



Pinckney Island National Wildlife Refuge Interpretive Tour Guide Manual



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HOW TO USE THIS MANUAL

This manual was developed to give volunteer docents leading tours at Pinckney Island NWR the resources they need to provide visitors with an informative and meaningful experience that is in line with the standards of the U.S. Fish and Wildlife Service. It is not meant to be a script for volunteers to read from, but rather something that can be studied at the volunteer's leisure, giving them a basic, but thorough, understanding of the refuge, its wildlife and habitat resources, and its significance as part of the greater National Wildlife Refuge System. We intend for this to be a living document, so please feel free to make suggestions if you feel there are additional resources that can/should be added. Also, volunteers are welcome to create and maintain their own larger manuals, using this manual as the basis and then printing any additional resources to accompany it.

Below is a brief description of each section of the manual:

Suggested Tour Stops

These are spots along the tour route that would be ideal for stopping and giving a brief talk about a particular topic or topics. Each stop has a brief description of what should be talked about there, as well as the sections in the manual to refer to for each suggested topic.

Topic Synopses

For each topic, the volunteer is provided with some basic information that should allow them to give visitors a thorough overview of the Refuge and its wildlife and habitat resources. In some cases, this is information that Refuge staff feels is of highest priority for a visitor to leave with some knowledge of. For instance, as an agency, we like for our visitors to know where they are visiting (a National Wildlife Refuge, not a National or State Park), the significance of being a "National Wildlife Refuge" (wildlife first; which is why there are so few public amenities on most refuges), and who manages the land (the U.S. Fish and Wildlife Service [Federal government) and not South Carolina DNR [State government]). At the same time, the information provided in these synopses is meant to not be too overwhelming for either the volunteer to learn or for the visitor to absorb.

Additional Resources

The additional resources sections provides the volunteer with credible web sites where they can go to learn more about a particular topic associated with their Refuge tour. By "credible", we mean that there is a ton of misinformation on the internet; these are sites we know to be trusted sources of factual information. Volunteers are welcome to learn as much as they wish about any topic, but you may find that your tour participants will guide that as well by what topics seem to interest them and the questions they seem to ask the most.

SUGGESTED TOUR STOPS

Stop One – Kiosk: Tour participants should be given a background of the refuge so that they know that they are visiting a National Wildlife Refuge, who manages it, and what the management objectives are. Those able to walk over to the kiosk should do so. Here you have a map of the island, an image of Charles Cotesworth Pinckney and images of frequently encountered wildlife. The parking lot area is a Live Oak Sea Island Forest and species of live oak, sable palmetto, sweet gum and pine make up much of the canopy. Understory shrubs include yaupon holly. Good spot for song birds and woodpeckers.

Suggested topics for discussion:

- Refuge Establishment and Administration
- History of Pinckney Island
- Maritime Forest
- Geology and Geography

Stop Two – First Open Area: High marsh predominates and the western side has a nice stand of black needle rush. Also to the west and east are portions of a salt panne, an area of extreme salinity. The succulent plant, glasswort is seen growing here. Closer to the road is seen Marsh Elder, Pinus sp, saltgrass, and sea oxeye.

Suggested topics for discussion:

- Tides
- Plants of the Salt Marsh
- Importance of Spartina

Stop Three – Second Open Area: If desired, and tides are cooperative, it may be wise to stop where passengers can view the oysters growing in one of the small marsh creeks. At this stop an animal trail parallels the road. On the way here a wonderful yaupon holly grows on the east side. Southern Red Cedar can be seen growing on the land. Often a sizable wrack has accumulated in this area.

Suggested topic for discussion

- Animals of the Salt Marsh
- Salt Marsh Ecology
- Importance of the Salt Marsh
- Threats to the Salt Marsh

Stop Four – Shell Midden: Visible on the east side as you enter the section of the island just before Ibis Pond are the remnants of a Native American shell midden.

