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CD-0004-22 (BOEM)

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ADOPTED FINDINGS EXHIBITS

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Source: BOEM, Frank Pendleton via the California Offshore Wind Energy Gateway

Exhibit 1-2. Current Offshore Wind Platform, Mooring and Anchor Types

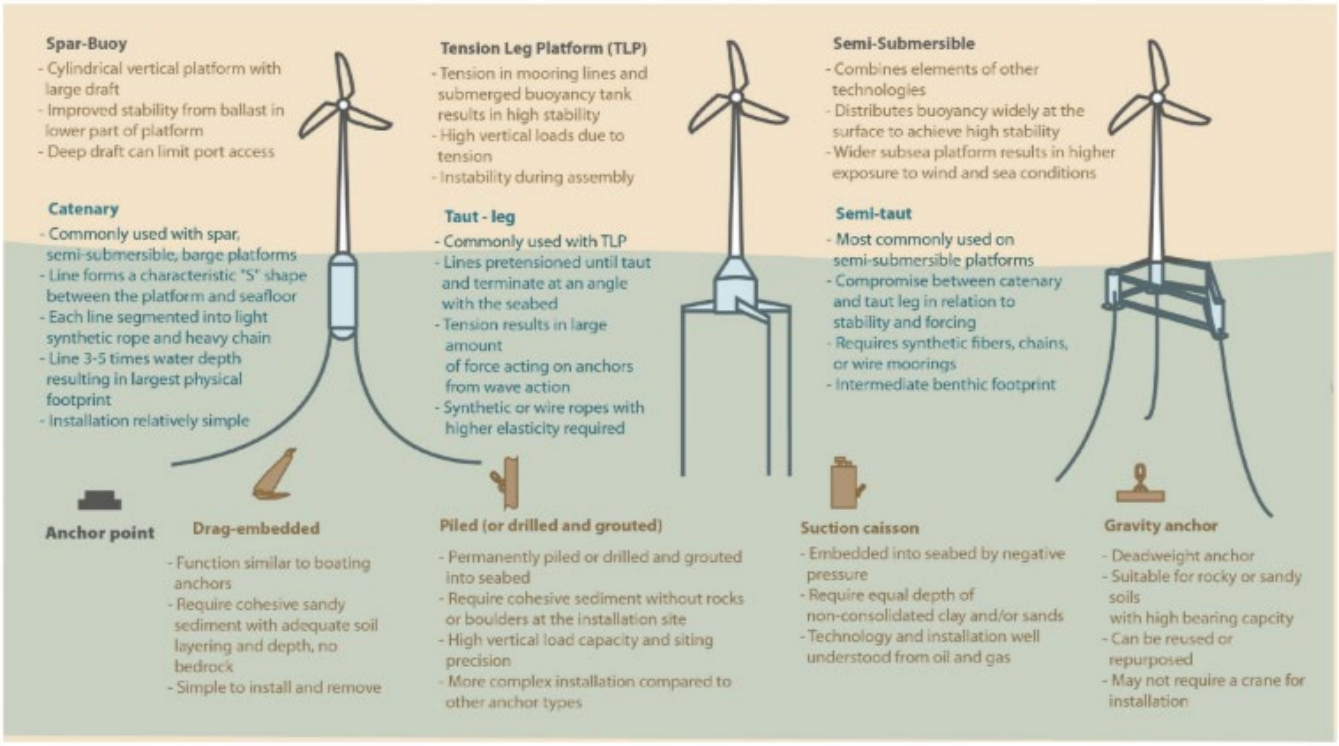


Diagram of current mooring, anchoring, and floating foundations from Maxwell et al., 2022.

Exhibit 1-3. Schematic of a Full-scale Floating Wind Energy Development

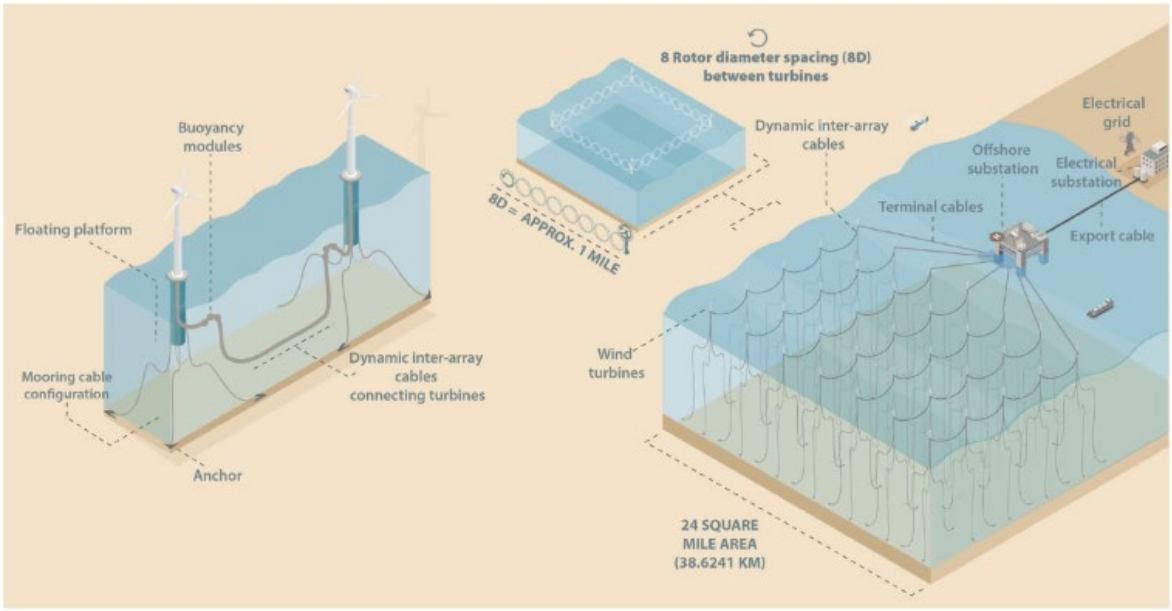
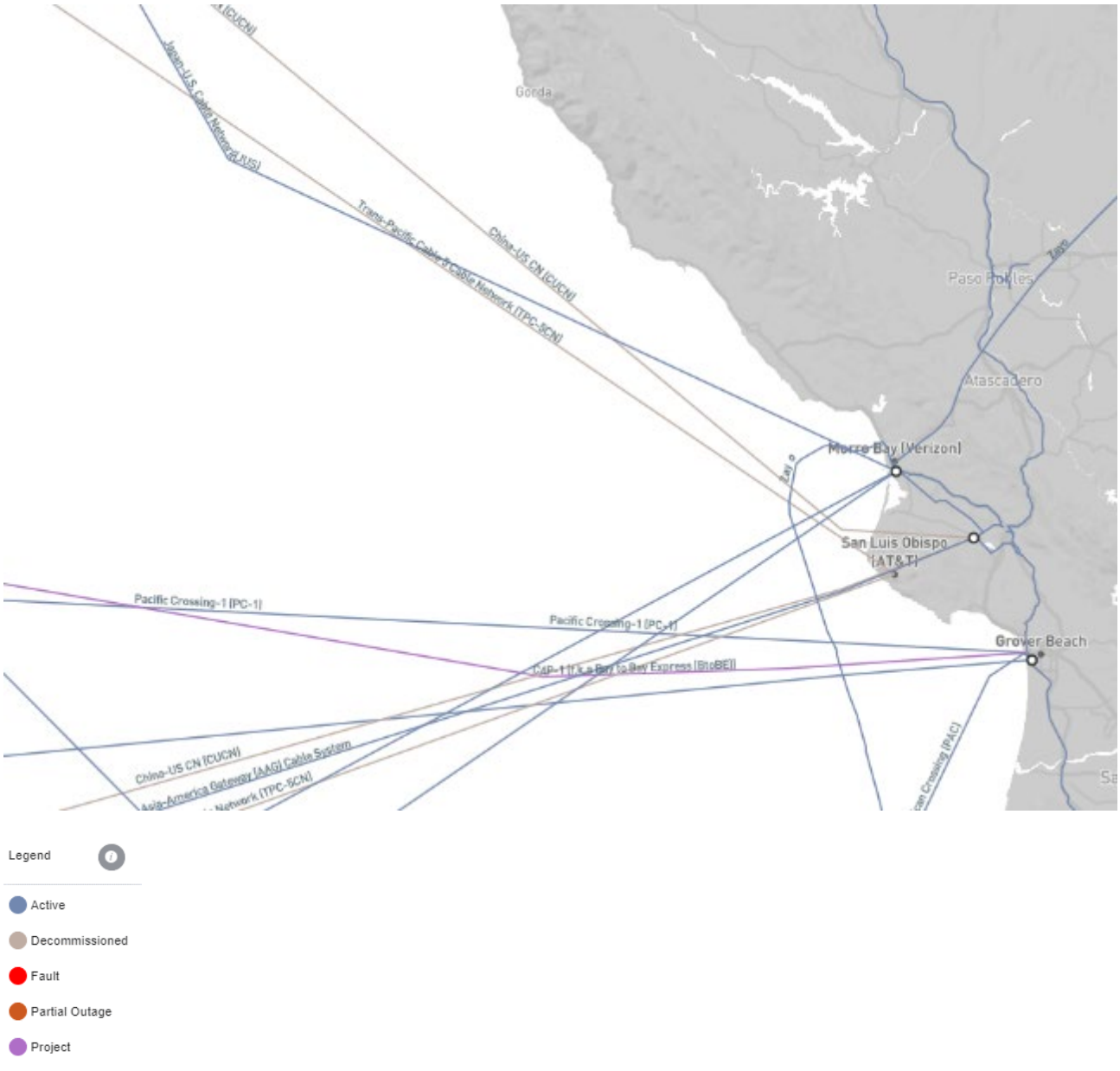


Fig. 2. Schematic of a full-scale floating wind energy development. Floating offshore wind turbines (FOWT) differ from fixed-foundation turbines primarily in the types of platform and anchoring system used to support the turbine. FOWT employs buoyant 'floating substructures' which are submerged or semi-submerged platforms anchored to the seabed by mooring lines and a variety of anchor types, and connected to one another by dynamic inter-array cables.

Source: Maxwell et al., 2022.

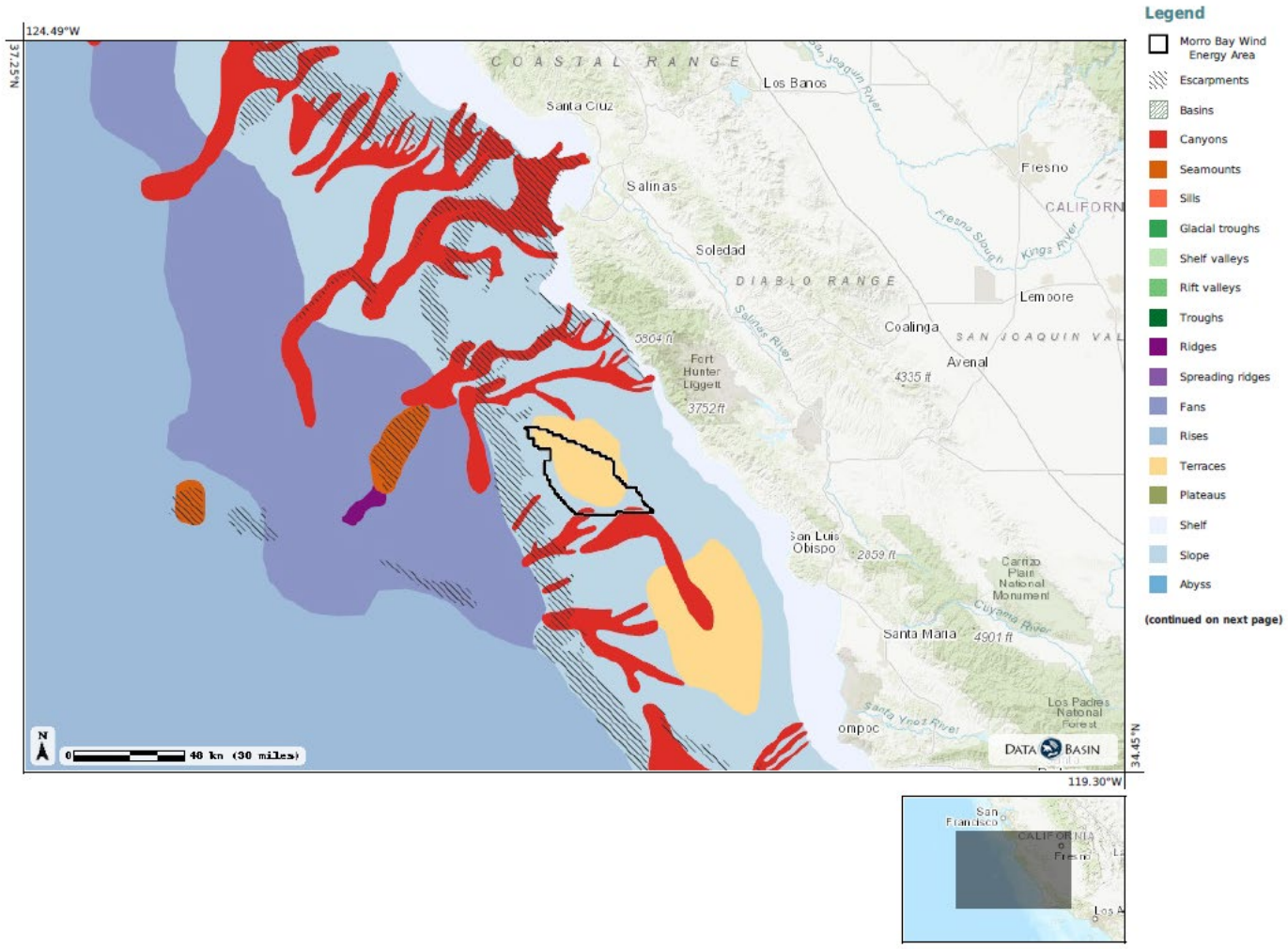
Exhibit 1-4. Subsea Cables and Cable Landings in the Vicinity of Morro Bay



Source: infrapedia.com

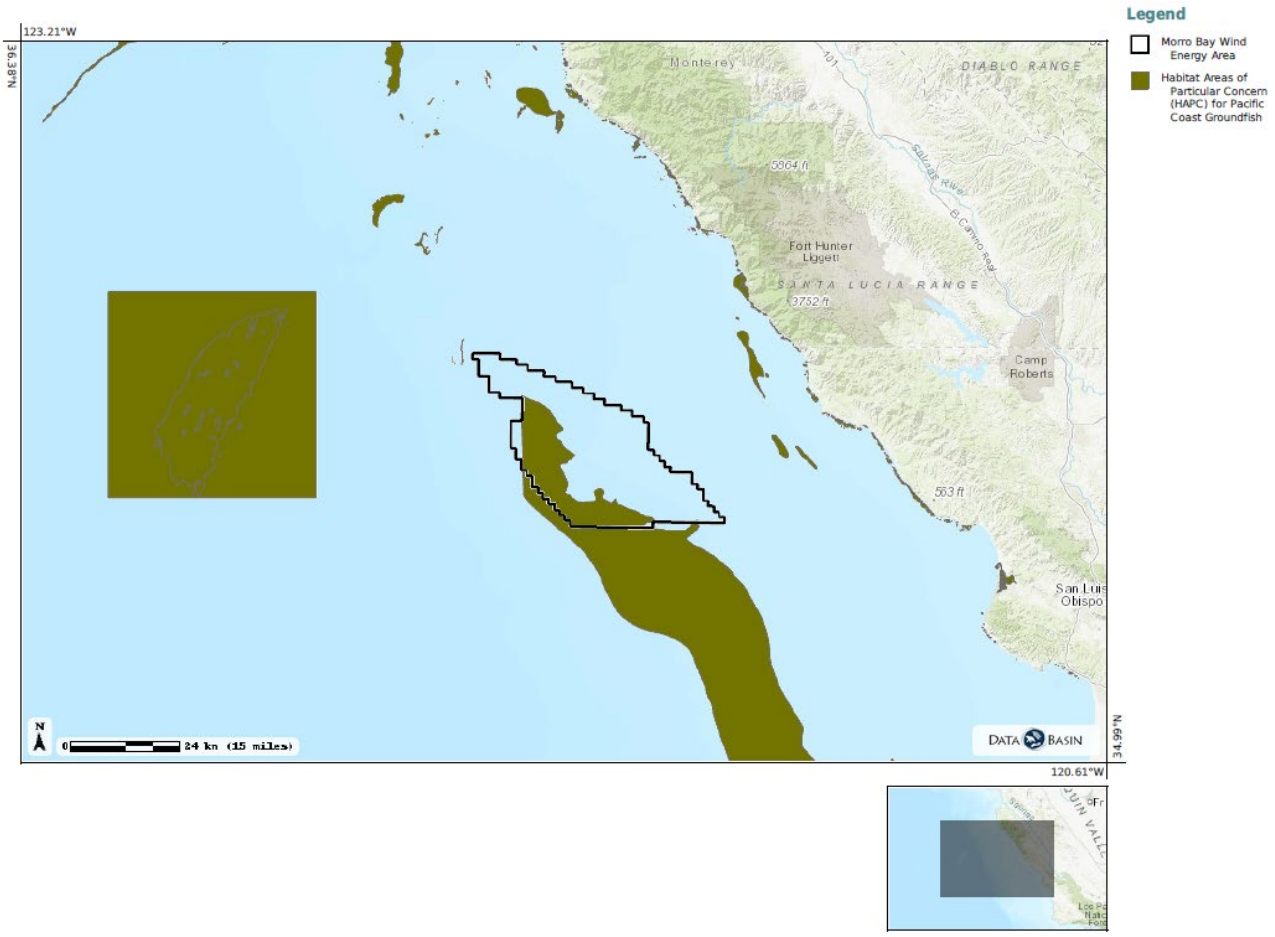
Marine Resources and Water Quality Exhibits

Exhibit 2-1a. Seafloor Features



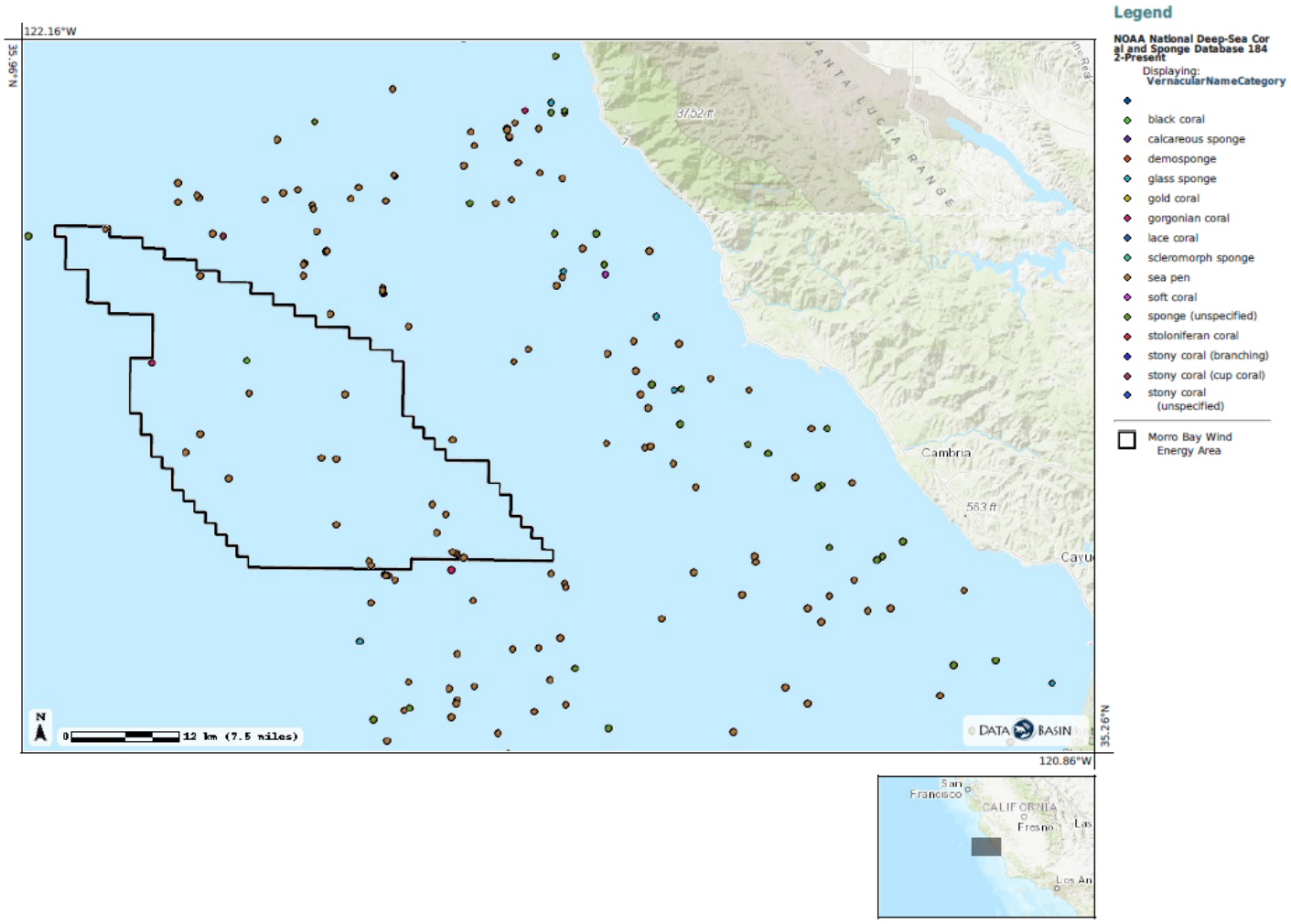
Source: Blue Habitats via the California Offshore Wind Energy Gateway

Exhibit 2-1b. Habitat Areas of Particular Concern: Groundfish



Source: National Marine Fisheries Service via the California Offshore Wind Energy Gateway

Exhibit 2-1c. Deep Sea Corals and Sponges

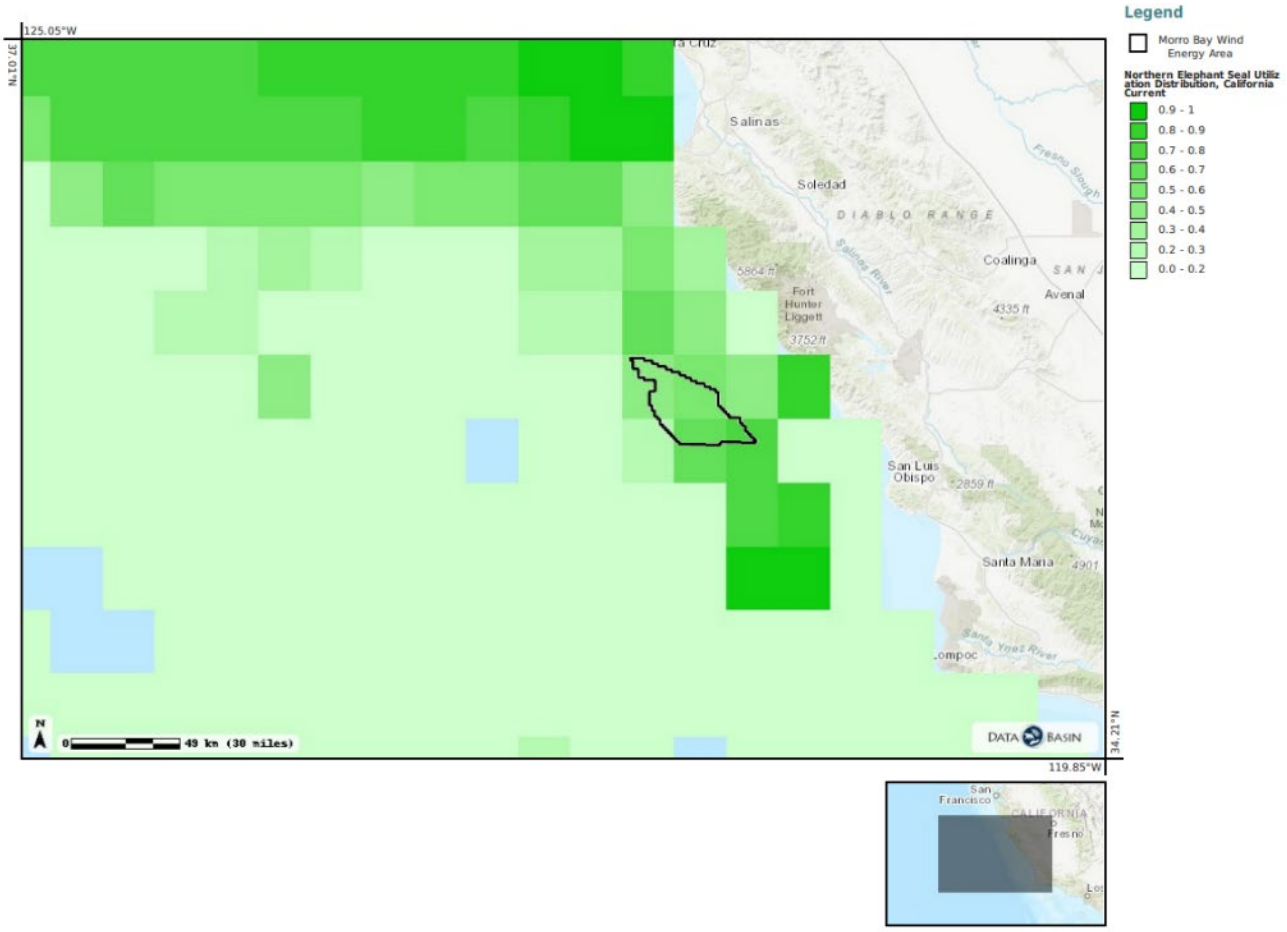


Source: NOAA, NMFS via the California Offshore Wind Energy Gateway

Exhibit 2-2a. Southern Sea Otter Density

Source: Hatfield and Tinker via the California Offshore Wind Energy Gateway

Exhibit 2-2b. Northern Elephant Seal Distribution



Utilization distribution shows the probability that a northern elephant seal is within any given cell of the map.
Source: Maxwell et al. 2013 via the California Wind Energy Gateway

Exhibit 2-3. Summer/Fall Whale Density/Presence Maps off West Coast
Source: Becker et al 2020 via the California Offshore Wind Energy Gateway

