National Wildlife Refuge System's
Coral Reef Refuges

It has been 100 years since President Theodore Roosevelt set aside the islands and reefs around Key West and the northwestern Hawaiian Islands to create two of the first wildlife refuges. The 96 million acre National Wildlife Refuge System (NWRS), a program within the U.S. Fish and Wildlife Service (FWS), now includes 13 coral reef refuges encompassing nearly 3 million acres, that conserve and protect the biological integrity, diversity, and environmental health of coral reefs and their companion lands. Included in the System are some of the most remote and pristine islands and atolls in the world. Since 2006, the FWS has also been responsible for the co-management of the 89 million acre Papahānaumokuākea Marine National Monument.

Coral reefs, among the most valuable, biologically complex, and diverse ecosystems on earth, provide habitat to one-third of all fish species in the ocean. Because of this incredible diversity, coral reefs are often called "Rainforests of the Sea". However, this actually underrates the diversity of coral reef ecosystems. Although tropical rainforests may contain a higher number of species, coral reefs include many more animal phyla, the taxonomic category below kingdom and above class. Coral reef species represent 33 of the 38 phyla in the Animal Kingdom. In comparison, only eight animal phyla are found in rainforests.

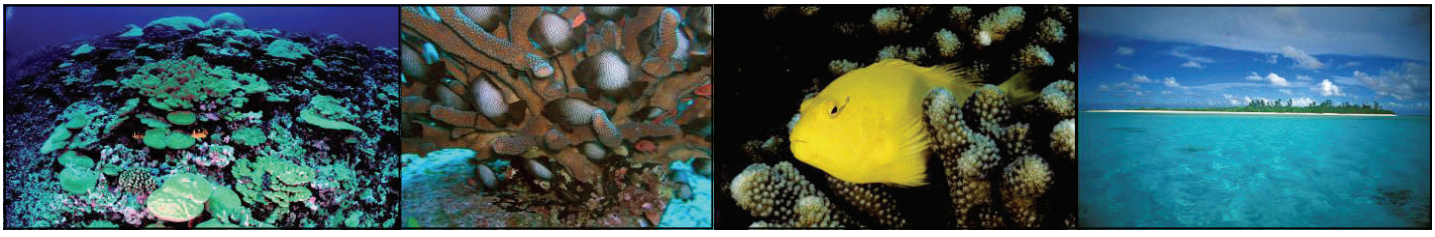
Tiny 4.5 ha Rose Island at Rose Atoll NWR. contains one of only two Pisonia grandis *forests within the NWRS.*

Orange-fin Anemonefish (Amphiprion chrysopterus*) and Bubble Tip Anemone (*Entacmaea quadricolor*), Baker Island*

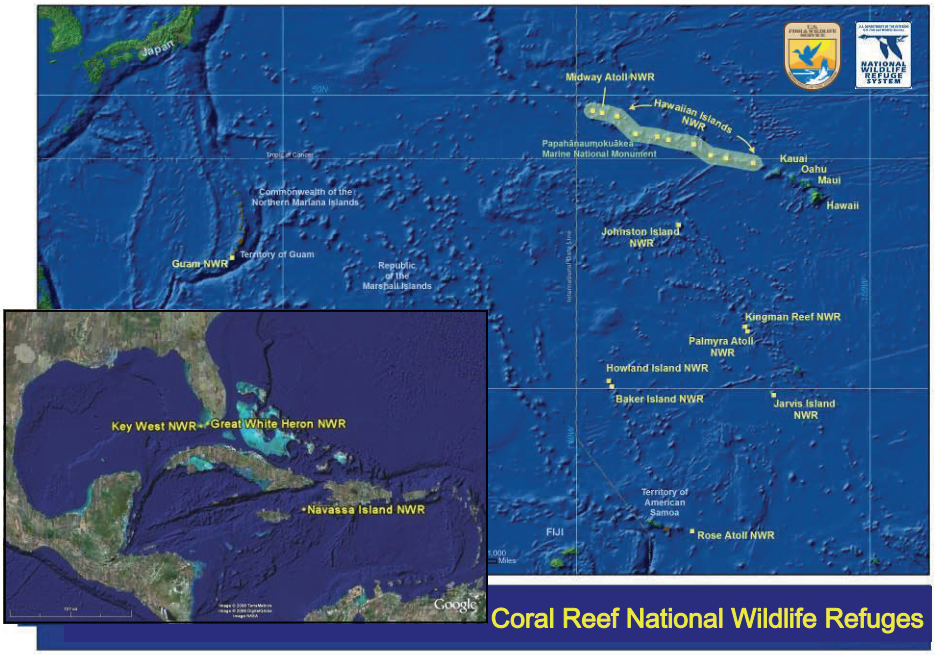
Coral reefs are valued for more than just scientific curiosity. They also build tropical islands, protect coasts from waves and storms, store untold potential for developing pharmaceuticals, and support U.S. tourism and fishing industries with billions of dollars. Each year, millions of Americans visit coral reefs to snorkel or dive among vast schools of fish, swim alongside majestic sea turtles or simply marvel at the these incredible gifts of nature. For some Americans, coral reefs are fundamental to the fabric of their local communities and are intertwined with their cultural traditions. Yet, the coral reef communities in the National Wildlife Refuge System are also cherished from afar. Underwater photographers capture spectacular scenes showing millions of Americans that healthy coral reef ecosystems are being conserved for future generations.

