<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Area (sq km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area in IKONOS image</td>
<td>679.6</td>
</tr>
<tr>
<td>Total Habitat Area Classified</td>
<td>518.7</td>
</tr>
</tbody>
</table>

The area in square kilometers of benthic habitats found at Maro Reef is estimated to be 1,856 sq. km. It is one of the most ecologically rich locales in the Northwestern Hawaiian Islands. Approximately 1200 km WNW of Kauai, Hawaiian Islands, lies Maro Reef at longitude 170 degrees 35 minutes W and latitude 25 degrees 22 minutes N. Maro Reef is a shallow-water reef ecosystem approximately 50 km long and 30 km wide extending above the ocean surface, and then only at very low tide. Much of the reef habitat at Maro Reef is composed of a series of islets or small islands. The shallow reef areas consist of numerous patch reefs, submerged pinnacles and elongate reticulate reef complex structures. Channels of deep water with highly irregular bottomography lie between the shallow reef structures. Due to its size, four map tiles are required to depict the 1:80,000 scale estimated bathymetry and aggregated habitat cover maps. Due to the 1928 tower, but it did not grow fast enough to disguise a human-made feature.

The Darwin Atoll was discovered in 1826 by the British explorer, Charles Darwin. The atoll is a small, shallow coral reef island located in the Pacific Ocean, approximately 700 km southwest of Midway Island. The atoll consists of a central lagoon surrounded by a series of outer reefs, which extend for several kilometers into the ocean. The lagoon is shallow and contains numerous small islands, which are composed of coral reefs. These reefs are covered with a variety of marine life, including fish, corals, and sponges. The atoll is a prime example of an atoll ecosystem, which is known for its rich diversity of marine species. The atoll is part of the Midway Atoll National Wildlife Refuge, which is managed by the United States Fish and Wildlife Service.
Index maps indicating the locations of map tiles for the 1:40,000 scale detailed habitat maps, the 1:80,000 scale aggregated cover and estimated bathymetry, and the 1:175,000 scale bank of Maro Reef, Northwestern Hawaiian Islands.

IKONOS image acquisition extent

Estimated bank area extent from Landsat

Index of 1:175,000 tiles

Index of 1:80,000 tiles

Index of 1:40,000 tiles
Figure 31. A 1:80,000 scale estimated bathymetry map of the northwest portion of Maro Reef, Northwestern Hawaiian Islands.
A 1:80,000 scale aggregated cover map of the northwest portion of Maro Reef, Northwestern Hawaiian Islands.
Tile 33. A 1:80,000 scale estimated bathymetry map of the northeast portion of the Northwestern Hawaiian Islands.
Tile A 1:80,000 scale aggregated cover map of the northeastern portion of Kaho'olawe, Northwestern Hawaiian Islands.
A 1:80,000 scale estimated bathymetry map of the southwest portion of Maro Reef, Northwestern Hawaiian Islands.
Tile 32: A 1:80,000 scale estimated bathymetry map of the southeast portion of Maro Reef, Northwestern Hawaiian Islands.
A 1:40,000 scale detailed habitat map of the northwest portion of Mano Reef, Northwestern Hawaiian Islands.
Title 40. A 1:40,000 scale detailed habitat map of the west central portion of Kure Reef, Northwestern Hawaiian Islands.
A 1:40,000 scale detailed habitat map of the north central portion of Mano Bay, Northwestern Hawaiian Islands.
Tile 42. A 1:40,000 scale detailed habitat map of the central portion of Maro Reef, Northwestern Hawaiian Islands.
A 1:40,000 scale detailed habitat map of the northeast portion of Maro Reef Northwestern Hawaiian Islands.
Title 45. A 1:40,000 scale detailed habitat map of the south central portion of Mako Reef, Northwestern Hawaiian Islands.
A 1:40,000 scale detailed habitat map of the southwest portion of Maro Reef, Northwestern Hawaiian Islands.
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The 1:40,000 scale detailed habitat map of the southeastern portion of Molokai Reef, Northwestern Hawaiian Islands.
The 48 A 1:75,000 scale bank map of the northern portion of Mako Reef, Northwestern Hawaiian Islands.
Tile 49. A 1:175,000 scale bathymetric map of the southern portion of Mako Reef, Northwestern Hawaiian Islands.
Located approximately 1300 km ESE of Midway and 900 km WNW of Kaua‘i is Gardner Pinnacles at longitude 168° 05‘ W and latitude 25° 02‘ N. Gardner Pinnacles is composed of two volcanic islets. These islets are the remnant emergent portions of a large, 14 million-year-old shield volcano that has been eroded to produce an extensive shelf over 207 sq. km in size. The larger pinnacle is 55 m high and about 180 m in diameter. The smaller pinnacle is located about 100 m NW of the larger pinnacle.