Exhibit 2-3a. Blue Whale Density

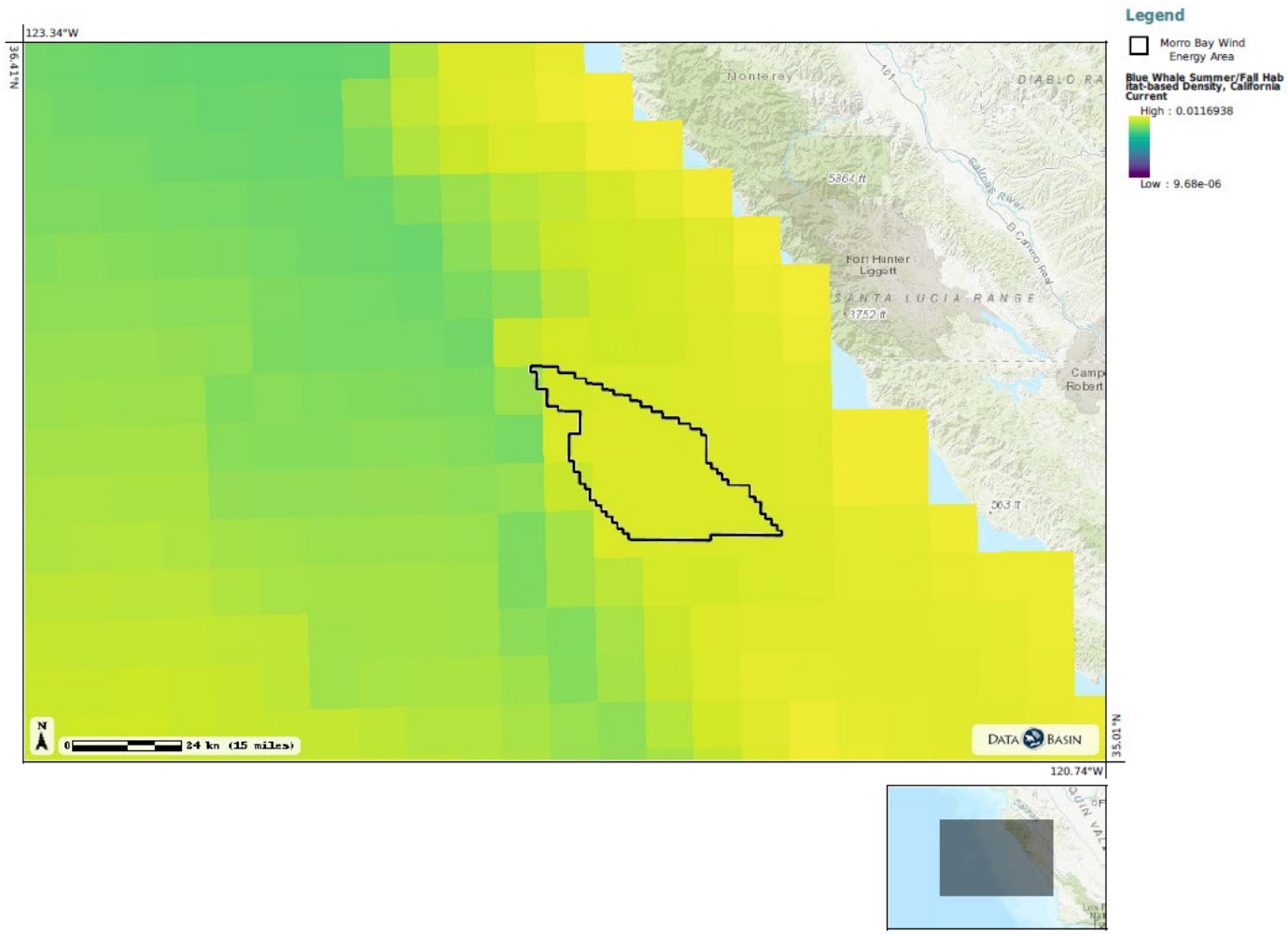


Exhibit 2-3b. Fin Whale Density

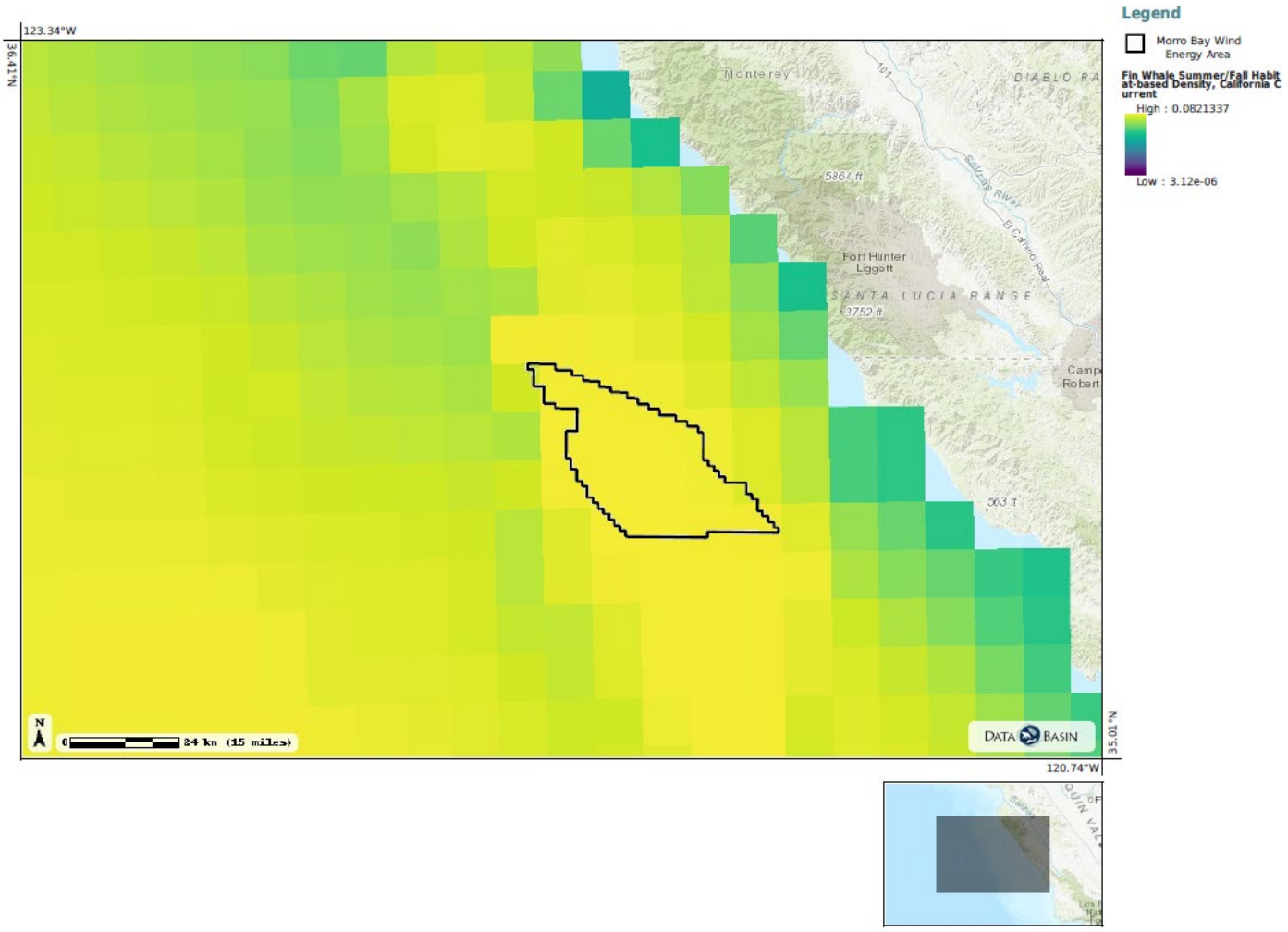


Exhibit 2-3c. Humpback Whale Density

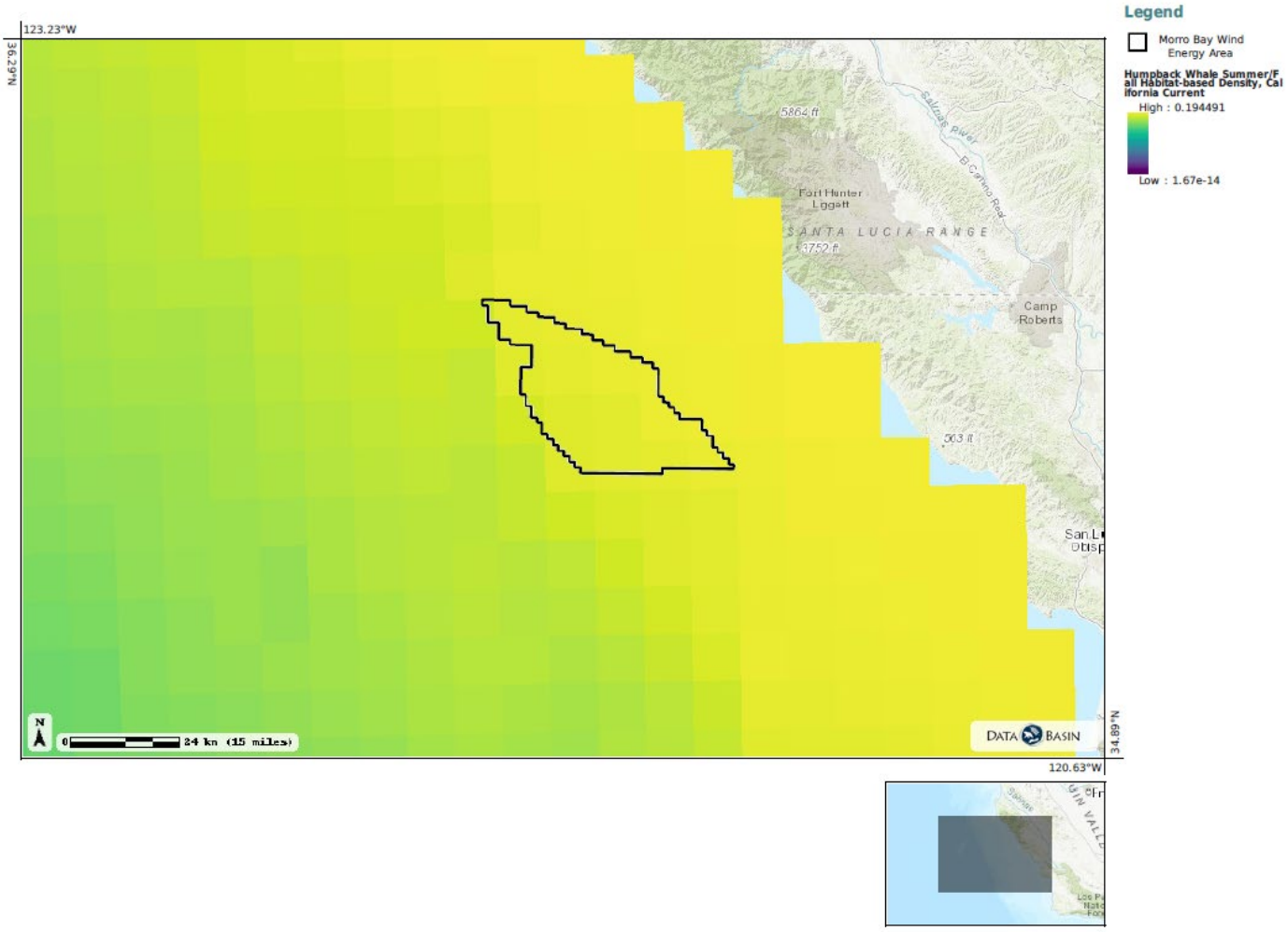


Exhibit 2-3d. Minke Whale Density

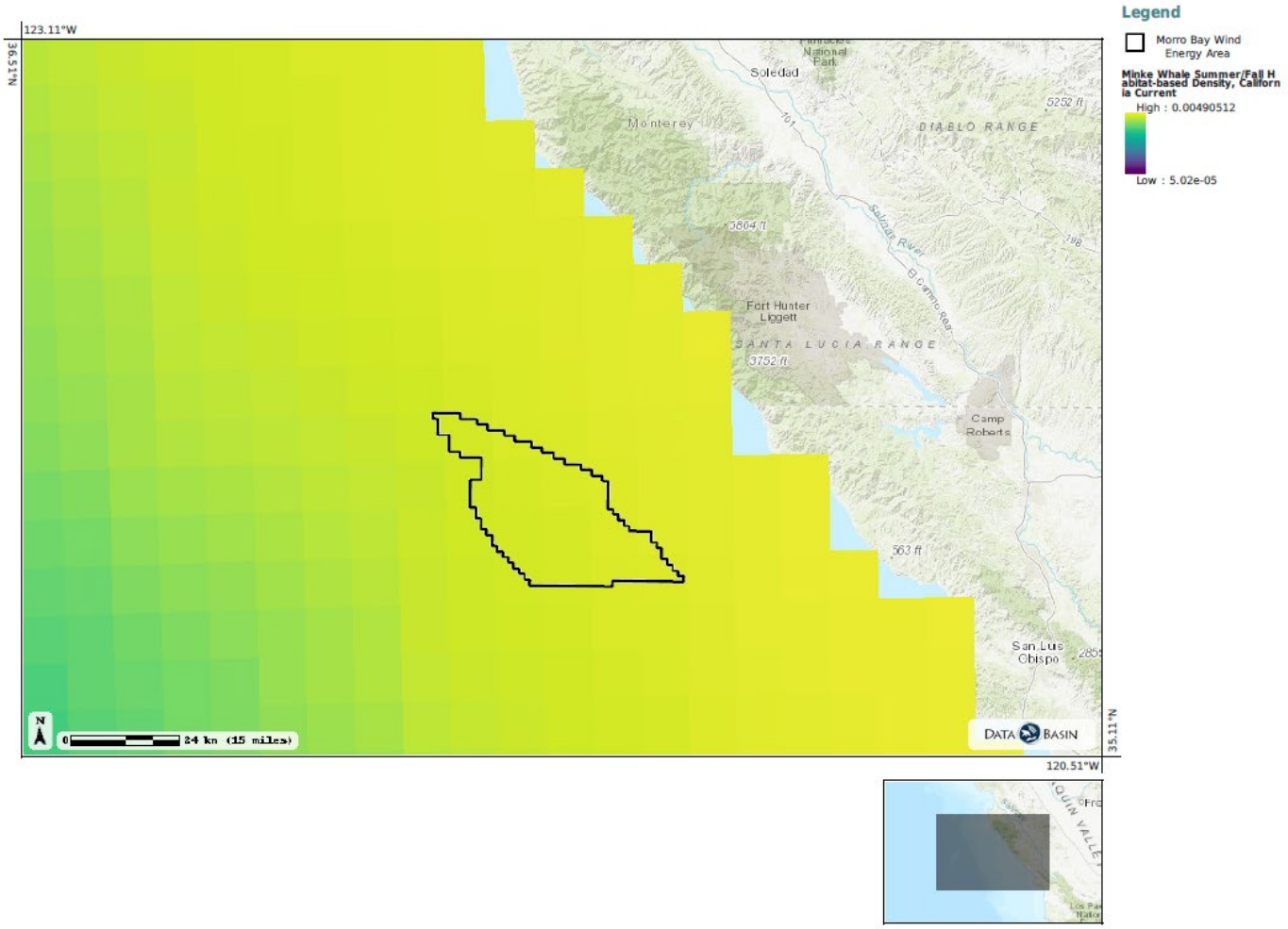
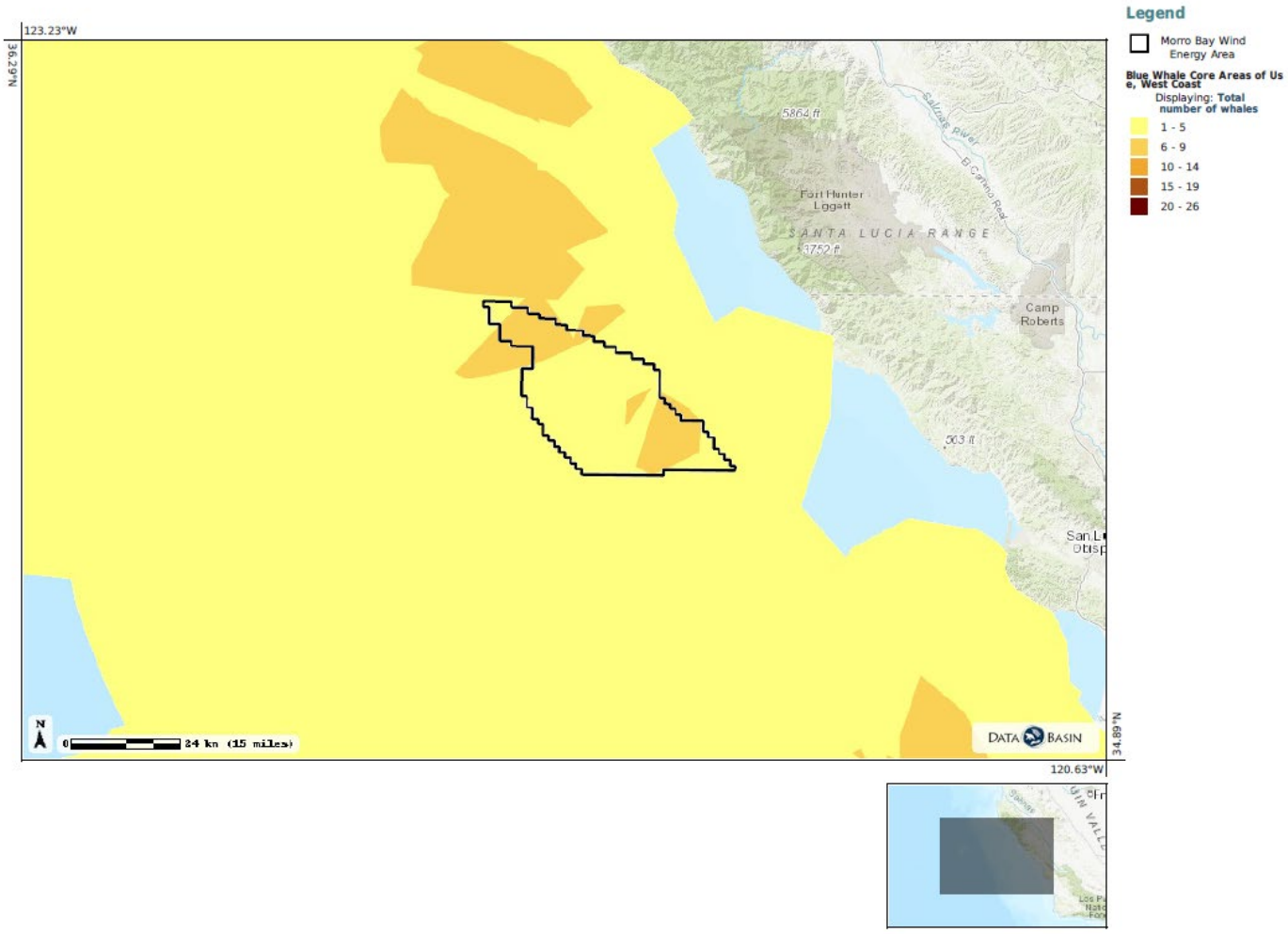
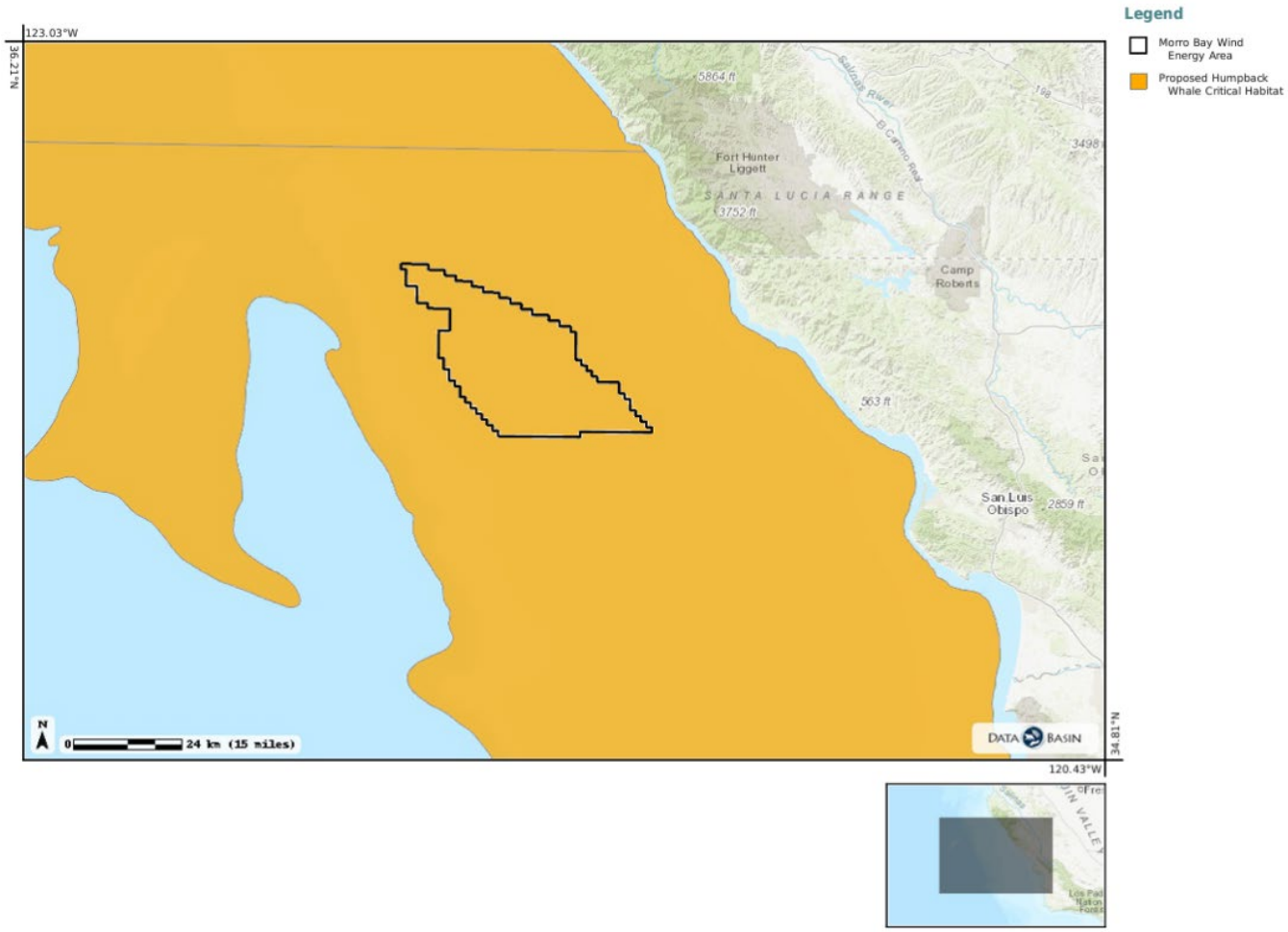


Exhibit 2-3e. Blue Whale Core Use Areas



Source: Palacios via the California Offshore Wind Energy Gateway

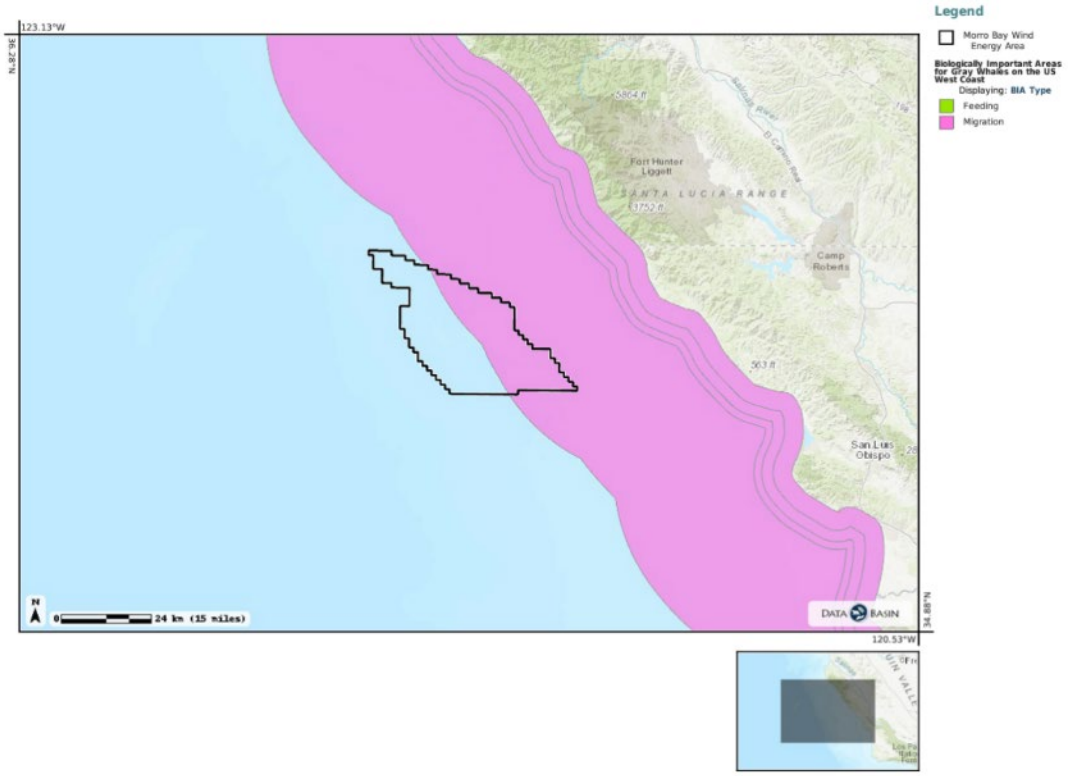
Exhibit 2-3f. Humpback Whale Critical Habitat



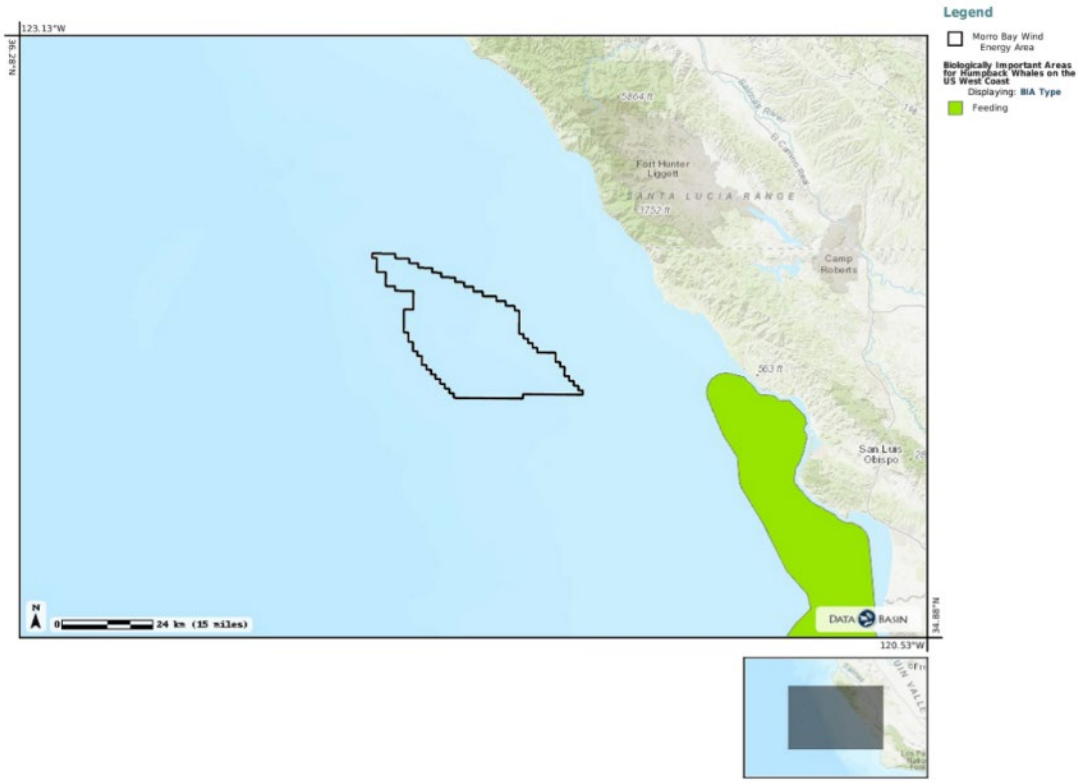
Source: Robert O'Conner and Karen Kavanaugh via the California Offshore Wind Energy Gateway

Exhibit 2-3g. Biologically Important Areas – Baleen Whales

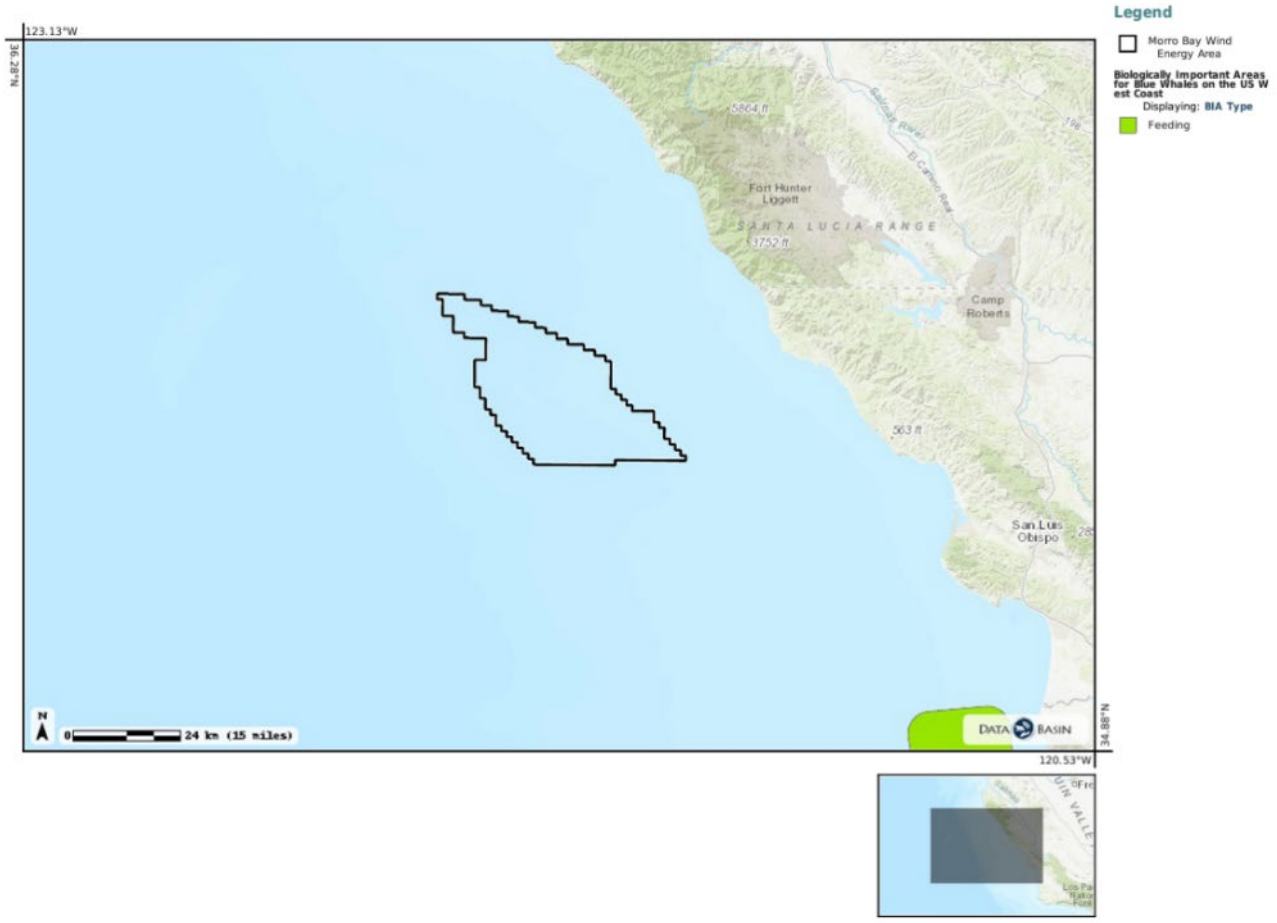
Gray Whale



Humpback Whale



Blue Whale



Source: Marine Geospatial Ecology Lab, Duke University via the California Offshore Wind Energy Gateway

