

= Biscayne National Park =

Biscayne National Park is a U.S. National Park located in southern Florida , south of Miami . The park preserves Biscayne Bay and its offshore barrier reefs . Ninety @-@ five percent of the park is water , and the shore of the bay is the location of an extensive mangrove forest . The park covers 172 @,@ 971 acres (69 @,@ 999 ha) and includes Elliott Key , the park 's largest island and first of the true Florida Keys , formed from fossilized coral reef . The islands farther north in the park are transitional islands of coral and sand . The offshore portion of the park includes the northernmost region of the Florida Reef , one of the largest coral reefs in the world .

Biscayne National Park protects four distinct ecosystems : the shoreline mangrove swamp , the shallow waters of Biscayne Bay , the coral limestone keys and the offshore Florida Reef . The shoreline swamps of the mainland and island margins provide a nursery for larval and juvenile fish , molluscs and crustaceans . The bay waters harbor immature and adult fish , seagrass beds , sponges , soft corals , and manatees . The keys are covered with tropical vegetation including endangered cacti and palms , and their beaches provide nesting grounds for endangered sea turtles . Offshore reefs and waters harbor more than 200 species of fish , pelagic birds , whales and hard corals . Sixteen endangered species including Schaus ' swallowtail butterflies , smalltooth sawfish , manatees , and green and hawksbill sea turtles may be observed in the park . Biscayne also has a small population of threatened American crocodiles and a few American alligators .

The people of the Glades culture inhabited the Biscayne Bay region as early as 10 @,@ 000 years ago before rising sea levels filled the bay . The Tequesta people occupied the islands and shoreline from about 4 @,@ 000 years before the present to the 16th century , when the Spanish took possession of Florida . Reefs claimed ships from Spanish times through the 20th century , with more than 40 documented wrecks within the park 's boundaries . While the park 's islands were farmed during the 19th and early 20th centuries , their rocky soil and periodic hurricanes made agriculture difficult to sustain . In the early 20th century the islands became secluded destinations for wealthy Miamians who built getaway homes and social clubs . Mark C. Honeywell 's guesthouse on Boca Chita Key was the area 's most elaborate private retreat , featuring a mock lighthouse . The Cocolobo Cay Club was at various times owned by Miami developer Carl G. Fisher , yachtsman Garfield Wood , and President Richard Nixon 's friend Bebe Rebozo , and was visited by four United States presidents . The amphibious community of Stiltsville was established in the 1930s in the shoals of northern Biscayne Bay , taking advantage of its remoteness from land to offer offshore gambling and alcohol during Prohibition . Following the Cuban Revolution of 1959 , Elliott Key was used as a training ground for infiltrators into Fidel Castro 's Cuba by the Central Intelligence Agency and by Cuban exile groups .

Originally proposed for inclusion in Everglades National Park , Biscayne Bay was cut from the proposed park to ensure Everglades ' establishment . It remained undeveloped until the 1960s , when a series of proposals were made to develop the keys in the manner of Miami Beach , and to construct a deepwater seaport for bulk cargo , along with refinery and petrochemical facilities on the mainland shore of Biscayne Bay . Through the 1960s and 1970s , two fossil @-@ fueled power plants and two nuclear power plants were built on the bay shores . A backlash against development led to the 1968 designation of Biscayne National Monument . The preserved area was expanded by its 1980 re @-@ designation as Biscayne National Park . The park is heavily used by boaters , and apart from the park 's visitor center on the mainland , its land and sea areas are accessible only by boat .

= = Geography = =

Biscayne National Park comprises 172 @,@ 971 acres (69 @,@ 999 ha) in Miami @-@ Dade County in southeast Florida . Extending from just south of Key Biscayne southward to just north of Key Largo , the park includes Soldier Key , the Ragged Keys , Sands Key , Elliott Key , Totten Key and Old Rhodes Key , as well as smaller islands that form the northernmost extension of the Florida Keys . A wide shallow opening in the island chain , located between the Ragged Keys and Key

Biscayne just north of the park 's boundary , is called the Safety Valve , as it allows storm surge water to flow out of the bay after the passage of tropical storms . The park 's eastern boundary is the ten @-@ fathom line (60 @-@ foot ; 18 m) of water depth in the Atlantic Ocean on the Florida Reef . The park 's western boundary is a fringe of property on the mainland , extending a few hundred meters inland between Cutler Ridge and Mangrove Point . The only direct mainland access to the park is at the Convoy Point Visitor Center , adjacent to the park headquarters . The southwestern boundary adjoins the Turkey Point Nuclear Generating Station and its system of cooling canals .

The southern portion of Biscayne Bay extends between Elliott Key and the mainland , transited by the Intracoastal Waterway . The park abuts the Florida Keys National Marine Sanctuary on the east and south sides of the park and John Pennekamp Coral Reef State Park to the south . Only 9 @,@ 075 acres (3 @,@ 673 ha) of the park 's area are on land , with the offshore keys comprising 4 @,@ 250 acres (1 @,@ 720 ha) and mainland mangrove swamps account for the remaining 4 @,@ 825 acres (1 @,@ 953 ha) . As an extension of the Everglades ecosystem , much of the park was originally proposed to be included in Everglades National Park , but was excluded in order to obtain a consensus for the establishment of the Everglades park in 1947 .