Gardner Pinnacles lie near the NE side of the extensive shelf, which is about 90 km long and from 10 km wide at the south end to 35 km wide at the north end. The sheer basalt walls of the pinnacles extend down to about 12 m below the water surface. From the base of the walls, the shelf lies in water between 18 m and 45 m deep. The shelf is very flat and almost featureless for great distances.

Due to the depth of water surrounding Gardner Pinnacles, very little characterization of the benthic habitats of Gardner Pinnacles was possible. No 1:40,000 scale detailed habitat maps were generated from satellite imagery for Gardner Pinnacles. An enhancement of the water reflectance of the IKONOS satellite image depicting bright sand and dark hardbottom areas (1:40,000 scale) is provided. Two 1:200,000 scale map tiles are included to depict the extensive shallow-water bank area around Gardner Pinnacles.
IKONOS image acquisition extent

Estimated bank area extent from Landsat

Tile 50

Tile 51

Index map indicating the locations of map tiles for the 1:200,000 scale bank of Gardner Pinnacles, Northwestern Hawaiian Islands.
Title 70 A 1200'000 scale bank map of the northern portion of Gardner Pinnacles Northwestern Hawaiian Islands.
Title 51: A 1:200,000 scale bathymetric map of the southern portion of Gardner Pinnacles, Northwestern Hawaiian Islands.
French Frigate Shoals is the most important breeding and nesting area for the Hawaiian green sea turtle in the entire Hawaiian archipelago. As much as 80 percent of all green sea turtles in the Hawaiian archipelago return to French Frigate Shoals to mate and breed. The numerous shoals and sand bars off the windward reef. It appears that severe North Pacific Swells suppress reef coral development in the Hawaiian Archipelago. Sand, rubble, uncolonized hard-rock supports a 727 sq.-km shallow lagoon that is from two and 10 km wide. La Perouse Pinnacle, located at the southwest corner of Kauai Island, islets dot the lagoon area of French Frigate Shoals. Waves and currents constantly change the size and shape of these sandy islets. Eastern Haw Frigate Shoals, Northw...
Index maps indicating the locations of map tiles for the 1:40,000 scale detailed habitat maps, the 1:80,000 scale aggregated cover and estimated bathymetry, and the 1:100,000 scale bank of French Frigate Shoals, Northwestern Hawaiian Islands.
The 1:80,000 scale estimated bathymetry map of the northwest portion of French Frigate Shoals, Northwestern Hawaiian Islands.
The 3:1 A 1:80,000 scale aggregated cover map of the northwest portion of French Frigate Shoals, Northwestern Hawaiian Islands.
Title 54. A 1:50,000 scale estimated bathymetry map of the northeast portion of French Frigate Shoals, Northwestern Hawaiian Islands.
A 1:80,000 scale aggregated cover map of the southwestern portion of French Frigate Shoals, Northwestern Hawaiian Islands.
Tile 58. A 1:80,000 scale estimated bathymetry map of the southeast portion of French Frigate Shoals, Northwestern Hawaiian Islands.
The 1:100,000 scale aggregate cover map of the southeast portion of French Frigate Shoals, Northwestern Hawaiian Islands.
Tile 60: A 1:40,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
A 1:40,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
The 64 A 1:40,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
The G. 1:100,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
Tile 67. A 1:40,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
Tile 68A: A 1:40,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
The 69A 1:40,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
A 1:80,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
Tile 71 A 1:80,000 scale detailed habitat map of a portion of French Frigate Shoals, Northwestern Hawaiian Islands.
The 73A 1:100,000 scale bank map of the southern portion of French Frigate Shoals, Northwestern Hawaiian Islands.
Necker Island (Moku Manamana)
Tiles 74 and 75
Tiles 76 and 77
Tiles 78
Tiles 79
Tiles 80
Tiles 81
Tiles 82
Tiles 83

Index of 1:40,000 tiles

 IKONOS image acquisition extent
 Estimated bank area extent from Landsat

Index of 1:175,000 tiles

Index of 1:80,000 tiles

Estimated bathymetry and the 1:175,000 scale bank of Necker Island, Northwestern Hawaiian Islands.