Exhibit 2-3h. Baird's Beaked Whale Density

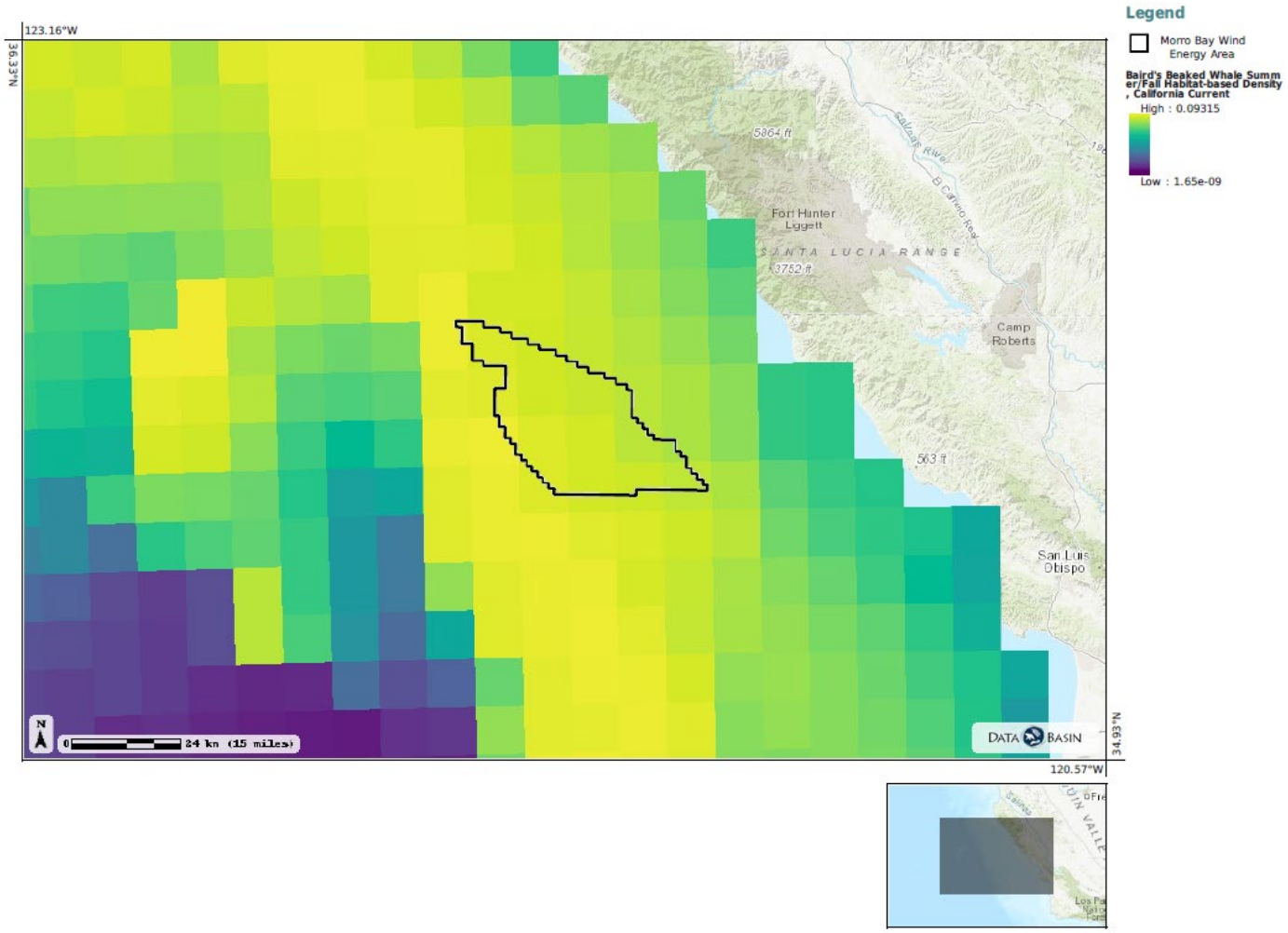


Exhibit 2-3i. Long Beaked Common Dolphin Density

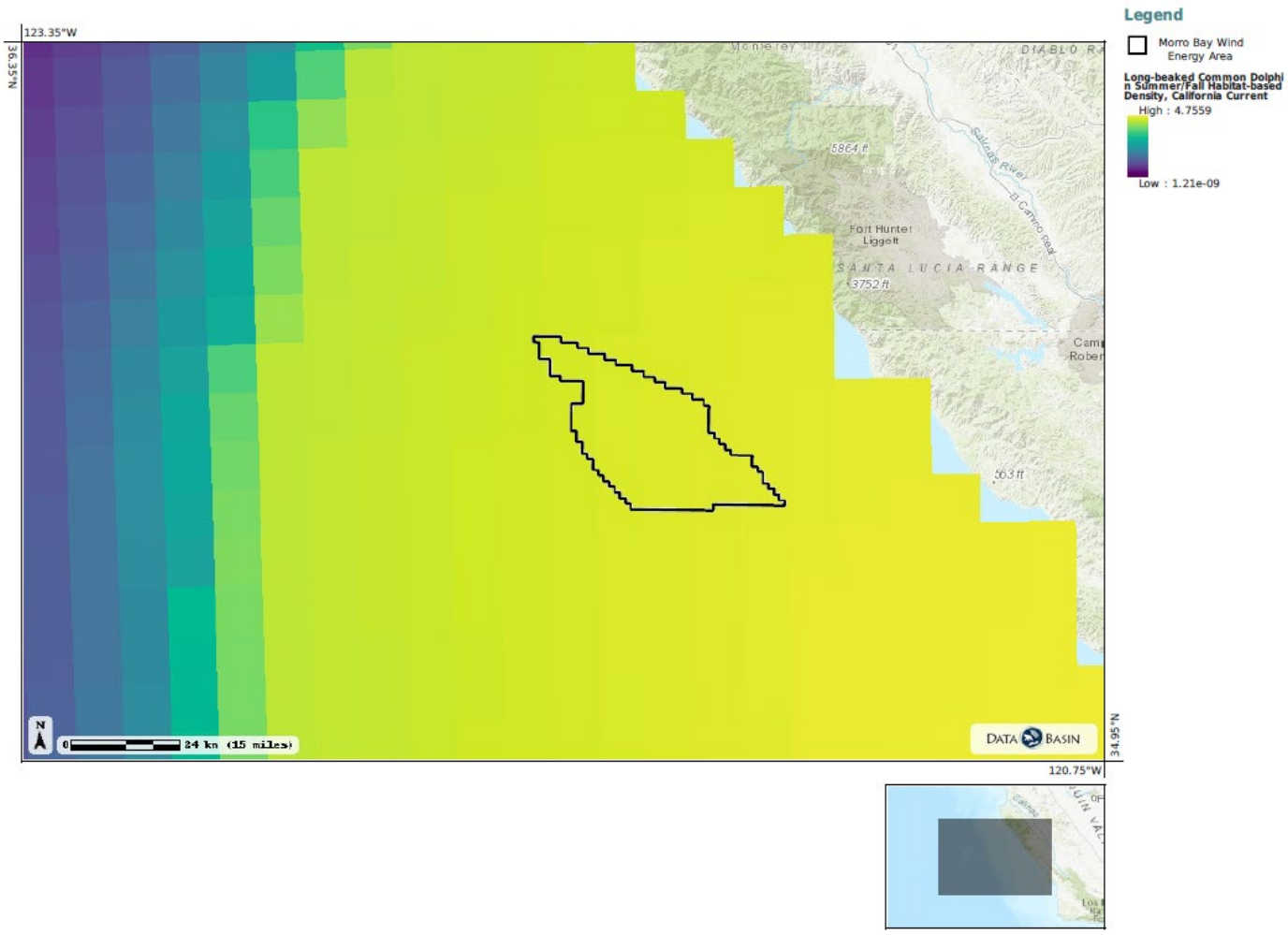


Exhibit 2-3j. Northern Right Dolphin Density

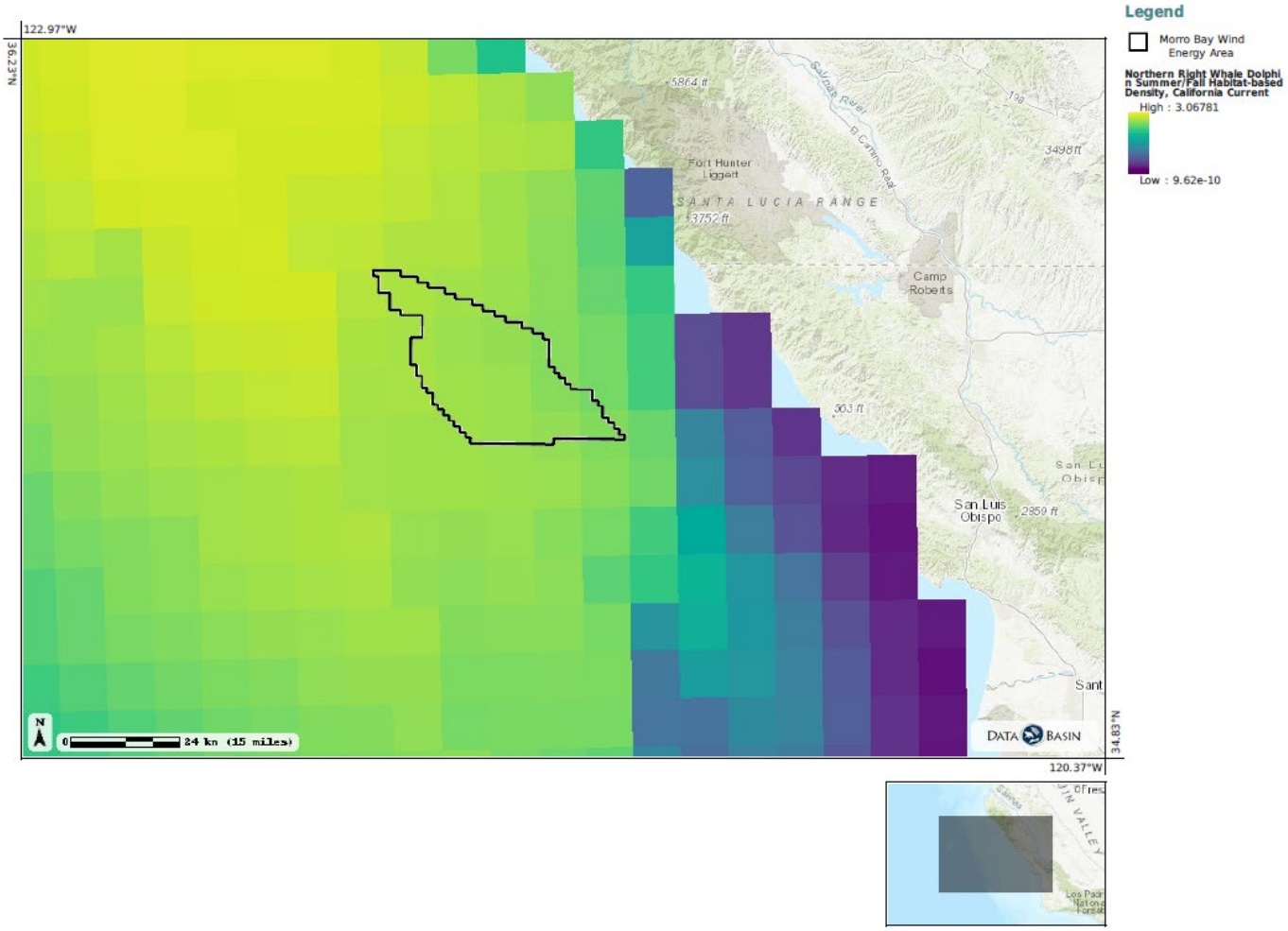


Exhibit 2-3k. Pacific White-Sided Dolphin Density

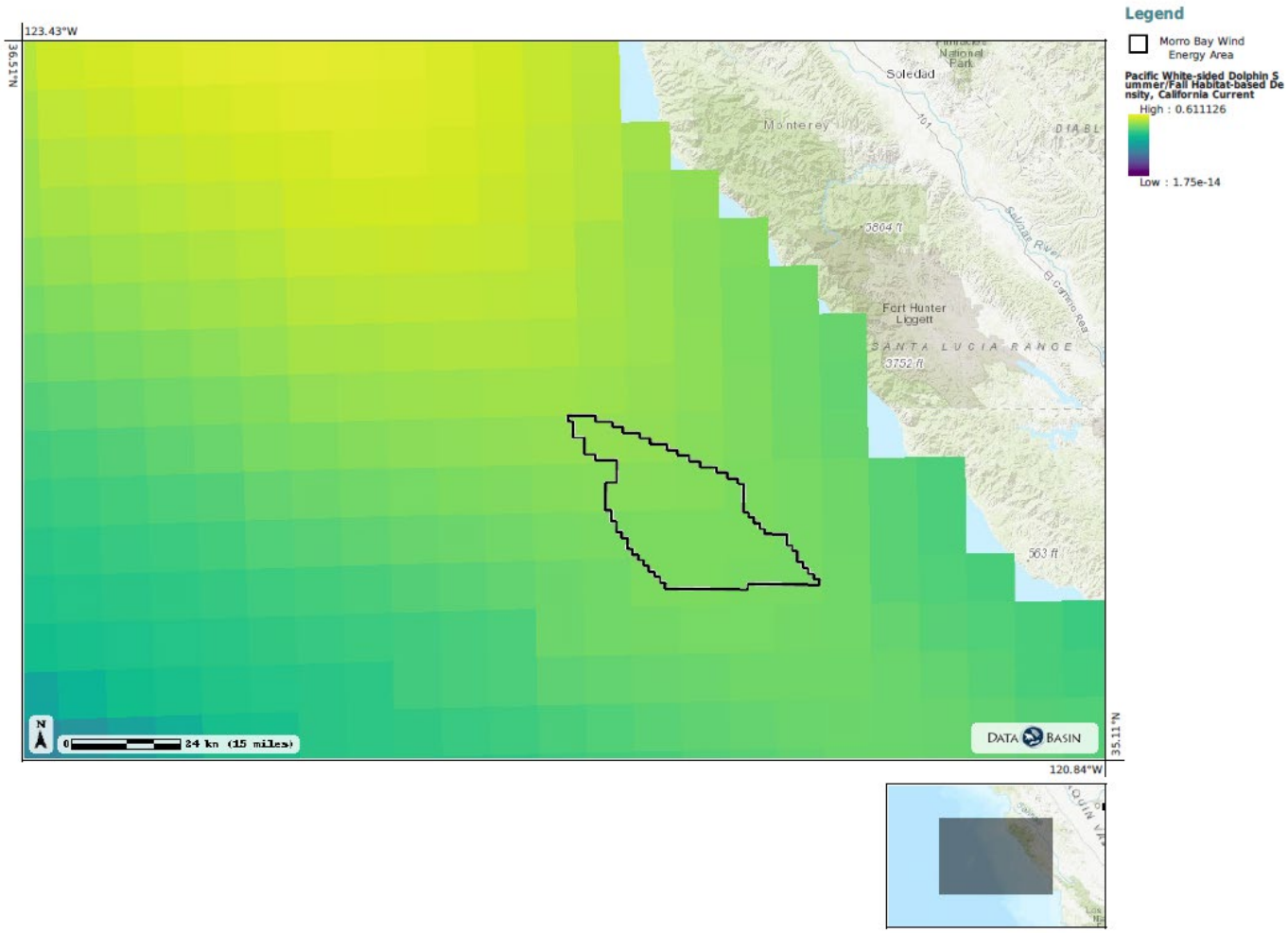


Exhibit 2-3l. Risso's Dolphin Density

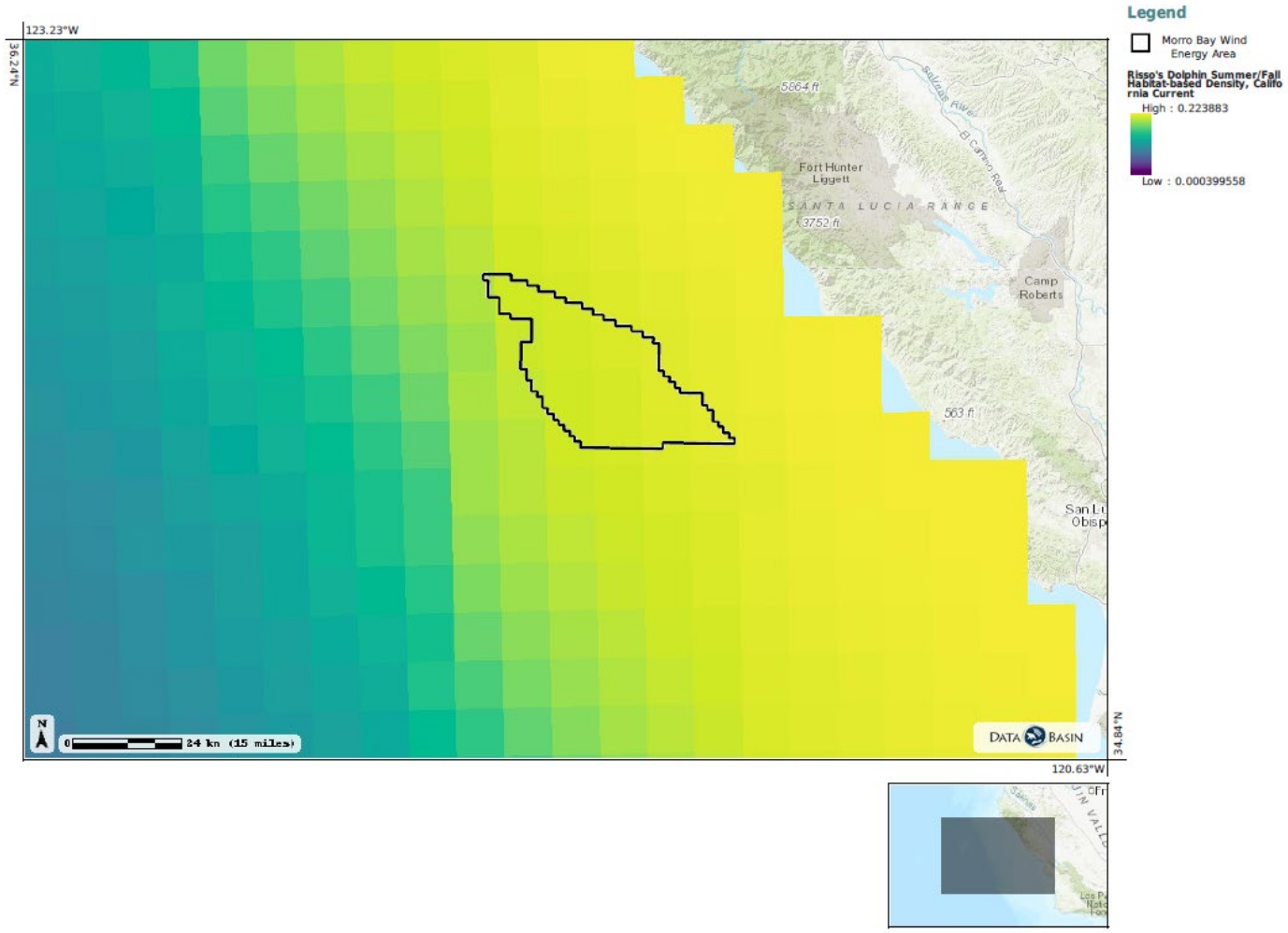


Exhibit 2-3m. Bottlenose Dolphin Density

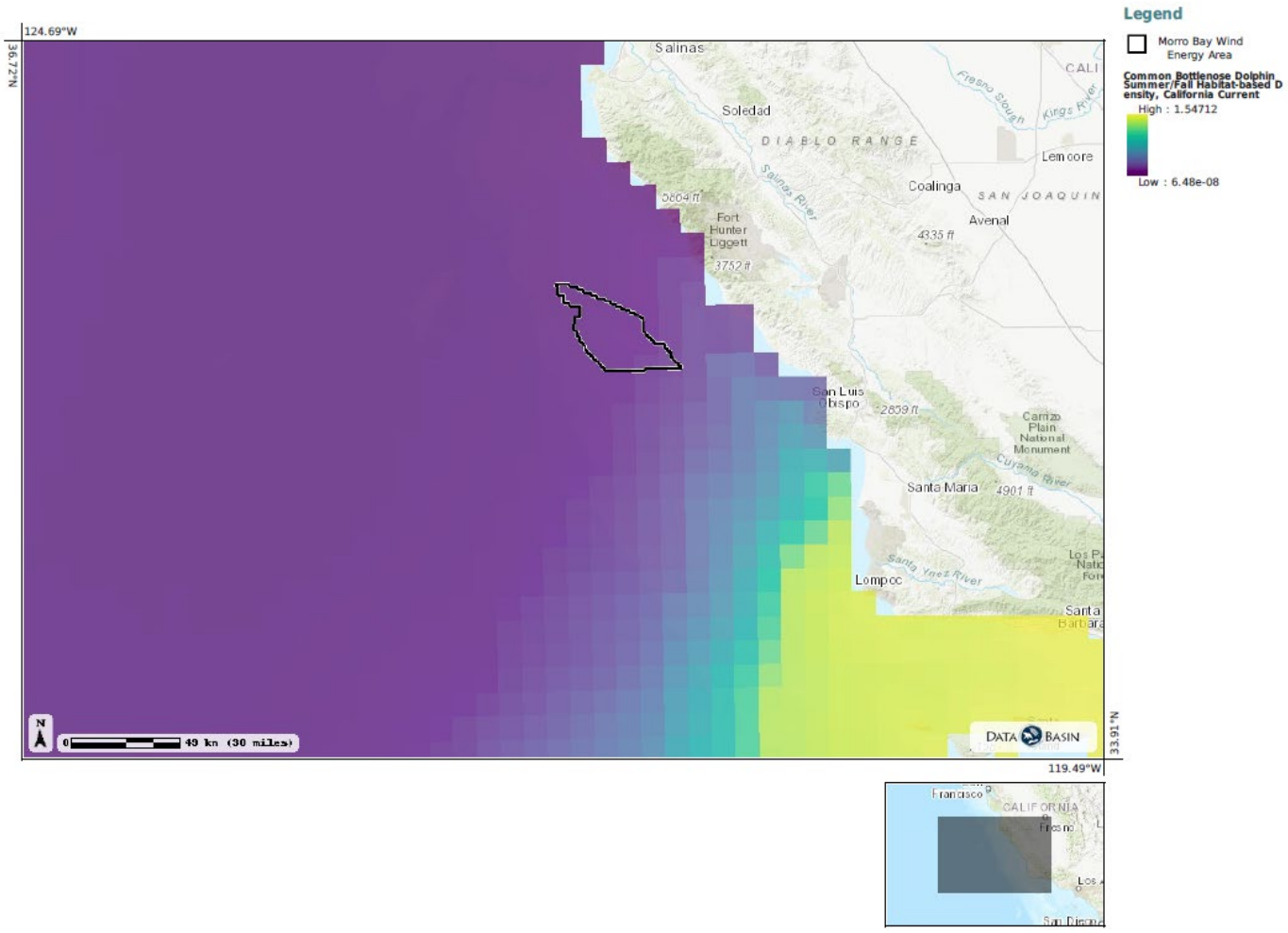


Exhibit 2-3n. Dall's Porpoise Density

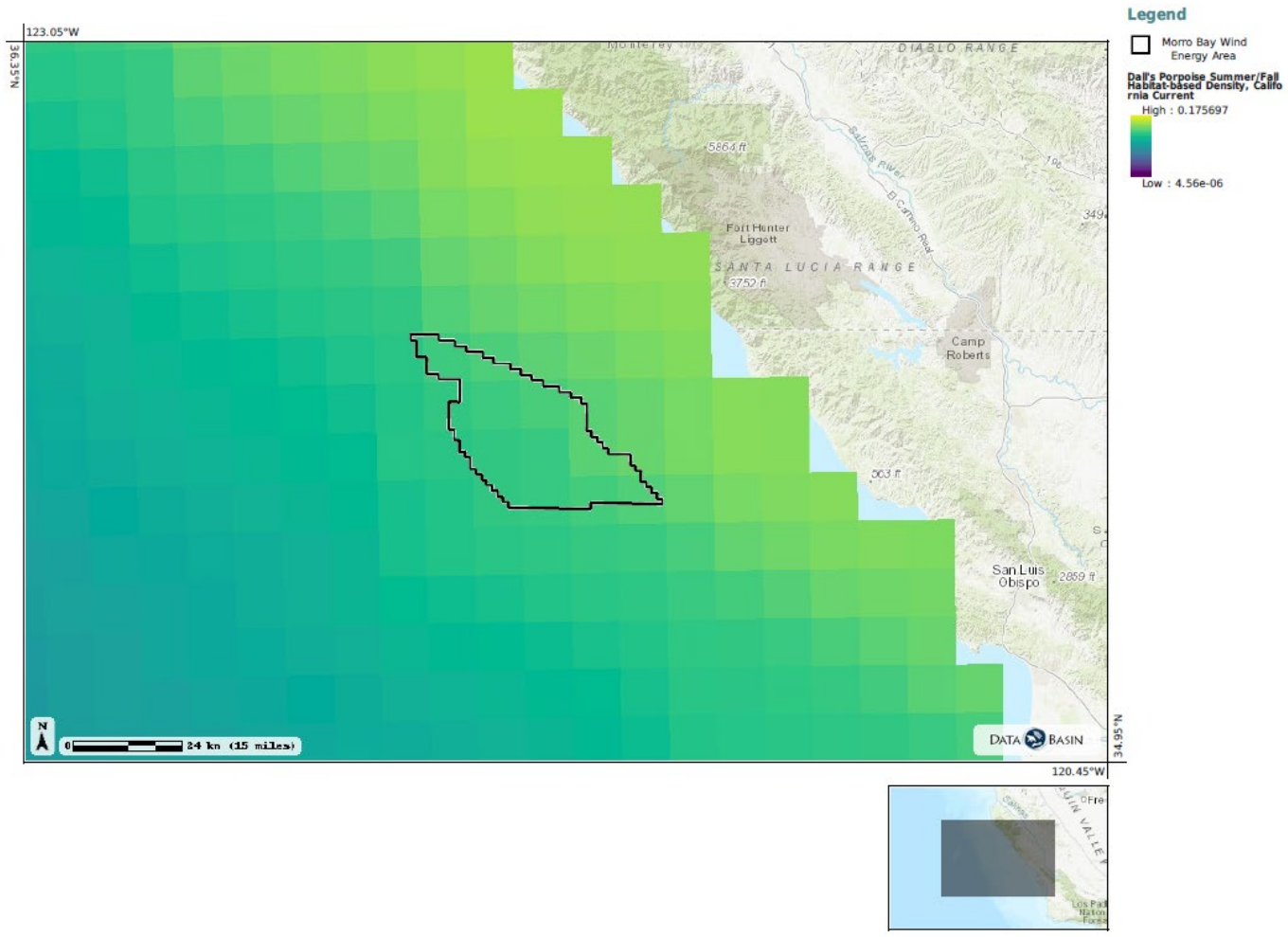


Exhibit 2-3o. Short Beaked Common Dolphin Density

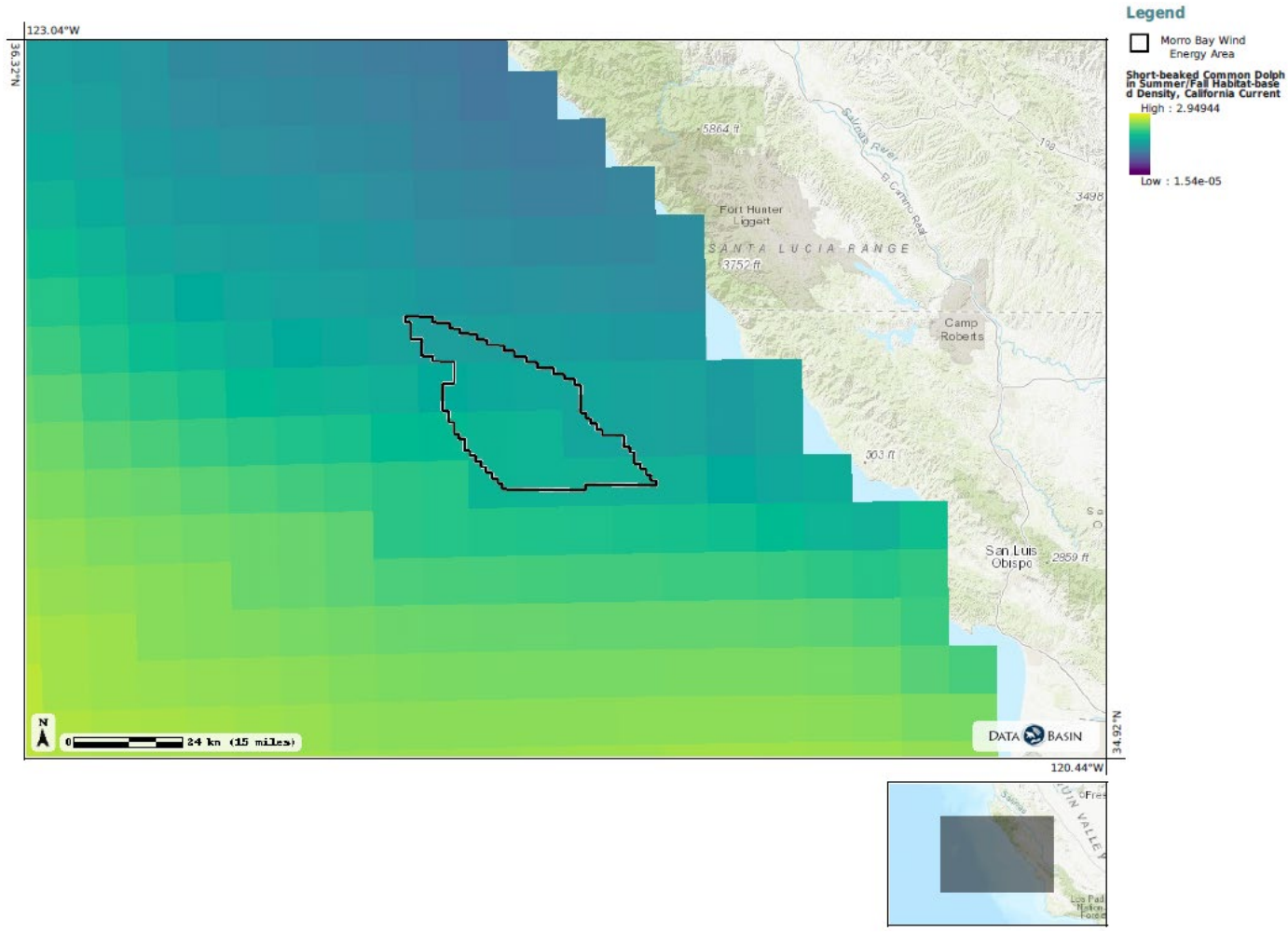


Exhibit 2-3p. Sperm Whale Density

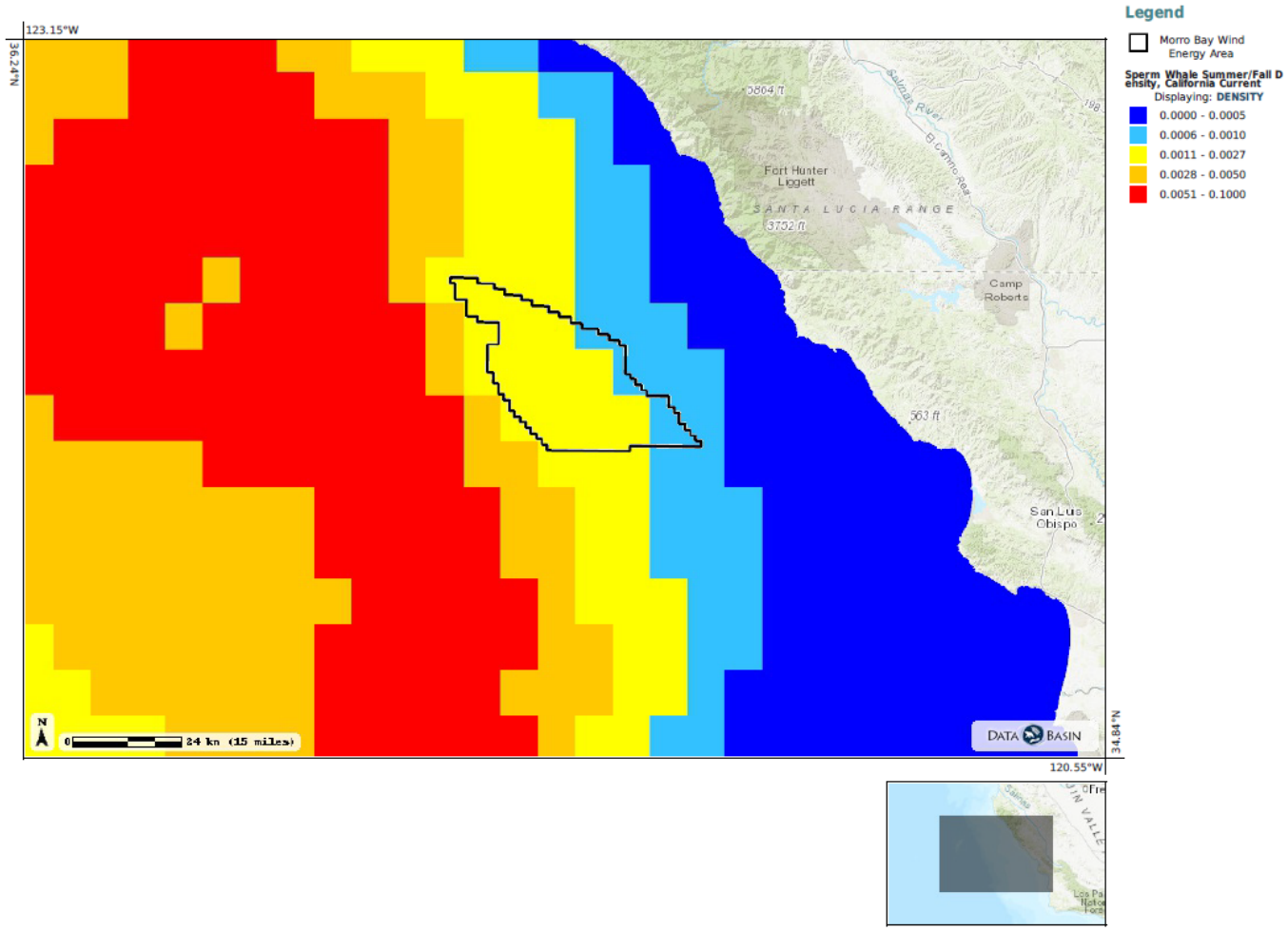
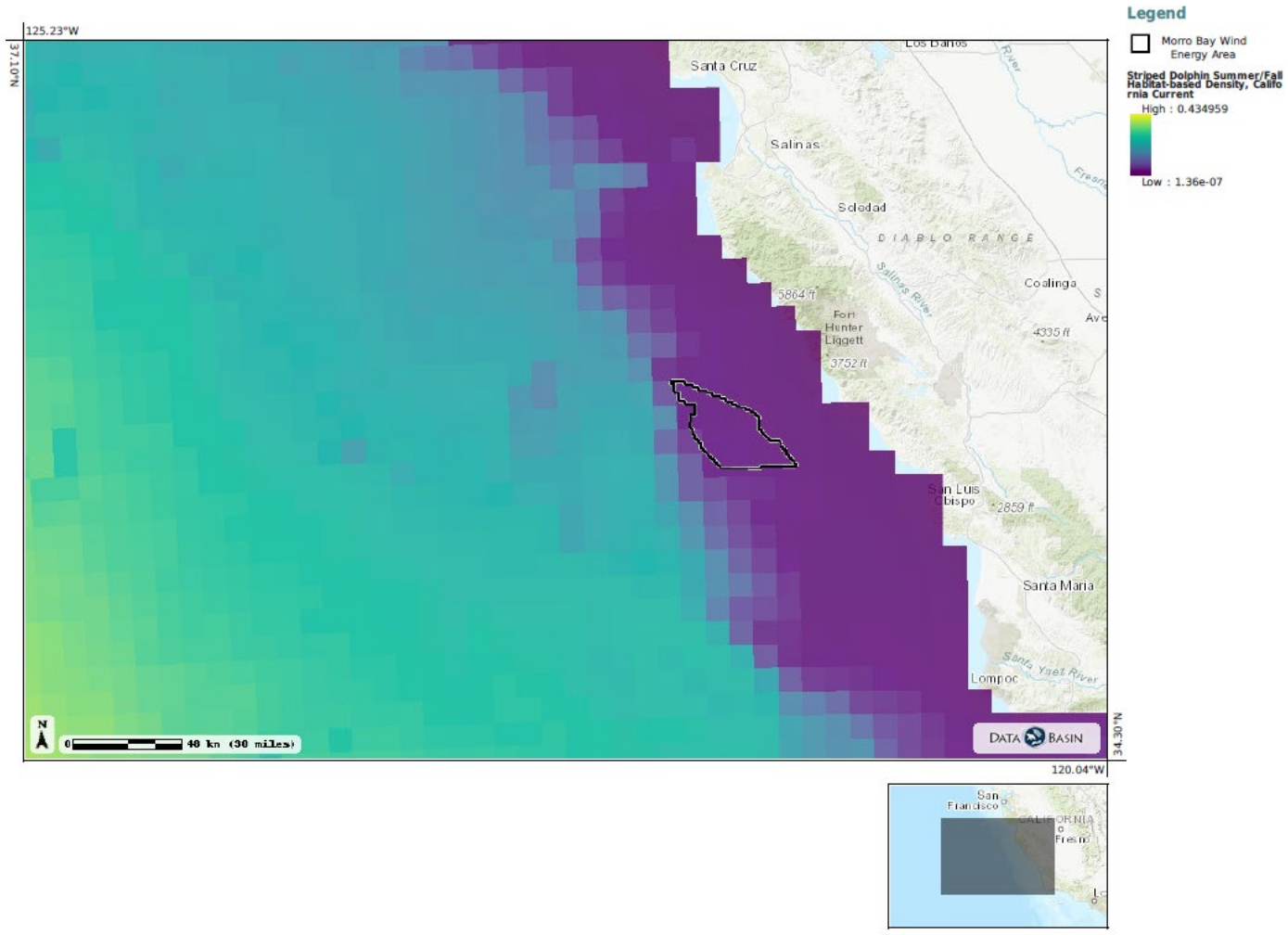
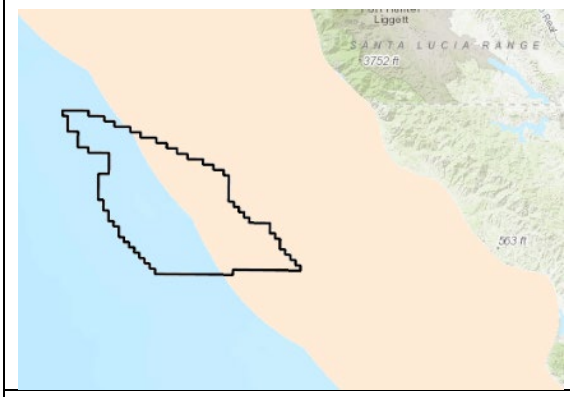
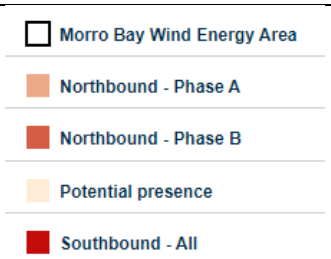
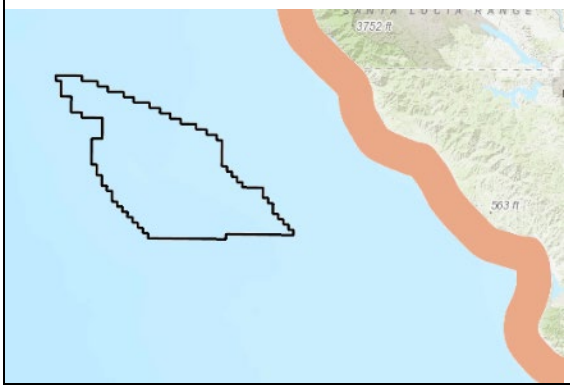


Exhibit 2-3q. Striped Dolphin Density

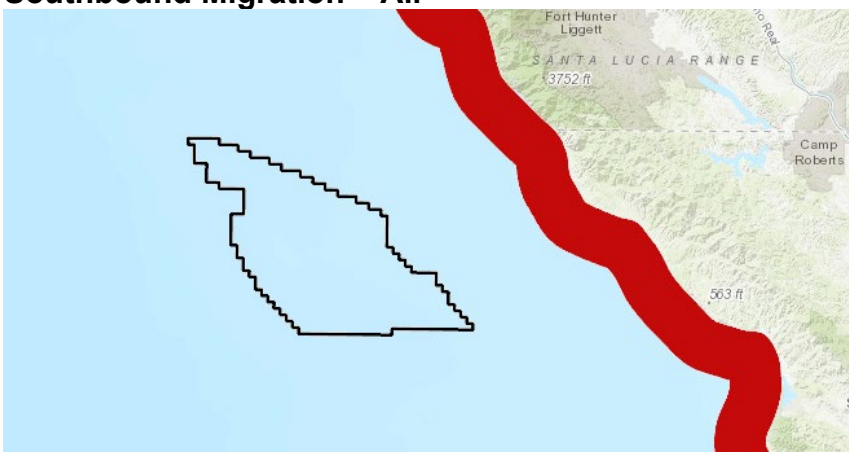


Source for Whale Density Maps: Becker et al. 2020 via the California Offshore Wind Energy Gateway

Exhibit 2-3r. Gray Whale Migration and Potential Presence Maps

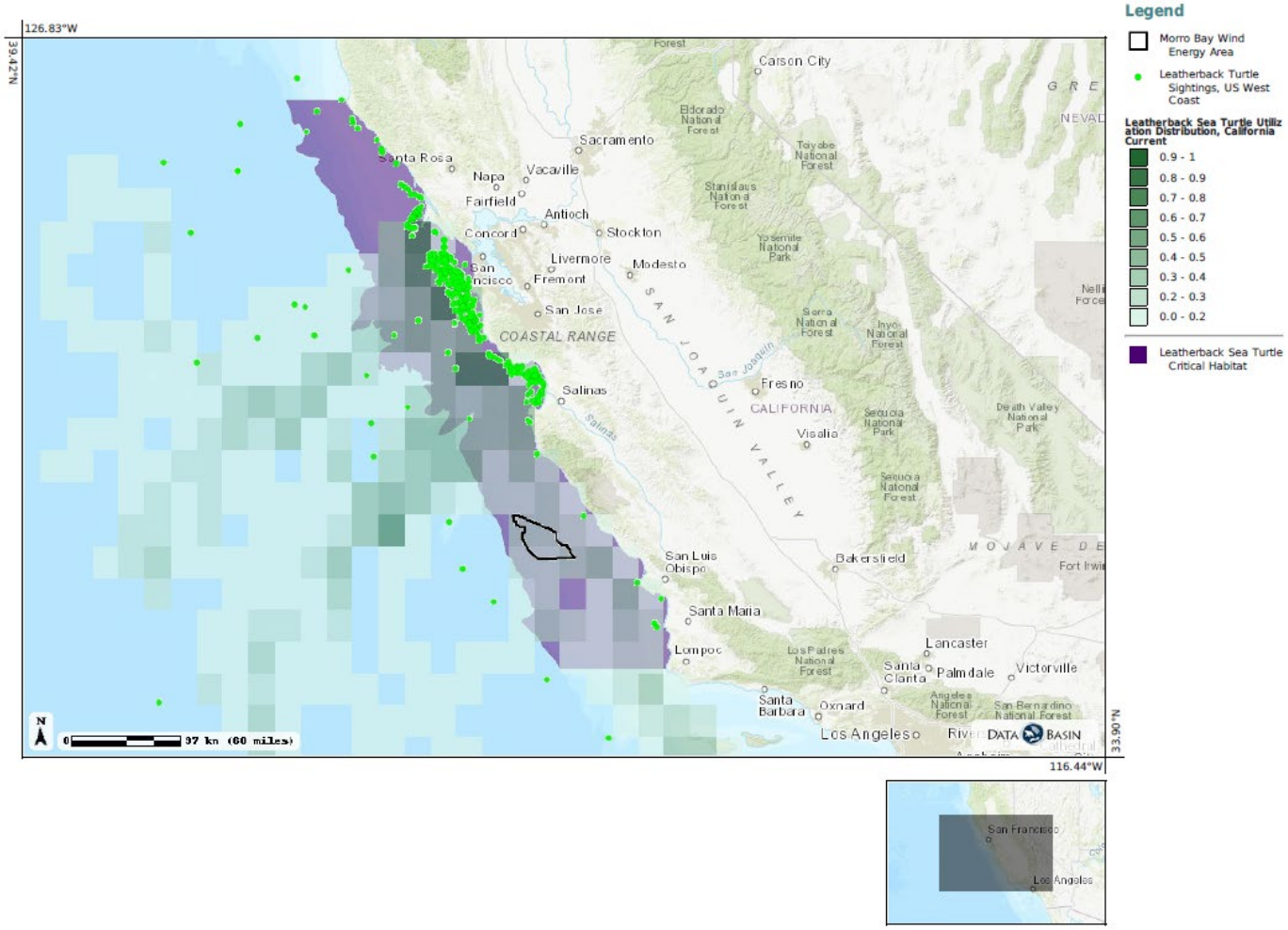
Potential Presence	Legend
	
Northbound Migration – Phase A (adults without calves)	**Northbound Migration – Phase B (females with calves)**
	

Southbound Migration – All



Source: Jacobs via California Offshore Wind Energy Gateway

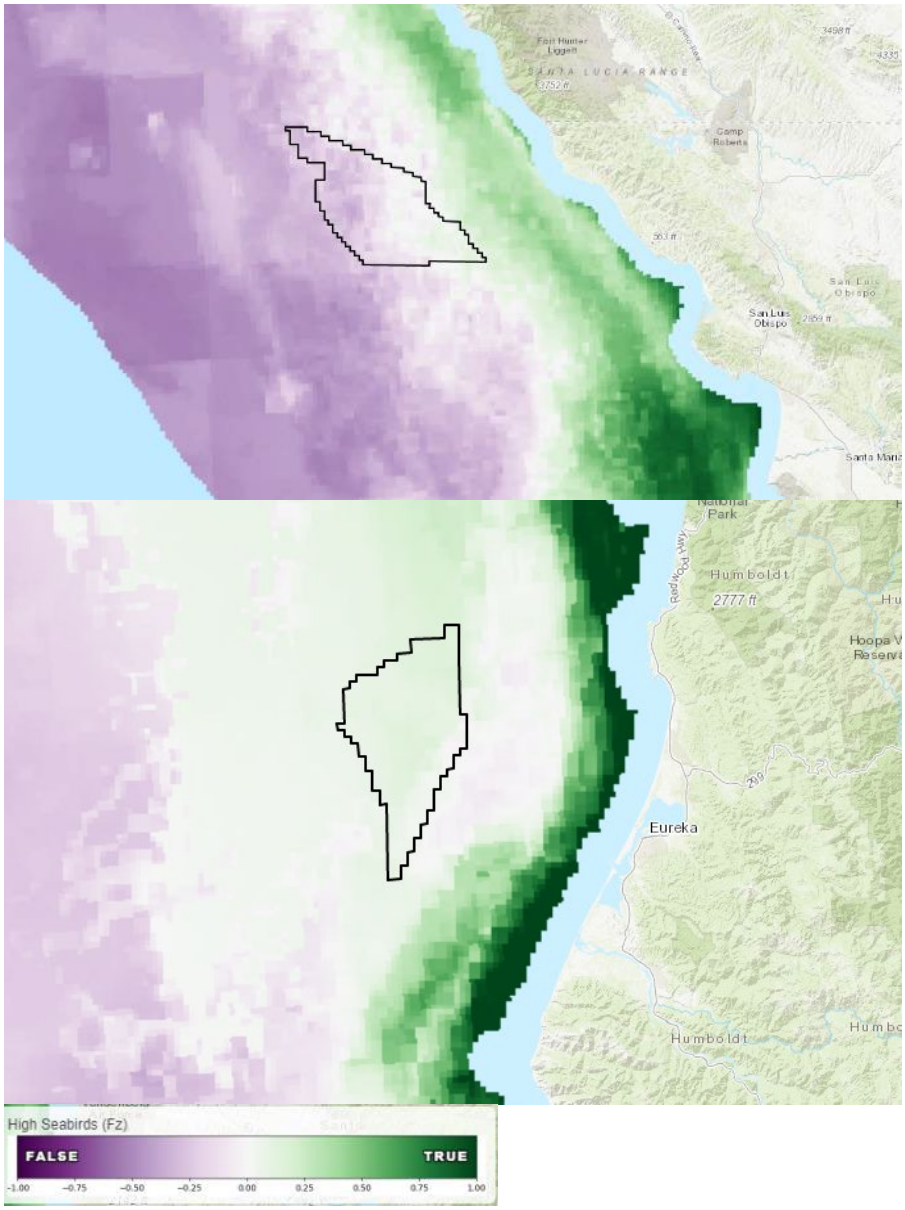
Exhibit 2-4. Leatherback Turtle Sightings, Critical Habitats, and Distribution



Source: Benson via the California Offshore Wind Energy Gateway

Exhibit 2-5. Seabird and Marine Mammal Considerations for Morro Bay and Humboldt WEAs

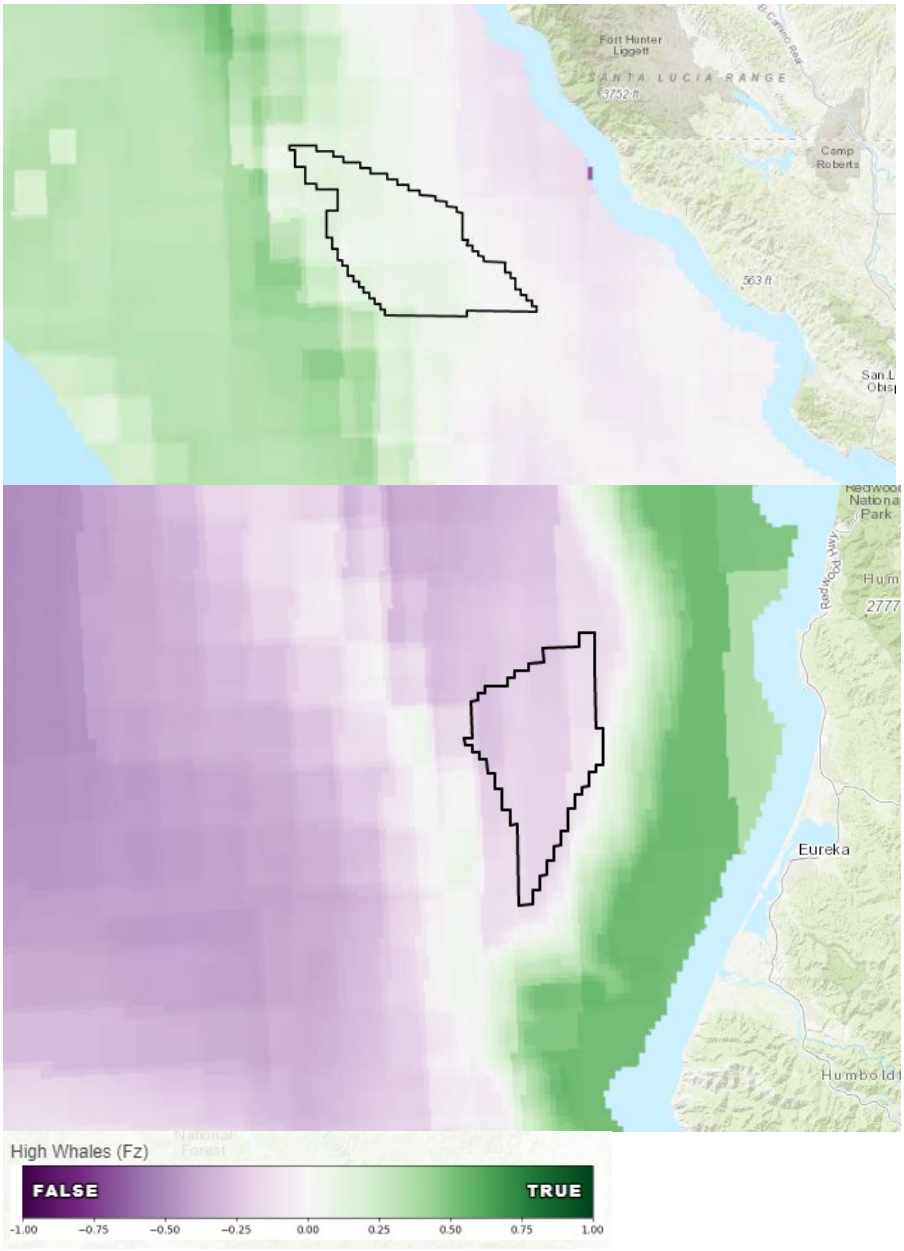
Exhibit 2-5a. Seabird Considerations



These maps combine multiple types of data into a single heatmap for seabirds in the Morro Bay and Humboldt WEAs. In the color ramp, purple represents fewer seabird considerations and green represents more seabird considerations. In both cases, there are more seabird considerations closer to the coast, and the Humboldt WEA has more seabird considerations than the Morro Bay WEA.

Source: California Offshore Wind Energy Modeling Platform - https://osw.eemsonline.org/

Exhibit 2-5b. Marine Mammal Considerations



These maps combine multiple types of data into a single heatmap for whales in the Morro Bay and Humboldt WEAs. In the color ramp, purple represents fewer whale considerations and green represents more whale considerations. In both cases, the areas of highest whale considerations fall outside the WEAs. Higher whale considerations are further offshore than the Morro Bay WEA, and are closer to shore than the Humboldt WEA. Generally, the Morro Bay WEA has more whale considerations than Humboldt WEA.

Source: California Offshore Wind Energy Modeling Platform - https://osw.eemsonline.org/

Exhibit 2-6. Bird Density Maps

Source: Jeffery B. Leirness, CSS Inc., NOAA via the California Offshore Wind Energy Gateway

Exhibit 2-6a. Marbled Murrelet Spring/Summer Density

Spring

Summer

Exhibit 2-6b. Scripps's Murrelet Spring Density

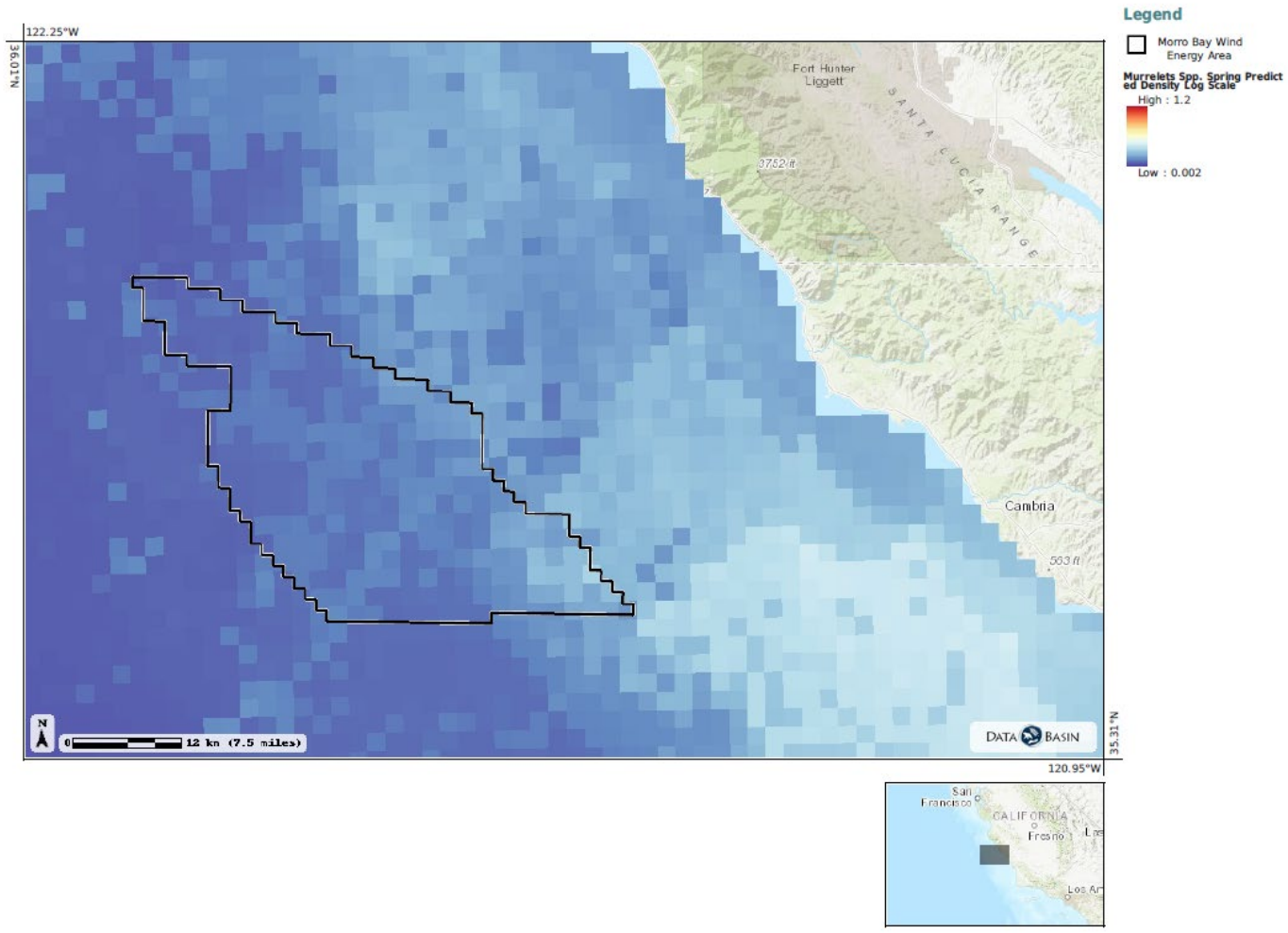
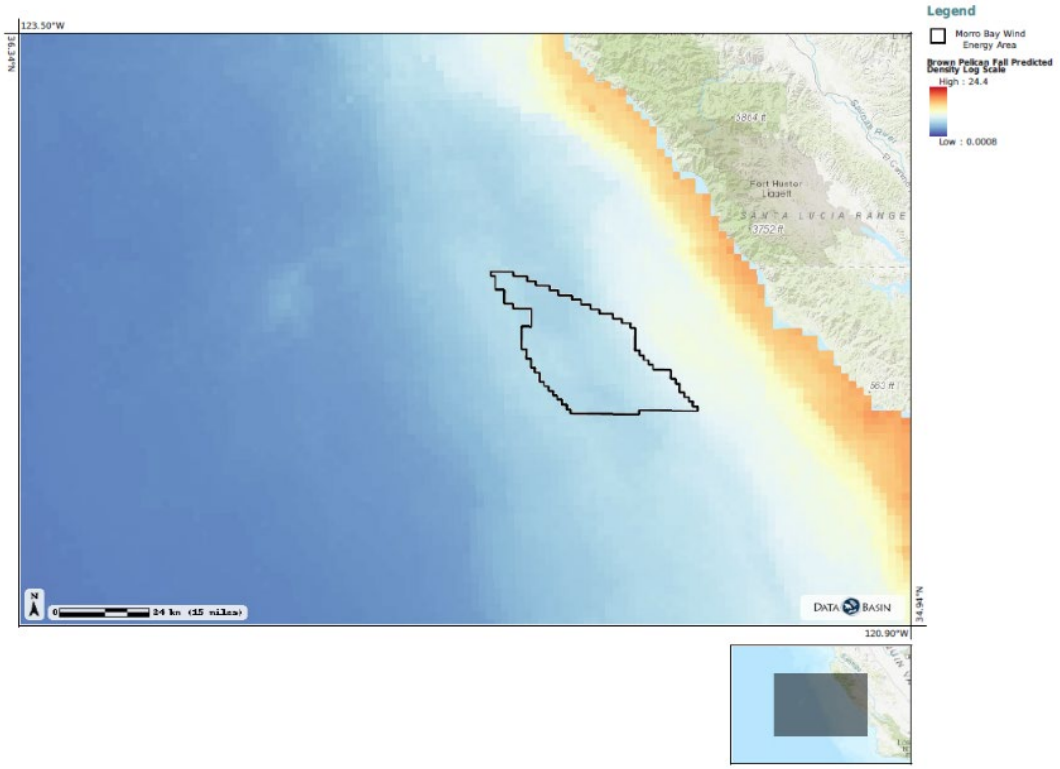
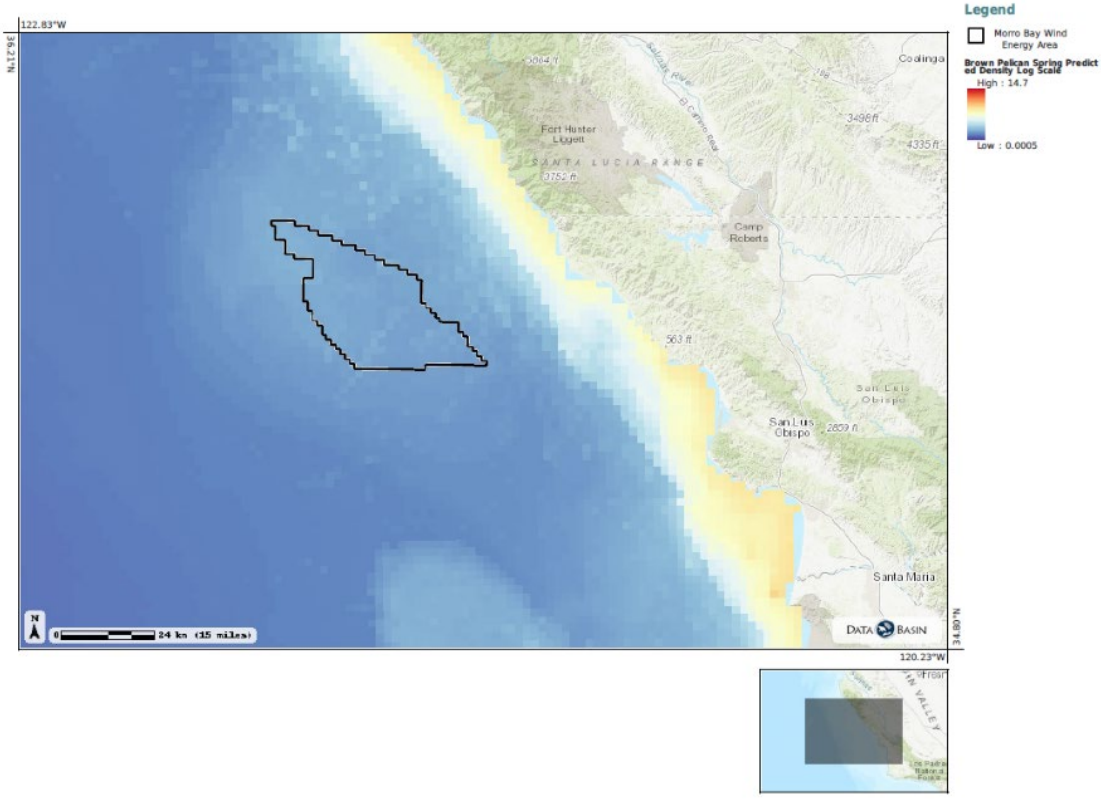


