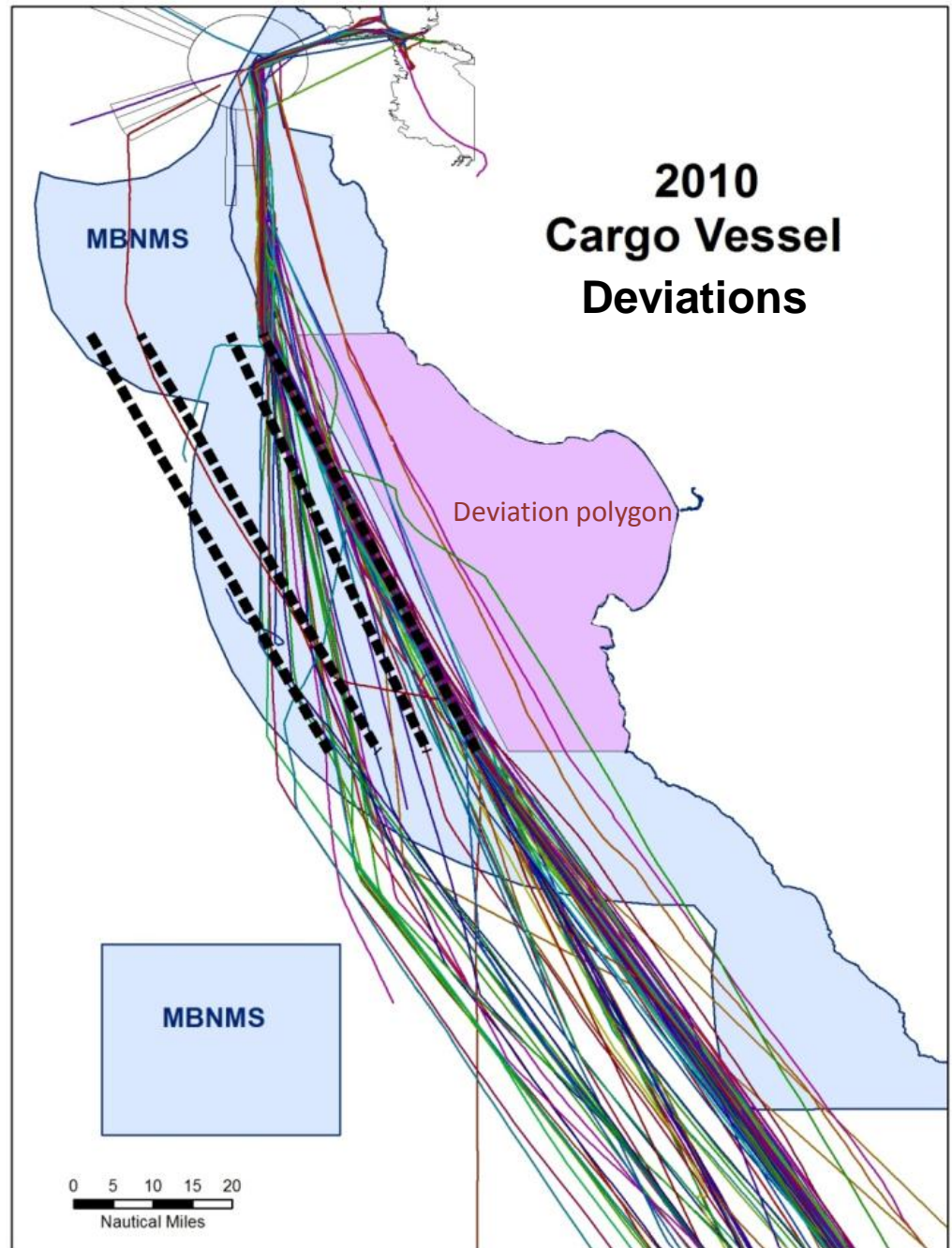
2009 Cargo Vessel Deviations (9/4 to 12/17, 2009)

Date	Vessel Name
10/4/2009	Santa Cruz
10/5/2009	Santa Cruz
10/8/2009	YM Vancouver
11/7/2009	Maersk Dhahran
Total # Ships	3
Total # Deviations	3