= = = Geology = = =

Biscayne Bay marks the southernmost extent of the Atlantic barrier islands , represented by Key Biscayne , and the northernmost extent of the Florida Keys at Elliott Key . The keys are distinguished from the barrier islands by the coral limestone that extends to the islands ' surface under a thin veneer of topsoil , while the barrier islands are dominated by wave @-@ deposited sands that cover most of the limestones . Biscayne Bay lies between low ridges of oolitic Miami Limestone on the west , forming Cutler Ridge , and the coral @-@ based Key Largo Limestone that underlies Elliott Key and the keys to the south . The Miami Limestone was deposited in turbulent lagoon waters . The Key Largo Limestone is a fossilized coral reef and was formed during the Sangamonian interglacial period of about 75 @,@ 000 to 125 @,@ 000 years ago . The Miami Formation achieved its present form somewhat later , during a glacial period in which the lagoon deposits were consolidated and cemented by fresh water . The Key Largo Limestone is a coarse stone formed from stony corals , between 69 and 200 ft (21 and 61 m) in thickness . As a consequence of their origins as reefs , the beaches of Elliott Key and Old Rhodes Key are rocky . Significant sandy beaches are found only at Sands Key .

= = = Hydrology = = =

Biscayne Bay is a shallow semi @-@ enclosed lagoon which averages 10 ft (3 @.@ 0 m) in depth . Both its mainland margins and the keys are covered by mangrove forest . The park includes the southern portion of Biscayne Bay , with areas of thin sediment called " hardbottom " , and vegetated seagrass meadows supporting turtlegrass and shoal grass .

As a result of efforts to control water resources in Florida and projects to drain the Everglades during the early and mid @-@ 20th century , water flow into Biscayne Bay has been altered by the construction of canals . These canals channel water from portions of the southeastern Everglades now used for agriculture into the bay . Prior to canal construction , most fresh water inflow came from rain and groundwater , but the canals are now altering the salinity profile of the bay , conveying sediment and pollutants and leading to saltwater intrusion into the Biscayne aquifer . The Comprehensive Everglades Restoration Plan (CERP) was established in 2000 to mitigate the effects of human intervention into the natural water flow of the Everglades . Primarily aimed at the restoration of historical patterns of water flow into Everglades National Park , the project will also deal with issues arising from the diversion of water out of the southern Everglades into Biscayne Bay . The Biscayne Bay Coastal Wetlands Project (BBCW) is a CERP component specifically intended to redistribute water flow so that fresh water is introduced gradually through creeks and marshes rather than short , heavy discharges through drainage canals .

= = Human history = =

= = = Native people = = =

Native Americans were present in lower Florida 10 @, @ 000 years ago , when ocean levels were low and Biscayne Bay was comparatively empty of water . Water levels rose from about 4000 years ago and inundated the bay . Archeologists believe that any traces left by the peoples of that era are now submerged ; none now exist on dry lands in the park . The Cutler Fossil Site , just to the west of the park , has yielded evidence of human occupation extending to at least 10000 years before the present . The earliest evidence of human presence in Biscayne dates to about 2500 years before the present , with piles of conch and whelk shells left by the Glades culture . The Glades culture was followed by the Tequesta people , who occupied the shores of Biscayne Bay . The Tequesta were a sedentary community living on fish and other sea life , with no significant agricultural activity . A site on Sands Key has yielded potsherds , worked shells and other artifacts indicating occupation from at latest 1000 AD to about 1650 , after contact was made with Europeans . A total of fifty significant archaeological sites have been identified in the park .

= = = Exploration = = =

Juan Ponce de León explored the area in 1513 , discovering the Florida Keys and encountering the Tequesta on the mainland . Other Spanish explorers arrived later in the 16th century and Florida came under Spanish rule . The Tequesta were resettled by the then @-@ Spanish government in the Florida Keys , and the South Florida mainland was depopulated . Ponce de León referred to the bay as " Chequescha " after its inhabitants , becoming " Tequesta " by the time of Spanish governor Pedro Menéndez de Avilés later in the century . The present name has been attributed to a shipwrecked Basque sailor known as the " Biscaino " or " Viscayno " who lived in the area for a time , or to a more general allusion to the Bay of Biscay .

Spanish treasure fleets regularly sailed past the Florida Keys and were often caught in hurricanes . There are 44 documented shipwrecks in the park from the 16th through the 20th centuries . At least two 18th @-@ century Spanish ships were wrecked in the park area . The Spanish galleon Nuestra Senora del Popolo is believed to have been wrecked in park waters in 1733 , though the site has not been found . HMS Fowey was wrecked in 1748 in what is now Legare Anchorage , at some distance from the Fowey Rocks . The discovery of the ship in 1975 resulted in a landmark court case that established the wreck as an archaeological site rather than a salvage site . 43 wrecks are included on the National Register of Historic Places in the Offshore Reefs Archeological District , which extends for 30 mi (48 km) along the seaward side of the Biscayne National Park keys . During the 18th century , Elliott Key was the reputed base of two different pirates , both of whom were called Black Caesar , commemorated by Caesar 's Creek between Elliott and Old Rhodes Key .