Exhibit 2-6c. Brown Pelican Seasonal Density

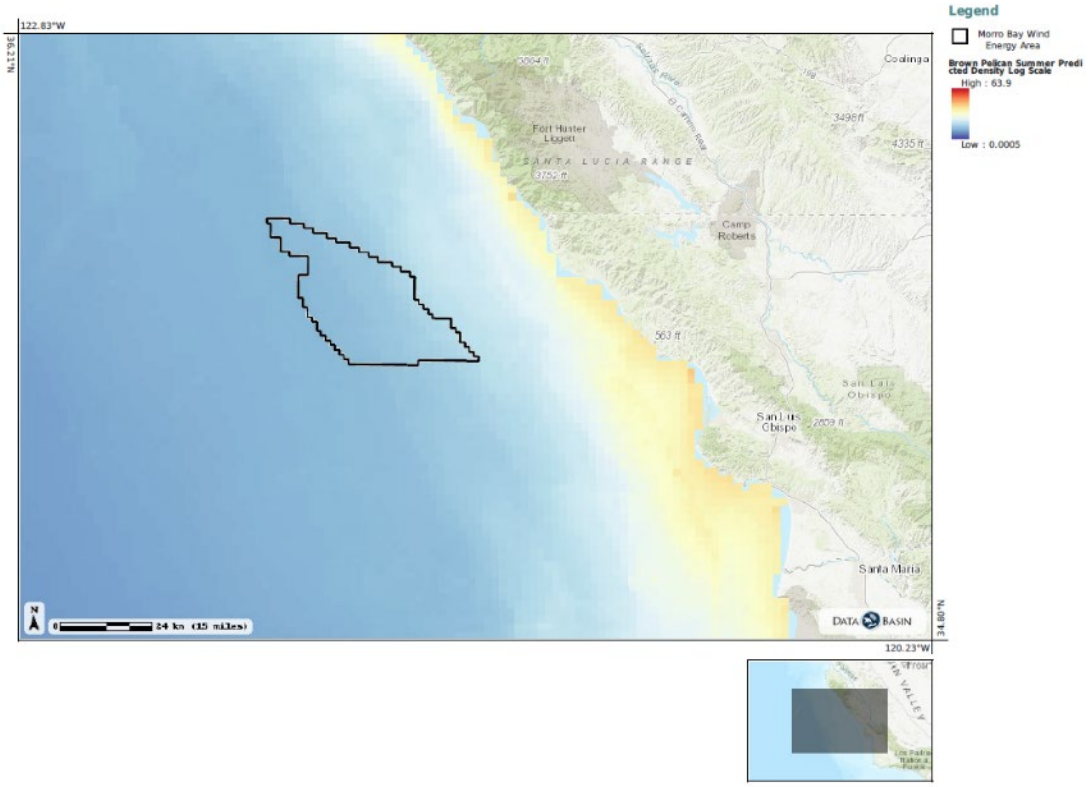
Fall



Spring



Summer



Winter

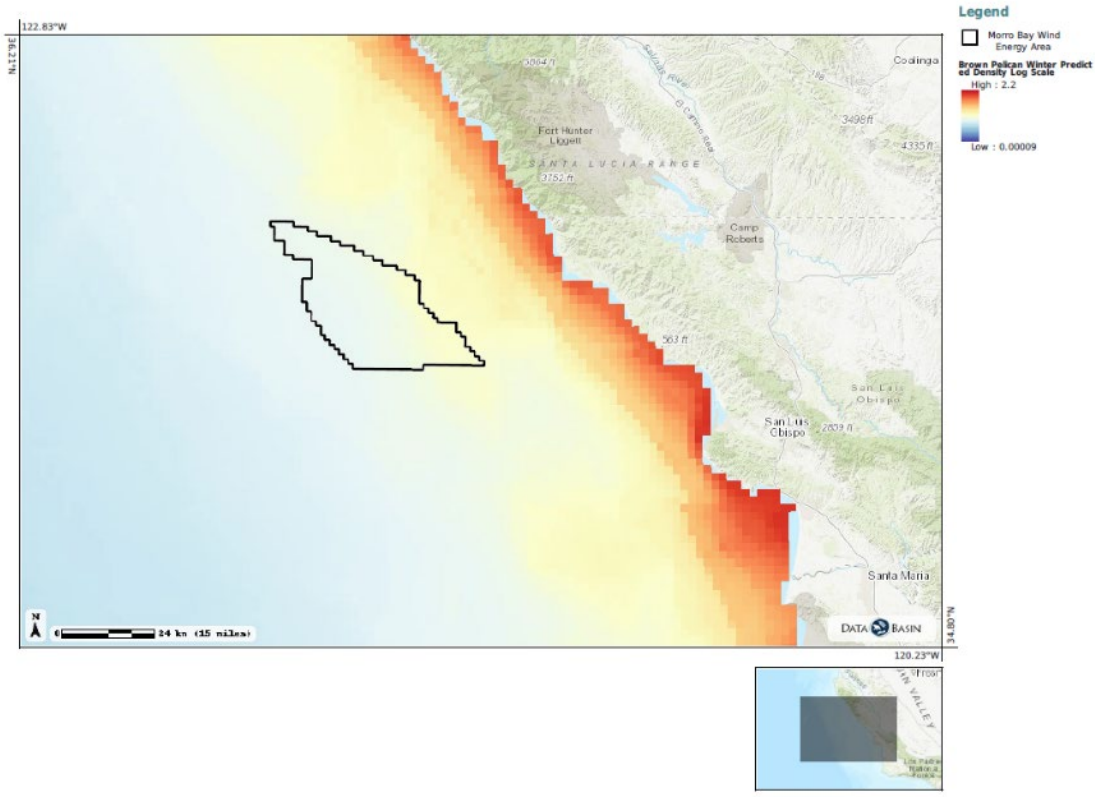
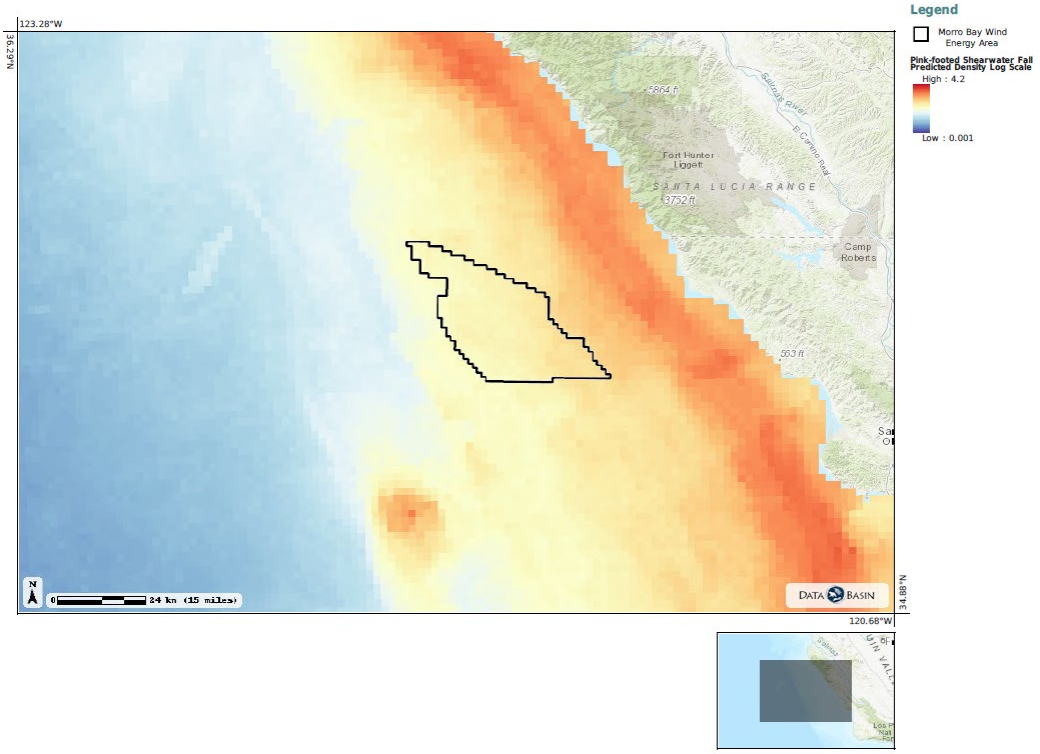
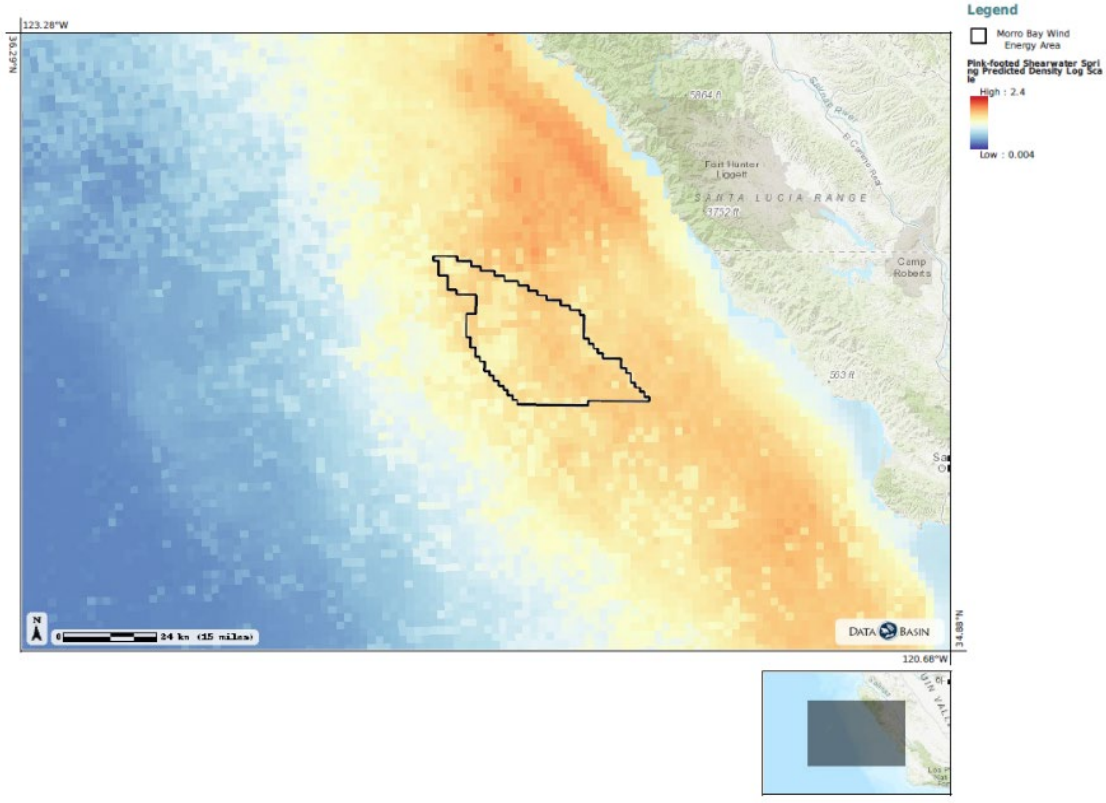


