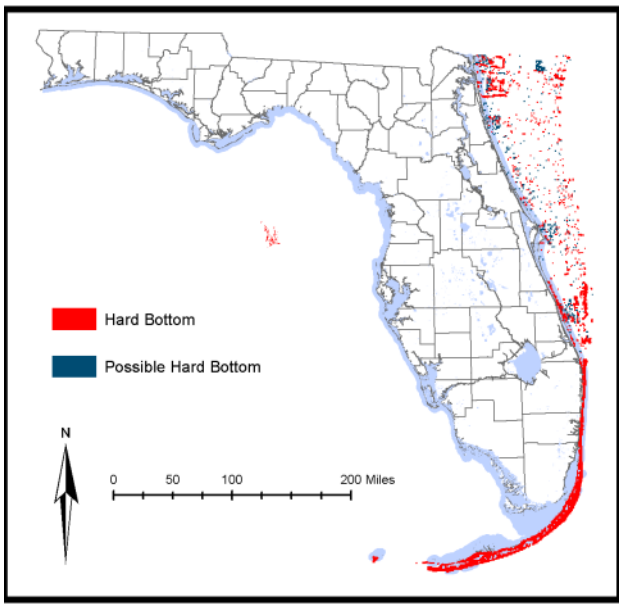
Hard Bottom



Some habitat distributions or locations may be misrepresented on this map due to size, resolution and insufficient data sources.

Status
Current condition: Poor and declining.
Due to the lack of sufficient map data for this habitat category (see Appendix C: GIS Data Tables), no acreage estimates are currently available.

Habitat Description

FNAI type: Consolidated Substrate, Octocoral Bed, Sponge Bed

Hard Bottom is characterized as mixed communities of algae, sponges, octocorals and stony corals. This habitat occurs in subtidal, intertidal, and supratidal zones throughout Florida's coastal waters. Hard Bottom is composed of attendant epibenthic biota on a rocky substrate composed of coquina, limestone, or relic coral, molluscan, and annelid reefs. Coquina is a limestone composed of broken shell debris. Limestone rock (many different strata) occurs as high- or low-relief outcrops of calcium carbonate. Relic reefs are the skeletal remains of once-living reefs such as the Vermetid Reef built by worm-like gastropod mollusks, *Petaloconchus*. These reefs are only known to be found in shallow waters seaward of the outer islands in the Ten Thousand Islands area of southwest Florida.

Hard Bottom biological communities are structured by depth and latitude and inhabited by sessile, planktonic, epifaunal, and pelagic plants and animals; infaunal organisms are present in interstitial soft bottom substrate. In the region south of Stuart on the east coast and Bay Port on the west coast, subtidal hard bottom communities are characteristically inhabited by soft corals (octocorals) and sponges. Octocoral Beds have dense concentrations of sea fans, sea plumes, and sea feathers. Mobile species found in octocoral beds include flamingo tongue shell, purple shrimp, and basket starfish. Sponge beds include the branching, vase, tube, Florida loggerhead, and

sheepswool sponges. Other mobile fauna found in both the octocoral beds and the sponge beds include amphipods, isopods, burrowing shrimp, crabs, sand dollars, and many species of fish. Although the coral species found in Hard Bottom habitat are not reef-building, they do contribute to the three-dimensional nature of the areas by increasing the surface area for sessile organisms and by providing important refuges for a variety of fish and invertebrates.

Associated Species of Greatest Conservation Need

Mammals

- *Trichechus manatus latirostris* West Indian Manatee
- *Eubalaena glacialis (*incl. *australis)* North Atlantic Right Whale

Birds

- *Aythya affinis* Lesser Scaup
- *Gavia immer* Common Loon
- *Podiceps auritus* Horned Grebe

Reptiles

- *Caretta caretta* Loggerhead Sea Turtle
- *Chelonia mydas* Green Sea Turtle
- *Eretmochelys imbricata* Hawksbill Sea Turtle
- *Lepidochelys kempii* Kemp's Ridley Sea Turtle
- *Malaclemys terrapin* Diamond-backed Terrapin

Fish

- *Acipenser oxyrinchus desotoi* Gulf of Mexico Sturgeon
- *Acipenser oxyrinchus oxyrinchus* Atlantic Sturgeon
- *Alosa aestivalis* Blueback Herring
- *Alosa alabamae* Alabama Shad
- *Aetobatus narinari* Spotted Eagle Ray
- *Alopias superciliosus* Bigeye Thresher Shark
- *Carcharhinus falciformis* Silky Shark
- *Carcharhinus obscurus* Dusky Shark
- *Carcharhinus perezi* Reef Shark
- *Carcharhinus plumbeus* Sandbar Shark
- *Carcharias taurus* Sand Tiger Shark
- *Carcharodon carcharias* White Shark
- *Cetorhinus maximus* Basking Shark
- *Manta birostris* Giant Manta Ray
- *Negaprion brevirostris* Lemon Shark
- *Sphyrna lewini* Scalloped Hammerhead
- *Sphyrna mokarran* Great Hammerhead
- *Sphyrna zygaena* Smooth Hammerhead
- *Squalus acanthias* Cape Shark, Piked Dogfish, Spurdog
- *Atractosteus spatula* Alligator Gar
- *Epinephelus drummondhayi* Speckled Hind
- *Epinephelus itajara* Goliath Grouper
- *Epinephelus nigritus* Warsaw Grouper
- *Epinephelus niveatus* Snowy Grouper
- *Epinephelus striatus* Nassau Grouper
- *Lutjanus mahogoni* Mahogany Snapper