= = = Settlement and pre @-@ park use = = =

The first permanent European settlers in the Miami area did not come until the early 19th century . The first settlements around Biscayne Bay were small farms on Elliott Key growing crops like key limes and pineapples . John James Audubon visited Elliott Key in 1832 . Colonel Robert E. Lee surveyed the area around Biscayne Bay for potential fortification sites in 1849 . At the end of the American Civil War in 1865 , a number of Confederates passed through the area as they were attempting to escape to Cuba . Elliott Key was a brief stopping point for John C. Breckinridge during his flight to Cuba . The former United States vice president , Confederate general and Confederate secretary of war spent two nights in Biscayne Bay on his journey . Few people lived in the park area until 1897 , when Israel Lafayette Jones , an African @-@ American property manager , bought Porgy Key for \$ 300 US . The next year Jones bought the adjoining Old Rhodes Key and moved his family there , clearing land to grow limes and pineapples . In 1911 Jones bought 212 @-@ acre (86

ha) Totten Key , which had been used as a pineapple plantation , for a dollar an acre , selling in 1925 for \$ 250 @, @ 000 . Before Israel Jones ' death in 1932 the Jones plantations were for a while among the largest lime producers on the Florida east coast .

Carl G. Fisher , who was responsible for much of the development of Miami Beach , bought Adams Key , once known as Cocolobo Key , in 1916 and built the Cocolobo Cay Club in 1922 . The two @-@ story club building had ten guest rooms , a dining room , and a separate recreation lodge . Patrons included Warren G. Harding , Albert Fall , T. Coleman du Pont , Harvey Firestone , Jack Dempsey , Charles F. Kettering , Will Rogers and Frank Seiberling . Israel Jones ' sons Lancelot and Arthur dropped out of the lime @-@ growing business after competition from Mexican limes made their business less profitable , and after a series of devastating hurricanes in 1938 they became full @-@ time fishing guides at the Cocolobo Club . The club had declined with the crash of 1929 which cost Fisher his fortune , but was revived by Garfield Wood in 1934 . Among the Joneses ' clients was avid fisherman Herbert Hoover and his family . The Joneses also provided the club with fish , lobster and crabs . Arthur and Lancelot Jones were the second largest landowners and the only permanent residents of the lower Biscayne Bay keys during the 1960s . Wood sold the Cocolobo Cay Club to a group of investors led by Miami banker Bebe Rebozo in 1954 , who renamed it the Coco Lobo Fishing Club . Clients guided by the Joneses included then @-@ senators John F. Kennedy , Lyndon Johnson , Richard Nixon , Herman Talmadge and George Smathers through the 1940s and 1950s .

During the Cold War the future park area was used as a training ground for Cuban exiles training for missions in Fidel Castro 's Cuba . Elliott Key in particular was used by the Central Intelligence Agency as a training area in the early 1960s in preparation for Bay of Pigs invasion . The largest facility was Ledbury Lodge , the only hotel ever built on the key . As late as 1988 a group of Cuban exiles were arrested when they tried to use the key for a mock landing . Farther north , exiled Venezuelan president Marcos Pérez Jiménez kept a house on Soldier Key until he was extradited in 1963 .

= = = Proposed development = = =

As modern communities continued growing in and around Miami , developers looked to southern Dade County for new projects . The undeveloped keys south of Key Biscayne were viewed as prime development territory . Beginning in the 1890s local interests promoted the construction of a causeway to the mainland . One proposal included building a highway linking the Biscayne Bay keys to the Overseas Highway at Key Largo and to the developed barrier islands to the north . At the same time , pressure built to accommodate industrial development in South Florida . This led to competing priorities between those who wished to develop for residential and leisure use and those in favor of industrial and infrastructure development . On December 6 , 1960 , 12 of the 18 area landowners who favored development voted to create the City of Islandia on Elliott Key . The town was incorporated to encourage Dade County to improve access to Elliott Key in particular , which landowners viewed as a potential rival to Miami Beach . The new city lobbied for causeway access and formed a negotiating bloc to attract potential developers .

In 1962 an industrial seaport was proposed for the mainland shores of Biscayne Bay , to be known as SeaDade . SeaDade , supported by billionaire shipping magnate Daniel K. Ludwig , would have included an oil refinery . In addition to the physical structures , it would have been necessary to dredge a 40 @-@ foot @-@ deep (12 m) channel through the bay for large ships to access the refinery . The channel would have also required cutting through the coral reef to get to the deep water . In 1963 Florida Power and Light (FP & L) announced plans for two new 400 @-@ megawatt oil @-@ fired power plants on undeveloped land at Turkey Point .

Many local residents and politicians supported SeaDade because it would have created additional jobs , but a group of early environmentalists thought the costs were too high . They fought against development of the bay and formed the Safe Progress Association . Led by Lloyd Miller , the president of the local chapter of the Izaak Walton League , Miami Herald reporter Juanita Greene , and Art Marshall , the opponents of industrialization proposed the creation of a national park unit

that would protect the reefs , islands and bay . After initial skepticism , the park proposal obtained the support of Miami Herald editors , as well as Florida Congressman Dante Fascell and Florida Governor Claude R. Kirk , Jr . , and were supported by lobbying efforts by sympathetic businessmen including Herbert Hoover , Jr .

One vision of Islandia , supported by land owners , would have connected the northern Florida Keys ? from Key Biscayne to Key Largo ? with bridges and created new islands using the fill from the SeaDade channel . Although Ludwig 's SeaDade plans were not supported by Miami @-@ area politicians or the state of Florida , Islandia 's supporters continued to lobby for development support . In 1968 , when it appeared the area was about to become a national monument , Islandia supporters bulldozed a highway six lanes wide right down the center of the island , destroying the forest for 7 miles (11 km) . Islandia landowners called it Elliott Key Boulevard , but called it " Spite Highway " privately . It was hoped that since there was so much environmental damage , no one would want it for a national monument . Over time in the near @-@ tropical climate , the forest grew back and now the only significant hiking trail on Elliott Key now follows the path of Elliott Key Boulevard .