Exhibit 2-6d. Pink Footed Shearwater Density

Fall Density



Spring Density



Summer Density

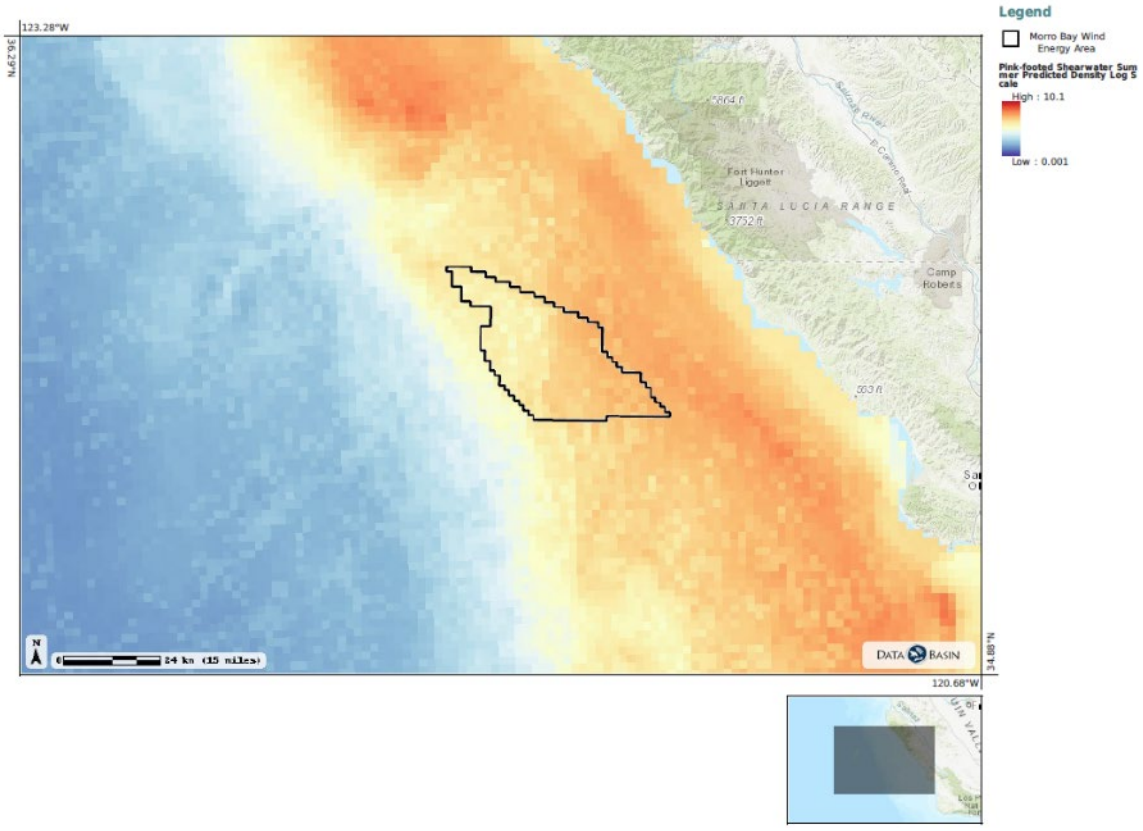


Exhibit 2-6e. Ashy Storm Petrel Spring/Fall Density

Spring

Fall

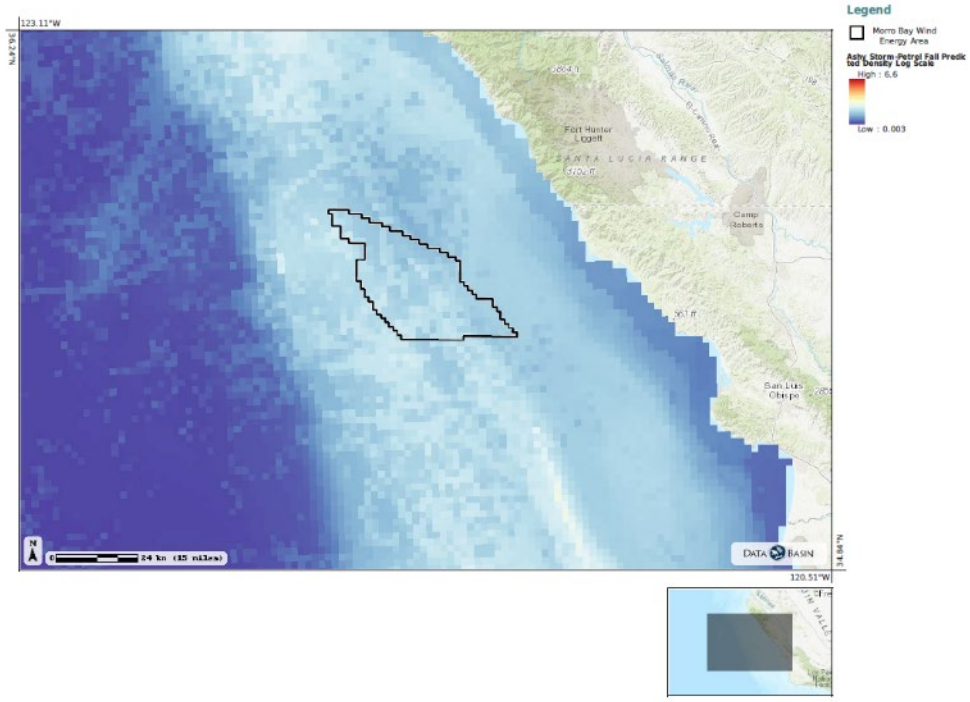


Exhibit 2-6f. Cassin's Auklet Winter Density

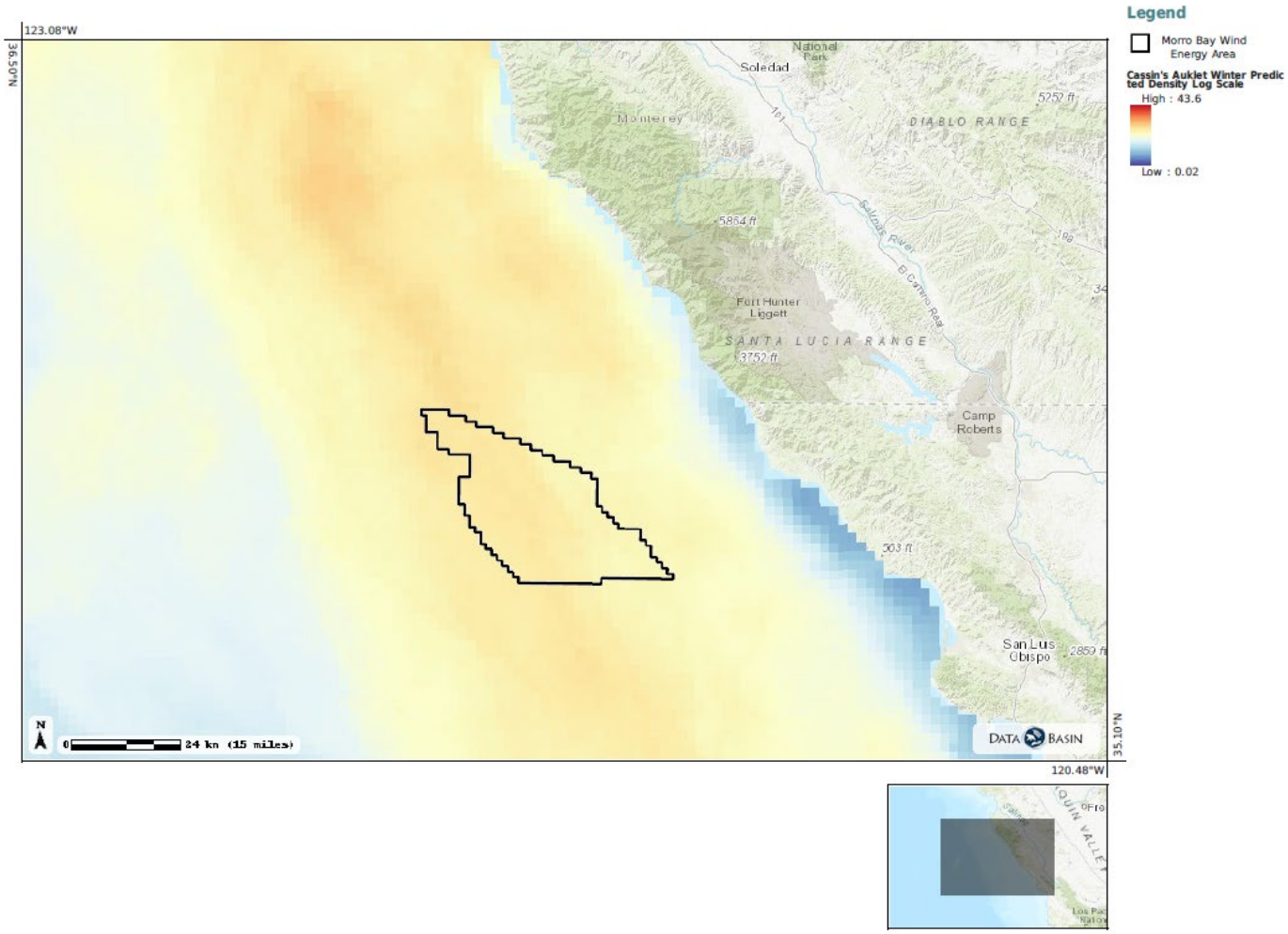


Exhibit 2-6g. Rhinoceros Auklet Winter Density

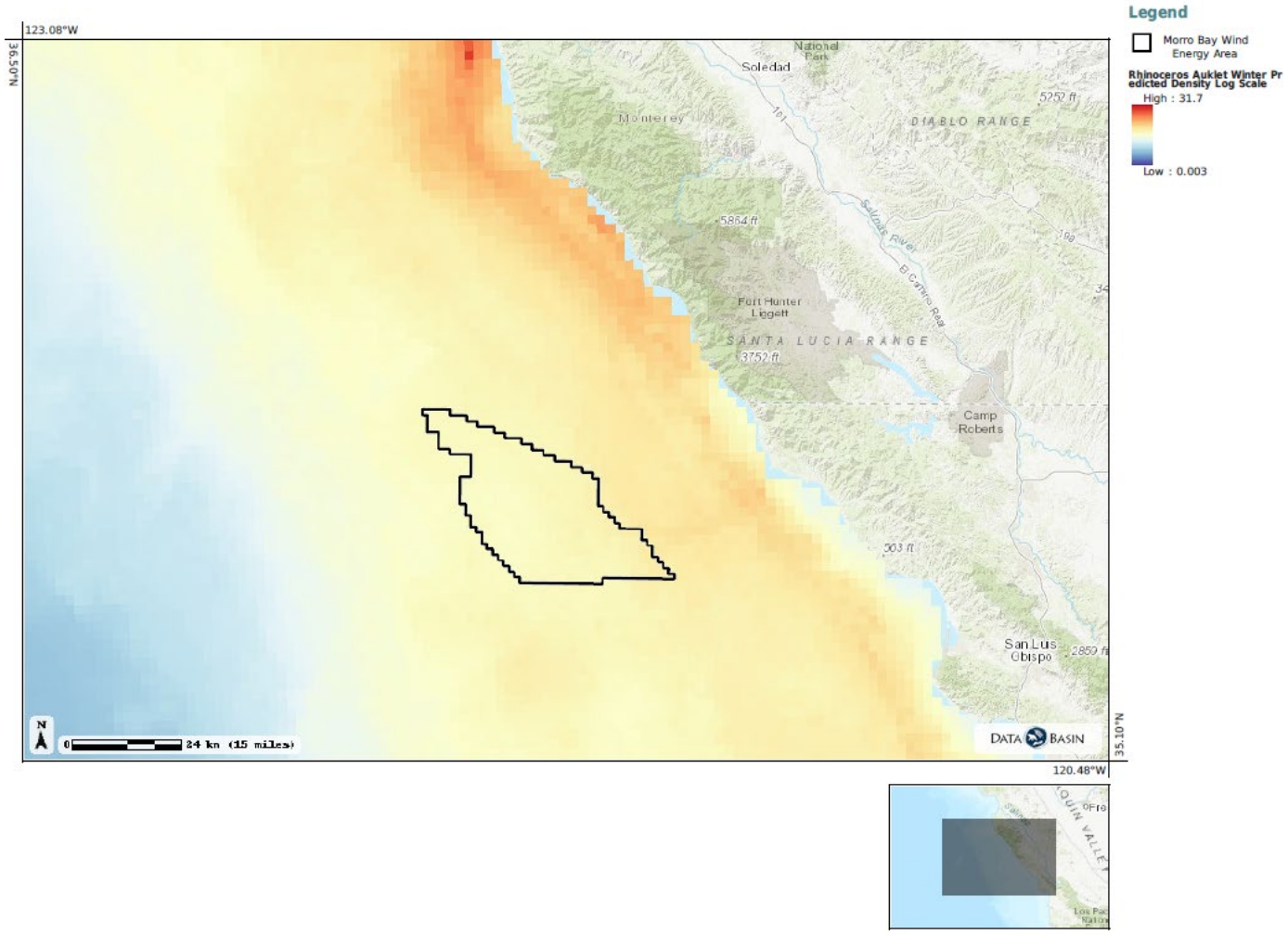


Exhibit 2-6h. Black-legged Kittiwake Winter Density

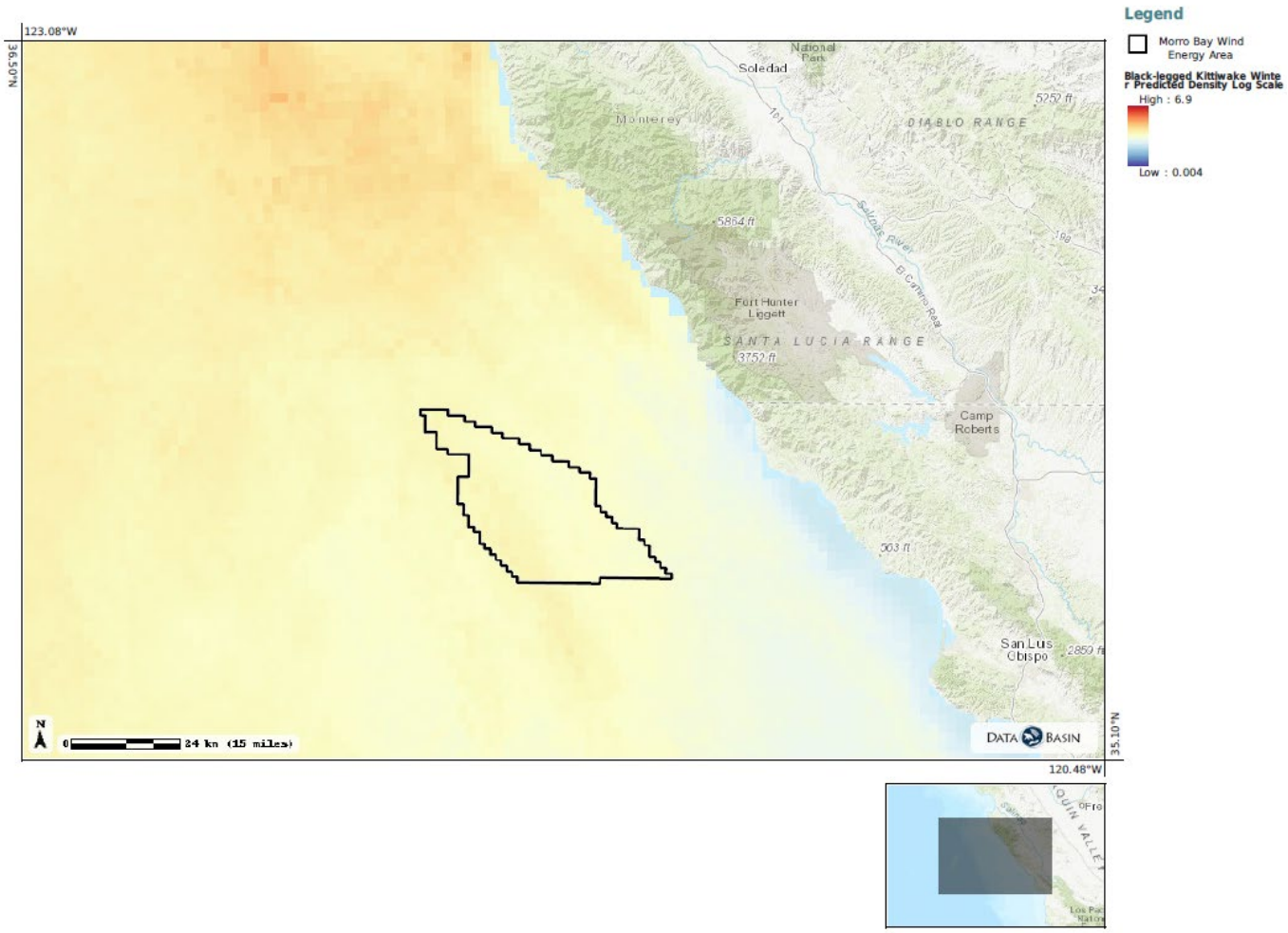


Exhibit 2-6i. Bonaparte's Gull Spring Density

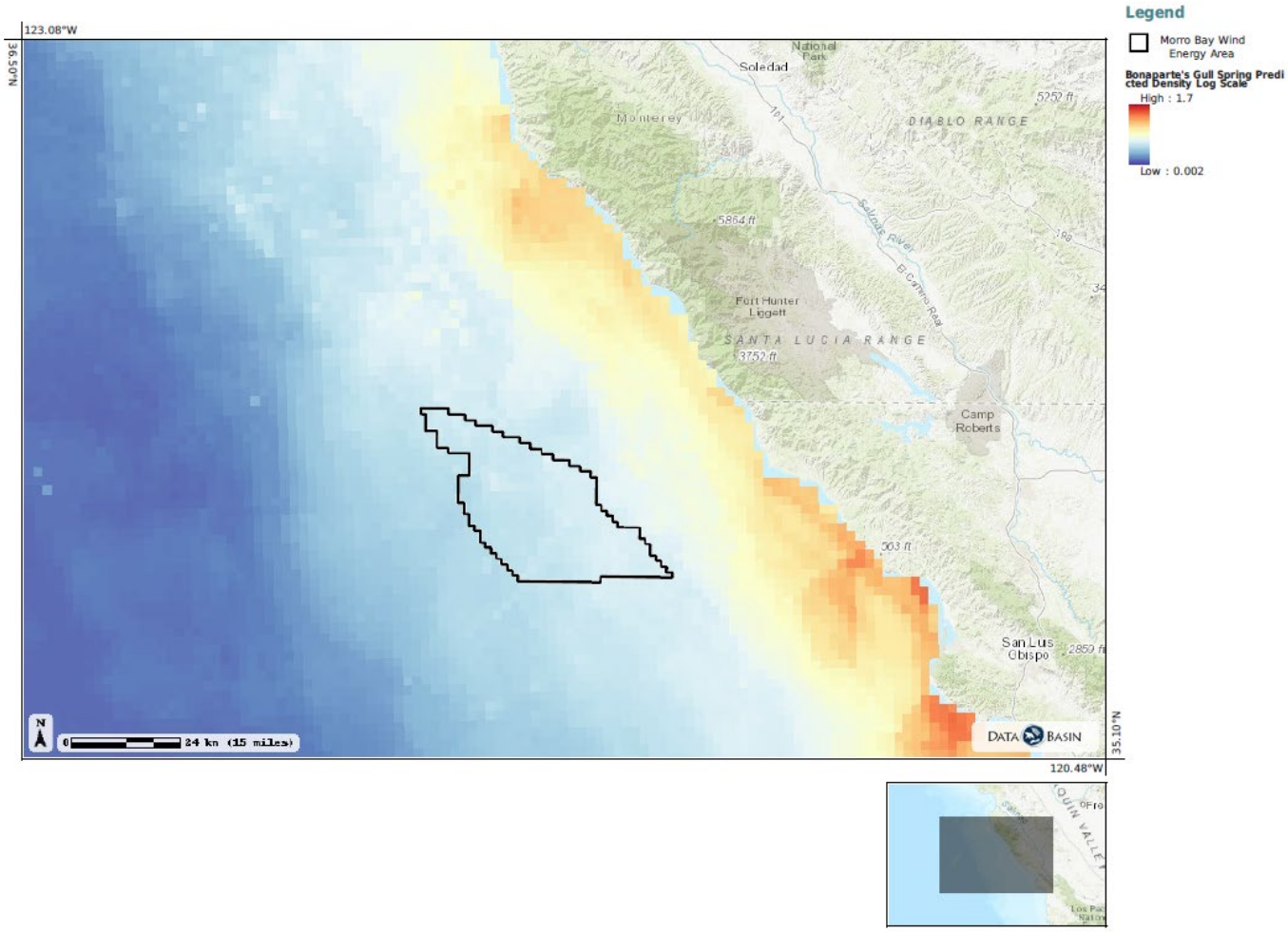


Exhibit 2-6j. California Gull Winter Density

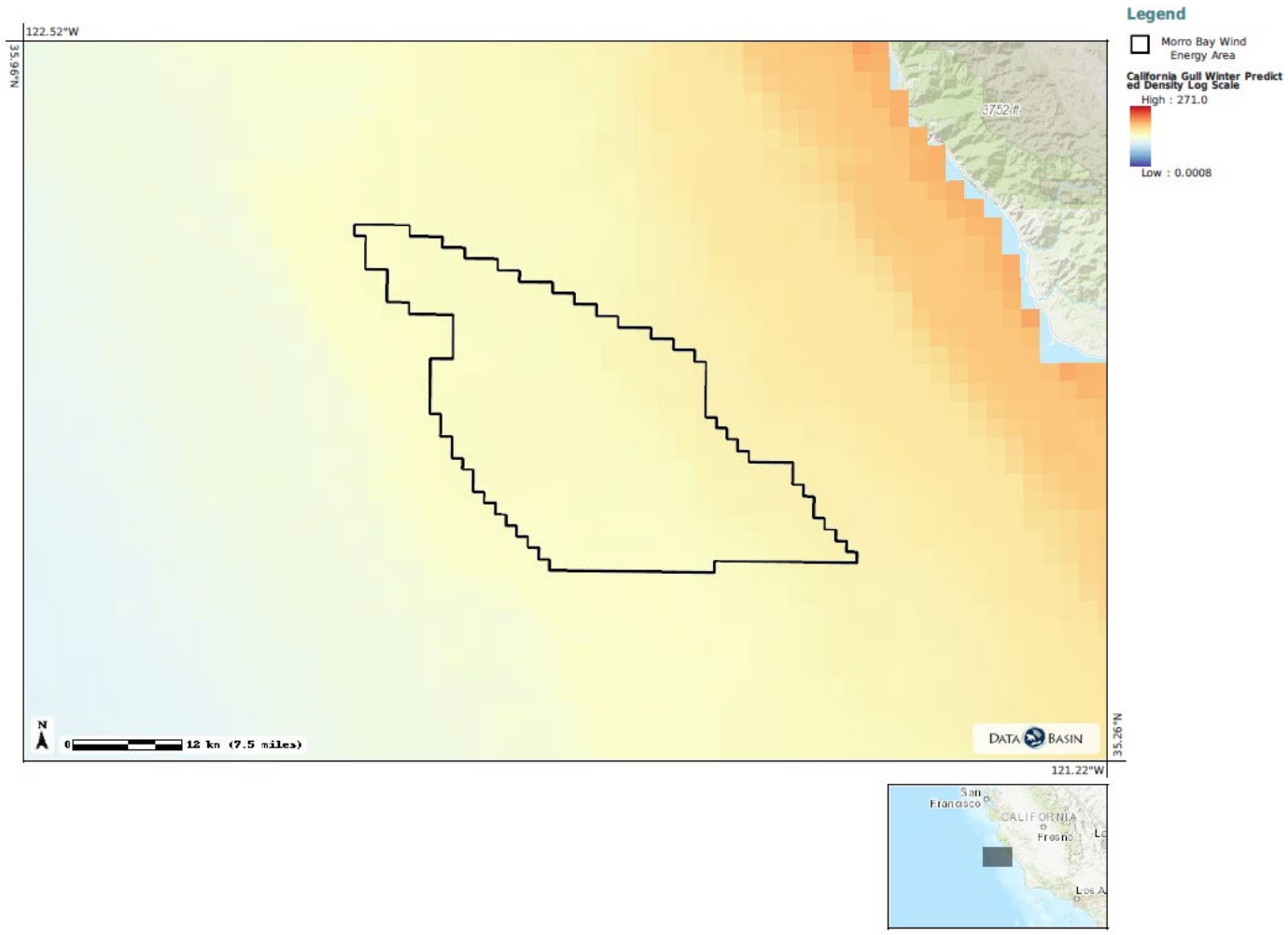


Exhibit 2-6k. Common Arctic Tern Fall Density

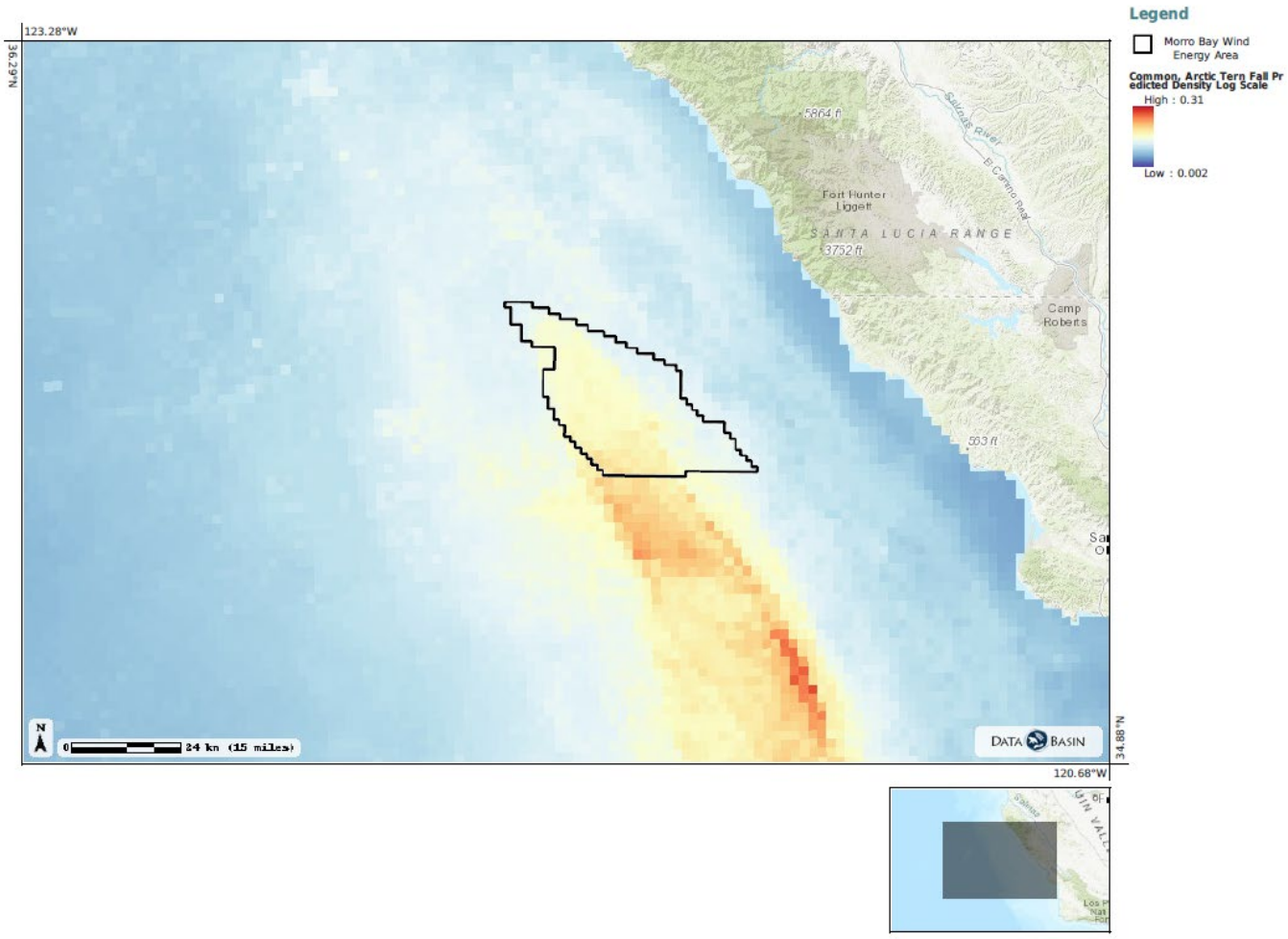


Exhibit 2-6l. Herring Iceland Gull Spring Density

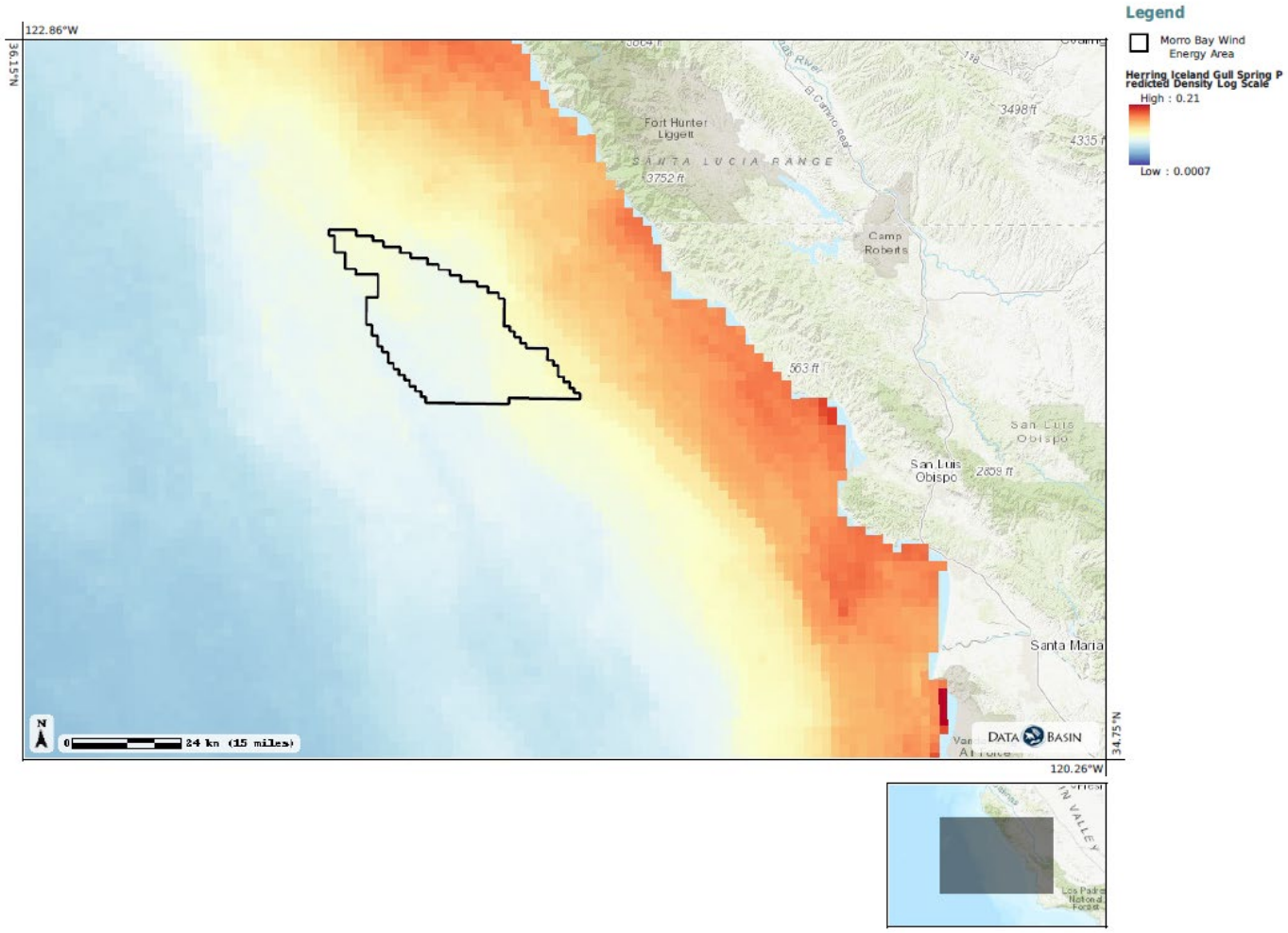


Exhibit 2-6m. Sabine's Gull Fall Density

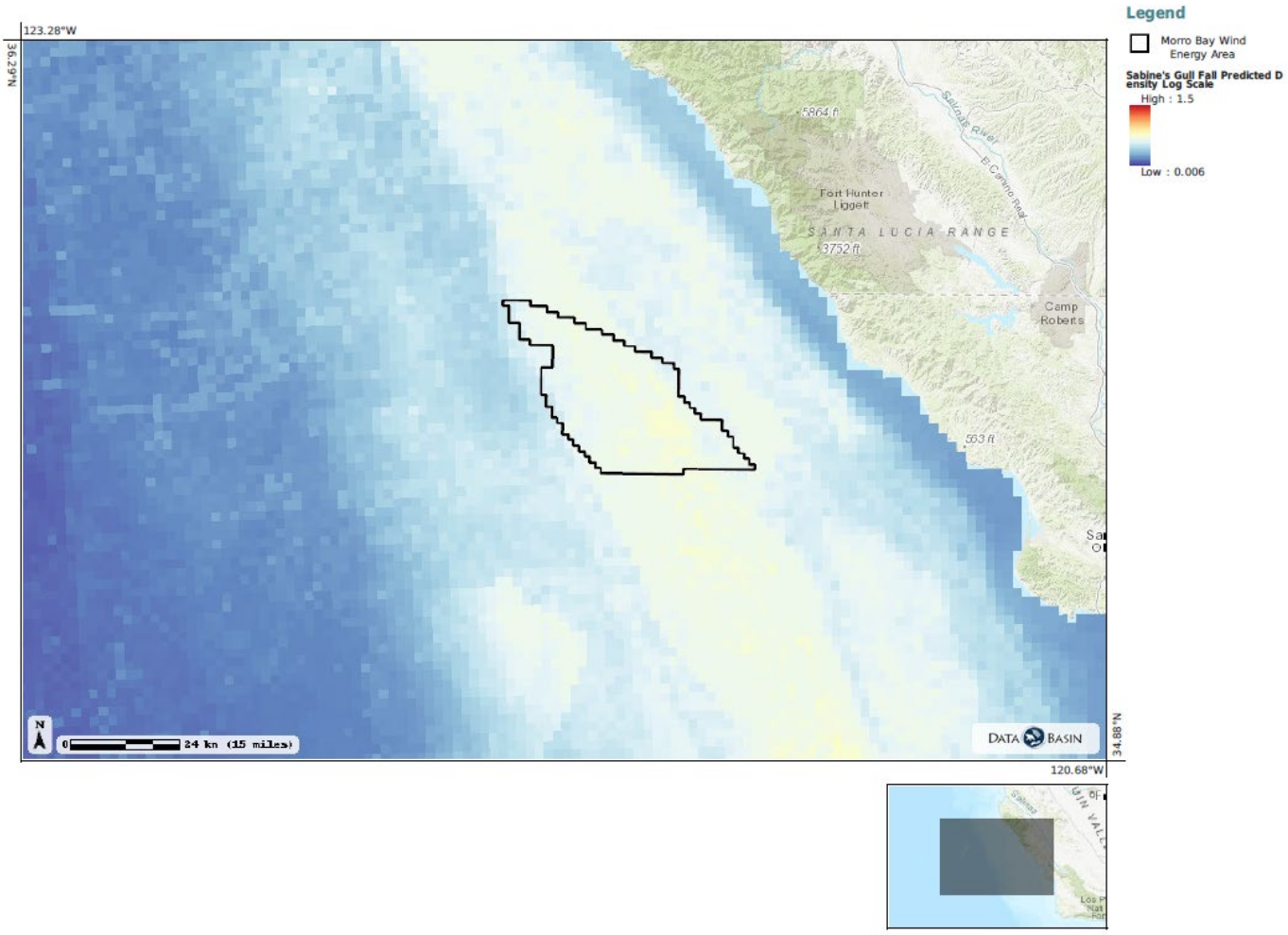


Exhibit 2-6n. Western and Glaucous-winged Gull Spring Density

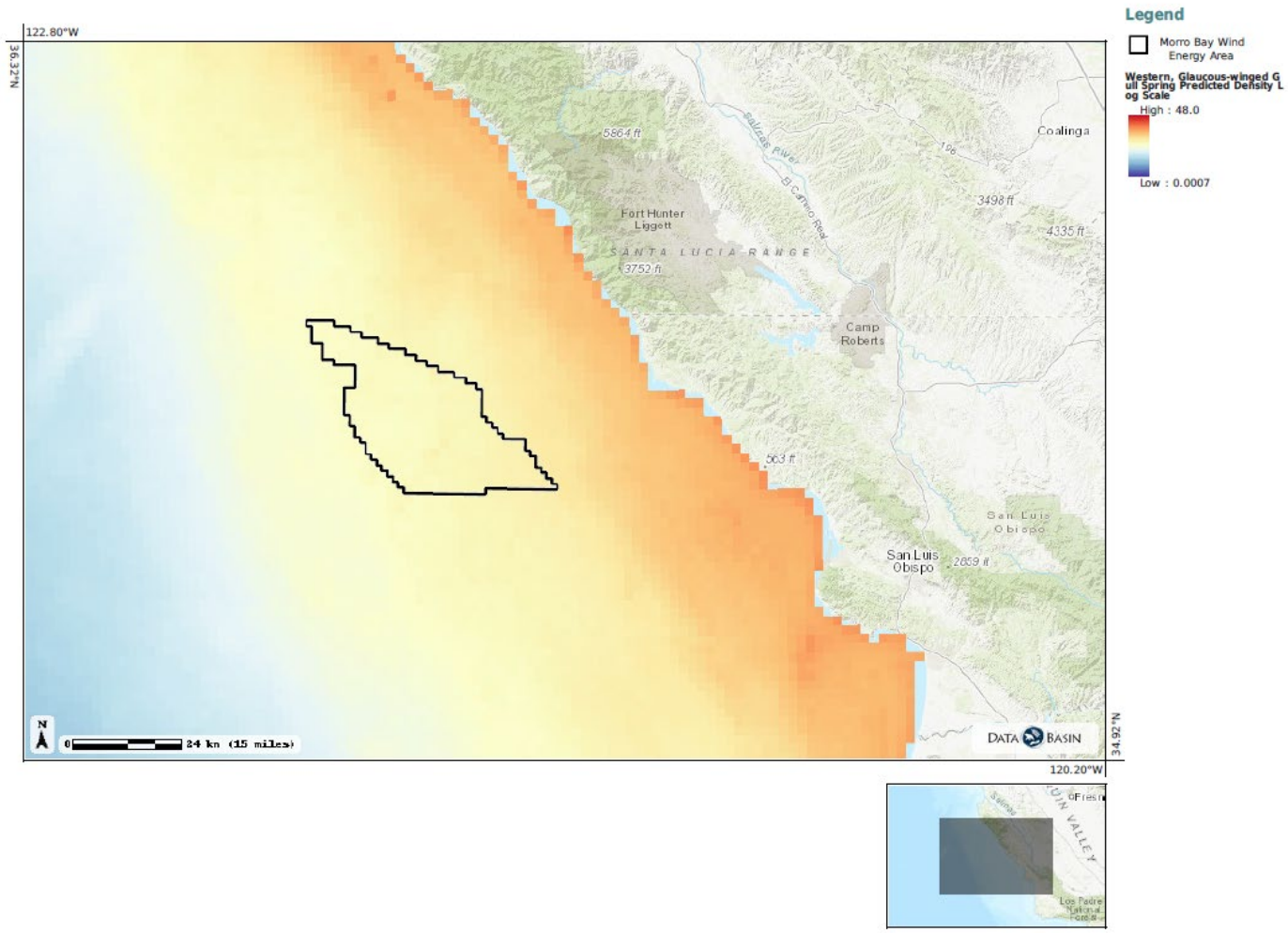


Exhibit 2-6o. Jaeger Spring Density

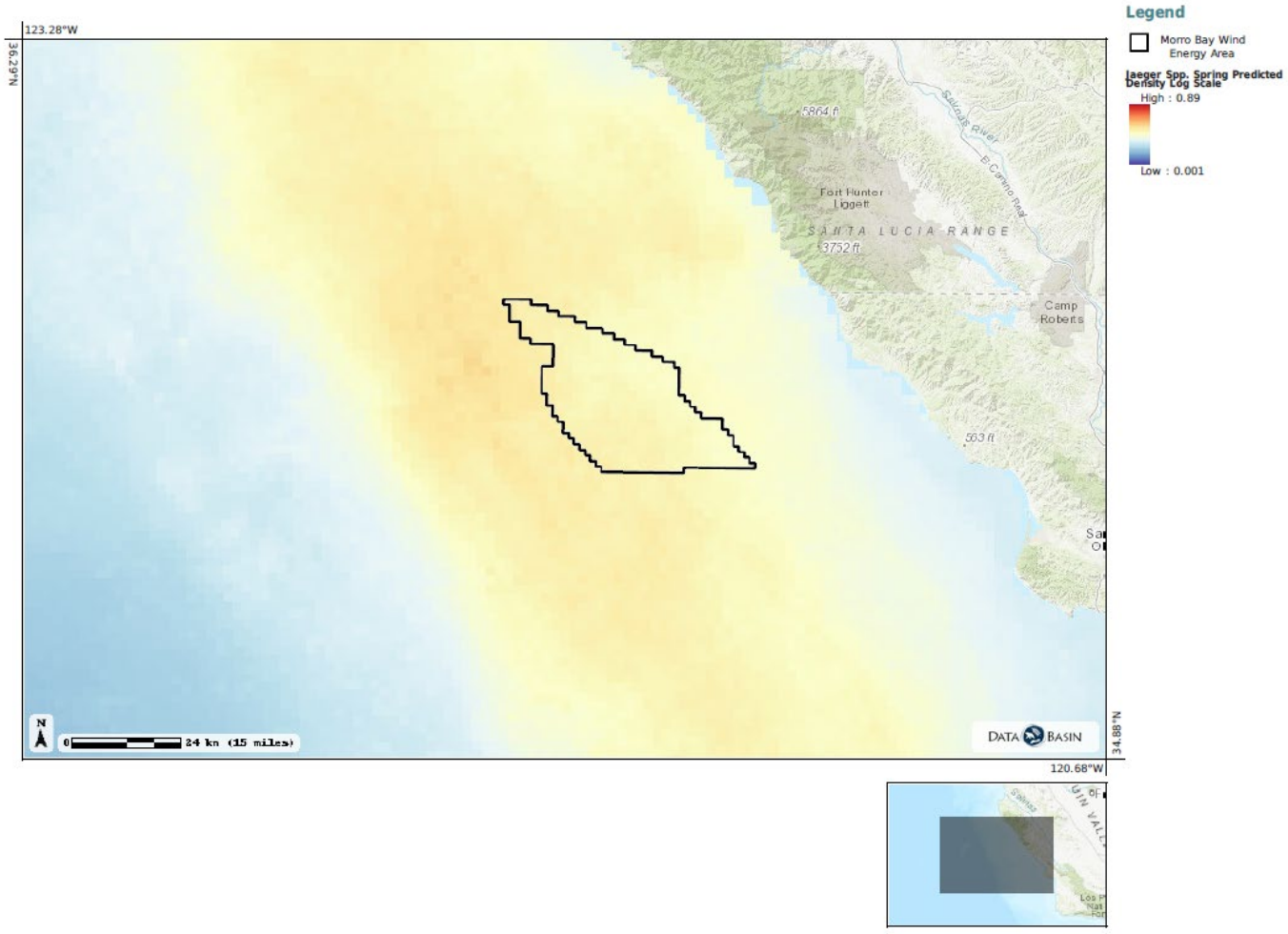


Exhibit 2-6p. Pomarine Jaeger Fall Density

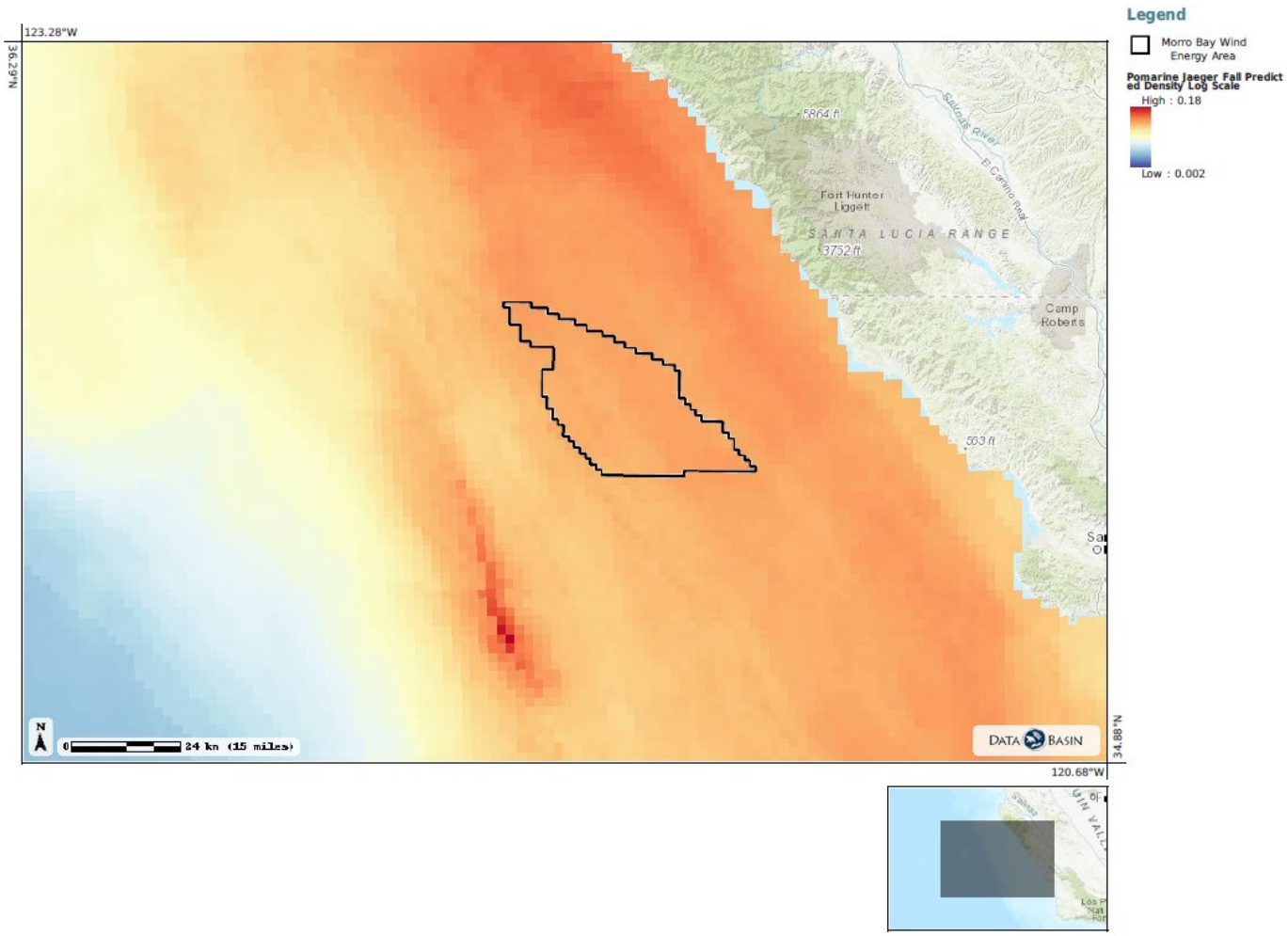


Exhibit 2-6q. Loon Spring Density

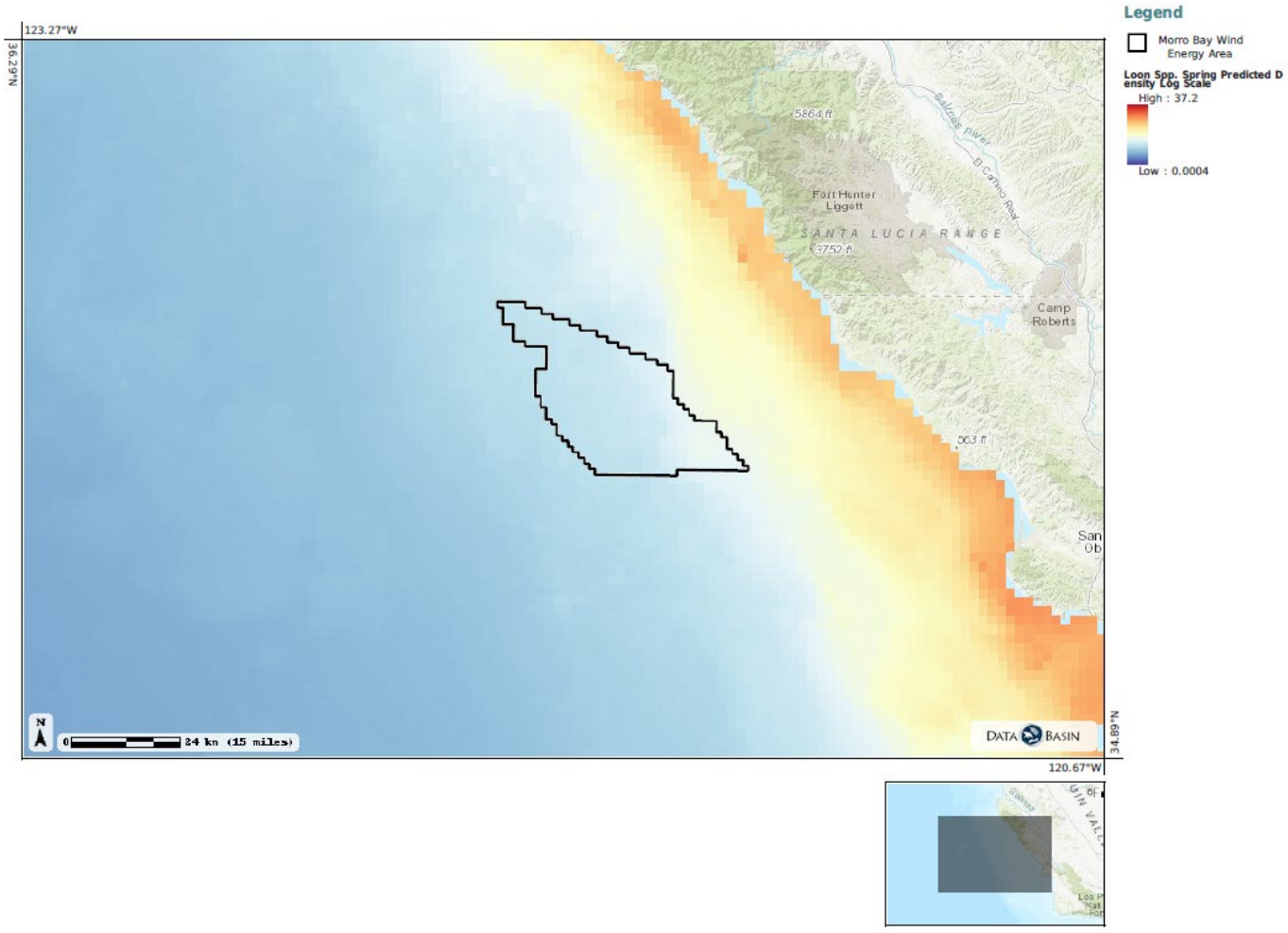


Exhibit 2-6r. Phalarope Fall Density

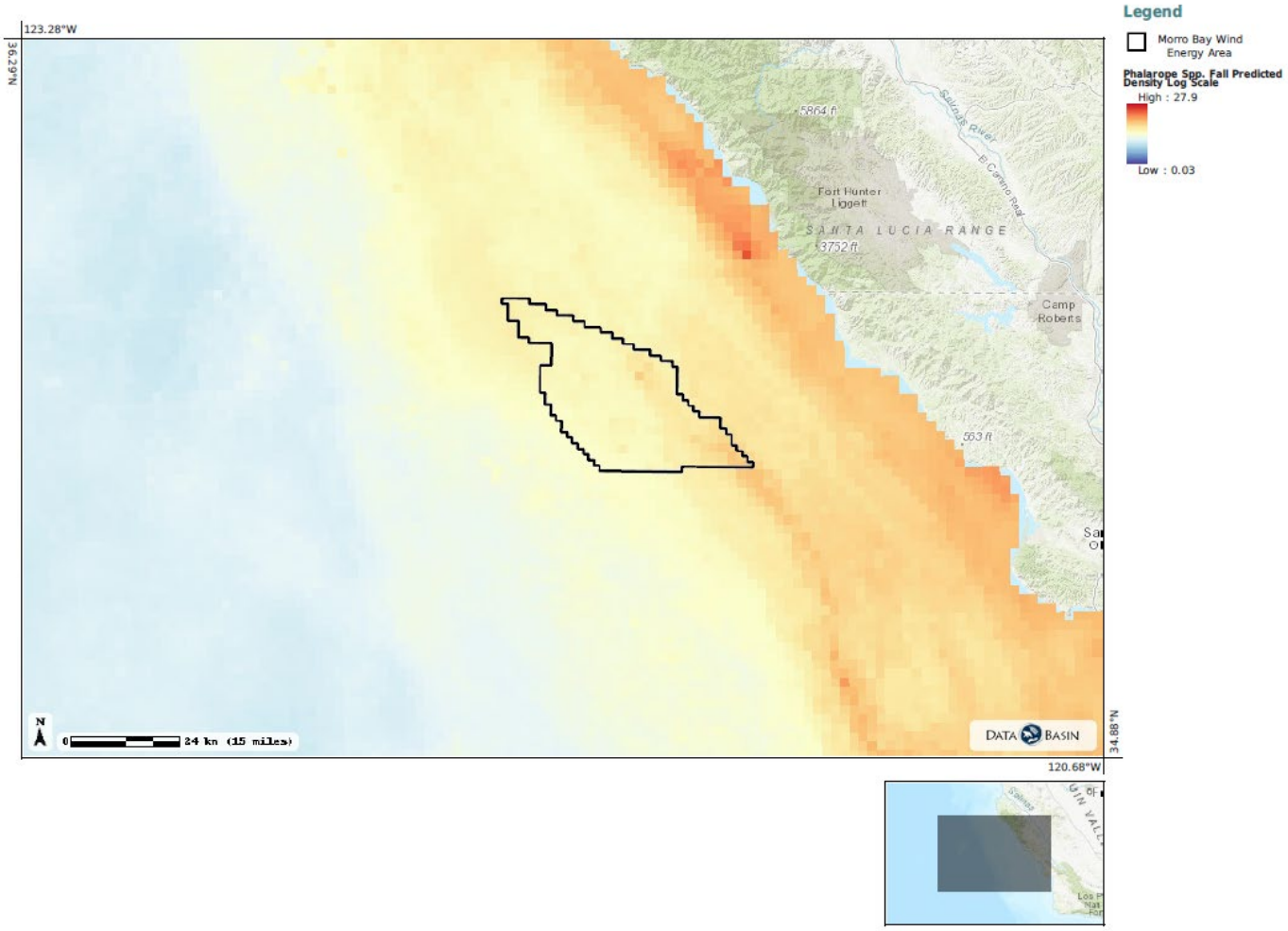


Exhibit 2-6s. Black Footed Albatross Spring Density

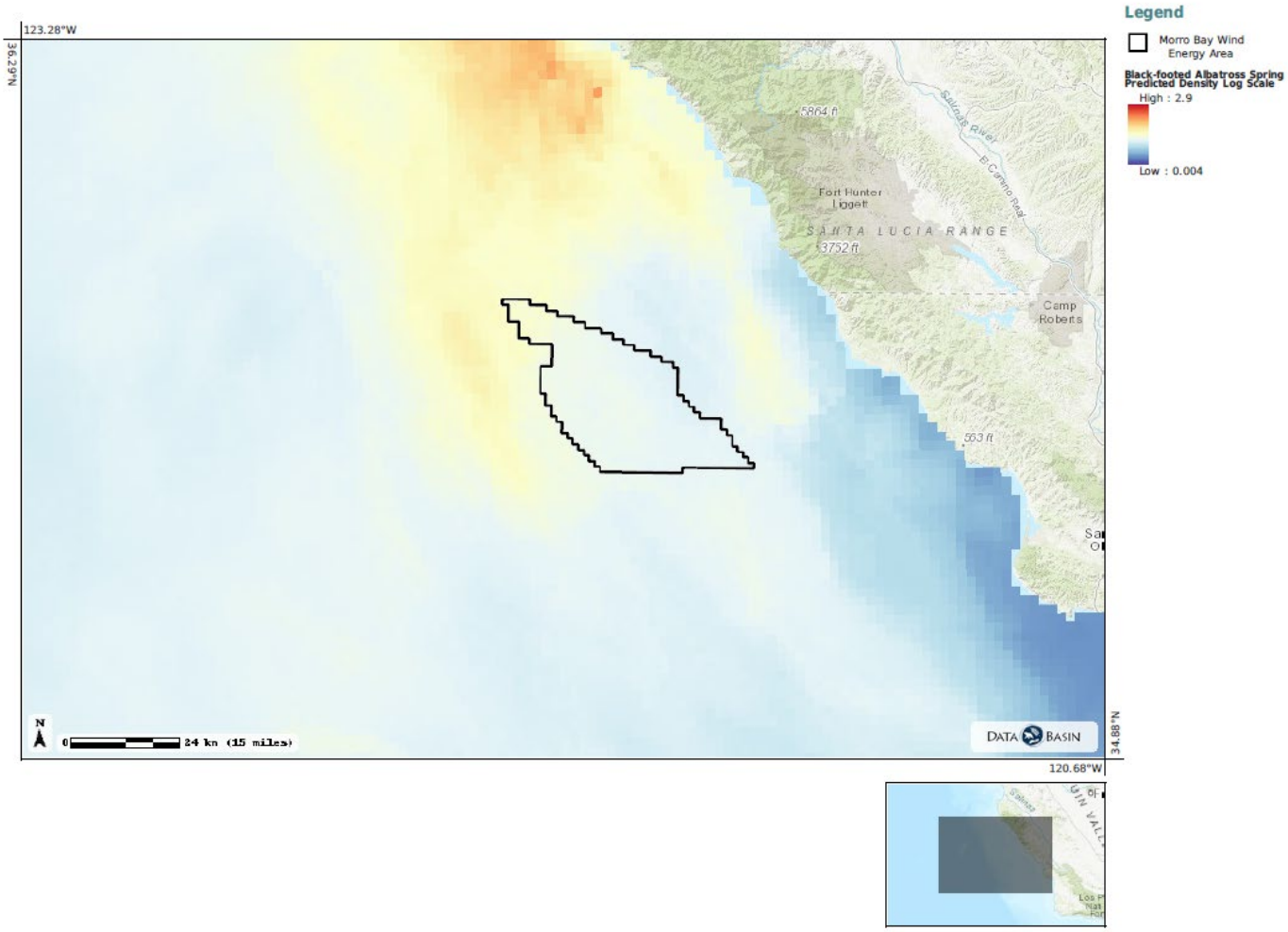


Exhibit 2-6t. Laysan Albatross Spring Density

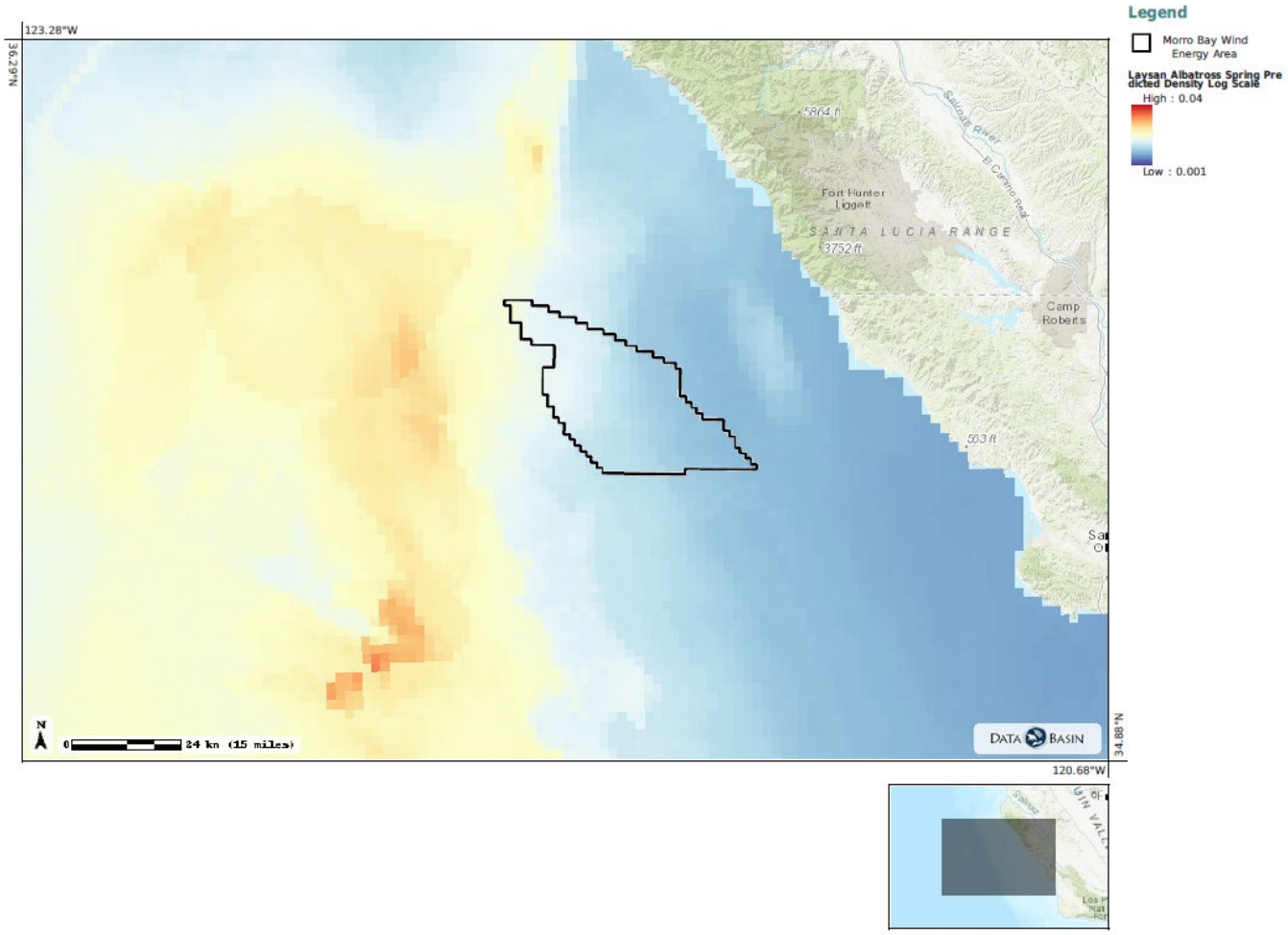


Exhibit 2-6u. Black Storm Petrel Summer Density

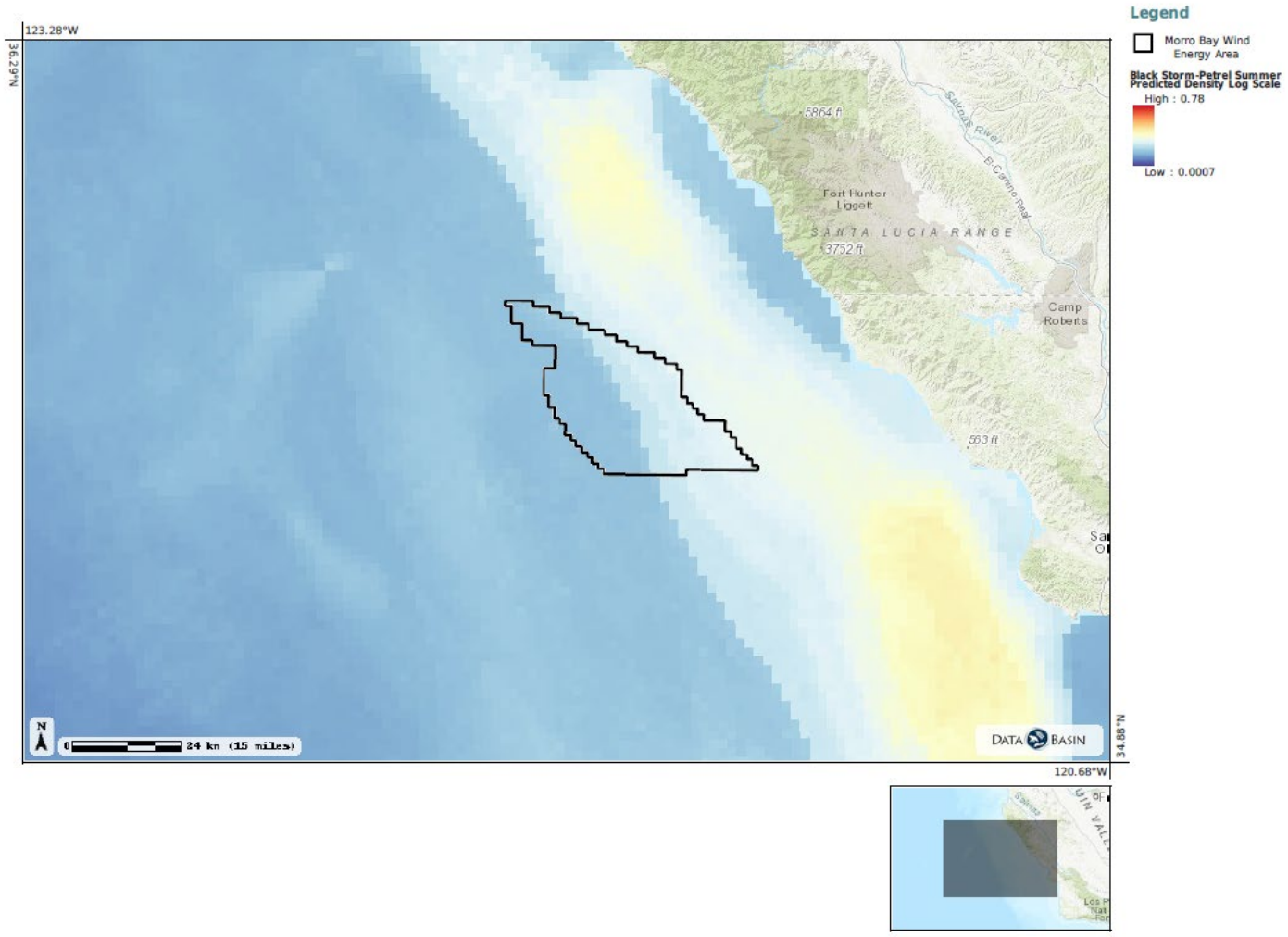


Exhibit 2-6v. Northern Fulmar Winter Density

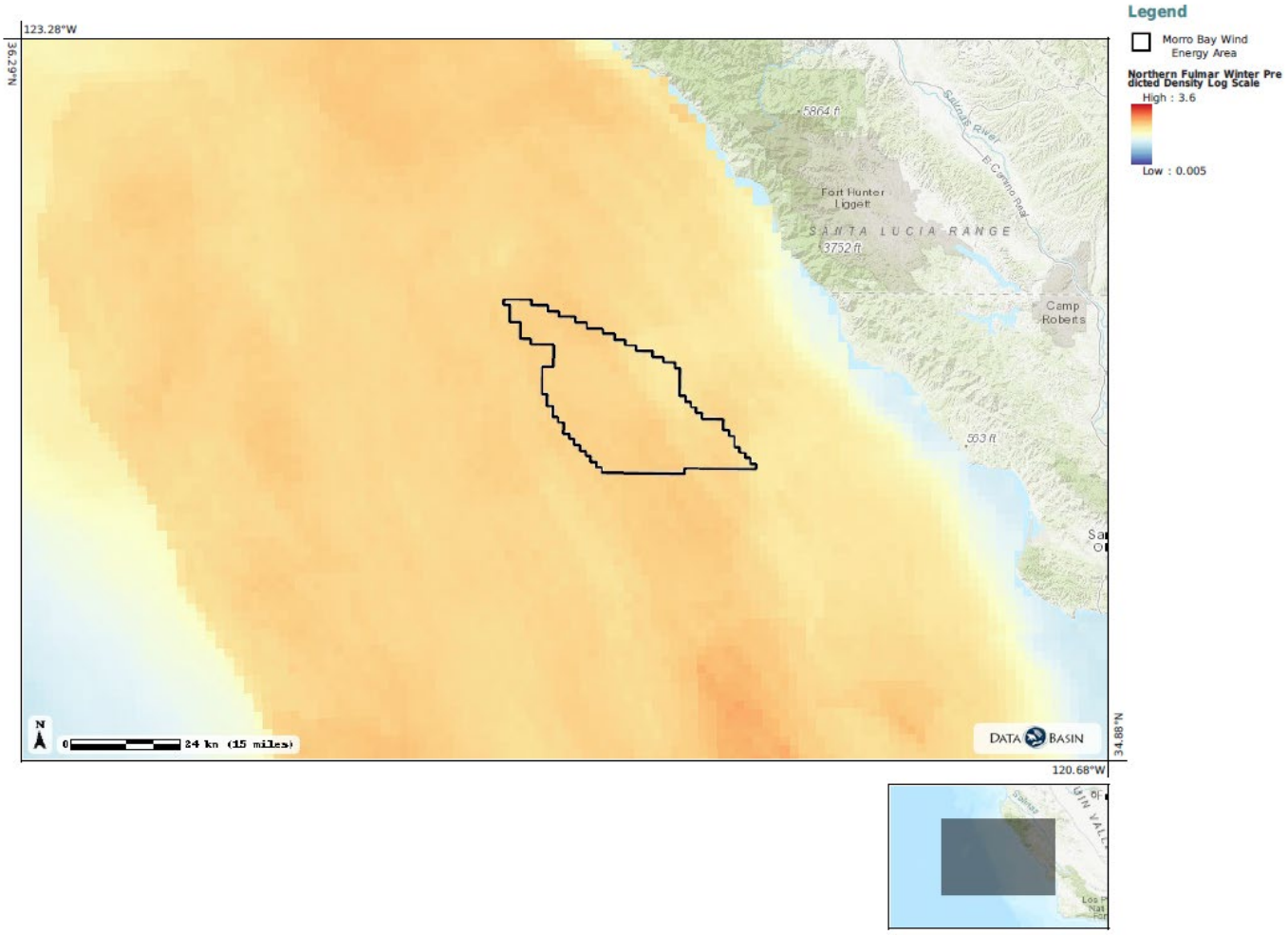


Exhibit 2-6w. Shearwater Summer Density

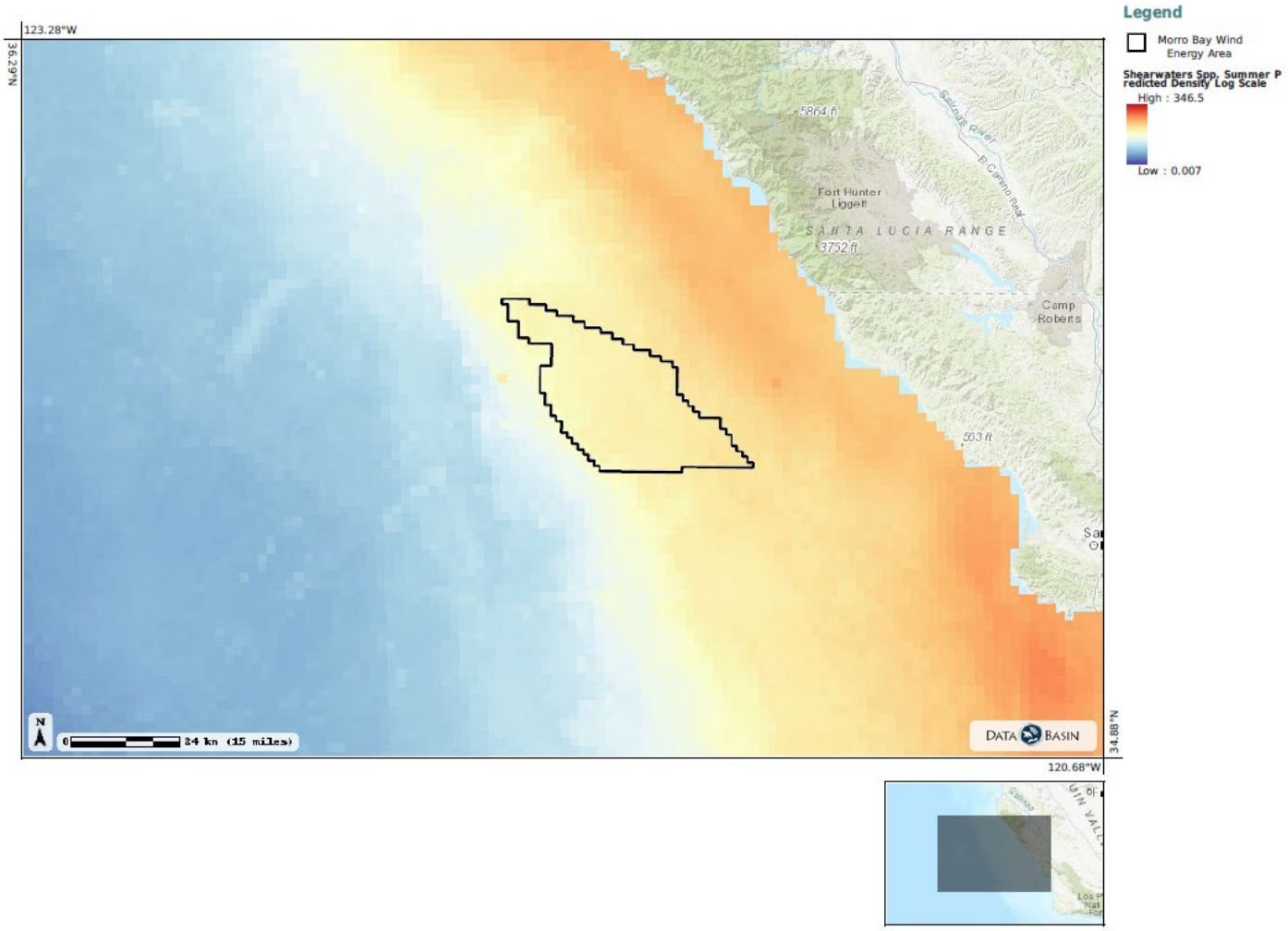
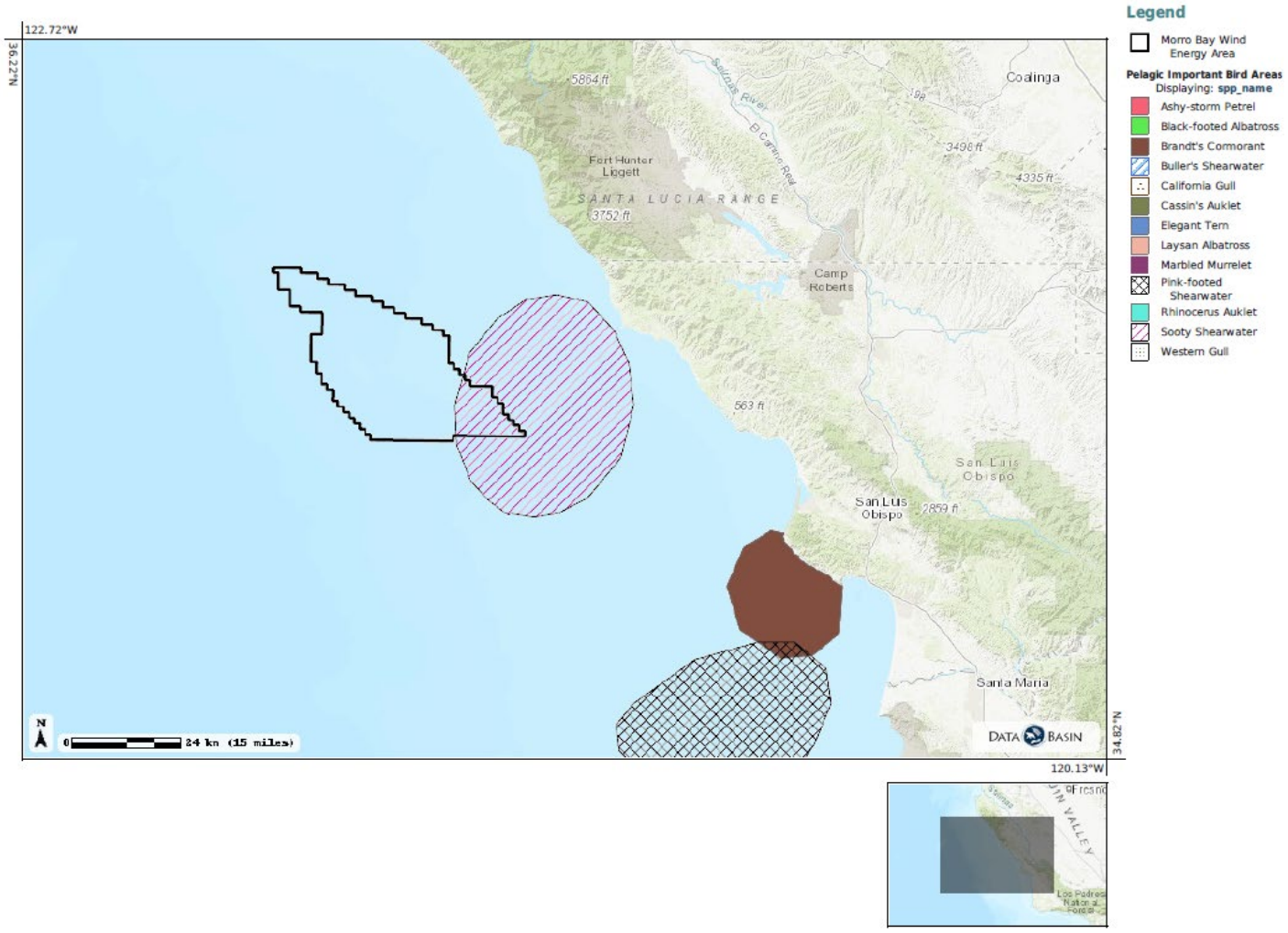


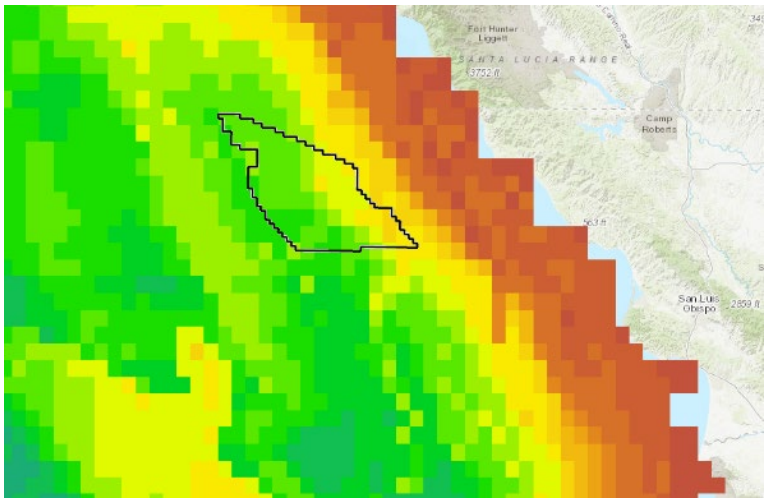
