

## Sanctuary Ecologically Significant Area (SESA)

### SESA 16: Davidson Seamount

#### Description

SESA 16 encompasses Davidson Seamount and surrounding soft rise habitat (3,875 m deep). Davidson Seamount, one of the largest seamounts in U.S. coastal waters, is 2,280 m tall with the summit at 1,250 m below the sea surface. Hard bottom seamount habitat comprises 73% of this SESA resulting in relatively low habitat richness (4 habitats) and intermediate habitat diversity (index=3.12). ROV surveys of benthic communities on the seamount have found a wide diversity and abundance of deep sea corals and sponges. The seamount has been the focus of research and monitoring including geology, oceanographic monitoring, fish assemblage studies, and seabird and mammal surveys (both aerial and ship-based). This SESA is located within MBNMS, and research activities may require a permit

([http://montereybay.noaa.gov/resourcepro/permit/permits\\_need.html](http://montereybay.noaa.gov/resourcepro/permit/permits_need.html)).

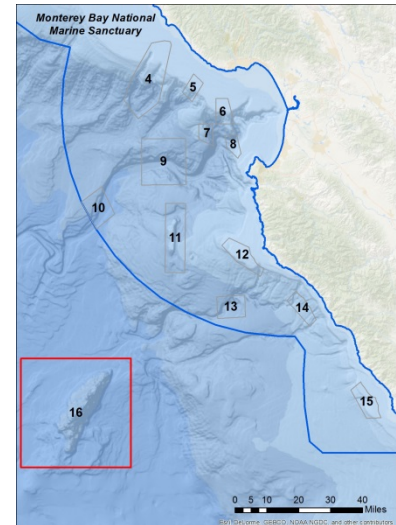


Figure 1. The location of SESA 16 and twelve additional SESAs in Monterey Bay National Marine Sanctuary. Credit: Chad King, MBNMS.

#### Resource Management Issues

SESA 16 contains Davidson Seamount, a large rocky, extinct underwater volcano that contains a number of well-studied, unique habitats and biological communities.

- Essential Fish Habitat (EFH) Conservation Area
- Recreational Fishing
- Wildlife viewing
- Leatherback sea turtle critical habitat
- Vessel traffic
- Cumulative research collection
- Marine debris/dumping
- Ocean acidification
- Sea temperature rise
- Underwater cables
- Water quality
- Bio-prospecting

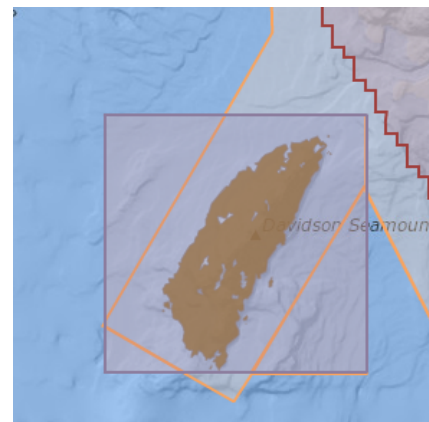


Figure 2. Close-up map of SESA 16. Grey border=SESA boundary; light orange border=EFH Conservation Area; red border=dominant commercial shipping lane. Source: SESAs Interactive Map, <http://sanctuarymonitoring.org/maps/sesa/>.

## Living Marine Resources & Uses

Table 1. Species known to occur within SESA 16: Davidson Seamount.