The oil @-@ fired Turkey Point power stations were completed in 1967 ? 68 and experienced immediate problems from the discharge of hot cooling water into Biscayne Bay , where the heat killed marine grasses . In 1964 FP & L announced plans for two 693 MW nuclear reactors at the site , which were expected to compound the cooling water problem . Because of the shallowness of Biscayne Bay , the power stations were projected to consume a significant proportion of the bay 's waters each day for cooling . After extensive negotiations and litigation with both the state and with Ludwig , who owned lands needed for cooling water canals , a closed @-@ loop canal system was built south of the power plants and the nuclear units became operational in the early 1970s .

Portions of the present park were used for recreation prior to the park 's establishment . Homestead Bayfront Park , still operated by Miami @-@ Dade County just south of Convoy Point , established a " blacks @-@ only " segregated beach for African @-@ Americans at the present site of the Dante Fascell Visitor Center . The segregated beach operated through the 1950s into the early 1960s before segregated public facilities were abolished .

= = = Park establishment and history = = =

The earliest proposals for the protection of Biscayne Bay were included in proposals by Everglades National Park advocate Ernest F. Coe , whose proposed Everglades park boundaries included Biscayne Bay , its keys , interior country including what are now Homestead and Florida City , and Key Largo . Biscayne Bay , Key Largo and the adjoining inland extensions were cut from Everglades National Park before its establishment in 1947 . When proposals to develop Elliott Key surfaced in 1960 , Lloyd Miller asked Secretary of the Interior Stewart Udall to send a Park Service reconnaissance team to review the Biscayne Bay area for inclusion in the national park system . A favorable report ensued , and with financial help from Herbert Hoover , Jr . , political support was solicited , most notably from Congressman Fascell . A 90 @-@ acre (36 ha) area of Elliott Key was by this time a part of the Dade County park system . The 1966 report noted that the proposed park contained the best remaining areas of tropical forest in Florida and a rare combination of " terrestrial , marine and amphibious life , " as well as significant recreational value . The report found that the most significant virtues of the potential park were " the clear , sparkling waters , marine life , and the submerged lands of Biscayne Bay and the Atlantic Ocean . Here in shallow water is a veritable wonderland . "

President Lyndon B. Johnson signed Public Law 90 @-@ 606 to create Biscayne National Monument on October 18 , 1968 . The monument was expanded in 1974 under Public Law 93 @-@ 477 and expanded again when the monument was redesignated a national park by an act of Congress through Public Law 96 @-@ 287 , effective June 28 , 1980 . The 1980 expansion extended the park almost to Key Biscayne and included Boca Chita Key , the Ragged Keys and the Safety Valve shoal region , together with the corresponding offshore reefs and a substantial portion of central Biscayne Bay

The first Islandia property owner to sell land to the National Park Service was Lancelot Jones , together with Katherine Jones , Arthur 's widow . They sold their lands for \$ 1 @, @ 272 @, @ 500 , about a third of the potential development value . Jones was given a life estate on 3 acres (1 @. @ 2 ha) at the age of 70 . He visited with park rangers stationed at the former Cocolobo Club , which eventually burned down in 1975 . The other life estate in the park was held by Virginia Tannehill , the widow of Eastern Airlines executive Paul Tannehill . Jones ' house built by Lancelot , his father and his brother , burned down in 1982 . He lived in a two @-@ room shack for the next ten years , riding out hurricanes on Porgy Key , but left his home permanently just before Hurricane Andrew in 1992 . The house was destroyed and Jones remained in Miami until his death in 1997 at 99 years .

Deprived of a rationale for existence by the national monument 's establishment , Islandia languished . The hiring of a police chief in 1989 prompted questions from the National Park Service to the Dade County state attorney 's office , headed by Janet Reno . In 1990 Reno 's office determined after investigation that all of the town 's elections were invalid , since the elections were restricted only to landowners , not residents . The town was finally abolished by the Miami @-@ Dade Board of County Commissioners in March 2012 .

The impact of Hurricane Andrew on neighboring Homestead Air Force Base caused the Air Force to consider closing the base and conveying it to Miami @-@ Dade County , which was interested in using the base for commercial air traffic as an alternative to Miami International Airport . An environmental impact study concluded that the resulting flight paths over the bay , only 2 mi (3 @. @ 2 km) to the east , would result in degradation of the park . In 1999 The Air Force prohibited major commercial development at Homestead as a result .

The park 's popularity as a destination for boaters has led to a high rate of accidents , some of them fatal . The Columbus Day weekend has been cited as the " most dangerous weekend of the year . " An annual boating regatta in its 57th year in 2012 resulted in six deaths between 2002 and 2011 , with damage to seabeds from vessel groundings and littering . Although official regatta activities take place outside the park , the area of Elliott Key has become a popular destination for some participants .

A fifth generating unit fueled by natural gas and oil was added to the Turkey Point generating station in 2007 . In 2009 , Turkey Point was proposed as the site of two new 1117 MW AP1000 nuclear reactors , to be designated Turkey Point 6 and 7 . If built , the new reactors would make Turkey Point one of the largest generating sites in the United States . Other neighboring influences on the bay are the agricultural lands of south Miami @-@ Dade County , a sewage treatment facility on the park boundary at Black Point , and its neighbor , the South Miami @-@ Dade Landfill .