Exhibit 2-6x. Important Bird Areas

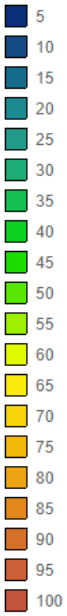


Source: Audobon California via the California Offshore Wind Energy Gateway

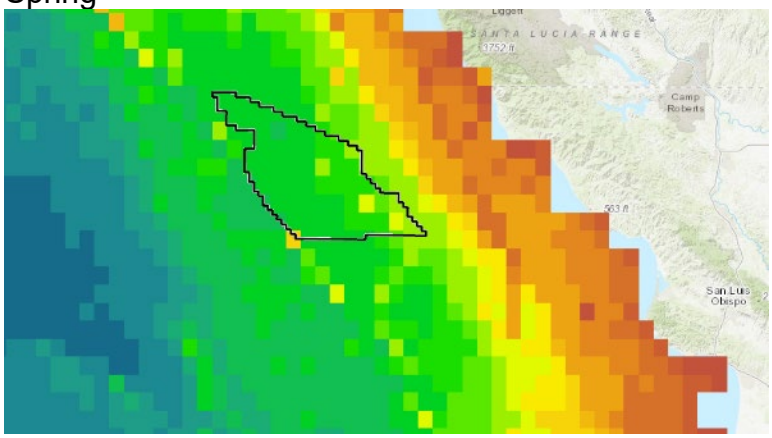
Exhibit 2-6y. Bird Abundance Maps by Season

Winter

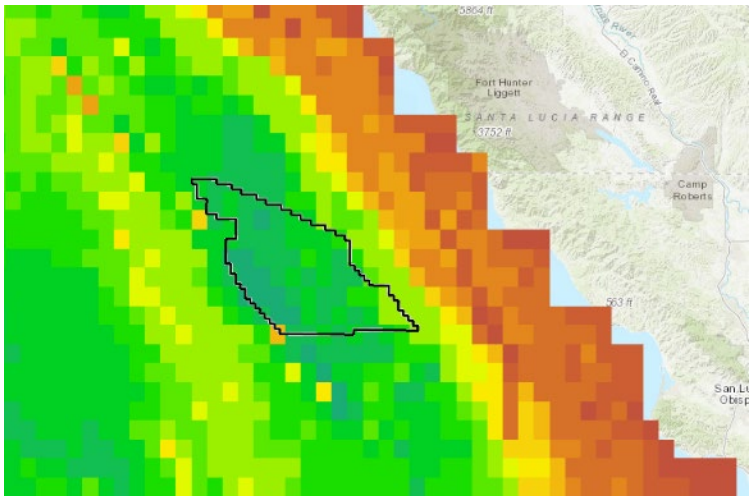




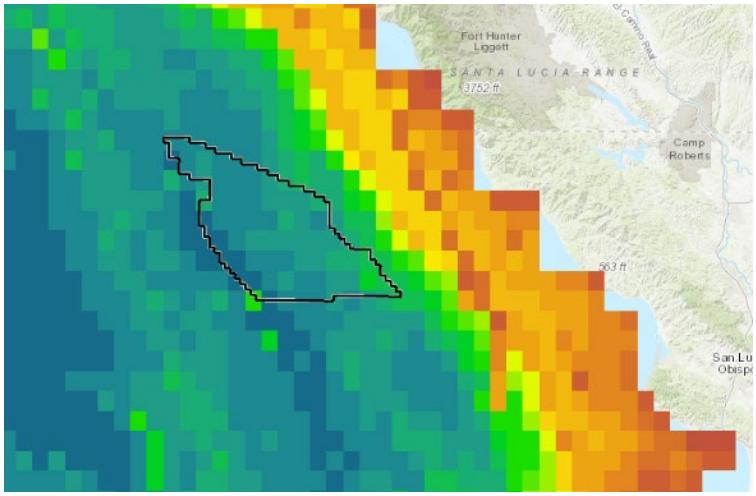
Spring



Summer



Fall



Note: The legend is based out of 100, with 0 having the lowest abundance and 100 having the highest.

Source: Dick et al. 2016 via the California Offshore Wind Energy Gateway

Exhibit 2-7. Comparison of Marine Frequency Hearing Ranges

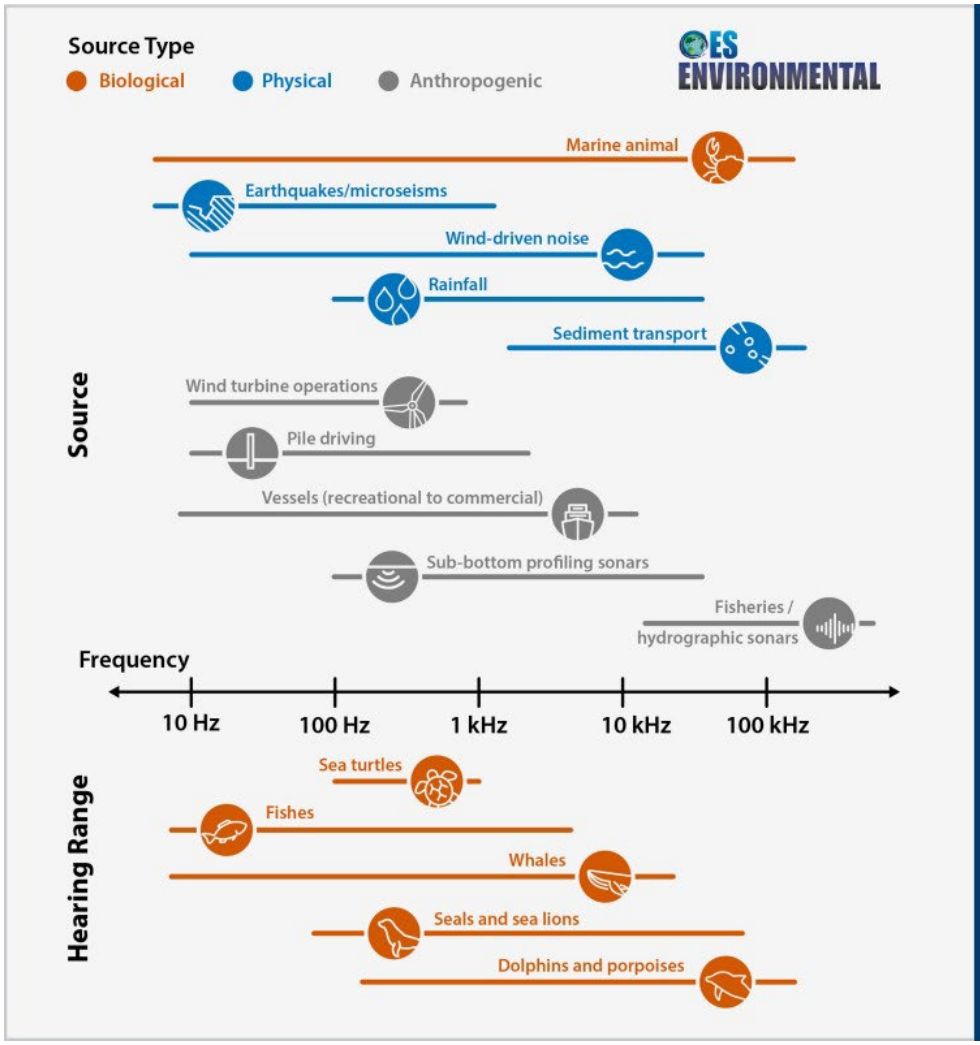
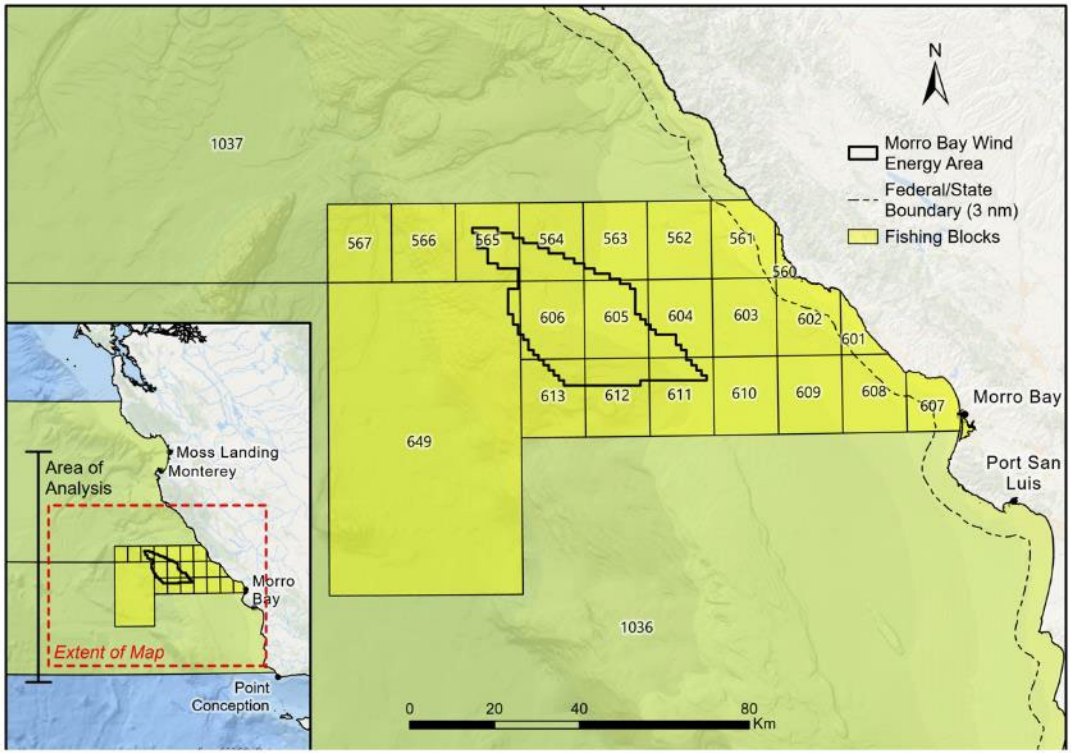


Figure 3. *Comparison of frequency ranges of hearing for marine life and various sound sources in the marine environment, including from OSW activities. Illustration from* ***Copping & Hemery 2020****.*

Source: ES Environmental

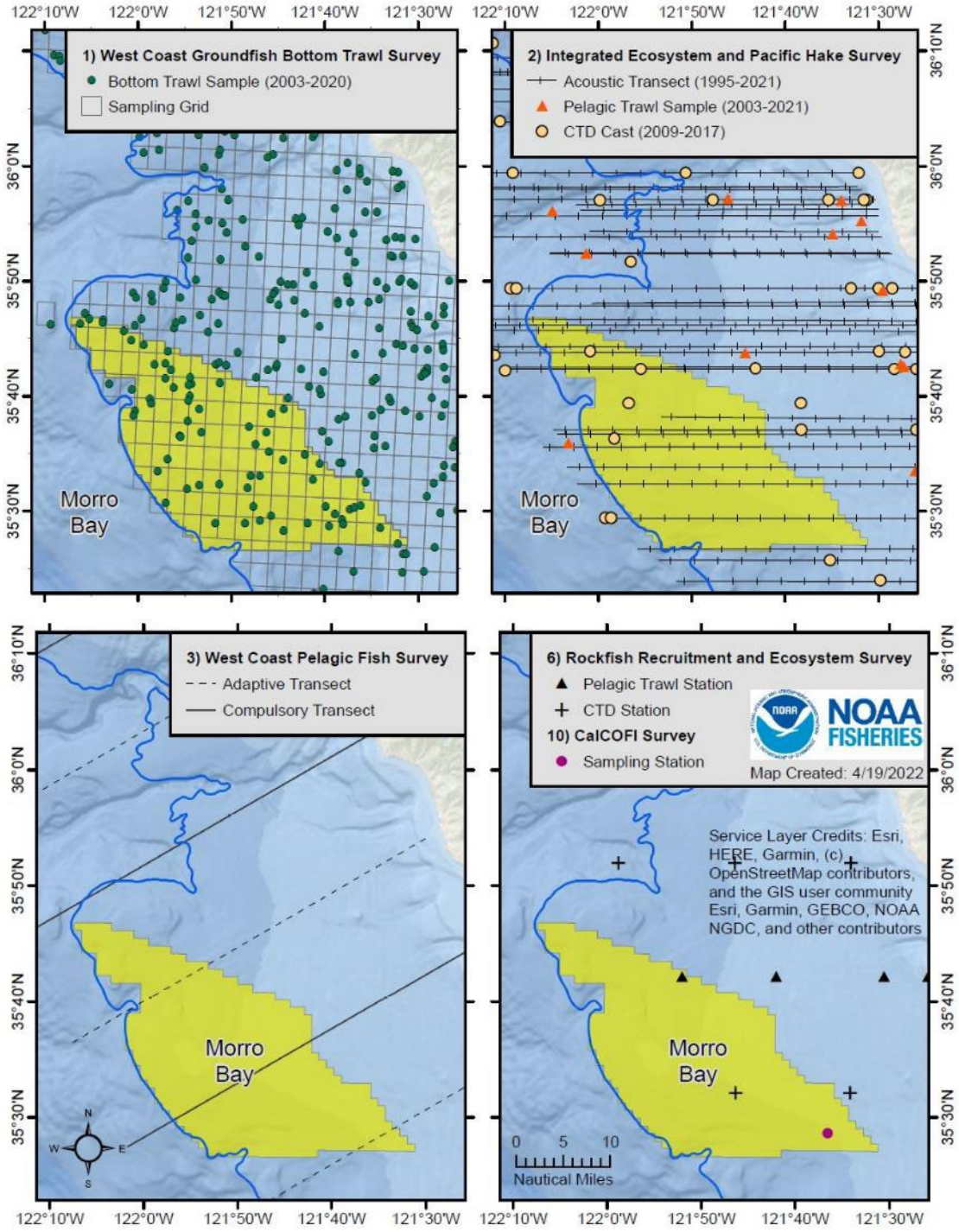
Commercial and Recreational Fishing Exhibits

Exhibit 3-1. Greater WEA, Central Coast Fishing Blocks. used, in part, to calculate values in Appendix C



Source: CDFW Marine Region

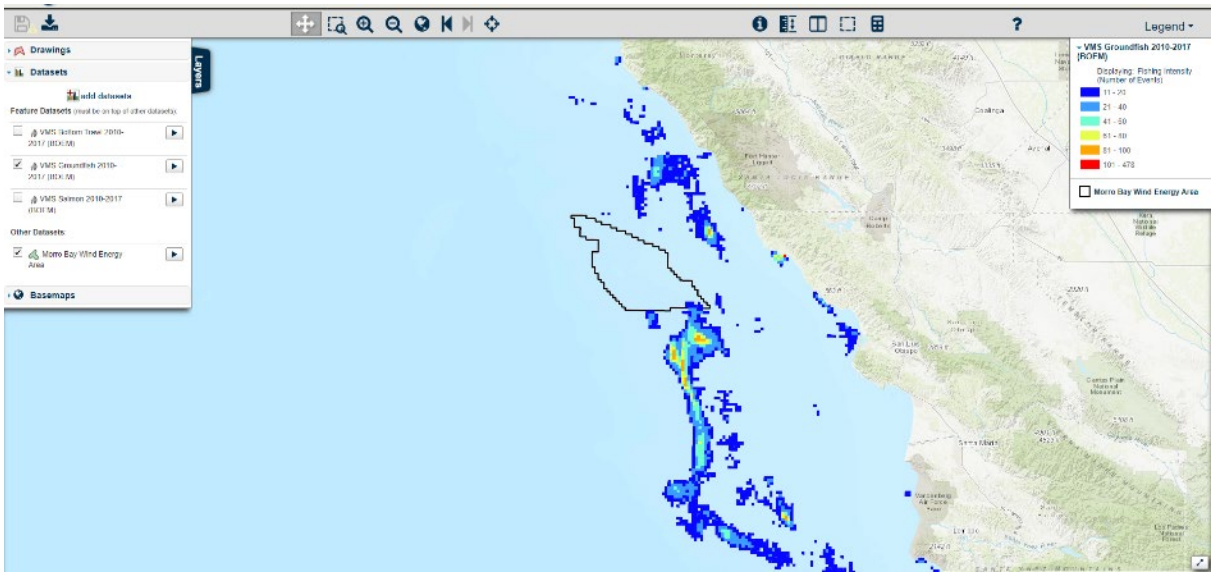
Exhibit 3-2. Representation of WEA Impact Area



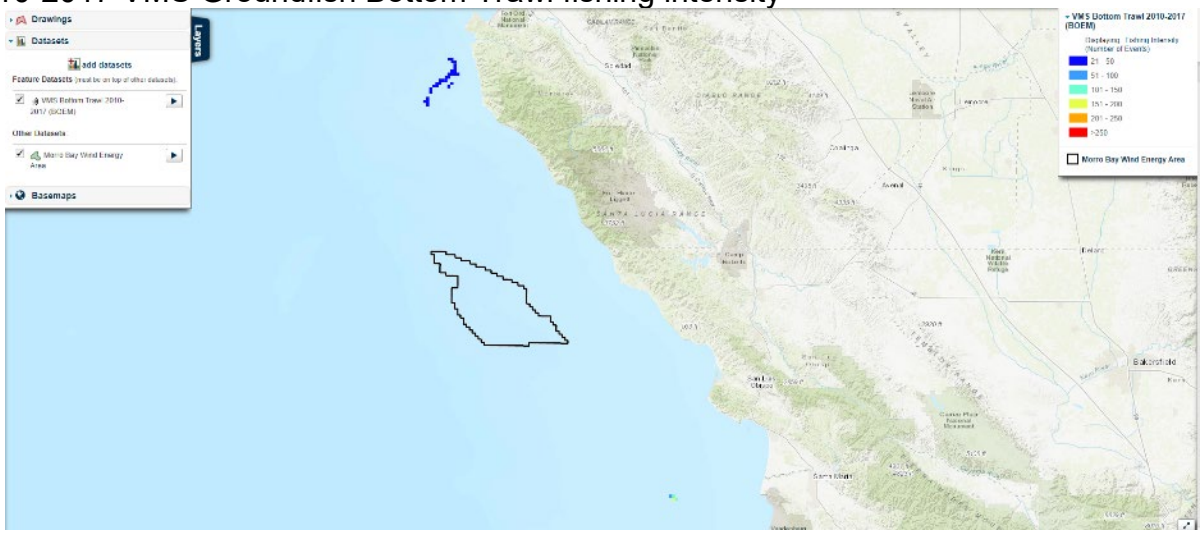
Source: NOAA

Exhibit 3-3. Groundfish Fishing Intensity

2010-2017 VMS Groundfish fishing intensity



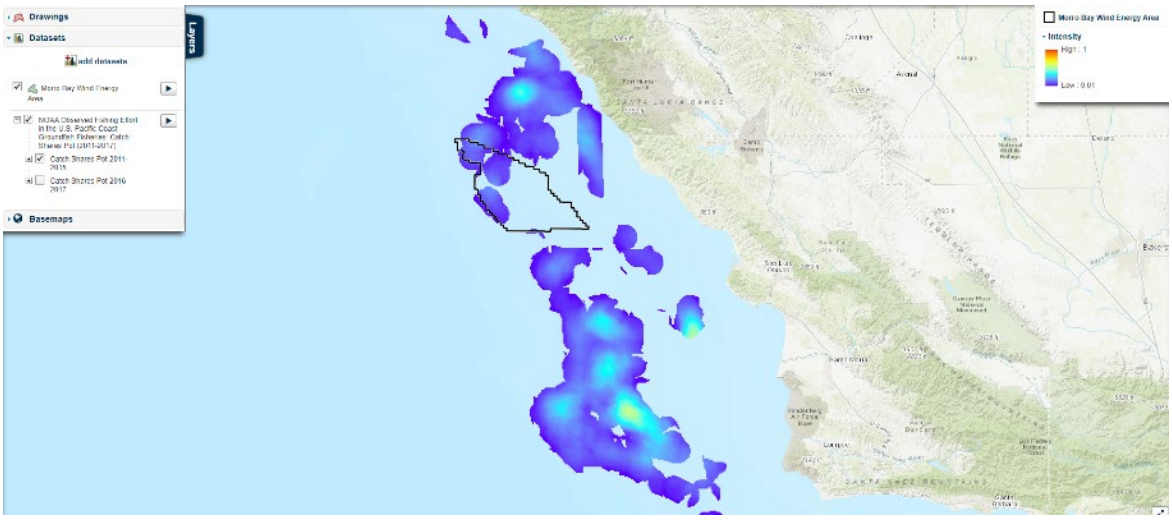
2010-2017 VMS Groundfish Bottom Trawl fishing intensity



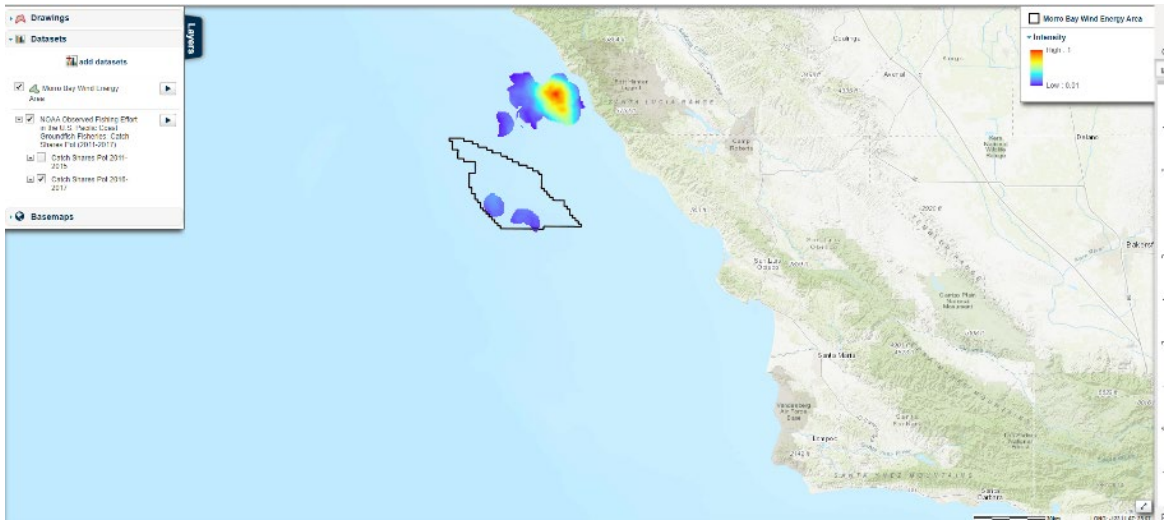
Source: BOEM, Frank Pendleton. Displayed via OSW Databasin

Exhibit 3-4. Observed Fishing effort in the U.S. Pacific Coast Groundfish Fisheries: Catch Shares Pot

Top: 2011-2015



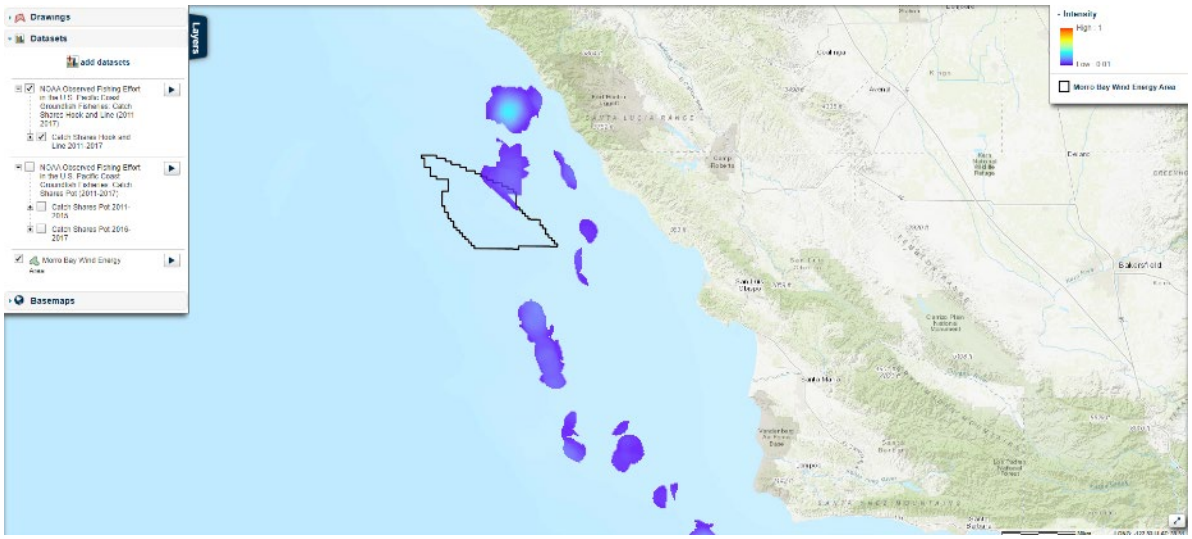
Bottom: 2016-2017



Source: NOAA Displayed via OSW Databasin

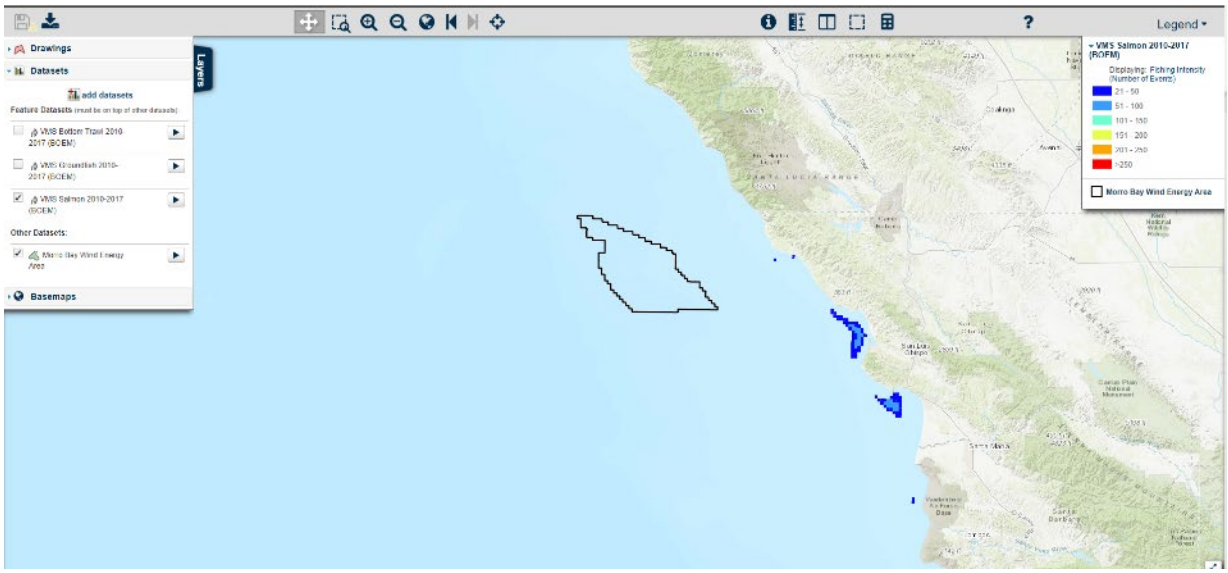
Exhibit 3-5. Observed fishing effort in the U.S. Pacific Coast Groundfish Fisheries: Catch Shares Hook-and-Line