Invertebrates	-sponges† (Porifera) -black corals† (Antipatharia) -stony corals† (Scleractinia) -soft corals† (Alcyonacea) -sea lilies (Crinoidea) (Burton and Lundsten 2008)  For complete list see “Davidson Seamount Taxonomic Guide”, Burton and Lundsten 2008
Fishes	For complete list see “Davidson Seamount Taxonomic Guide”, Burton and Lundsten 2008
Marine birds	-Laysan Albatross ( <i>Phoebastria immutabilis</i> ), Black-footed Albatross <sup>2</sup> ( <i>P. nigripes</i> ) -Northern Fulmar ( <i>Fulmarus glacialis</i> ) -Cook’s Petrel ( <i>Pterodroma cookii</i> ), Stejneger’s Petrel ( <i>P. longirostris</i> ) -Pink-footed Shearwater ( <i>Puffinus creatopus</i> ), Sooty Shearwater ( <i>P. griseus</i> ) -Leach’s Storm-Petrel ( <i>Oceanodroma leucorhoa</i> ) -Black-bellied Plover ( <i>Pulvialis squatarola</i> ) -Least Sandpiper ( <i>Calidris minutilla</i> ) -Short-billed Dowitcher ( <i>Limnodromus griseus</i> ) -Red Phalarope ( <i>Phalaropus fulicarius</i> ), Red-necked Phalarope ( <i>P. lobatus</i> ) -Long-tailed Jaeger ( <i>Stercorarius longicaudus</i> ), Pomarine Jaeger ( <i>S. pomarinus</i> ), <i>Parasitic Jaeger</i> ( <i>S. parastiticus</i> ) -California Gull ( <i>Larus californicus</i> ), Western Gull ( <i>L. occidentalis</i> ) -Arctic Tern ( <i>Sterna paradisaea</i> ) -Cassin’s Auklet <sup>2</sup> ( <i>Ptychoramphus aleuticus</i> ) -Xantus’ Murrelet ( <i>Synthliboramphus scrippsi</i> ) (Ainley et al. 2012; Benson 2002; Newton and DeVogelaere 2013)
Marine mammals	-fin whale <sup>1</sup> ( <i>Balaenoptera physalus</i> ) -humpback whale <sup>1</sup> ( <i>Megaptera novaeangliae</i> ) -sperm whale ( <i>Physter macrocephalus</i> ) -killer whale ( <i>Orcinus orca</i> ) -Pacific white-sided dolphin ( <i>Lagenorhynchus obliquidens</i> ) -Risso’s dolphin ( <i>Grampus griseus</i> ) -Northern right-whale dolphin ( <i>Lissodelphis borealis</i> ) -Dall’s porpoise ( <i>Phocoenoides dalli</i> ) -California sea lion ( <i>Zalophus californianus</i> ) -Northern fur seal ( <i>Callorhinus ursinus</i> ) -Northern elephant seal ( <i>Mirounga angustirostris</i> ) (Benson 2002; Forney 2002; Newton and DeVogelaere 2013)
Marine reptiles	Not sampled

Special Status Species: Endangered<sup>1</sup>, Birds of Conservation Concern<sup>2</sup>,  
Biogenic habitat†

### Diverse or productive communities:

- low primary productivity
- low krill production
- marine bird and mammal high diversity

Migration, breeding, or foraging areas: Not sampled

## Research

### SIMoN projects:

Davidson Seamount: 2002 Expedition (2002)

<http://sanctuarysimon.org/projects/100114/davidson-seamount%3a-2002-expedition>

Davidson Seamount: 2006 Expedition to Ancient Coral Gardens (2006)

<http://sanctuarysimon.org/projects/100307/davidson-seamount%3a-2006-expedition-to-ancient-coral-gardens>

Davidson Seamount: 2010 Marine Mammal & Seabird Survey (2010)

<http://sanctuarysimon.org/projects/100397/davidson-seamount%3a-2010-marine-mammal-%26-seabird-survey>

Davidson Seamount: Ecological Characterization & Habitat Modeling of the Fauna (2008-09)

<http://sanctuarysimon.org/projects/100340/davidson-seamount%3a-ecological-characterization-%26-habitat-modeling-of-the-fauna>

Davidson Seamount: 2010 Marine Mammal Aerial Surveys (2010)

<http://sanctuarymonitoring.org/projects/100381/davidson-seamount%3a-2010-marine-mammal-aerial-surveys->

Davidson Seamount 2015: Characterization of Mammals, Birds, and Midwater Fishes Above and Adjacent to Davidson Seamount (2015)

<http://sanctuarymonitoring.org/projects/100421/davidson-seamount-2015%3a-characterization-of-mammals%2c-birds%2c-and-midwater-fishes-above-and-adjacent-to-davidson-seamount>

### Monitoring stations and/or data collection instruments:

- MBARI/MBNMS transects and individually marked corals

### MBNMS research:

- Seamount exploration and characterization (R/V Western Flyer, 2002 & 2006)
- CTD profile (NOAA Ship Shimada, 2015)
- Mid-water fish trawls (NOAA Ship Shimada, 2015)

## Science Needs & Research Questions

### Ecological Characterization of Davidson Seamount

[http://sanctuaries.noaa.gov/science/assessment/pdfs/mbnms\\_boundary\\_expansion.pdf](http://sanctuaries.noaa.gov/science/assessment/pdfs/mbnms_boundary_expansion.pdf)

- Are there temporal changes in the biologic community living on or near the Davidson Seamount?
- Are there ecological links between the seamount and other habitats of the Sanctuary (e.g., migration pathways and nutrient transport)?