= = Activities = =

Biscayne National Park operates year @-@ round . Camping is most practical in winter months , when mosquitoes are less troublesome on the keys . Private concessioners provide full day tours in the park that include snorkeling , hiking , paddling and sailing from the park headquarters . Boat excursions to Boca Chita and Adams Key are also available .

= = = Recreation = = =

Access to the park from the mainland is limited to the immediate vicinity of the Dante Fascell Visitor Center at Convoy Point . All other portions of the park are reachable only by private or concessioner boats . Activities include boating , fishing , kayaking , windsurfing , snorkeling and scuba diving . Miami @-@ Dade County operates four marina parks near the park . Homestead Bayfront Park is directly adjacent to the park headquarters at Convoy Point . Farther south Black Point Park provides access to Adams and Elliott Keys . Matheson Hammock Park is near the north end of the park , and Crandon Park is on Key Biscayne .

Although it is a federally designated park , fishing within Biscayne is governed by the state of Florida . Anglers in Biscayne are required to have a Florida recreational saltwater fishing license . Fishing is limited to designated sport fish , spiny lobster , stone crab , blue crab and shrimp .

Tropical reef fish may not be collected , nor may sharks , conch , sea urchins and other marine life . Reef life species such as coral and sponges are also protected from collecting by visitors . Additionally , lobstering is prohibited in the Biscayne Bay @-@ Card Sound Lobster Sanctuary , administered by the state of Florida to protect spiny lobster breeding areas , which overlaps much of Biscayne Bay .

A private concessioner provides tours from the Park headquarters into the bay and to the keys . Most tours are operated during the peak winter season from January to April . Personal watercraft are prohibited in Biscayne and most other national parks , but other private powerboats and sailboats are permitted .

= = = Island facilities = = =

Most of Biscayne 's permanent facilities are on the offshore keys . A seasonally staffed ranger station is located on Elliott Key , as well as a campground and 36 boat slips . A single loop trail runs from the harbor to the oceanfront , and a path following the Spite Highway runs the length of the island . Adams Key is a day @-@ use @-@ only area for visitors , although two Park Service residences are on the island . Boca Chita Key is the most @-@ visited island , with a campground and picnic areas . The Boca Chita Lighthouse is occasionally open to visitors when staffing permits .

= = = Snorkeling and diving = = =

Snorkeling and scuba diving on the offshore reefs are popular activities . The reefs have been the cause of many shipwrecks . A selection of wrecks have been the subjects of ranger @-@ led snorkeling tours and have been organized as the Maritime Heritage Trail , the only underwater archaeological trail in the National Park Service system . The wrecks of the Arratoon Apcar (sank 1878) , Erl King (1891) , Alicia (1905) , Lugano (1913) and Mandalay (1966) are on the trail together with an unknown wreck from the 1800s and the Fowey Rocks Lighthouse . The Alicia , Erl King and Lugano are relatively deep wrecks , best suited for scuba dives . The Mandalay is at a shallower depth and is especially popular for snorkeling .

= = Historical structures = =

Although most of Biscayne National Park 's area is water , the islands have a number of protected historical structures and districts . Shipwrecks are also protected within the park , and the park 's offshore waters are a protected historic district .

= = = Stiltsville = = =

Stiltsville was established by Eddie " Crawfish " Walker in the 1930s as a small community of shacks built on pilings in a shallow section of Biscayne Bay , not far from Key Biscayne . Comprising 27 structures at its height in the 1960s , Stiltsville lost shacks to fires and hurricanes , with only seven surviving in 2012 , none of them dating to the 1960s or earlier . The site was incorporated into Biscayne National Park in 1985 , when the Park Service agreed to honor existing leases until July 1 , 1999 . Hurricane Andrew destroyed most of Stiltsville in 1992 . The Park Service has undertaken to preserve the community , which is now unoccupied . The community is to be administered by a trust and used as accommodation for overnight camping , educational facilities and researchers .

= = = Other structures = = =

Biscayne National Park includes a number of navigational aids , as well as an ornamental structure built to resemble a lighthouse . The Fowey Rocks Light is a skeleton @-@ frame cast iron structure built in 1878 . Already included within the boundaries of the park , the light was acquired by the Park

Service on October 2 , 2012 . The unmanned Pacific Reef Light is about three miles offshore from Elliott Key . The original 1921 structure was replaced in 2000 and its lantern was placed on display in a park in Islamorada .

Industrialist Mark C. Honeywell was a Cocolobo Club member who bought Boca Chita Key in 1937 , expanding the facilities to include a small lighthouse . Boca Chita Key was developed with several structures including an imitation lighthouse , built using coral rock and topped with a wire cage resembling a lighthouse lantern , and the end of a jetty on the north side of the key . The key was owned by Honeywell until 1945 . Mark and Olive Honeywell also built a chapel , a guesthouse , seawalls and utility buildings on the island .

The Boca Chita Key structures are administered as a cultural landscape , interpreting the area 's use as a retreat for the rich . More modest homesteads include the now @-@ abandoned plantations developed by Israel Jones and his sons , and the Sweeting Homestead on Elliott Key . The frame structures associated with these plantations , together with those of the Cocolobo Cay Club and frame buildings on Boca Chita Key , have been destroyed by fire and hurricanes .