2011-2017



Source: NOAA Displayed via OSW Databasin

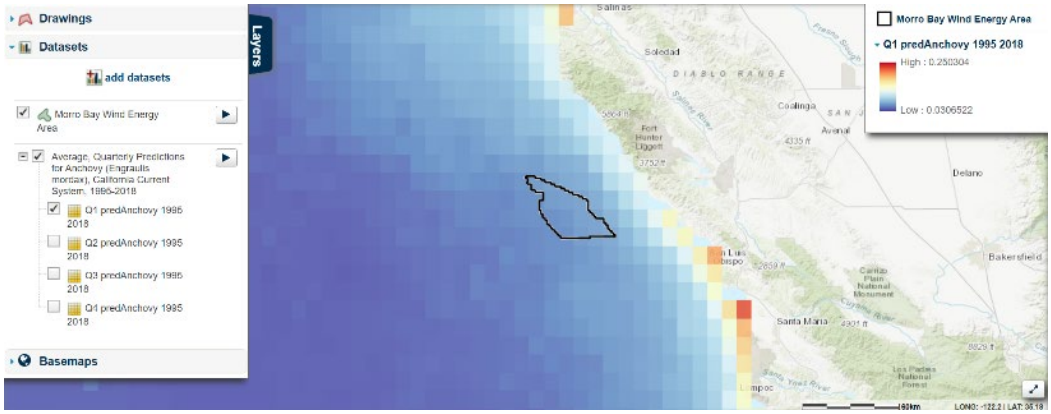
Exhibit 3-6. Salmon Fishing Intensity 2010-2017



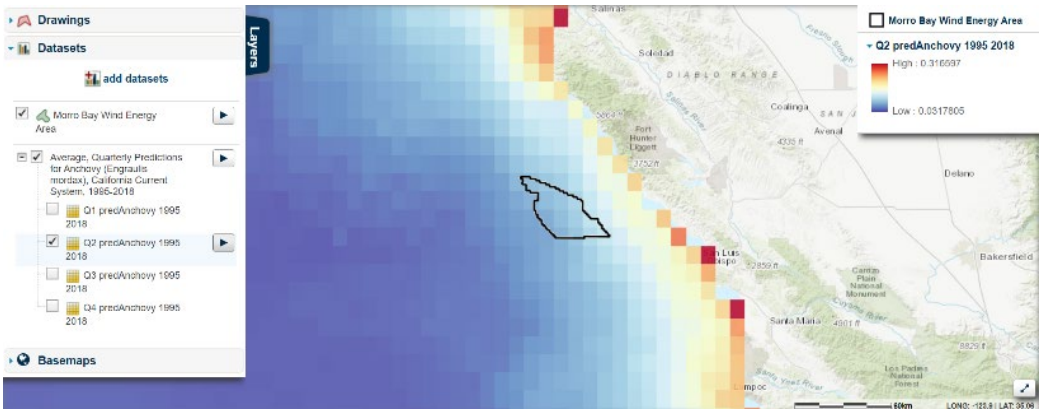
Source: BOEM, Frank Pendleton. Displayed via OSW Databasin

Exhibit 3-7. Average, quarterly species distribution predictions for anchovy (Engraulis mordax) in the California Current System

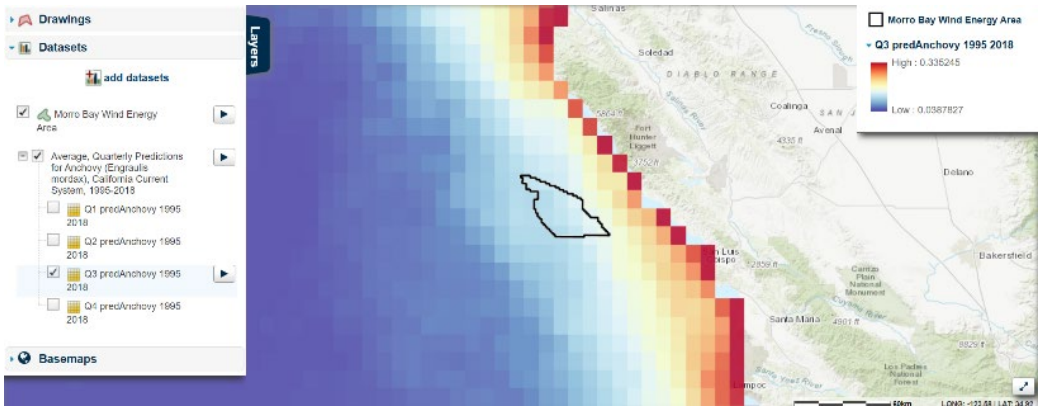
1995-2018
Q1



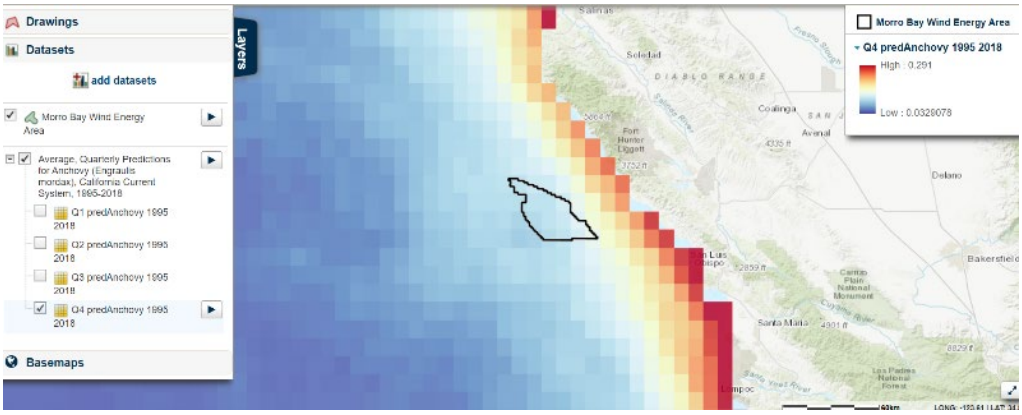
Q2



Q3

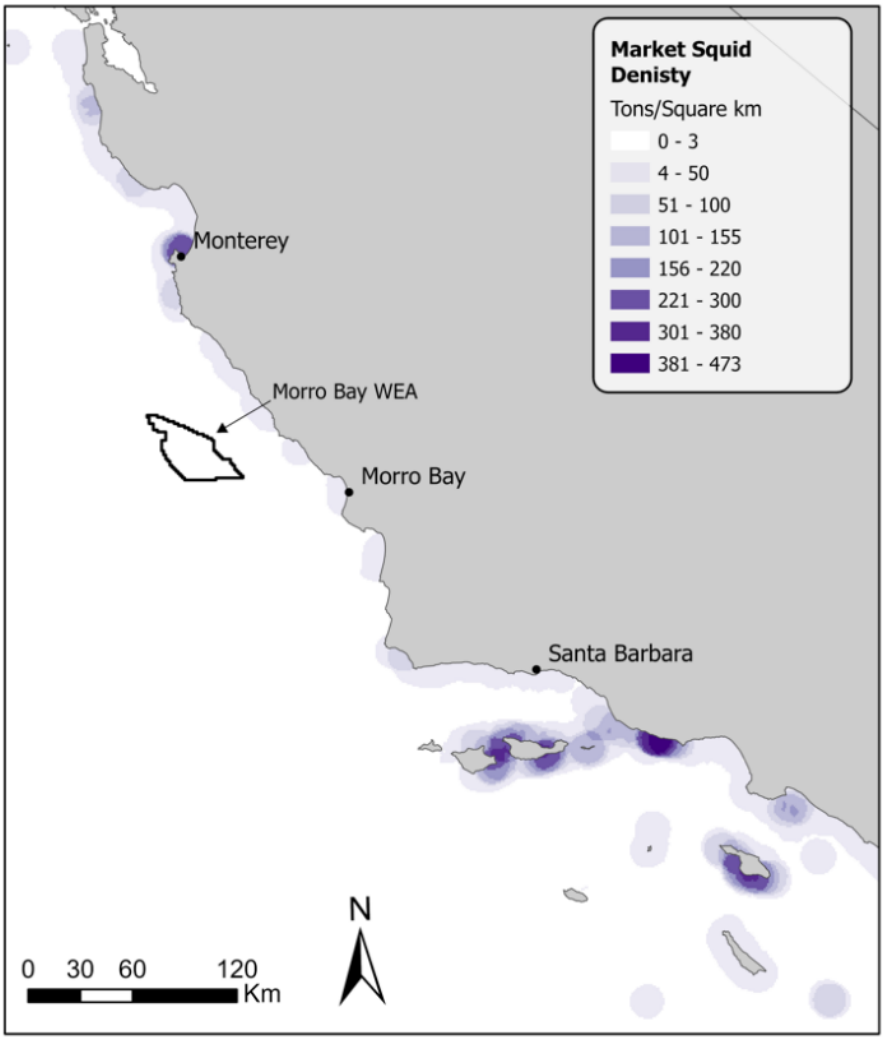


Q4



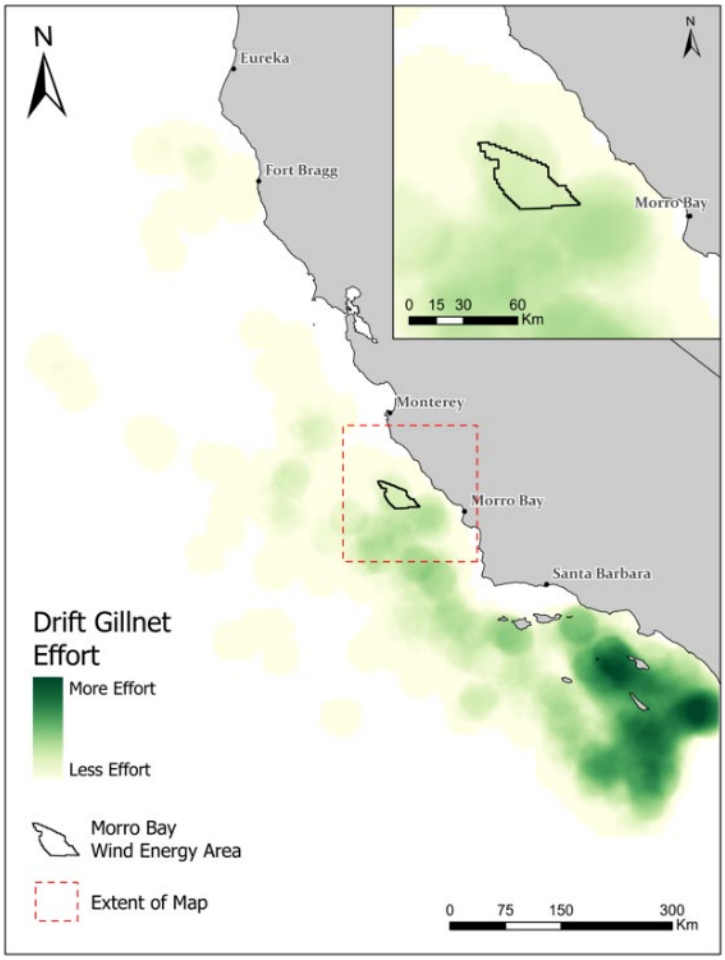
Source: NOAA SWFSC trawl surveys. Processed by CBI and displayed via OSW Databasin

Exhibit 3-8. Market Squid Fishing Density 1999-2020



Source: CDFW

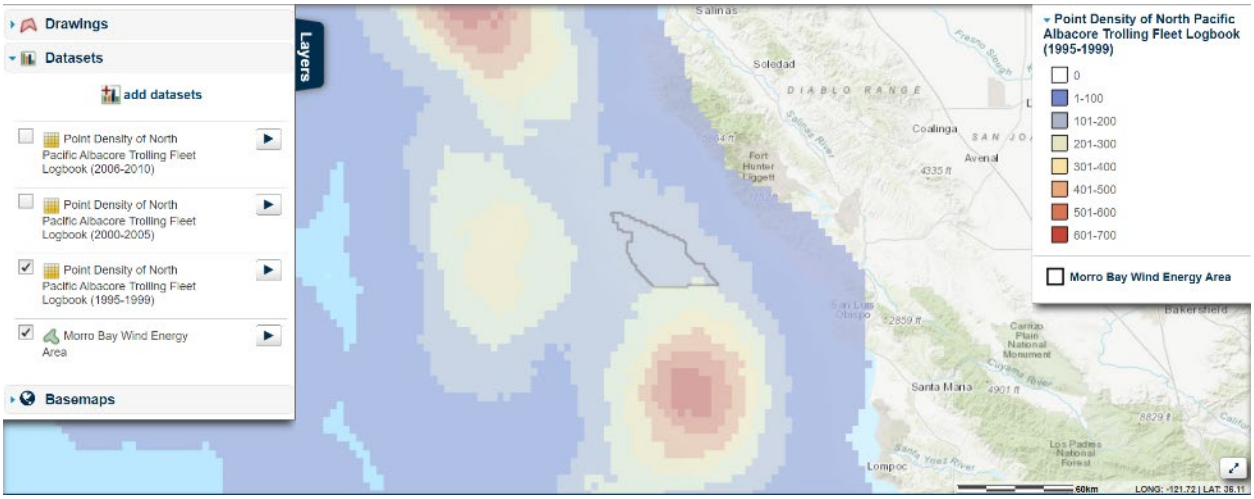
Exhibit 3-9. Drift Gillnet Fishing Intensity (2011-2016)



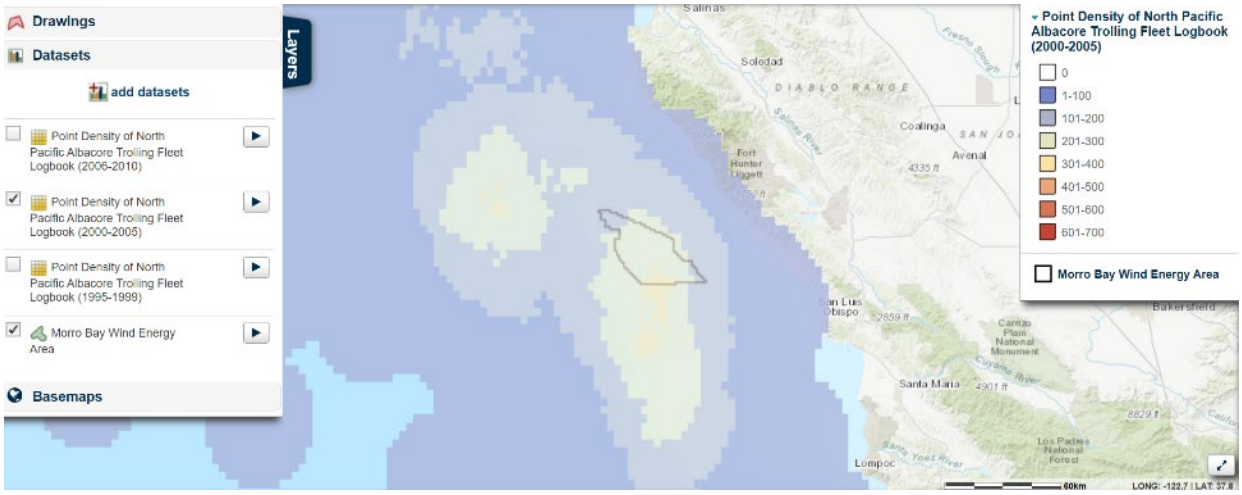
Source: NOAA fisheries/CDFW via CBI OSW Databasin

Exhibit 3-10. Point Density of North Pacific Albacore Trolling Fleet

1995-1999

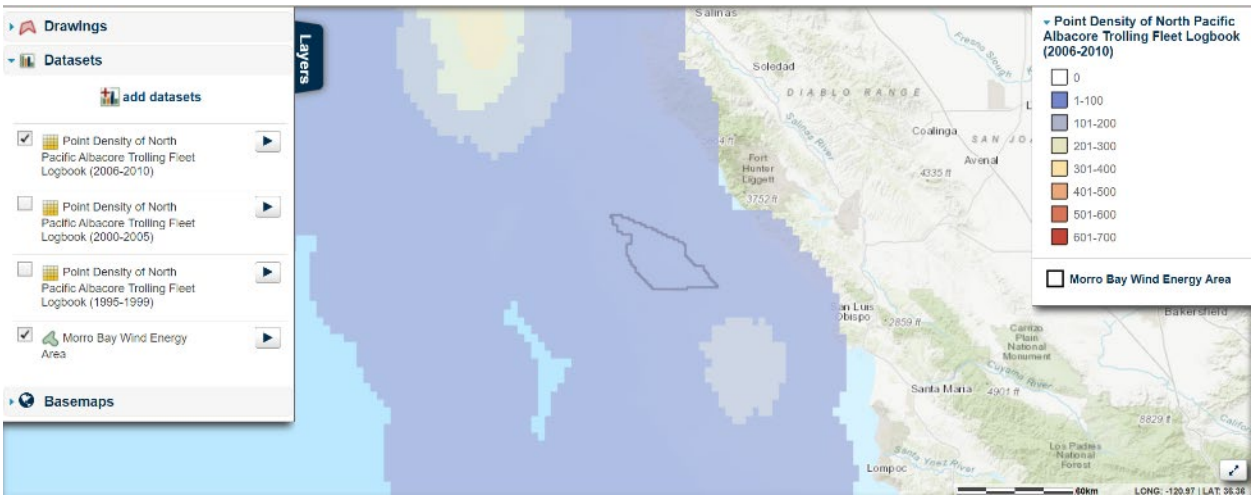


2000-2005

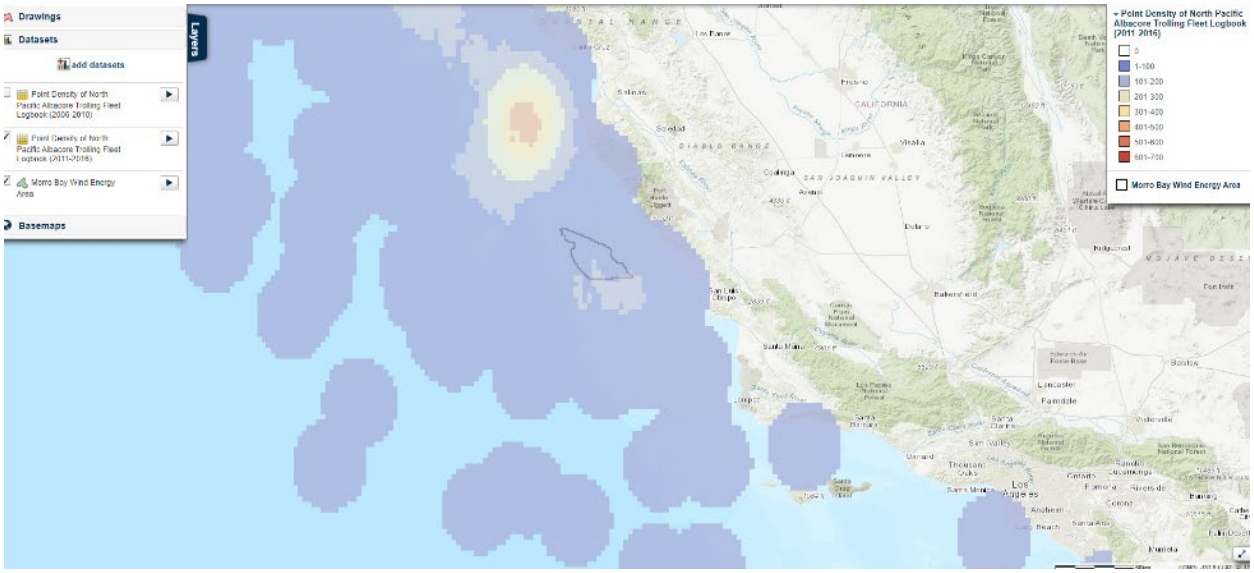


CD-0004-22 (BOEM) Exhibits

2006-2010

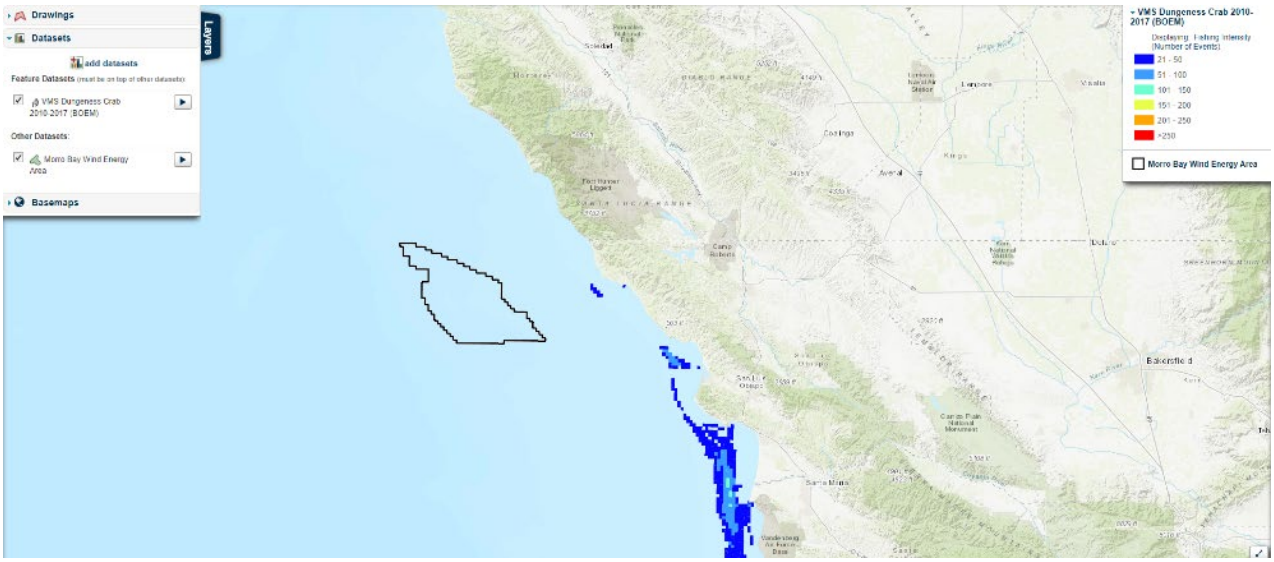


2011-2016



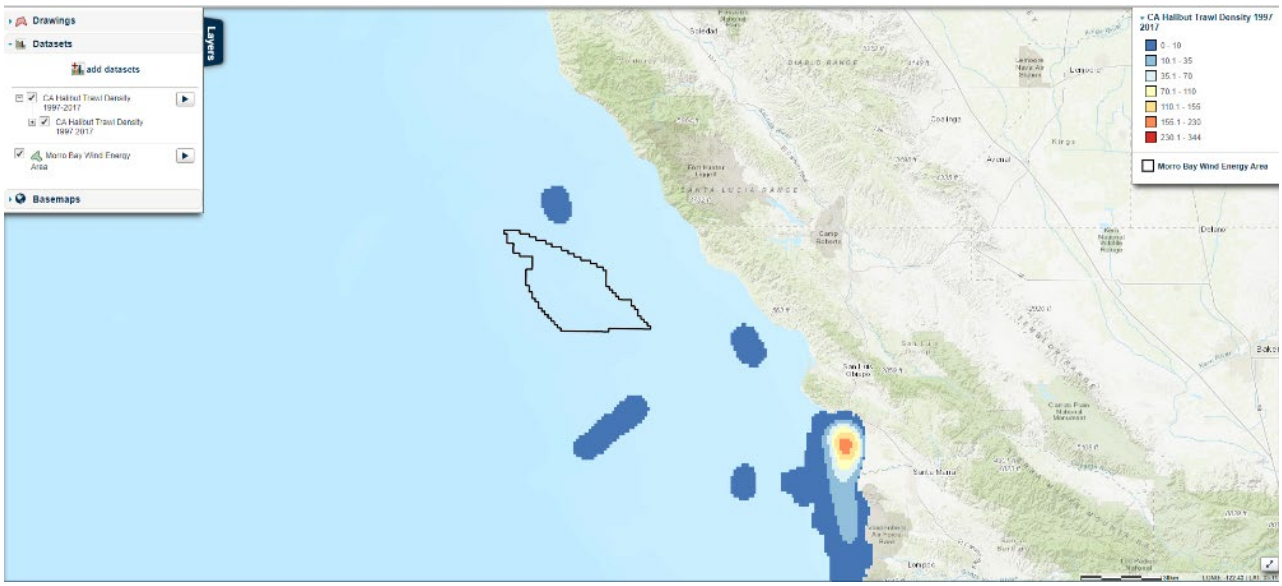
Source: CDFW via OSW Databasin

Exhibit 3-11. VMS Dungeness Crab Fishing Intensity 2010-2017



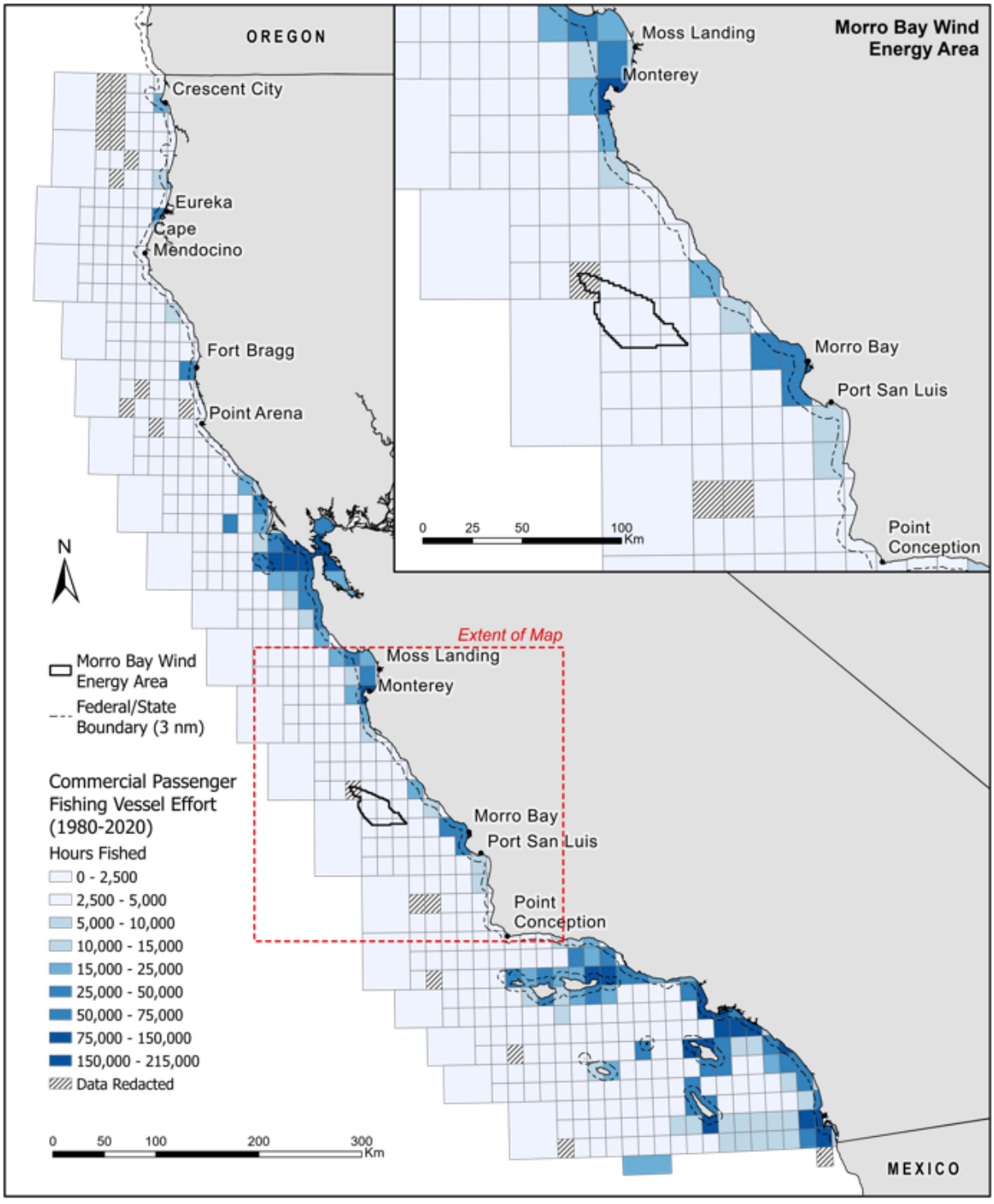
Source: BOEM, Frank Pendleton. Displayed via OSW Databasin

Exhibit 3-12. CA Halibut Trawl Density (1997-2017)



Source: CDFW via OSW Databasin.

Exhibit 3-13. CPFV Recreational Fishing Effort 1980-2020 by Block



Source: CDFW

Exhibit 3-14. Essential Fish Habitat Map, Central Coast, Groundfish FMP

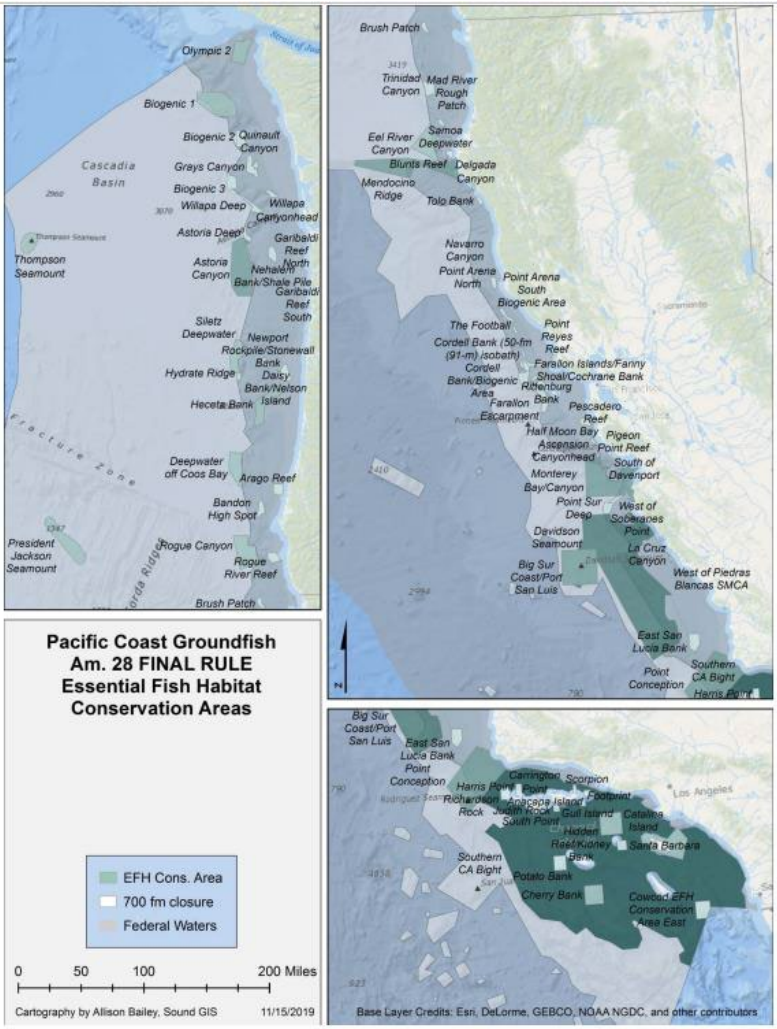
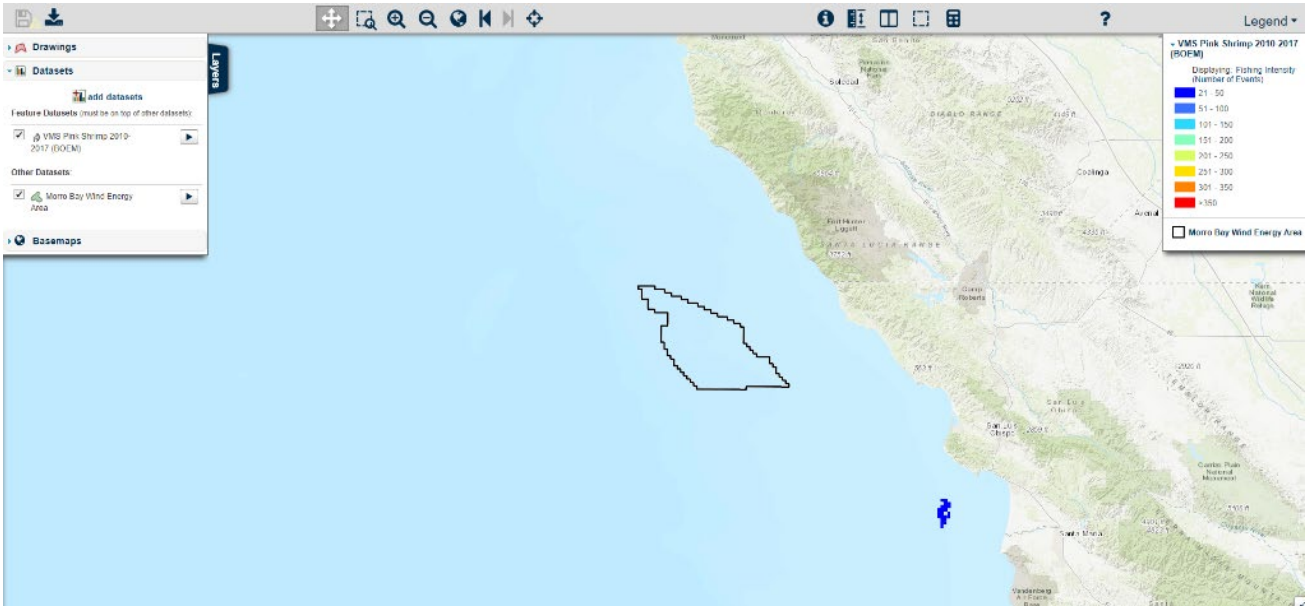


Figure 1. Areas with gear restrictions and Essential Fish Habitat Conservation Areas (EFHCAs) closed to certain types of fishing off the U.S. West Coast under the Pacific Coast Groundfish Fishery Management Plan, as amended through Amendment 28 (2020). Shades of green for EFHCAs (listed in Tables 2 through 6 below) vary by the size of the closure, with larger area closures appearing darker.

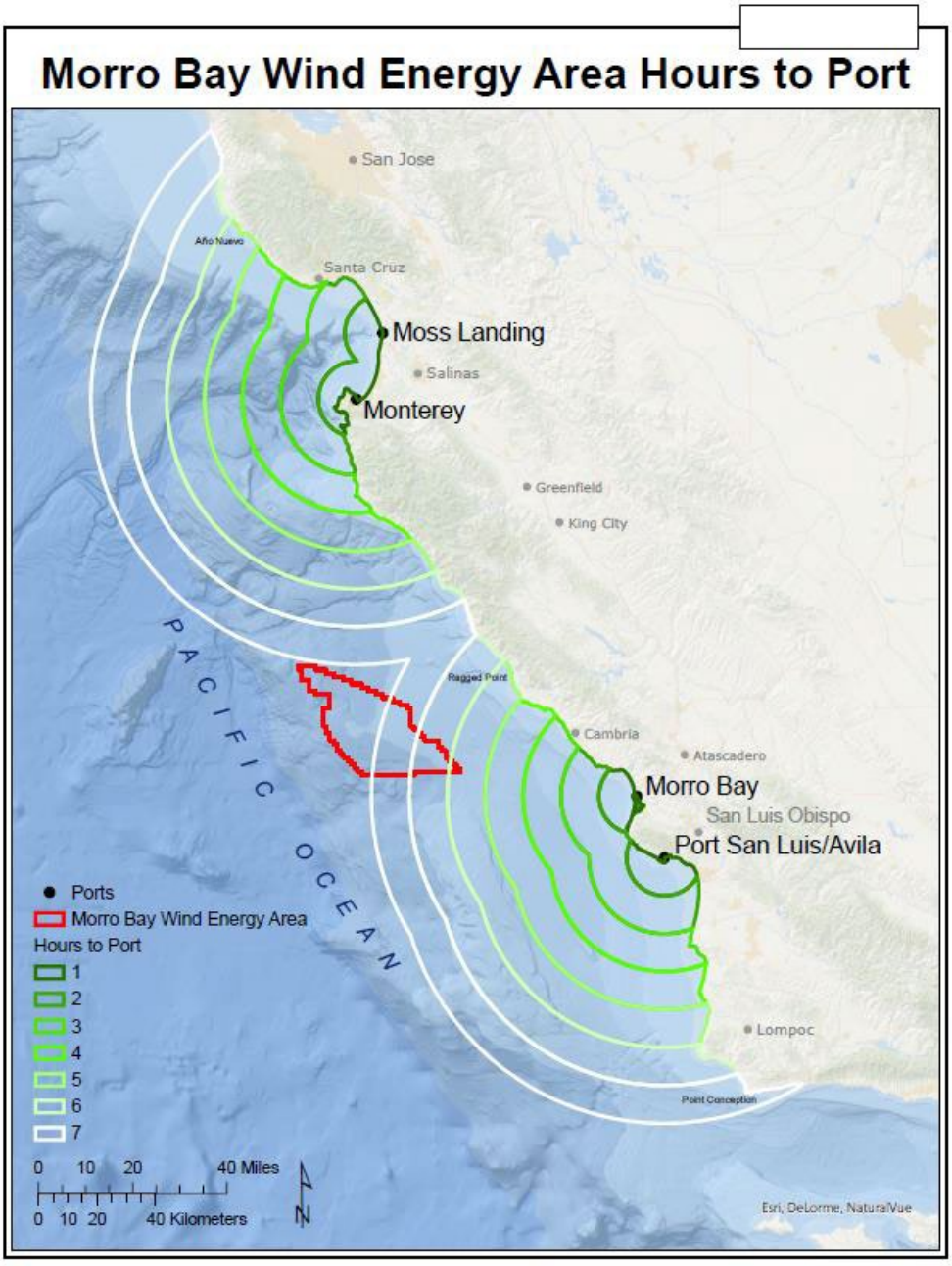
Source: Pacific Fishery Management Council

Exhibit 3-15. VMS Pink Shrimp Fishing Intensity 2010-2017



Source: BOEM, Frank Pendleton. Displayed via OSW Databasin

Exhibit 3-16. Morro Bay Hours to port, inspired by North Coast Fishermen's Mapping Project

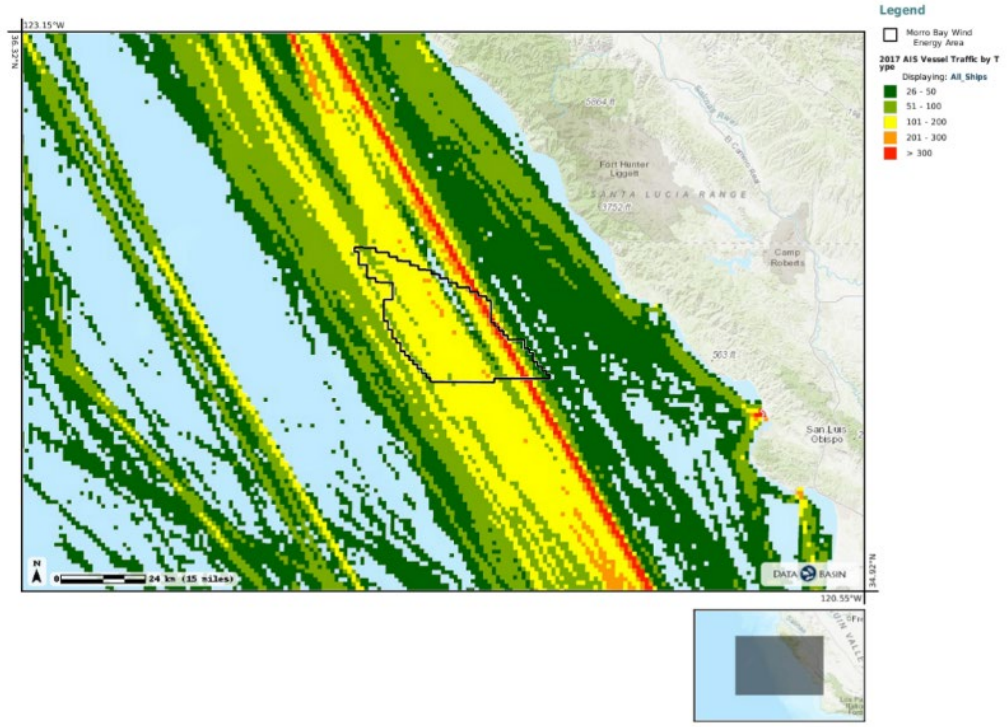


Created by CA Coastal Commission Mapping Unit (credit: Alanna Casey).