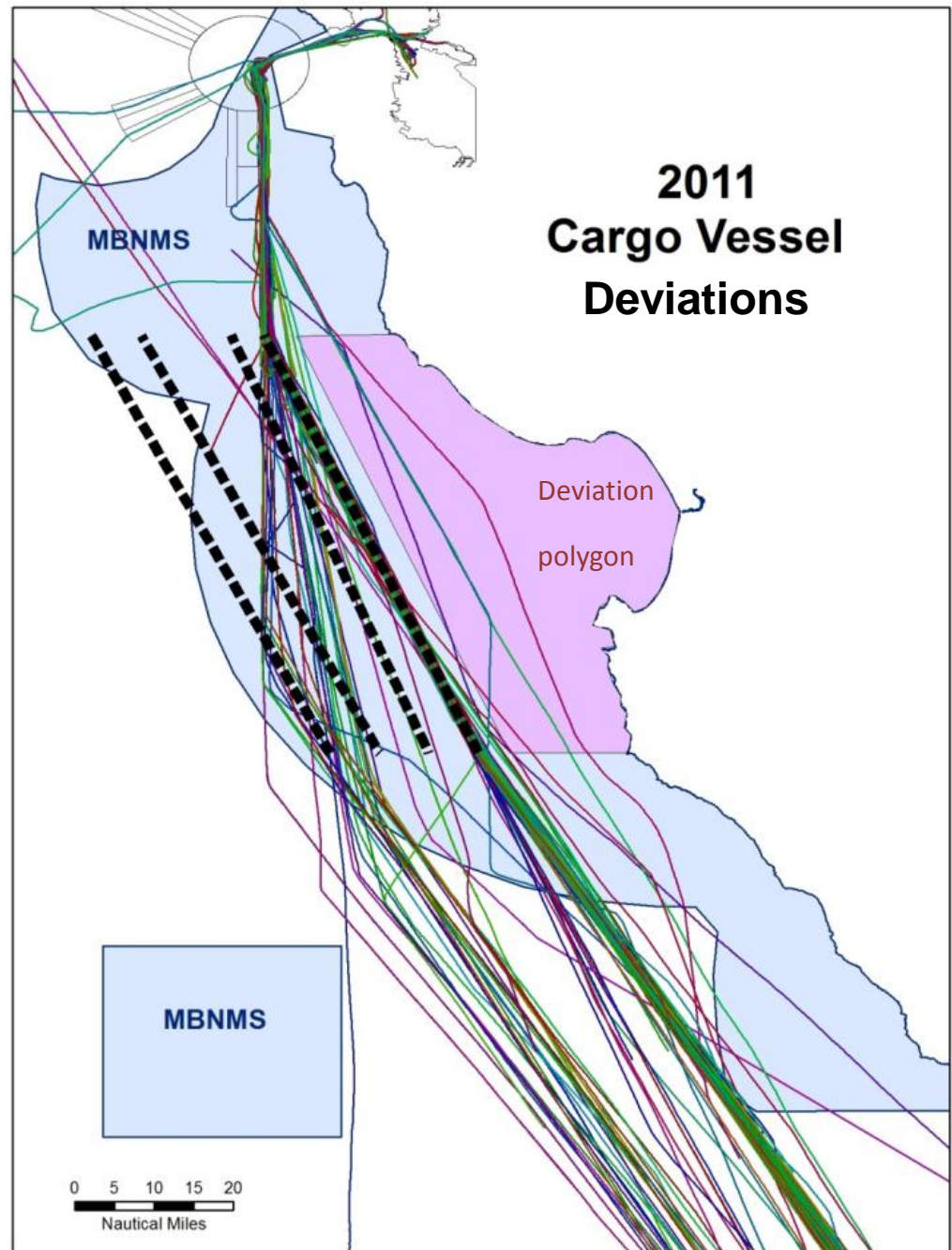
2010 Cargo Vessel Deviations

Date	Vessel Name
1/6/2010	Maersk Dhahran
3/11/2010	Maersk Dhahran
4/4/2010	Leda Trader
4/6/2010	Hyundai Singapore
5/13/2010	Maersk Dhahran
5/14/2010	Toby Tide
5/15/2010	Toby Tide
5/25/2010	Toby Tide
5/26/2010	Toby Tide
7/14/2010	Maersk Dhahran
7/19/2010	Horizon Falcon
9/16/2010	Maersk Dhahran
11/19/2010	Maersk Dhahran
Total # Ships	5
Total # Deviations	11