### Impacts on Whales from Human Uses

[http://sanctuaries.noaa.gov/science/assessment/pdfs/mbnms\\_whale\\_science.pdf](http://sanctuaries.noaa.gov/science/assessment/pdfs/mbnms_whale_science.pdf)

- What are the spatial and temporal patterns of habitat use of large whales throughout sanctuary waters (both inshore and offshore)?
- What are the environmental and prey characteristics that lead to foraging aggregations that may leave whales vulnerable to disturbance by recreational ocean users?

## Socioeconomics and the Human Dimension

[http://sanctuaries.noaa.gov/science/assessment/pdfs/mbnms\\_socioeconomics.pdf](http://sanctuaries.noaa.gov/science/assessment/pdfs/mbnms_socioeconomics.pdf)

- How do we determine the overall impact of multiple human activities (some with negative and some with positive influence) on Sanctuary resources?
- What is the geographic distribution of human activities that influence the condition of Sanctuary resources? Are there hot spots?

**SESAs Interactive Map:** <http://sanctuariesimon.org/maps/sesa>

## Publically Available Imagery

- MBARI ROV: Video Annotation and Reference System (<http://www.mbari.org/products/research-software/video-annotation-and-reference-system-vars/>)
- SIMoN Photo Library (<http://sanctuariesimon.org/photos/index.php>)



Figure 3. Precious coral (*Corallium* sp.) and basket stars (*Gorgonocephalus* sp.). Credit: NOAA/MBARI (<http://sanctuariesimon.org/photos/index.php>).



Figure 4: Black coral (*Trissopathes pseudotrística*), primnoid coral (*Narella* sp.), crinoids (*Florometra serratissima*), sea spider (Class Pycnogonida), and bryozoans (Phylum Ectoprocta) on the Davidson Seamount at 2669 meters. Credit: NOAA/MBARI (<http://sanctuariesimon.org/photos/index.php>).

## SESA Data Layers

Table 2. The 13 SESAs of the MBNMS are comprised of a variety of biological and environmental characteristics that describe unique pelagic and benthic deep sea communities. Listed are a subset of these qualities which include habitat diversity (Shannon-Wiener diversity index); hard substrate area coverage (%); the most common type of habitat; the presence and abundances of corals and sponges, demersal fishes, and marine birds; and the area coverage (%) of upwelling zone within each SESA. Sources: Draft MBNMS report in preparation; SESAs Interactive Map, <http://sanctuarymonitoring.org/maps/sesa/>.

SESA	Habitat diversity (H')	Hard substrate (%)	Primary habitat	Corals & sponges	Demersal fishes	Marine birds	Upwelling zone (%)
4	5.43	8%	Slope 2 soft canyon	yes-high	yes-high	yes-high	yes-50%
5	6.13	19%	Slope 1 Soft Canyon	yes- high	yes-med	yes-med	yes-100%
6	6.62	13%	Shelf Break soft	yes-high	yes-low	yes-med	no
7	3.52	9%	Slope 2 soft canyon	yes-med	yes-high	yes-med	no
8	5.32	33%	Slope 2 soft canyon	yes-med	yes-med	yes-high	no
9	2.34	5%	Slope 2 soft canyon	yes-high	yes-high	yes-low	no
10	3.23	1%	Rise soft canyon	yes-med	not sampled	yes-low	no
11	1.56	16%	Slope 2 soft	yes-med	yes-high	yes-low	no
12	4.17	32%	Shelf hard	yes-med	yes-high	yes-med	yes-50%
13	2.00	0%	Slope 2 soft	yes-low	not sampled	yes-low	no
14	2.41	0%	Slope 1 Soft	yes-med	yes-high	yes-med	yes-50%
15	5.31	18%	Shelf Break soft	yes-med	yes-med	yes-med	yes-25%
16	3.12	73%	Slope 2 hard	yes-high	yes-high	yes-low	no

## Selected Publications

Ainley D, Spear L, Casey J, Ford RG, Gill T, et al. 2012. Chapter 3: Biogeography of Marine Birds. A Biogeographic Assessment off North/Central California. Retrieved from Center for Coastal Monitoring and Assessment (NCCOS), National Ocean Service. Available at: <http://ccma.nos.noaa.gov/ecosystems/sanctuaries/california/html/birds/>

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Benson S. 2002. Davidson Seamount Expedition: Summary of Surface Observations. Unpublished report to the Monterey Bay National Marine Sanctuary. 2pp.

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Cairns SD. 2007. Calcaxonian Octocorals (Cnidaria: Anthozoa) from Eastern Pacific Seamounts. *Proceedings of the California Academy of Sciences* 58(25):511-541.

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