Natural Laboratories

But more than underwater treasures, the coral reef refuges act as natural laboratories. Stress from human activities and climate change are threatening coral reef ecosystems around the world. Within the past decade, approximately 27% of the world's reefs have been destroyed or have suffered severe damage. The coral reef refuges represent a baseline for pristine conditions allowing scientists to study climate change impacts separate from the human impacts thus providing fundamental insights for conservation and restoration of these valuable but endangered ecosystems.



All photos courtesy Jim Maragos / USFWS.



Northwest Hawaiian Islands	
Hawaiian Islands NWR	1909
Midway Atoll NWR	1988*
Remote Pacific Ocean	
Johnston Atoll NWR	1926
Kingman Reef NWR	2001
Palmyra Atoll NWR	2001
Howland Island NWR	1974
Baker Island NWR	1974
Rose Atoll NWR	1973
Jarvis Island NWR	1974
Guam NWR	1993
Florida and Caribbean	
Key West NWR	1908
Great White Heron NWR	1938
Navassa Island NWR	1999

* Midway Atoll NWR and Hawaiian Islands NWR are part of the 89 million acre Papahānaumokuākea Marine National Monument.

About the Coral Reef Refuges

Midway Atoll, site of the famous battle that changed the course of World War II, conserves almost 300,000 acres of coral reefs and open water along with the historical resources of the islands. Many of the other refuges in the Pacific also served as important forward operating bases during the war.

Some of the refuges, including Navassa Island in the Caribbean Sea and Baker, Howland, and Jarvis Islands in the South Pacific, were initially claimed by the U.S. under the Guano Islands Act of 1856. These islands, home to massive seabird colonies for many centuries, contained guano deposits, prized as an agricultural fertilizer, over a hundred feet deep. After the resource was depleted, the islands remained U.S. possessions and were governed as insular affairs. Howland Island is perhaps most famous for being the next destination of famed aviator Amelia Earhart before she disappeared during her round the world flight in 1937.

Palmyra Atoll is a group of small islands encircling a system of three lagoons surrounded by more than 16,000 acres of coral reefs. Owing to the 175 inches of annual rainfall, the islands are covered with lush vegetation including some of the last surviving stands of Pisonia beach forest in the U.S. Pacific, including some trees that tower over 100 feet in height. Kingman Reef, just 38 miles northwest of Palmyra Atoll, includes some of the most remote and pristine coral reefs in the world. The refuge is an example of a trophic pyramid turned upside down. Far different from the typical coral reef community with their vast schools of small fish, the Kingman Reef ecosystem is dominated by top predators such as sharks and red snappers while surprisingly few prey fish are present.

Rose Atoll, one of the smallest atolls in the world, is the southernmost refuge in the System located at 14° S Latitude. The refuge is included within the territory of and managed cooperatively with American Samoa. Rose is distinguished by the pink hue of its atoll reef, caused by crustose coralline algae, and the numerous flat-topped, steep-sided pinnacles that rise from the lagoon's sandy floor.

Johnston Island is likely the most isolated atoll in the world. Perhaps due to this isolation, fewer coral species are found at Johnston Island than at other Pacific sites; however, coral coverage is extremely high. Fish abundance is also high with over 300 species reported many of which are found no where else in the world. Johnston Island was long controlled by the U.S. military, who dredged large areas of the lagoon for material to expand the island from 46 to 596 acres. Despite this major disturbance the health of the coral reefs is exceptional; testament to the resilience of these ecosystems.

The Ritidian Unit of the Guam NWR, is an "overlay refuge" on lands administered by the U.S. Air Force and U.S. Navy. Although the military mission comes first on these lands, the U.S. Fish and Wildlife Service assists in protecting native species and habitats.

The Key West and Great White Heron refuges, two of the most visited in the entire system, were originally designated in order to protect migratory birds. However, these refuges also include substantial near-shore coral reefs that are easily accessible for recreational activity. All of the other coral reef refuges require special use permits for entry.

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