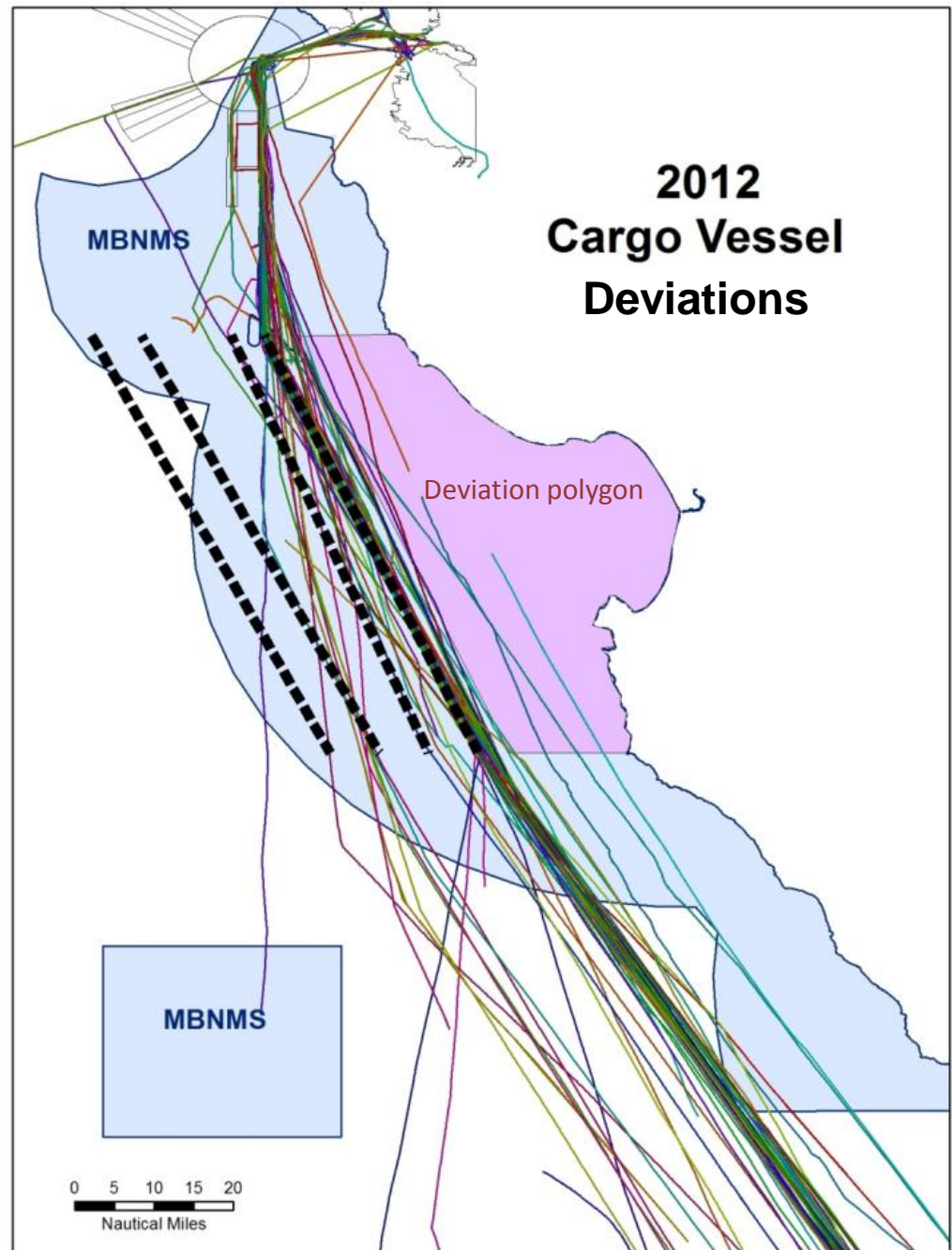
2011 Cargo Vessel Deviations

Date	Vessel Name
1/21/2011	Maersk Dhahran
2/24/2011	MPP triumph
5/8/2011	Kota Jasa
5/12/2011	Ocean Pioneer
5/24/2011	MV CSAV Venezuela
6/17/2011	Kota Jasa
8/14/2011	NRC Quest
Total # Ships	6
Total # Deviations	7



2012 Cargo Vessel Deviations

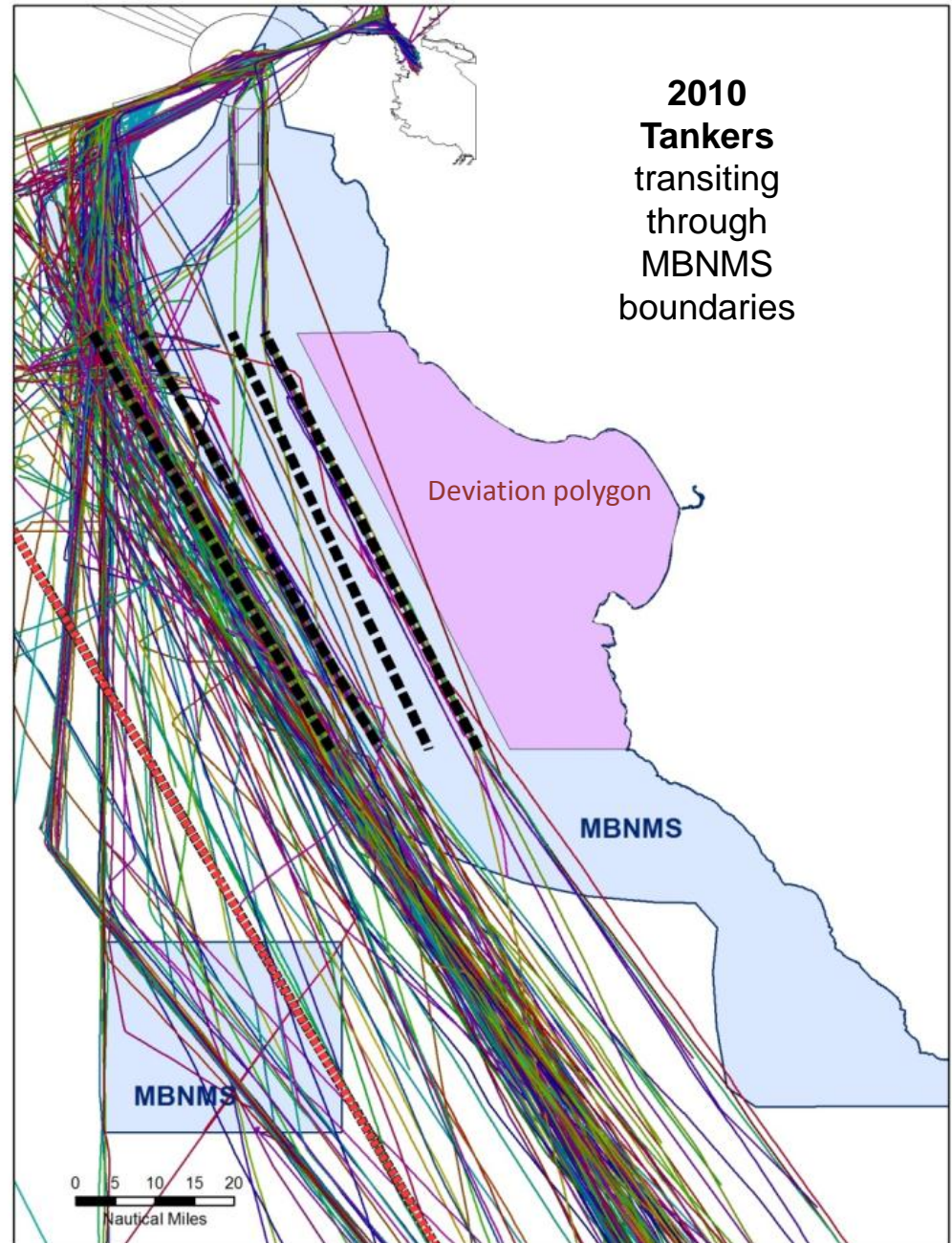
Date	Vessel Name
2/27/2012	Mol Diamond
4/6/2012	Hanjin Hamburg
5/18/2012	Apl Thailand
6/14/2012	Cape Mayor
7/5/2012	Apl China
7/22/2012	War Admiral
8/23/2012	War Admiral
8/24/2012	War Admiral
9/14/2012	Adele Elise
10/10/2012	Adele Elise
10/13/2012	Ocean Pioneer
Total # Ships	8
Total # Deviations	10