Invertebrates

- *Gorgonia flabellum* Venus Sea Fan
- *Gorgonia ventalina* Purple Sea Fan
- *Bartholomea annulata* Ringed (Curlique Or Corkscrew) Anemone
- *Condylactis gigantea* Giant Caribbean Anemone
- *Epicystis crucifer* Beaded (Rock) Anemone
- *Stichodactyla helianthus* Sun (Carpet) Anemone
- *Acropora cervicornis* Staghorn Coral
- *Acropora palmata* Elkhorn Coral
- *Acropora prolifera* Fused Staghorn Coral
- *Agaricia agaricites* Lettuce Coral
- *Eusmilia fastigiata* Flower Coral
- *Diploria clivosa* Knobby Brain Coral
- *Diploria labyrinthiformis* Grooved Brain Coral
- *Diploria strigosa* Symmetrical Brain Coral
- *Manicina areolata* Rose Coral
- *Montastraea annularis* Boulder Star Coral
- *Solenastrea hyades* Knobby Star Coral
- *Dendrogyra cylindrus* Pillar Coral
- *Dichocoenia stokesii* Elliptical Star Coral, Pineapple Coral
- *Isophyllastraea rigida* Rough Star Coral
- *Isophyllia sinuosa* Sinuous Cactus Coral
- *Oculina robusta* Robust Ivory Tree Coral
- *Oculina varicosa* Large Ivory Coral
- *Porites porites* Finger Coral
- *Phyllangia americana* Hidden Cup Coral
- *Siderastrea siderea* Massive Starlet Coral
- *Discosoma calgreni* Forked-tentacle Corallimorpharian
- *Discosoma neglecta* Umbrella Mushroom, Umbrella Corallimorph
- *Discosoma sanctithomae* Warty False Coral
- *Ricordea florida* Florida False Coral
- *Plumapathes pennacea* Feather Black Coral
- *Tanacetipathes barbadensis* Bottle Brush Black Coral
- *Tanacetipathes tanacetum* Bottle Brush Black Coral
- *Tanacetipathes thamnea* Black Coral
- *Millepora alcicornis* Encrusting Fire Coral
- *Pseudobiceros splendidus* Red-rim Flatworm, Splendid Flatworm
- *Calliostoma javanicum* Chocolate-lined Topsnail
- *Lithopoma americanum* American Starsnail
- *Cassis flammea* Flame Helmet
- *Cassis madagascariensis* Emperor or Queen Helmet
- *Cassis tuberosa* King Helmet
- *Cypraea cervus* Atlantic Deer Cowrie
- *Cypraea zebra* Measled Cowrie
- *Cyphoma mcgintyi* Spotted Cyphoma
- *Strombus gallus* Roostertail Conch
- *Strombus gigas* Queen Conch
- *Dolabrifera dolabrifera* Warty Seacat
- *Glossodoris sedna* Red-tipped Sea Goddess
- *Elysia picta* Painted Elysia
- *Octopus joubini* Atlantic Pygmy Octopus

- *Lysmata wurdemanni* Peppermint Shrimp
- *Mithrax aculeatus (pilosus)* Hairy Clinging Crab
- *Luidia senegalensis* Nine-armed Sea Star
- *Poraniella echinulata* Red Miniature Sea Star
- *Copidaster lymani* Mottled Red Sea Star
- *Oreaster reticulatus* Cushion Star, Bahama Star
- *Asterina folium* Common Blunt Armed Sea Star
- *Echinaster echinophorus* Thorny Sea Star
- *Asteroporpa annulata* Basket Star
- *Astropyga magnifica* Magnificent Urchin
- *Diadema antillarum* Long-spined Urchin
- *Lytechinus williamsi* Jewel Urchin
- *Ocnus suspectus* A Sea Cucumber
- *Euthyonidiella destichada* A Sea Cucumber
- *Euthyonidiella trita* A Sea Cucumber
- *Actinopyga agassizii* Five-toothed Sea Cucumber, West Indian Sea Cucumber
- *Holothuria mexicana* Donkey Dung Sea Cucumber
- *Holothuria parvula* A Sea Cucumber

Conservation Threats

Threats to Hard Bottom habitats are caused by changes in sediment accretion and removal from beach nourishment activities, damage from ship and boat groundings, cumulative impacts of anchors of all size vessels, and alteration of species composition and trophic interactions caused by parasites and pathogens.