= = Ecology = =

South Florida is a transitional zone between the Nearctic and Neotropical ecozones , resulting in a wide variety of plant and animal life . The intersection of ecozones brings opportunities for visitors to see species , particularly birds , that are not seen elsewhere in North America . The park includes four distinct ecosystems , each supporting its own flora and fauna . Mangrove swamp , lagoon , island key and offshore reef habitats provide diversity for many species . In this semi @-@ tropical environment , the seasons are differentiated mainly by rainfall . Warm to hot and wet summers bring occasional tropical storms . Though only marginally cooler , the winters tend to be relatively drier . Bay salinity varies accordingly , with lower salinity levels in the wet summer , trending to more fresh water on the west side where new fresh water flows in .

Hundreds of species of fish are present in park waters , including more than fifty crustacean species ranging from isopods to giant blue land crabs , about two hundred species of birds and about 27 mammal species , both terrestrial and marine . Molluscs include a variety of bivalves , terrestrial and marine snails , sea hares , sea slugs and two cephalopods , the Caribbean reef octopus and the Caribbean reef squid .

The sheltered open waters of the bay and the outlying chain of keys provide resting areas for migrating birds on their way between North American , the Caribbean islands , and South America . Many southbound land birds stop in the fall at Bill Baggs Cape Florida State Park , just north of the park on Key Biscayne , before venturing across the open waters of Biscayne Bay . Northbound spring migrants do likewise on Elliott Key . Most of the small passerine migrants are warblers , with ovenbirds , palm warblers , American redstarts , common yellowthroats , prairie warblers , worm @-@ eating warblers and black @-@ throated blue warblers accounting for the majority . Migrant raptors include short @-@ tailed hawks , sharp @-@ shinned hawks , merlins , peregrine falcons and swallow @-@ tailed kites , while bald eagles and ospreys nest in the park . Both white @-@ tailed and red @-@ tailed tropicbirds are seen in the park , as are American flamingos , with some of the latter probably escaped captive birds .

= = = Shoreline and mangrove swamp = = =

The mainland shorelines are dominated by a marshy transitional zone chiefly populated by red mangrove and black mangrove growing from the shallow water , with white mangrove growing farther back from the water 's edge . The trees ' aerial root structure provides a sheltered habitat for crabs , fish and wading birds . The brown waters within the mangrove thickets are nurseries for fish , mollusc and crustacean larvae that require a quiet sheltered environment before the immature animals can disperse into open waters . Mangroves shed leaves at about 2 to 4 short tons per acre (4 @.@ 5 to 9 @.@ 0 t / ha) per year , providing food for fish , worms and crustaceans . Because the carbon in the leaves is sequestered by incorporation into animals , the mangrove swamp is

estimated to have two to three times the ability to sequester carbon of terrestrial forests . The mangrove forest on Biscayne Bay is the longest on Florida 's east coast . Shoreline and island mangrove swamps , together with the bay , represent a significant nursery for the marine life of southeast Florida .

The salt @-@ tolerant mangrove margin has expanded inland as freshwater flow into the bay has been channelized , replacing freshwater sawgrass marshes . The L @-@ 31E coastal storm surge levee inland of the park 's western boundary has played a significant role in isolating former freshwater marshlands from their water sources . At the same time , tidal water does not reach the interior of the coastal margin , limiting interchange between salt and freshwater ecosystems .

Bird life on the shoreline includes yellow @-@ crowned night herons , loggerhead shrikes , prairie warblers and shorebirds . Mangrove cuckoos , a notoriously difficult @-@ to @-@ observe species , may be seen at Convoy Point and Black Point . Biscayne has one of the largest populations of mangrove cuckoos in Florida .

The park 's margins are habitat for the threatened American crocodile . The construction of miles of cooling water canals in the marl lands close to the shore behind the Turkey Point power plant , and the canals ' warm waters , have provided a nearly ideal environment for crocodile nesting , making the power plant a nursery for many of those living in the park . Although crocodiles and American alligators both occur in extreme southern Florida , alligators are uncommon in Biscayne , since alligators mainly inhabit fresh waters found farther inland , while crocodiles can live in Biscayne 's somewhat saltier estuarine waters .

= = = Bay waters = = =

The open waters are inhabited by fishes , molluscs and crustaceans living on sea grasses or who prey on each other . The shallowness of the lagoon makes it suitable habitat for diving birds such as anhinga , cormorants and diving ducks . The bay also provides habitat for juvenile sea animals that have left the shelter of the mangrove belts . Manatees frequent the quiet waters of the bay . The bay has a year @-@ round population of double @-@ crested cormorants . Winter residents include northern gannets , American white pelicans and common loons . The bay also has a resident population of common bottlenose dolphins .

Biscayne Bay is a shallow lagoon with little vertical density or salinity gradient due to its lack of depth . Instead of a vertical gradient , the bay shows a horizontal density gradient , with fresh water entering from the drainage canals on the west side and seawater entering through gaps in the keys and through the safety valve section of shoals . Bay salinity reaches a peak in June . Changes in the salinity pattern of the bay have had negative effects on formerly abundant species such as red drum . Biscayne Bay and Florida Bay are major nurseries for red grouper and gray snapper . The bottom of the lagoon hosts sponges and soft corals in places where grasses cannot not grow . Three primary species of seagrass are found in the park : turtlegrass , shoal grass and manatee grass . The endangered Johnson 's seagrass is also found in small quantities in the bay , which is at the southern end of the grass 's range . Roughly 75 percent of the central bay floor is covered by grasses . Scarring of seagrass beds by vessel groundings or propellers is a significant problem . About 200 such incidents are documented each year , with full re @-@ growth requiring up to 15 years . The bay is also affected by commercial shrimp trawling , which is permitted in park waters . The passage of roller @-@ frame trawl nets does not harm grasses , but damages soft corals and sponges .