2012 Cargo Vessel Deviations

2010 Tankers Deviation

Date	Vessel Name
4/19/2010	Gulf Stream



Number of annual deviations*

Type	2009	2010	2011	2012
Cargo	3 (by 3 vessels)	11 (by 5 vessels)	7 (by 6 vessels)	10 (by 8 vessels)
Tanker	0	1 (by 1 vessel)	0	0

*2009 time period: (9/4 to 12/17, 2009)

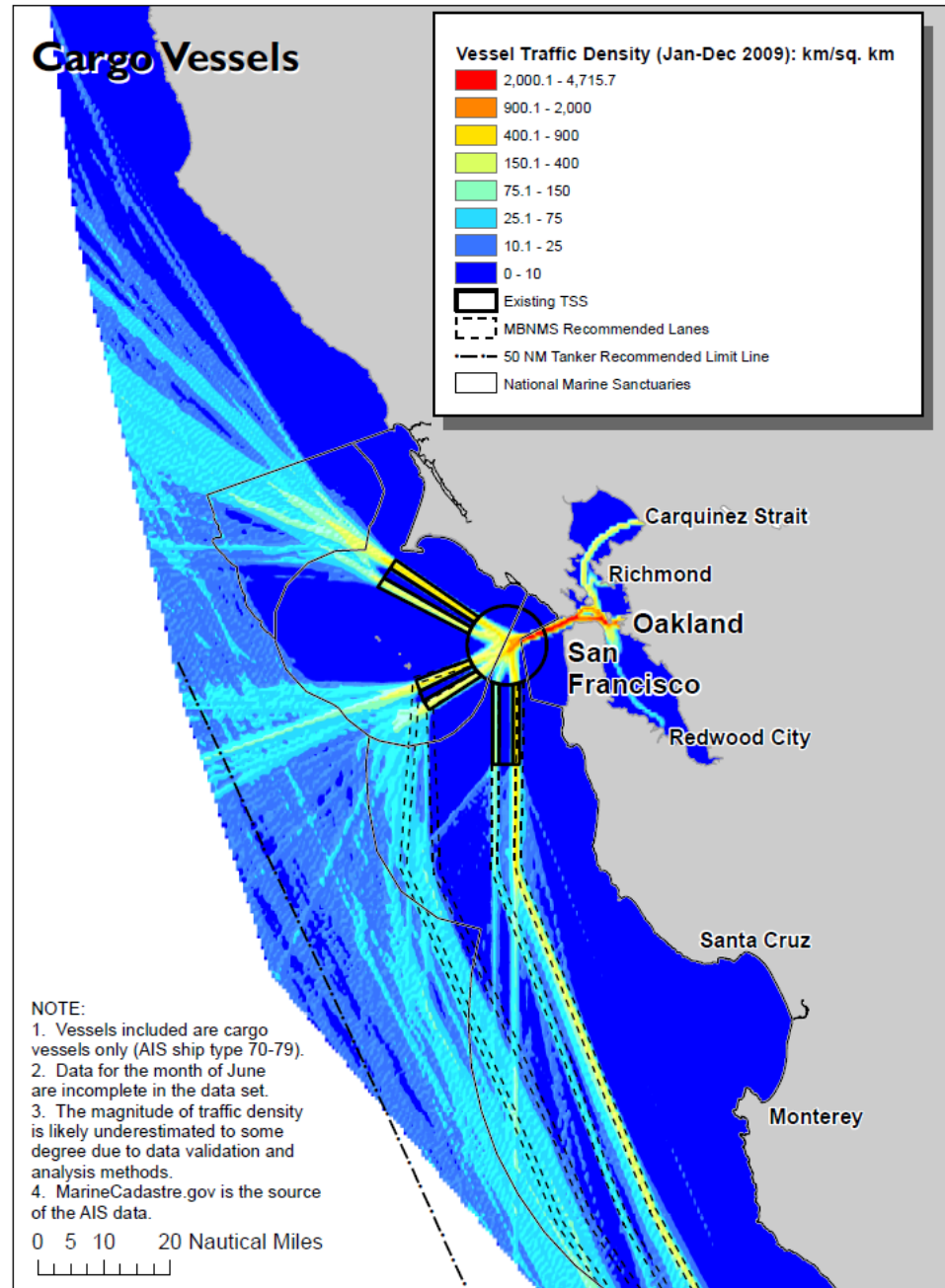
Density Analysis by Southwest Fisheries Science Center