Threats to Hard Bottom habitats that were also identified for multiple other habitats are addressed in Chapter 7: Multiple Habitat Threats and Conservation Actions. These threats include:

- Channel modification/shipping lanes
- Chemicals and toxins
- Climate variability
- Dam operations/incompatible release of water (quality, quantity, timing)
- Disruption of longshore transport of sediments
- Fishing gear impacts
- Harmful algal blooms
- Incompatible fishing pressure
- Incompatible industrial operations
- Incompatible wildlife and fisheries management strategies
- Invasive animals
- Invasive plants
- Key predator/herbivore loss
- Management of nature (beach nourishment and impoundments)
- Roads, bridges and causeways
- Shoreline hardening
- Vessel impacts

The following stresses and sources of stress threaten this habitat:

Stresses		Habitat Stress Rank
A	Altered species composition	High
B	Altered structure	High
C	Altered water quality–physical, chemistry	High
D	Altered weather regime/sea level rise	High

E	Habitat destruction	High
F	Habitat disturbance	High
G	Keystone species missing or lacking in abundance	High
H	Missing key communities or functional guilds/trophic shift	High
I	Sedimentation	Medium

The sources of stress, or threats, were used to generate conservation actions.

Sources of Stress		Habitat Source Rank	Related Stresses (see above)
1	Parasites/pathogens	**High**	A, B, E, G, H
2	Disruption of longshore transport of sediments	**High**	E, F, I
3	Channel modification/shipping lanes	**High**	E, F, I
4	Incompatible industrial operations	**Medium**	C, E
5	Incompatible fishing pressure	**Medium**	A, G
6	Dam operations/incompatible release of water: (quality, quantity, timing)	**Medium**	A, C, F
7	Climate variability	**Medium**	D
8	Inadequate stormwater management	**Medium**	A, C, G
9	Key predator/herbivore losses	**Medium**	A, F
10	Harmful algal blooms	**Medium**	A, F, G
11	Invasive plants	**Medium**	A, H
12	Management of nature (beach nourishment, impoundments)	**Medium**	A, C, E, F, I
13	Fishing gear impacts	**Medium**	B, E, F
14	Incompatible wildlife and fisheries management strategies	**Medium**	A, G
15	Placement of artificial structures	**Medium**	A, B, E, H
16	Shoreline hardening	**Medium**	E
17	Vessel impacts	**Medium**	E
18	Chemicals and toxins	**Medium**	F
19	Invasive animals	**Medium**	A
20	Solid waste	**Medium**	E, F
21	Utility corridors	**Low**	B, E
22	Roads, bridges and causeways	**Low**	E
23	Boating impacts	**Low**	E
24	Incompatible aquarium trade	**Low**	A
Statewide Threat Rank of Habitat		**High**	

Conservation Actions

Actions to abate the threats to Hard Bottom that were also identified as statewide threats (see list above) are in Chapter 7: Multiple Habitat Threats and Conservation Actions. Outcomes identified for this habitat address better understanding of the effects of beach nourishment and ensuring that ship anchorages are not sited over sensitive areas to reduce the probability that vessels run aground.

Highest ranked actions identified for abating this source of stress focus on:

- Establishing a funding source for remediation of damages from vessel impacts
- Development of a vessel anchoring management plan
- Improving the detection of pathogens, parasites, and biotoxins in marine organisms and the ability to rehabilitate impacted animals

Additional actions included:

- Evaluating whether parasites are indicators of estuarine and marine health
- Developing methods for keeping vessels away from sensitive areas
- Supporting restoration of damaged areas and replacement of species lost

The following actions, organized by action type, were identified to abate this threat:

Beach Nourishment/Impoundments

Overall Rank	Land/Water Species Management	*Feasibility*	*Benefits*	Cost
H	Review and revise criteria for statewide monitoring protocols to assess beach and offshore habitat impacts related to beach nourishment projects similar to BACI (Before-after-control-impacts: the analytical framework and adaptive management tool).	VH	M	L

Parasites/Pathogens

Overall Rank	**Land/Water/Species Management**	*Feasibility*	*Benefits*	Cost
H	Improve capabilities for/sophistication of inspection, recognition and treatment of aquatic organism diseases and parasites.	VH	M	M
H	Continue and support response teams/hotlines associated with disease outbreak, trauma, strandings, and mortality events for fish and wildlife species.	VH	M	M
L	Expand the number and capabilities of rehabilitation facilities for diseased and injured wildlife.	H	L	VH
Overall Rank	**Research**	*Feasibility*	*Benefits*	**Cost**
H	Conduct additional research on aquatic wildlife parasites and diseases, and the impacts of biotoxins on fish and wildlife resources.	VH	M	H
H	Synthesize and consolidate understanding, and identify gaps in understanding, of marine flora/fauna diseases, pathogens, and biotoxin impacts on fish and wildlife resources.	VH	M	L
M	Research and examine use of parasites as indicators of estuarine and marine health.	VH	L	M

Vessel Impacts

Overall Rank	Land/Water/Species Management:	*Feasibility*	*Benefits*	Cost
VH	Explore establish a marine/estuarine restoration fund.	M	VH	H
M	Develop a passive warning system for vessels to alert operators of sensitive or danger zones (shallows, reefs).	M	M	H
M	Encourage avoidance of anchorage and moorage in sensitive areas.	M	M	M
M	Identify appropriate areas for anchorage and moorings. Develop educational tools on low-impact mooring techniques.	M	M	M