= = = Keys = = =

Elliott Key is the largest island in the park , measuring 1 @,@ 650 acres (670 ha) and about 8 @.@ 1 mi (13 km) long by 0 @.@ 62 mi (1 km) wide . Next largest is Old Rhodes Key at 660 acres (270 ha) , then Sands Key 420 acres (170 ha) , Totten Key 380 acres (150 ha) and Little Totten Key at 200 acres (81 ha) , with 37 smaller islands arranged in a north @-@ south line 5 to 8 @.@ 7 mi (8 to 14 km) east of the mainland shoreline . The keys shift from barrier islands with

rocky cores in the north to coral rock platforms in the south . All are fringed with mangroves , with subtropical vegetation and hardwood forests in the interiors , including gumbo limbo , mahogany , ironwood , torchwood and satinleaf . Insects include Schaus ' swallowtail , an endangered species , as well as dense clouds of mosquitoes in the wet season , preyed upon by dragonflies . Marsh rabbits and raccoons , together with mice and rats comprise the primary mammalian species . Reptiles include rattlesnakes and a variety of lizards , as well as an occasional crocodile .

The keys are a transitional area capable of hosting unexpected birds , often Caribbean species that have strayed near the mainland . The interior of the keys are frequented by warblers and the hawks that prey on them . Coastal zones are habitat for ruddy turnstones and least sandpipers . Gulls and terns include royal terns , laughing gulls and ring @-@ billed gulls , with brown pelicans just offshore . Wilson 's plovers nest on Boca Chita Key , where nesting zones are closed during breeding season .

Sea turtles nest on island beaches in the park . Park staff actively assist turtle nesting by removing debris from beaches that might pose an obstacle to adults and hatchlings . Loggerhead turtles are the most common sea turtle species and account for nearly all of the turtle nests in the park . Nest sites are identified by daily morning beach patrols and are protected with mesh screen against the predation by abundant raccoon population . Nest protection efforts have reduced predation from 100 % of nests disturbed per year to no disturbed nests in 2007 , with a more usual average of more than 50 % nest disturbance in most years . In 2012 one undisturbed nest was found and protected , five partially disturbed nests were protected , and one nest was destroyed by predators . The threatened eastern indigo snake is also present on the island .

Rare and endangered plant species on the islands include Sargent 's cherry palm and the semaphore prickly @-@ pear cactus (*Consolea corallicola*) . The cactus , which has been described as " near extinction " , has been reduced to about 20 individuals . A colonial population of 570 cacti were found on one island in Biscayne Bay in 2001 , making it the largest known population of semaphore prickly @-@ pear cactus in the world . The only natural population of Sargent 's palm grows on Elliott Key . Fewer than 50 grew on the key in 1991 . Despite efforts to propagate the plant , there are now 16 Sargent 's palms on Elliott Key , with about 123 propagated on Long Key .

Two critically endangered butterflies , Schaus ' swallowtail (*Papilio aristodemus*) and the Miami blue , are found in the park , mostly on Elliott Key . In 2012 the U.S. Fish and Wildlife Service (USFWS) authorized a capture and captive breeding program for Schaus ' swallowtail after only five of the butterflies were found by surveyors in the park , down from 35 in 2011 , of a total surveyed Florida population of 41 . The Miami blue was feared to be extinct after Hurricane Andrew in 1992 , but a population was found in 1999 at Bahia Honda Key . Captive breeding produced 25 @,@ 000 Miami blues , some of which have been released on Elliott Key with mixed results .

= = = Coral reef and offshore waters = = =

Beyond the keys in the Atlantic Ocean the seafloor slopes gradually down before rising in an almost continuous coral reef . The reef , composed of living corals , is inhabited by more than 200 species of fish , as well as molluscs , crustaceans and worms . Every coral species in park waters is considered protected by either federal or state regulations . Coral reefs are estimated to cover about half the area of the park , with about 4000 individual patch reefs and areas of bank @-@ barrier reef . Hundreds of species of hard and soft corals , sea anemones and sponges are found in bay and offshore waters . The coral reefs may themselves be subdivided into the outer reef on the edge of the Florida carbonate platform , the patch reefs between the outer reef and the keys , and the reefs in the shoals on either side of the keys . The offshore reefs are dominated by elkhorn coral to 10 @-@ meter (33 ft) water depth , and staghorn coral below 10 meters . The landward patch reefs are principally composed of boulder star coral and symmetrical brain coral . The island shoal reefs mainly consist of lesser starlet coral and *Porites* finger corals .

Reef environments in Biscayne National Park have seen declines in species richness and diversity across all fish species from 1977 to 1981 to 2006 ? 2007 . A sampling program showed declines at all sampling sites . A correlation has been posited between the observed decline in coral reef

coverage throughout the Florida Reef tract and the decline in fish species . Declines in populations were noted in both gamefish and in fish species not exposed to fishing pressure . Algal cover has increased as coral has declined , so that coral @-@ dwelling species have decreased while herbivorous fish have increased . Increased overall salinity and changing salinity gradients in Biscayne Bay may also play a role , while polychlorinated biphenyl and mercury contamination have been noted in fish samples .