- 2009 AIS data from MarineCadastre.gov
- Cargo Vessels and Tanker analyses
- Density (km/square km)

2009 Vessel Traffic

Cargo Vessels

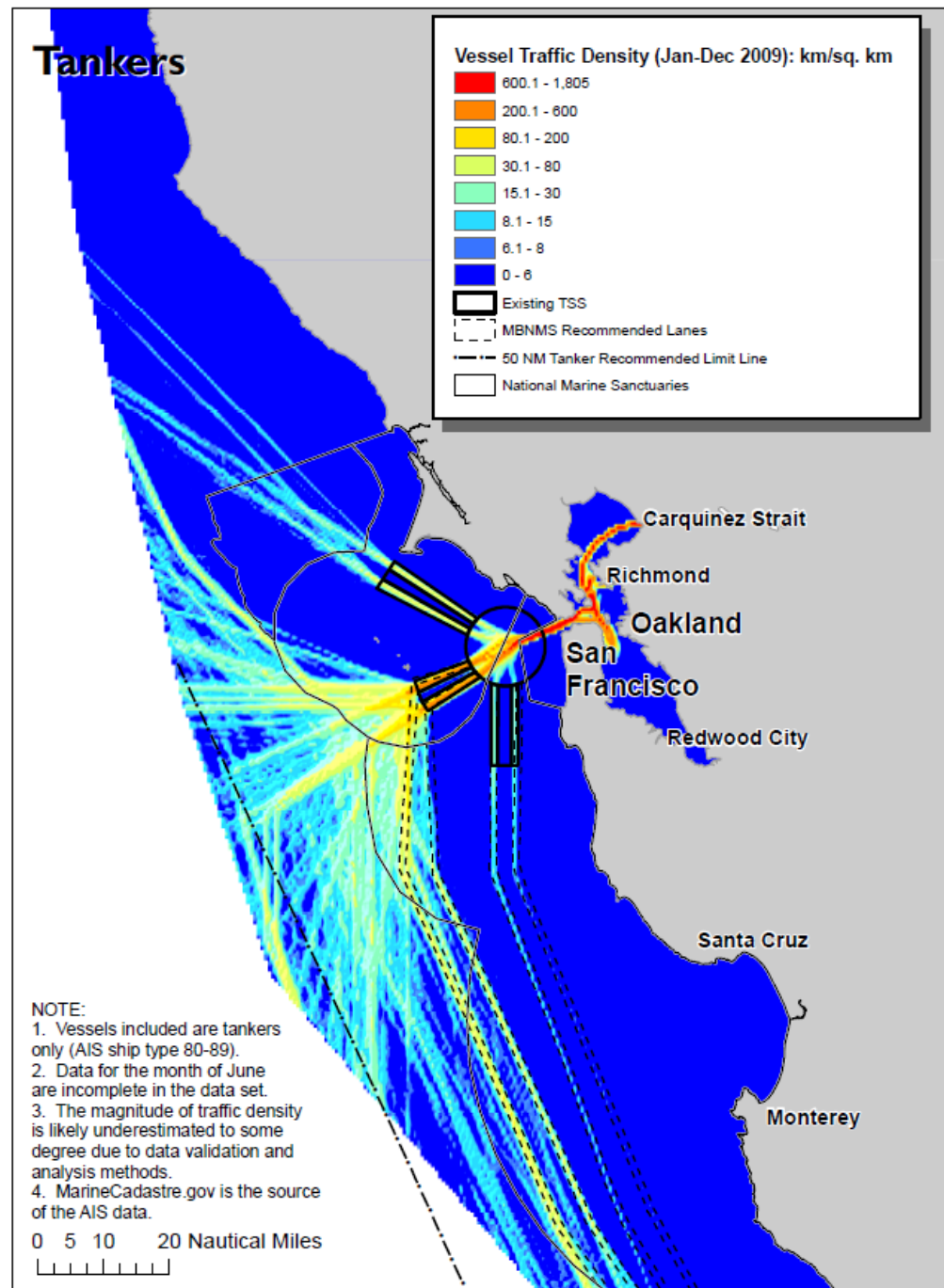
Map and
Analysis by
Southwest
Fisheries
Science Center