ver and 40,000 scale detailed habitat maps, the 1:80,000 scale aggregated cover and
The 74. A 1:80,000 scale estimated bathymetry map of the northern portion of Necker Island, Northwestern Hawaiian Islands.
The 1:8,000,000 scale estimated bathymetry map of the southern portion of Necker Island, Northwestern Hawaiian Islands.
A 1:80,000 scale aggregated cover map of the southern portion of Necker Island, Northwestern Hawaiian Islands.
Title 78. A 1:40,000 scale detailed habitat map of the northwest portion of Necker Island, Northwestern Hawaiian Islands.
Tile 80. A 1:40,000 scale detailed habitat map of the northeast portion of Necker Island, Northwestern Hawaiian Islands.
The 8A-1:40,000 scale detailed habitat map of the east central portion of Necker Island, Northwestern Hawaiian Islands.
A 1:40,000 scale detailed habitat map of the southeast portion of Necker Island, Northwestern Hawaiian Islands.
The B.S. A 1:75,000 scale bank map of the southern portion of Necker Island, Northwestern Hawaiian Islands.
The Nihoa Finch and the Laysan Finch are found nowhere else on earth. The island is considered to be the best example of a nearly undis turbed coastal ecosystem in the entire Hawaiian archipelago.

Dr. Conant's bird studies began in 1980 and were continued by Rosemary Grant of Princeton University. Dr. Conant's findings confirmed that these birds can adapt to changes in food type and availability. For many years, similar research was conducted on the Galapagos Islands by Peter and Sheila Conant, an ornithologist at the University of Hawaii. The research was conducted on the Galapagos Islands by Peter and Sheila Conant, an ornithologist at the University of Hawai...
A 1:80,000 scale estimated bathymetry map of Nihoa Island, Northwestern Hawaiian Islands.
A 1:80,000 scale aggregated cover map of Nihoa Island, Northwestern Hawaiian Islands.
Title 86: A 1:40,000 scale detailed habitat map of the northern portion of Nihoa Island, Northwestern Hawaiian Islands.
The 97: A 1:40,000 scale detailed habitat map of the southern portion of Nihoa Island, Northwestern Hawaiian Islands.
A 1:80,000 scale bank map of Nihoa Island, Northwestern Hawaiian Islands.
An enhancement of the Landsat satellite's blue channel was used to generate the bank map of Pioneer Bank (173.75 W and 26.0 N). Due to the depth of the water at Pioneer Bank, no characterization of the benthic habitats from satellite imagery was possible. A 1:100,000 scale map is included to depict the shallow-water bank area around Pioneer Bank.
A 1:100,000 scale map of Pioneer Bank, Northwestern Hawaiian Islands.
Raita Bank

An enhancement of the Landsat satellite's blue channel was used to generate the bank map of Raita Bank (169°30'W and 25°30'N).

Due to the depth of the water at Raita Bank, no characterization of the benthic habitats from satellite imagery was possible.

Two 1:100,000 scale map tiles are included to depict the shallow-water bank area around Raita Bank.

Estimated bank area extent from Landsat index map indicating the locations of map tiles for the 1:100,000 scale bank of Raita Bank, Northwestern Hawaiian Islands.
The 65. A 1:100,000 scale map of the southern portion of Raita Bank, Northwestern Hawaiian Islands.
Southeast Brooks Bank, West Brooks Bank, and St. Rogatien Bank

An enhancement of the Landsat satellite's blue channel was used to generate the bank map of Southeast Brooks Bank, Brooks Bank, West Brooks Bank, and St. Rogatien Bank (approximate center of line drawn through chain of banks: 167°52ʹ W and 24°40ʹ N). Due to the depth of the water at these banks, no characterization of the benthic habitats from satellite imagery was possible.

Two 1:150,000 scale map tiles are included to depict the extensive shallow-water bank area around Southeast Brooks Bank, Brooks Bank, West Brooks Bank, and St. Rogatien Bank.

Index map indicating the locations of map tiles for the 1:150,000 scale bank of Southeast Brooks Bank, Northwestern Hawaiian Islands.
An enhancement of the Landsat satellite’s blue channel was used to generate the map of the Bank West of Nihoa Island. Due to the depth of the water at these banks, no characterization of the benthic habitats from satellite imagery was possible. The estimated bank area extent from Landsat Index map for the 1:80,000 scale bank of Bank West of Nihoa Island lies at longitude 162 degrees 14 minutes W and 22 degrees 57 minutes N.