The park 's eastern boundary lies just beyond the rise of the offshore reef at ten @-@ fathom (60 @-@ foot ; 18 m) sea depth . Areas farther offshore are protected within the Florida Keys National Marine Sanctuary , which extends eastward to a boundary corresponding to a depth of 300 fathoms (1 @, @ 800 ft ; 550 m) . The offshore waters harbor brown pelicans , magnificent frigatebirds , brown boobies , particularly around the offshore lights , and pelagic birds such as shearwaters and petrels . Whales in offshore waters are rare , but can include right whales , humpback whales , sperm whales , fin whales and sei whales , all of them endangered . The smalltooth sawfish is similarly rare in park waters and endangered . Threatened coral species include elkhorn and staghorn corals , as well as pillar coral , listed as endangered in Florida .

= = = Exotic species = = =

More than 50 species of exotic plant have been documented in the park , with almost 20 of those considered to be pest species which may displace native plants and possibly alter the ecological balance . Green iguanas , cane toads , black rats , lionfish , fire ants , oscar and brown basilisk lizards are common in the park . The lionfish (*Pterois volitans* and *Pterois miles*) is a tropical fish from the Indian @-@ Pacific Ocean area . It is known for its voracious appetite and its ability to establish itself in new waters , rapidly replacing other species . Researchers theorized that the introduction of this species in the park occurred during Hurricane Andrew in 1992 . Sightings in Biscayne Bay at that time were believed to have been from home aquariums that were destroyed during the hurricane , though the researcher who first proposed the theory has since retracted the assertion . More recent lionfish sightings are probably from more established populations in the Florida Keys to the south of the park . Also likely originating from human captivity , Burmese pythons have been observed near the park 's boundary along the mainland . Exotic plant species which pose the highest risk to native plant communities include Brazilian @-@ pepper , torpedo grass , tuberous sword fern , guava and portiatree .

= = Climate = =

Biscayne 's tropical climate reflects its location in extreme South Florida . Southern Miami @-@ Dade County is classified as tropical savanna in the Köppen @-@ Geiger system . Seasons may be divided into the November ? April dry season and the May ? October wet season . Dry season temperatures average between 66 and 76 ° F (19 and 24 ° C) with an average monthly rainfall of 2 @. @ 1 inches (53 mm) . Wet season temperatures average between 76 and 85 ° F (24 and 29 ° C) with an average monthly rainfall of 5 @. @ 39 inches (137 mm) . The wet season roughly coincides with hurricane season , with frequent thunderstorms .

Like many locations in southern Florida , Biscayne National Park is affected by hurricanes every few years . Most storms require temporary closings and occasional repairs to park facilities . A direct hit by a powerful hurricane can produce severe consequences , primarily by its impact on human interventions in the environment rather than on the natural environment of the park , which is well @-@ adapted to these events . Significant hurricanes to strike Biscayne include storms in 1835 and 1904 , the 1906 Florida Keys hurricane , the 1926 Miami hurricane , the 1929 Bahamas hurricane , the 1935 Labor Day hurricane , the 1935 Yankee hurricane , the 1941 Florida hurricane , the 1945 Southeast Florida hurricane , the 1948 Miami hurricane , Hurricane King in 1950 , Hurricane Donna in 1960 , . Hurricane Cleo in 1964 , and Hurricane Andrew in 1992 . The park can be affected by wave action from more distant tropical storms such as 2012 's Hurricane Sandy , which damaged facilities on Elliott Key .

On August 24 , 1992 , Hurricane Andrew came ashore just south of Miami , passing directly across Biscayne National Park with maximum sustained winds of 141 miles per hour (227 km / h) , with gusts to 169 mph (272 km / h) . The storm surge was up to 17 ft (5 @. @ 2 m) above mean sea level . It was a compact Category 5 hurricane on the Saffir @-@ Simpson Hurricane Scale . Biscayne Bay was affected by bottom scouring and turbidity and with damage to its fringes of mangrove forest . Leakage from damaged boats and marinas polluted the bay with fuel , with discharges continuing for nearly a month after the hurricane 's passage . A commemorative plaque was placed at the Dante Fascell Visitor Center in 2002 to commemorate the human and environmental cost of Andrew , and to celebrate the area 's recovery from the storm 's effects . The inscription reads in part :

On Monday , August 24 , 1992 , at 4 : 30 a.m. , the eye wall of Hurricane Andrew passed over this point before striking Homestead and southern Miami @-@ Dade County .

The Fowey Rocks light station transmitted weather data with winds peaking at a two @-@ minute wind speed of 127 knots (235 km / h) and a gust to 147 knots (272 km / h) before the station ceased transmitting , presumably due to damage from stronger gusts . The strongest part of the eyewall had not reached Fowey Rocks when it stopped transmitting .

Since all park lands are no more than a few feet above sea level , they are vulnerable to rising sea levels . Park Service studies project that much of the park 's land area will be lost in the next two hundred years . Sea level in Biscayne Bay is projected to rise between 3 and 7 inches (8 and 18 cm) by 2030 , and 9 to 24 inches (23 to 61 cm) by 2060 . A sea level rise of 3 to 6 inches (8 to 15 cm) is projected to increase saltwater intrusion into the Biscayne Aquifer . Higher rises will make the southern Everglades a saltwater marsh , altering the ecology of the region .