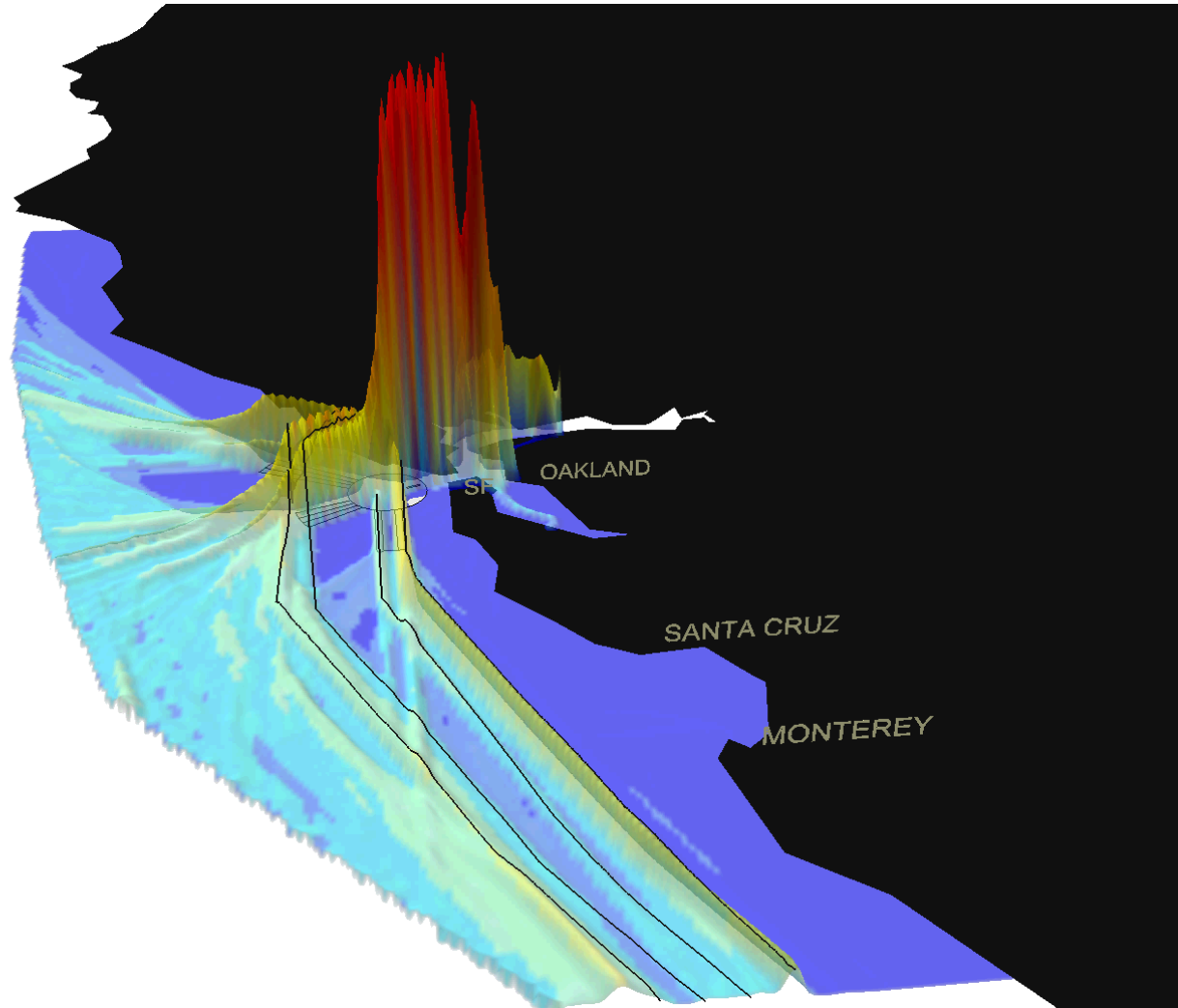
2009 Vessel Traffic

Tankers

Map and
Analysis by
Southwest
Fisheries
Science Center



2009 Vessel traffic density in 3D



Animation and
Analysis by
Southwest
Fisheries Science
Center

**Continued
Monitoring
&
Coordination
with USCG**

Real time

- Daily real time monitoring by MBNMS
- Continued real time communications with USCG on deviations
- USCG letters to ship lines as needed

Annually

- Annual data analysis for cargo ships and tankers by NPS and MBNMS

- Algal Blooms
- Bathymetry
- Buoys
- Gliders
- Models
- Satellite Imagery
- Ship Tracking**
- Shore Stations
- Surface Currents
- Tides
- Water Quality
- Waves
- Weather
- Webcams

Automatic Identification System (AIS) Ship Traffic Map

This Google Map shows positions of vessels equipped with radio transmitters (generally large ships). Ship positions are determined by a series of receiver stations along the California coast. Each vessel's unique signal allows its name and type as well as speed and direction to be reported on our website. The red balloon marker shows the most recent position of the ship, with the previous trackline indicated by a line extending from marker. The map updates on every hour and at 20 minutes past each hour, showing the location of ships for the nearshore marine area from Pt. Arena to Pt. Conception as of those times. See further instructions below map if needed.