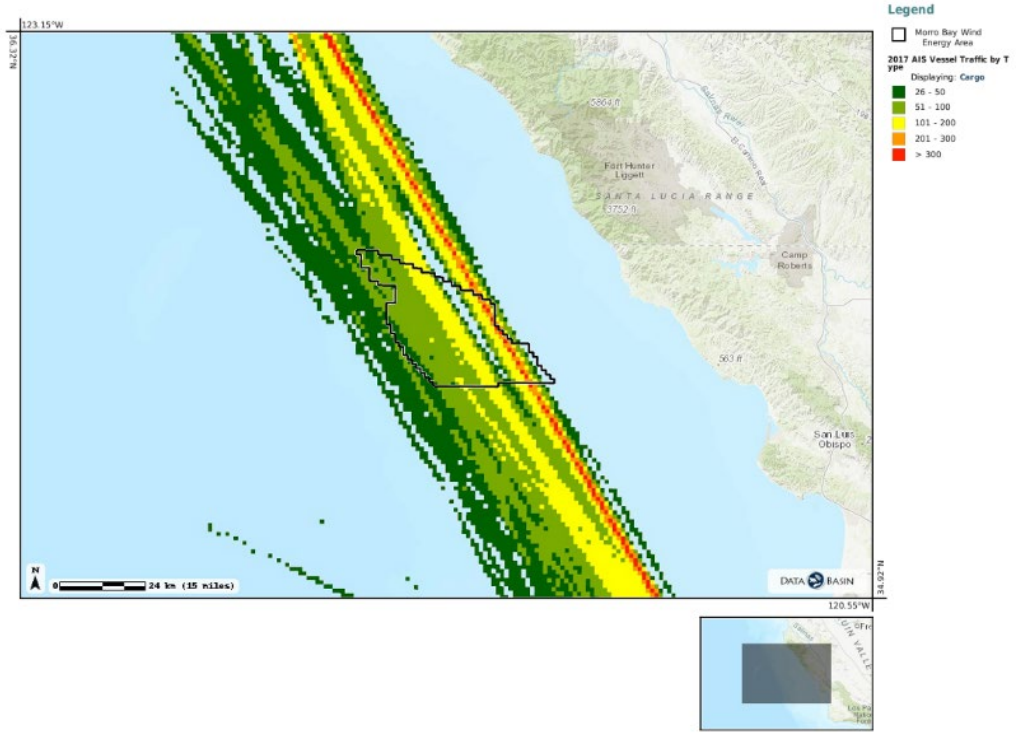
Coastal Hazards Exhibits

Exhibit 4-1. AIS Shipping Vessel Traffic 2017

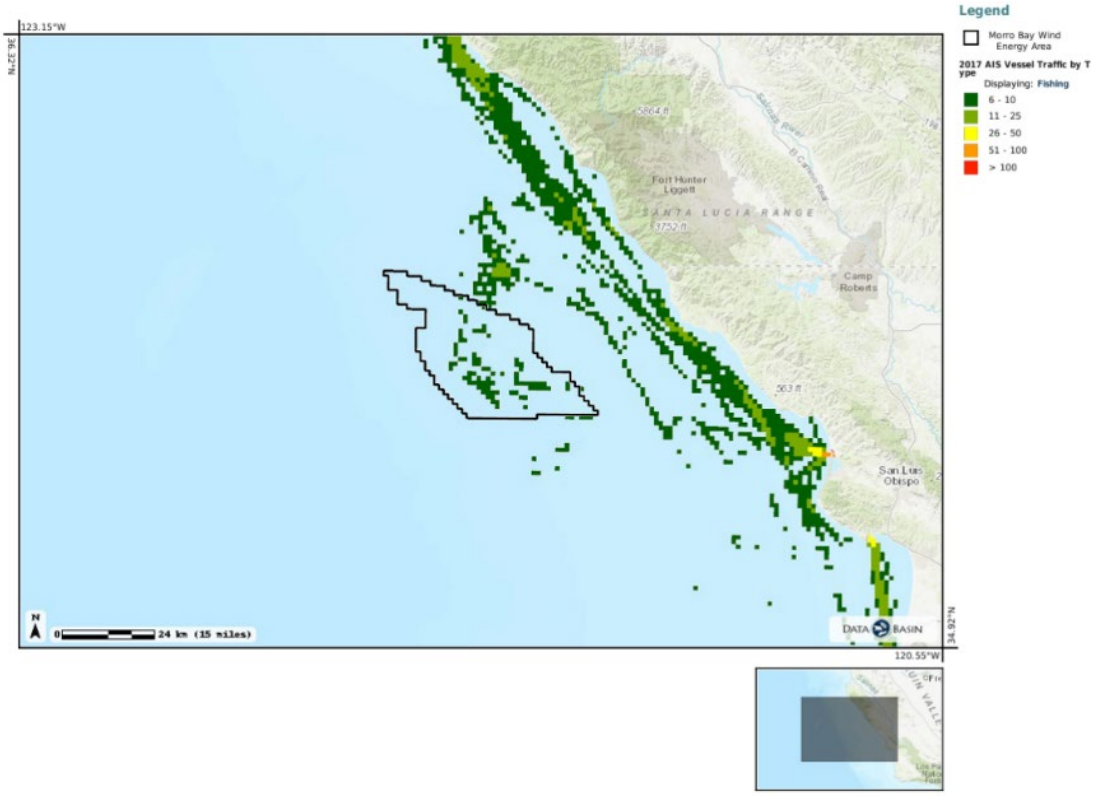
All Vessels



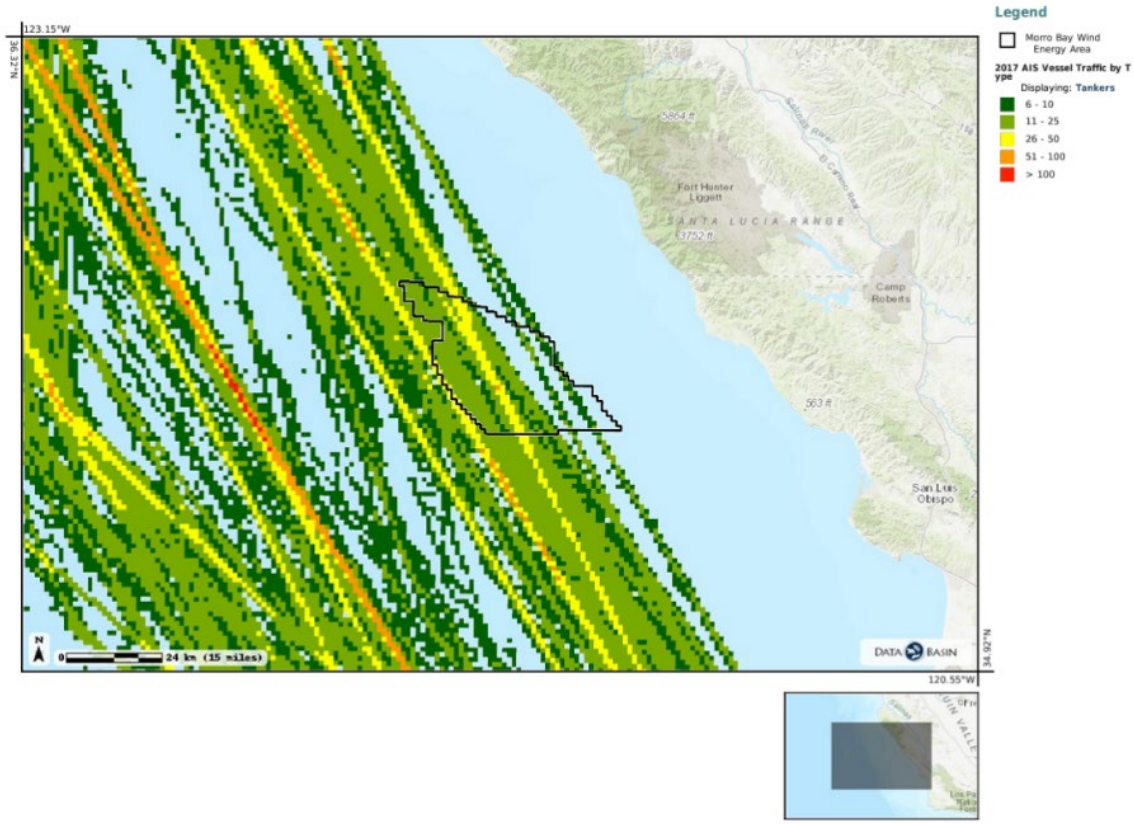
Cargo Vessels



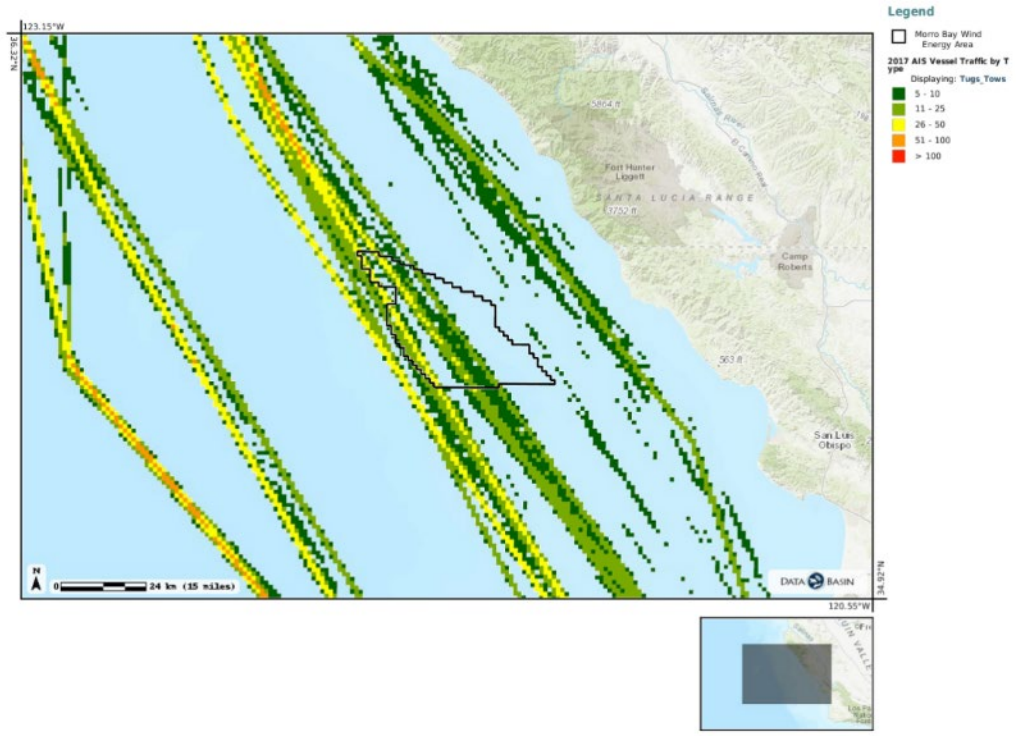
Fishing Traffic



Tankers

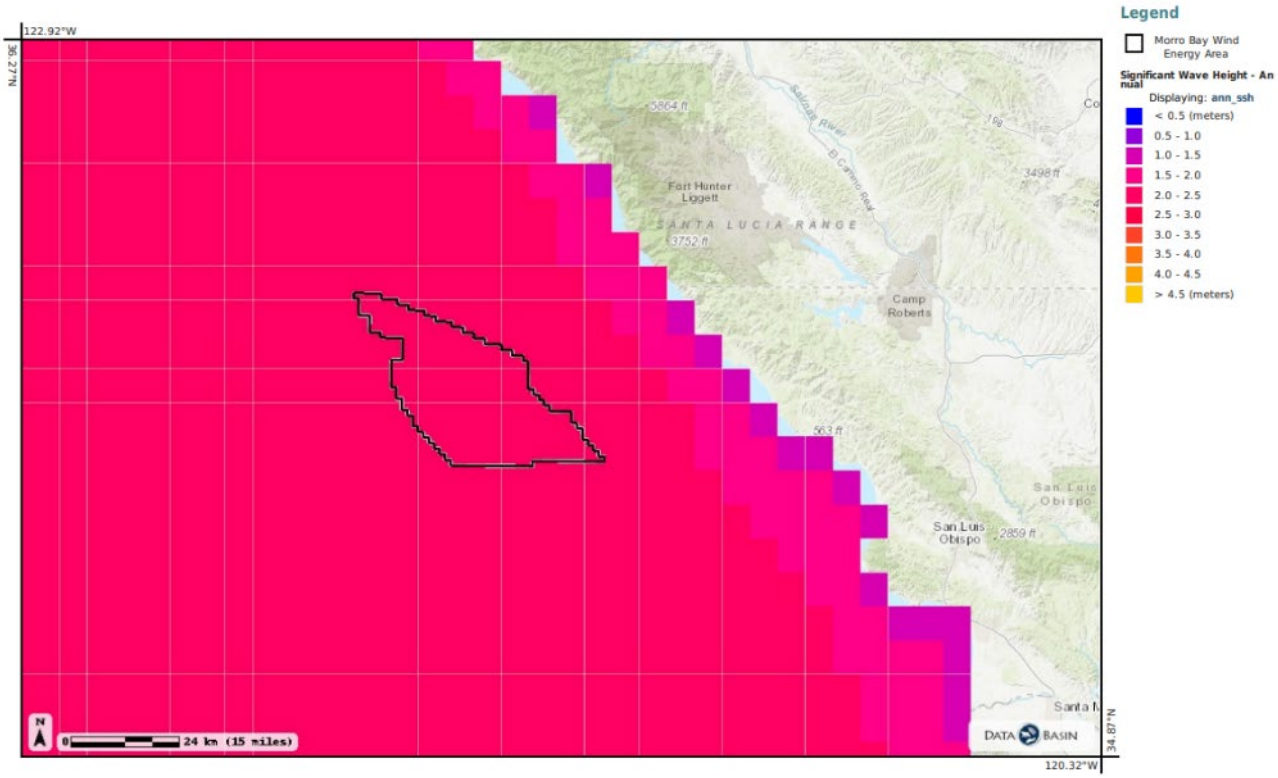


Tugs/Tows



Source: BOEM via the California Offshore Wind Energy Gateway

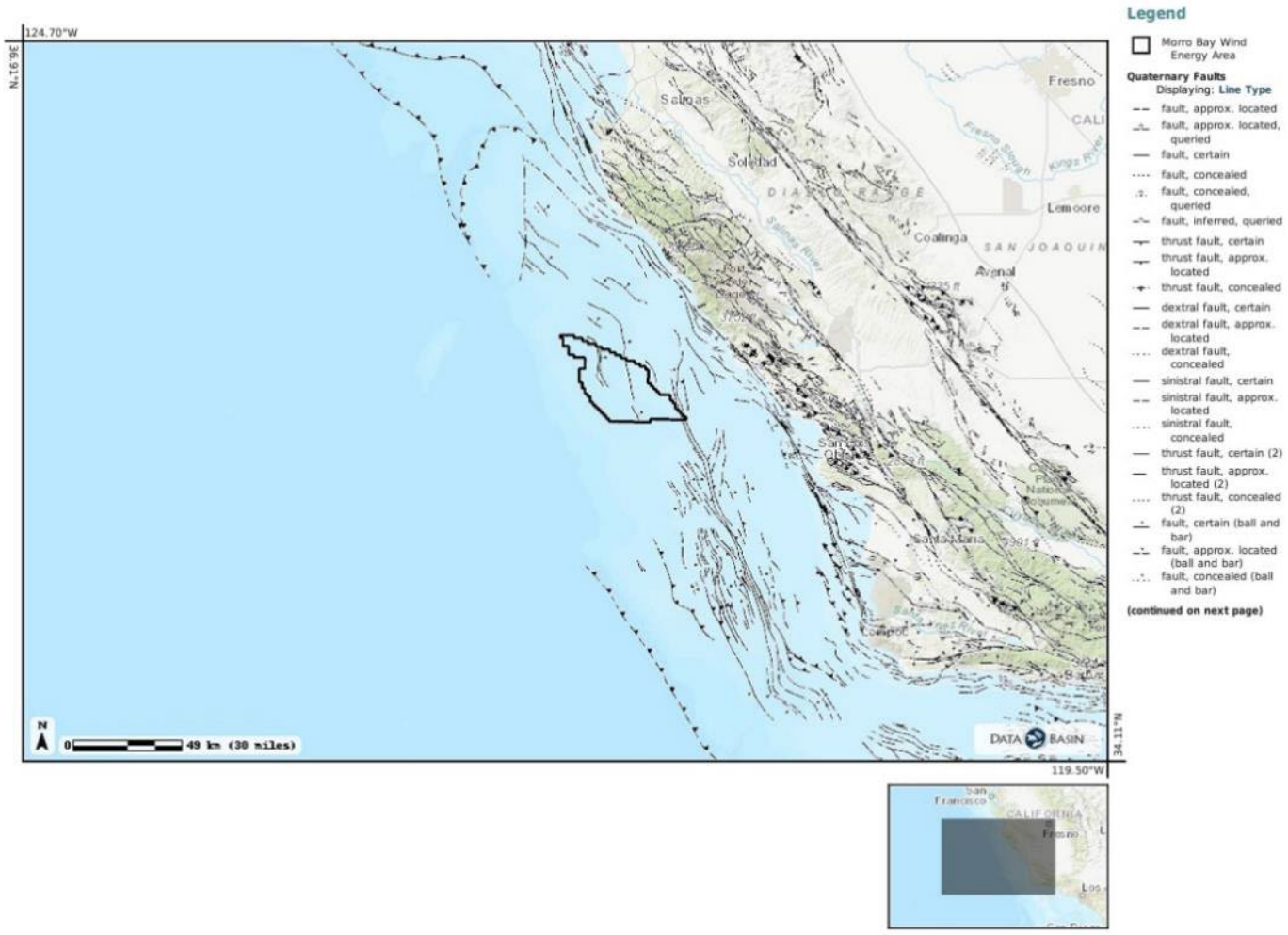
Exhibit 4-2. Significant Wave Height



This map provides wave height in meters, the Morro Bay WEA has a significant wave height of 2.0-2.5 meters or 6.5 to 8.2 feet.

Source: NREL/Virginia Tech via Databasin

Exhibit 4-3. Geologic Faults Within WEA

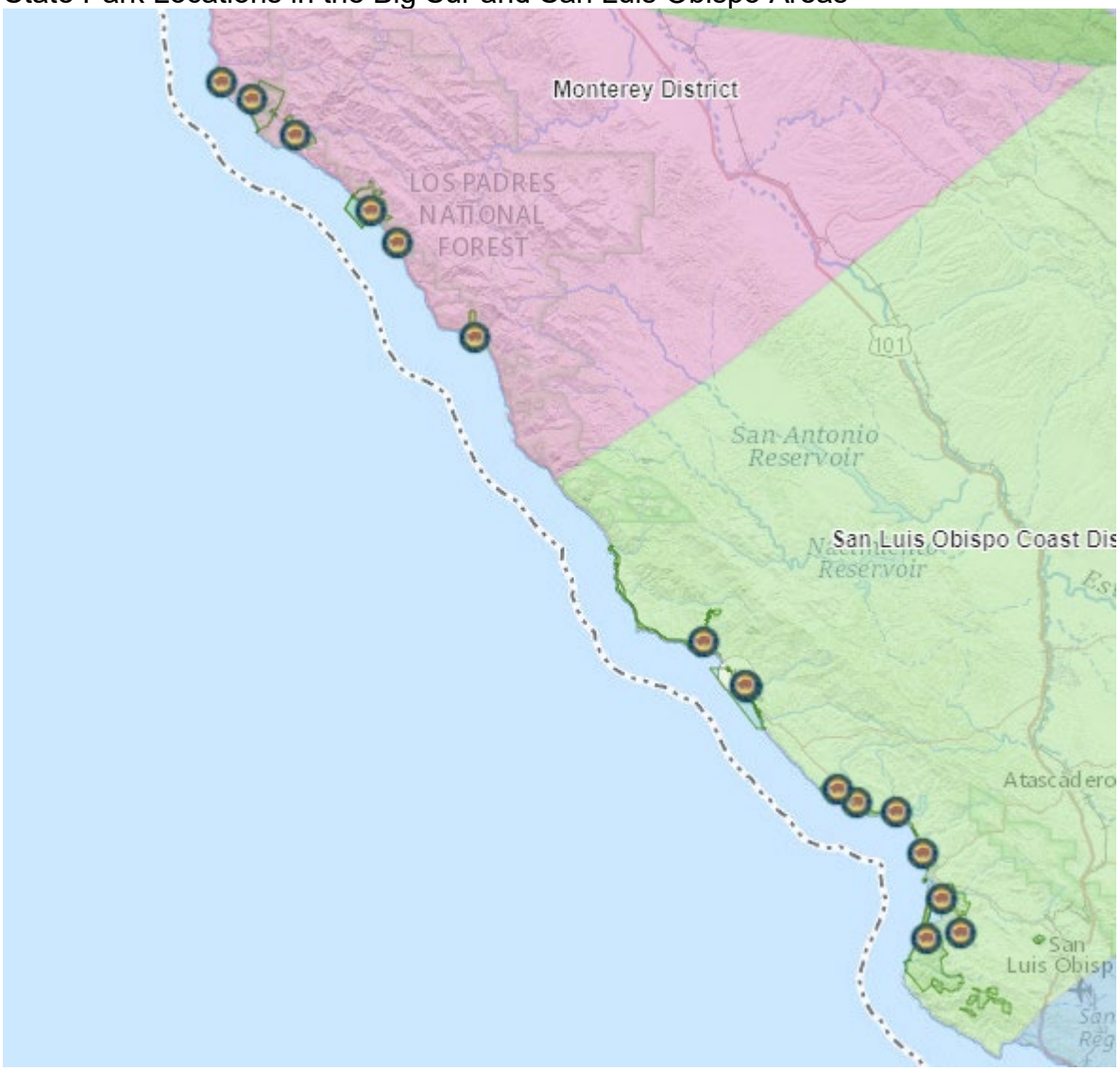


Source: Department of Conservation via the California Offshore Wind Energy Gateway

Scenic and Visual Resources Exhibits

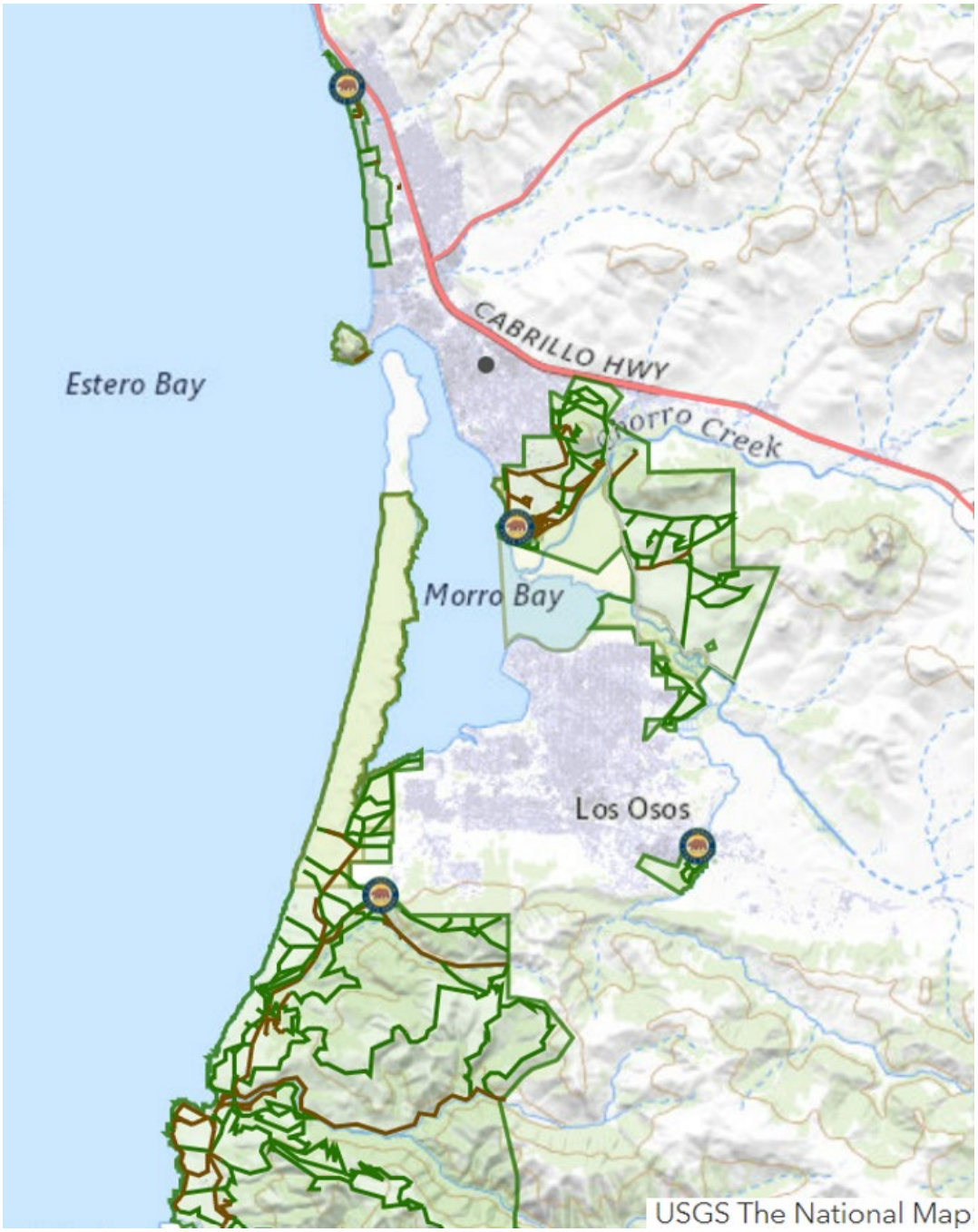
Exhibit 5-1. Map of State Parks near the WEA

State Park Locations in the Big Sur and San Luis Obispo Areas



Source: California Department of Parks and Recreation
https://csparks.maps.arcgis.com/apps/webappviewer/index.html?id=f96a883ff4154455b23bdc119f4574a9

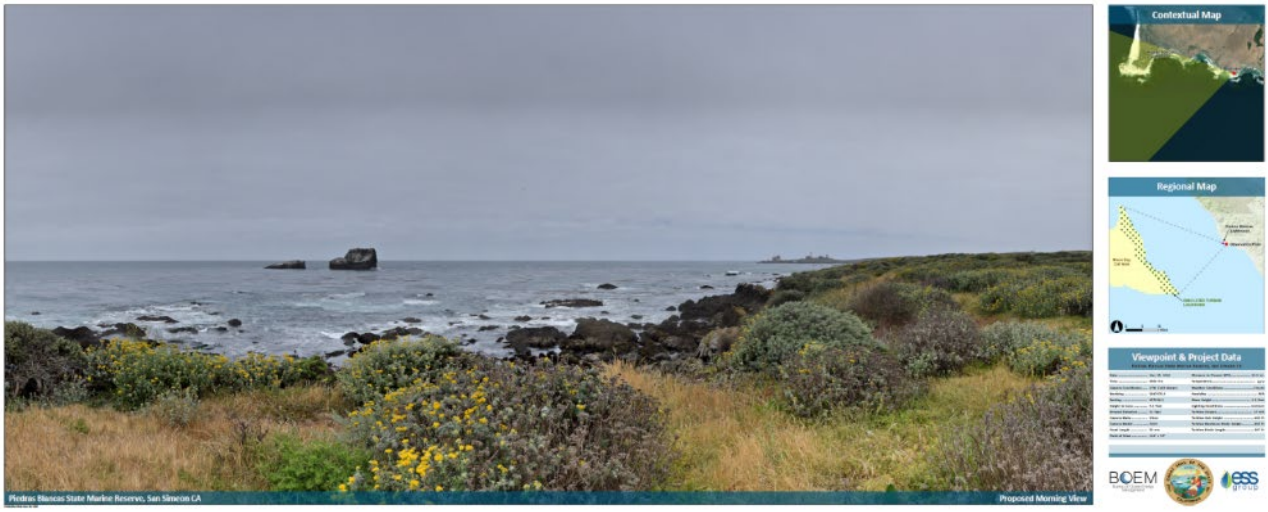
State Park Locations Near Morro Bay



Source: USGS National Map

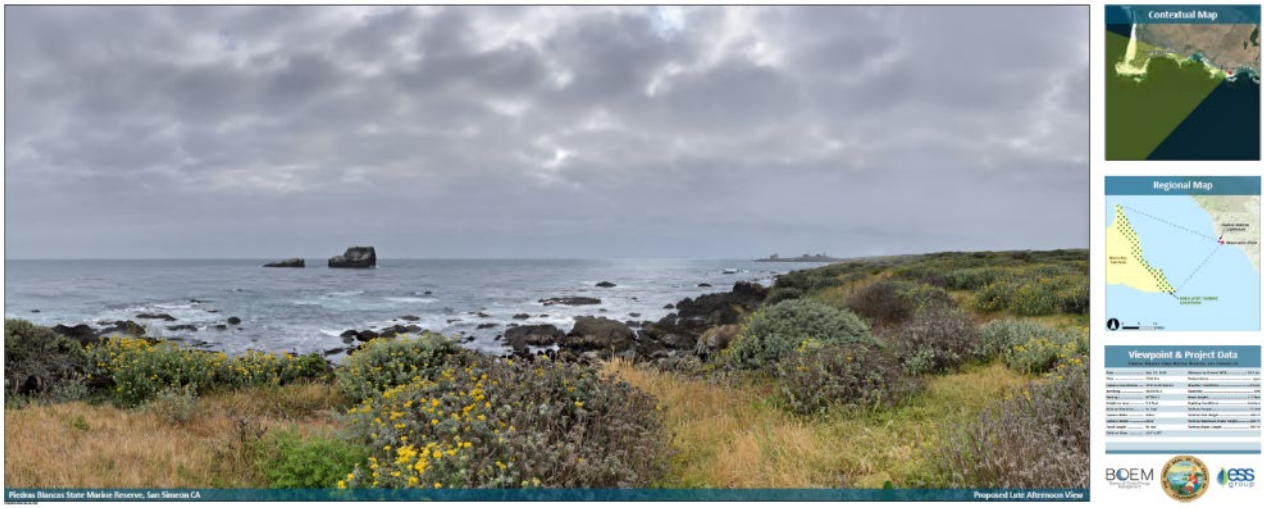
Exhibit 5-2. Visual Simulations

Proposed Morning View

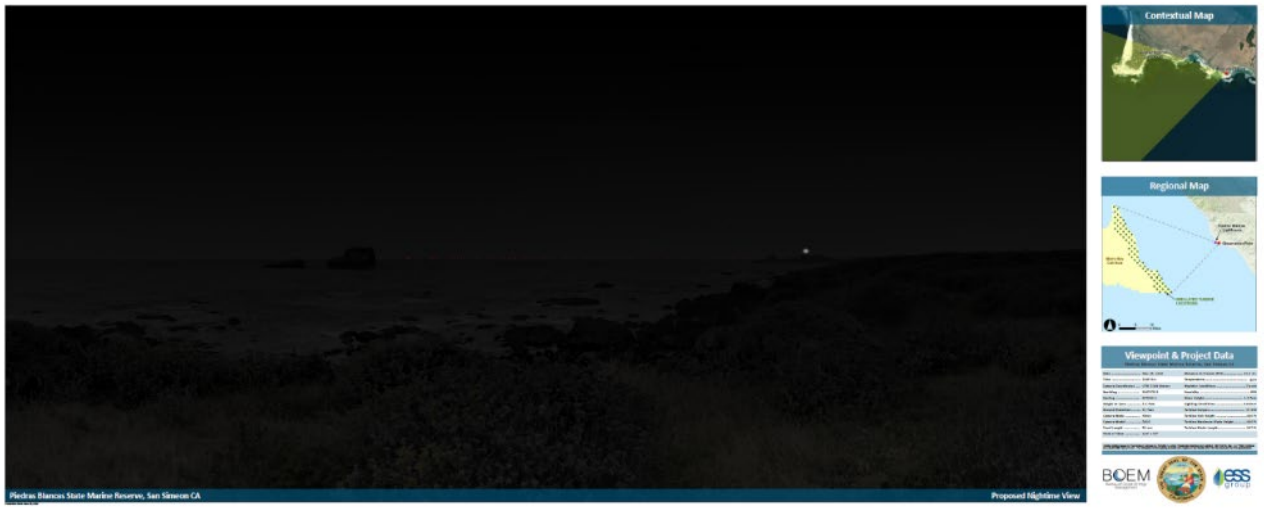


Proposed Midday View

Proposed Late Afternoon View



Proposed Nighttime View



Source: BOEM, ESS Group, and State of California

Tribal and Cultural Resources Exhibits

Exhibit 6-1. Map of Predicted locations for possible submerged cultural resources

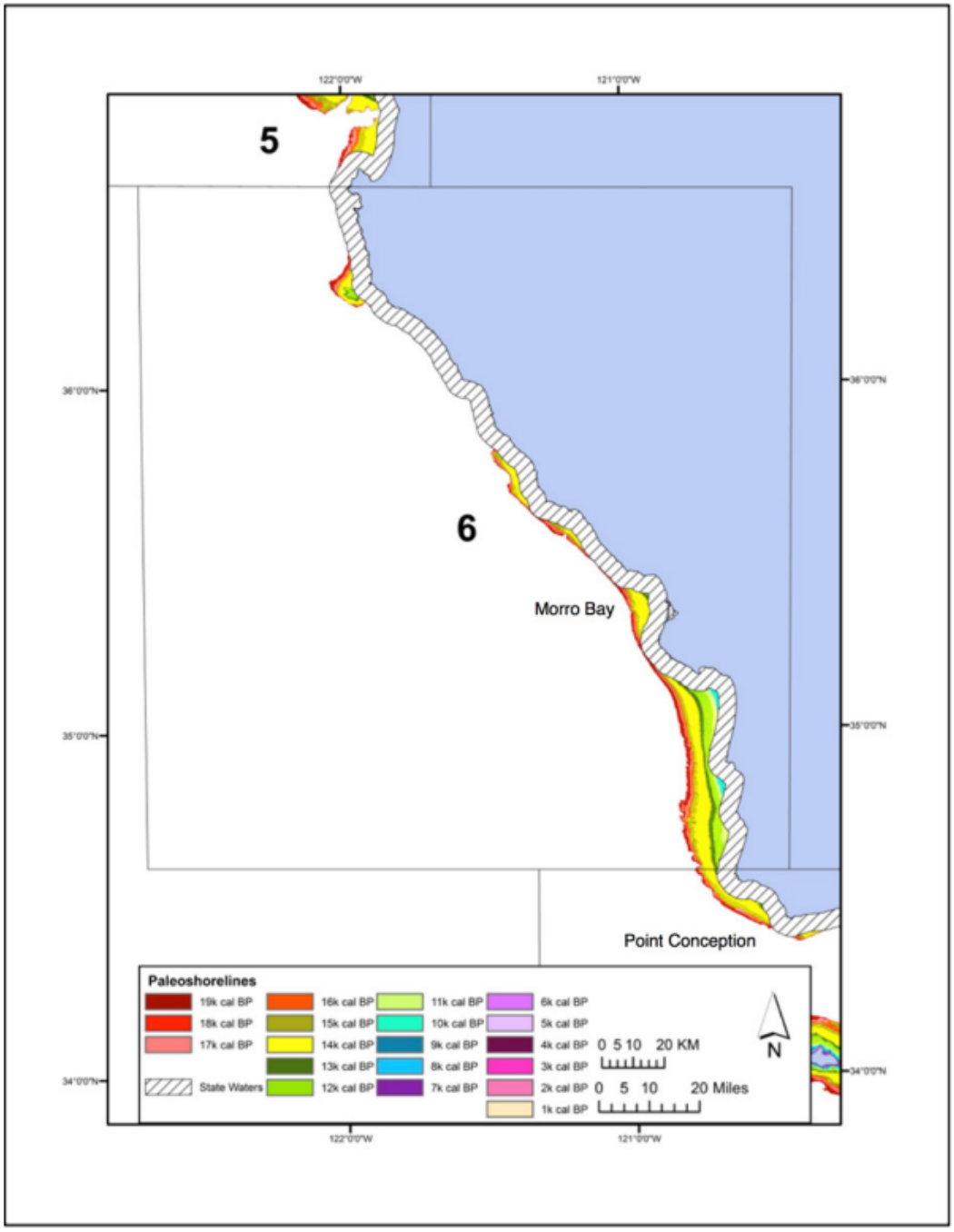


Figure 16. Inset map of Subdivision 6 showing shoreline contours present on exposed POCS coastal landscape during LGM time.

Source: ICF International 2013

Environmental Justice Exhibits

Exhibit 7-1. CES 4.0 Population Characteristics near WEA

Coastal Zone Boundary

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

N

Population Characteristics* from CES 4.0

- 0 – 10
- > 10 – 20
- > 20 – 30
- > 30 – 40
- > 40 – 50

*Population Characteristics from CES 4.0 is made up of indicators from the Sensitive Populations and Socioeconomic Factors including: rates of asthma, Cardiovascular disease, Low -birth weight, education, housing burden, linguistic isolation, poverty, and unemployment.

Exhibit 7-2. CalEnviroScreen 4.0 near WEA

Coastal Zone Boundary

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

N

CalEnviroScreen 4.0 Overall Percentile

- >70 - 80
- >60 - 70
- >50 - 60
- >40 - 50
- >30 - 40
- >20 - 30
- >10 - 20
- 0 - 10 (Lowest Scores)

The CalEnviroScreen 4.0 tool shows cumulative impacts from Population Characteristics and Pollution Burdens in California communities by census tract and ranks them.

Exhibit 7-3. AB 1550 Low-income Communities near WEA

Coastal Zone Boundary

AB 1550 Low Income Communities*

Yes

No

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

N

*AB 1550 Low-income are identified as households with median incomes at or below 80% the statewide median income or with median household incomes at or below the threshold designated as low-income by HCD's State Income Limits.