All Ships
 Fishing
 Tugs
 Pilot
 Military/Law enforcement
 Passenger
 Cargo
 Tankers
 Pleasure craft
 Research or Dredging

[Hide Vessel Information](#)

All other/unknown ship tracks are white.

MMSI:	368992000
Name:	ALGOL
Call Sign:	NAMW
Destination:	PER ORDERS
ETA:	30-Aug-2014 10:30:00
Speed:	0.1 kts
Heading:	207.7 deg
Size(LxWxD):	289.0m x 33.0m x 10.2m

MMSI:	538004105
Name:	AMAGI GALAXY
Call Sign:	V7VE9
Destination:	No Info
ETA:	Not Available
Speed:	0.0 kts
Heading:	0.0 deg
Size(LxWxD):	152.0m x 27.0m x 8.5m

MMSI:	566951000
Name:	APL PHOENIX
Call Sign:	9V9918
Destination:	No Info
ETA:	Not Available
Speed:	17.2 kts
Heading:	304.1 deg
Size(LxWxD):	328.0m x 46.0m x 12.3m

MMSI:	369542000
Name:	BLACK EAGLE
Call Sign:	WDJJ
Destination:	No Info
ETA:	Not Available
Speed:	0.0 kts
Heading:	10.0 deg
Size(LxWxD):	189.0m x 32.0m x 9.5m

MMSI:	564553000
Name:	CITRUS EXPRESS
Call Sign:	9V8972
Destination:	No Info
ETA:	Not Available
Speed:	0.0 kts

Outreach goals

- MBNMS Vessel Traffic Website
- Final Report (2009-2012 Analysis)
- Conferences
- Presentations (SAC, CWG)
- Ship industry meeting
- Coast Pilot
- Local notice to mariners

montereybay.noaa.gov/resourcepro/resmanissues/vessels.html

Apps Monterey Bay N... National Ocean... Imported From ... ESRI Customer ... Seasons in the S... EFHRC Catalog...

MONTEREY BAY NATIONAL MARINE SANCTUARY

Home | About MBNMS | Resource Protection | Education & Outreach | Research & Monitoring | Get Involved | Advisory Council | Materials & Resources

Resource Protection

- Overview
- General Information
- Ecosystem-Based Management
- Permits, Regulations, & Enforcement
- Water Quality
- Maritime Heritage
- Resource Issues
- Acoustic Impacts
- Climate Change
- Coastal Armoring & Erosion
- Cruise Ships
- Desalination
- Emergency Response & Oil Spills
- Fishing & Harvesting
- Harbors & Dredging
- Introduced Species
- Landslides & Debris
- Marine Debris
- Marine Protected Areas
- Military Activities
- Motorized Personal Watercraft
- Oil & Gas Development
- Vessel Traffic

Resource Issues: Vessel Traffic

Overview of the issue

There are approximately 4000 transits of the Sanctuary each year by large shipping vessels (greater than 300 gross tons), including container ships, bulk freighters, hazardous materials carriers, and tankers. Vessel traffic within the Sanctuary was a major issue of concern raised during the designation process due to potential impacts from a large spill should one of these vessels ground along the coastline. For example, an oil spill could severely impact the sea otter population. The Sanctuary also hosts an abundance of whales and the National Marine Fisheries Service has identified vessel strikes as one of the threats that could impede the recovery of endangered whales so it is vital to understand vessel traffic in the Sanctuary, for more information on ship strikes see [whale strikes](#).

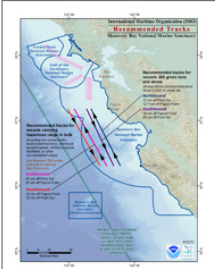
How is the Sanctuary involved?

In 1997, the United States Coast Guard (USCG) and the National Oceanic and Atmospheric Administration (NOAA) established a workgroup of key stakeholders in the issue of vessel traffic, including representatives from federal, state and local governments, environmental groups and industry to review existing practices and risks, and recommend a package of strategies which would maximize protection of Sanctuary resources while allowing for the continuation of safe, efficient and environmentally sound transportation. The group's recommendations included alteration of the Traffic Separation Scheme (TSS) off San Francisco to move vessels away from the sensitive San Mateo shoreline. Most importantly, container ships, bulk freighters, and vessels carrying hazardous materials were moved offshore to reduce the risk of groundings, and organized into north-south lanes to reduce the risk of collision. These recommendations were ultimately approved by the International Maritime Organization (IMO), and implementation began in 2000. For details of the historic track changes please see the [Vessel Traffic Management Plan Executive Summary](#).

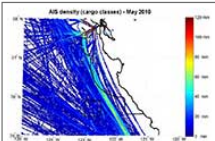
In 2012, the Sanctuary staff provided input to the IMO to reduce ship strikes of whales on approaches to the San Francisco Bay ports and improve navigational safety. The San Francisco TSS lanes will be extended in 2013 due to the input from NOAA. For more information see [the 2012 press release](#).

Reports

In 2013, Sanctuary staff collaborated with Southwest Fisheries Science Center (SWFSC) and Naval Postgraduate School (NPS) staff to analyze the use of the recommended tracks by cargo vessels and tankers to help determine if any additional management implementations are necessary to protect the Sanctuary's resources. SWFSC staff developed 2009 density maps for tankers and cargo vessels based on Automatic Identification System (AIS) data from MarineCadastrre. NPS staff developed a Matlab code to detail daily deviations of the recommended tracks by cargo vessels and tankers for AIS data from September 2009 to 2012. Sanctuary staff reviewed AIS data daily to note any deviations and are working with United States Coast Guard staff to follow up with vessels traveling more than three nautical miles inside the recommended track for vessels 300 gross tons and above. The report, "[Monterey Bay National Marine Sanctuary \(MBNMS\) Vessel Traffic Analysis: 2009-2012](#)" (3.5M PDF), details how these three AIS data analyses do indicate that a great majority of the vessels that transit through the MBNMS are complying with the IMO recommended tracks.



Current IMO recommended tracks (the San Francisco Traffic Separation Scheme (TSS) was updated June 1st, 2013)



Cargo vessel densities through MBNMS for May 2010. The color bar indicates the total number of minutes vessels spent in one square arc-minute of area over the course of the month. Figure from Christopher Miller at Naval Postgraduate School (NPS) from "Monthly distributions of shipping vessels within MBNMS for Jan-Dec2010."

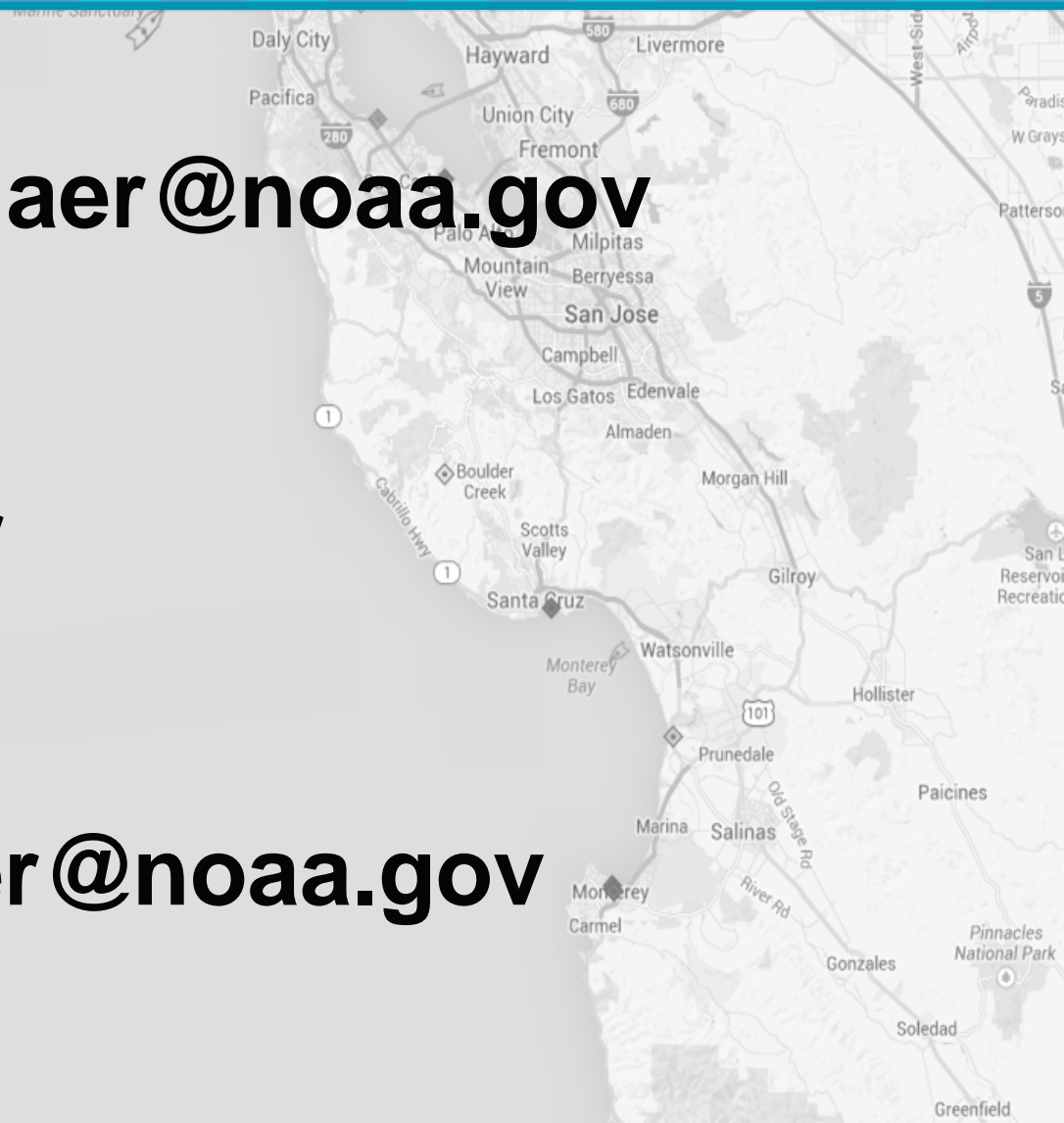
Questions?



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