Suggested topic for discussion:

- Early inhabitants

Stop Five – Ibis Pond: Ibis Pond provides one of the best opportunities for birding and viewing reptiles. Depending on the time of year, the pond may be serving as a rookery for colonial nesting wading birds. Stands of wax myrtle surround the portions of the pond and the nearby woodland.

Suggested topics for discussion

- History of Ibis Pond
- What is a Rookery? (Colonial nesting birds)
- Alligator/Nesting Birds Relationship
- Bird Identification
- Wetland Plant Identification
- Butterfly Garden

Stop Six – Starr Pond: Depending on the amount of rainfall and the season of the year, Starr Pond may offer some species not seen at Ibis Pond.

Return Ride: A few announcements may be in order. They include, “We hope they have enjoyed the tour and we are pleased that everyone is returning safely”. You may to mention some of the highlights of the tour and quiz passengers about the things they liked. Remind them that there are over 560 National Wildlife Refuges throughout the United States, and encourage them to visit other refuges, including the other two accessible refuges in our Complex, Savannah and Harris Neck NWRs.

Then it may be time to talk about funding. Mention Friends and the fact that volunteers maintain the Refuge, since it is unstaffed. It is also time to mention again the Community Foundation of the Low Country and the grant that was so generously given to provide the golf cart. As a non-profit we still have expenses. Donations gratefully accepted.

REFUGE ESTABLISHMENT AND ADMINISTRATION

Pinckney Island NWR was established in 1975, by a Deed of Donation, *“as a wildlife refuge and as a nature and forest preserve for aesthetic and conservation purposes, without disturbing the habitat of the plant and animal populations except as such disturbance may be necessary to preserve the use of the real property for the purposes above mentioned” (Deed of Donation, December 4, 1975); and “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (16 U.S.C. 715d, Migratory Bird Conservation Act)*

Pinckney Island National Wildlife Refuge is managed by the U.S. Fish and Wildlife Service (Federal Government) and is part of a larger system of public lands called the National Wildlife Refuge System. It is one of over 565 National Wildlife Refuges located throughout the United States. There is at least one refuge in every state (even Puerto Rico!) National Wildlife Refuges are special places because on refuges, wildlife comes first! While other federal lands like National Parks and National Monuments are managed more for the benefit of people, National Wildlife Refuges focus on wildlife and habitat management and conservation. The Fish and Wildlife Service understands the vital role people play in its conservation mission, which is why most refuges are open to a variety of wildlife-dependent recreational activities like wildlife observation, photography, hunting, and fishing.

The primary management objectives for Pinckney Island NWR are:

- To protect and provide habitat for threatened and endangered species.
- To provide and maintain habitat for migratory and resident birds that utilize and or nest annually on the refuge.
- To provide, enhance, and maintain habitat for native wildlife.
- To promote wildlife interpretive and recreational opportunities.

Pinckney Island NWR is administered by the Savannah Coastal Refuges Complex, which also includes the following refuges:

- Savannah NWR (Jasper County, SC & Chatham & Effingham Counties, GA)
- Tybee NWR (Jasper County, SC)
- Wassaw NWR (Chatham County, GA)
- Harris Neck NWR (McIntosh County, GA)
- Blackbeard Island NWR (McIntosh County, GA)
- Wolf Island NWR (McIntosh County, GA)

While there is no staff directly assigned to Pinckney Island, the staff of the Savannah Coastal Refuges Complex supports all refuges within the Complex. The headquarters office for the Complex is located at the Savannah National Wildlife Refuge Visitor Center located in Hardeeville, SC. Staff and equipment resources are shared amongst all seven refuges which makes planning and prioritizing extremely important in order to achieve management goals.

In the absence of permanent staff on the refuge, Pinckney is fortunate to have a very dedicated group of volunteers who live in the area. These volunteers work very hard, keeping the refuge trails mowed and cleared, performing general maintenance, picking up trash, cleaning and repairing signs and exhibits, and assisting visitors.

PUBLIC USE / VISITOR SERVICES

Pinckney Island NWR, adjacent to Hilton Head, South Carolina, is an island of habitat surrounded by a "sea of development." There are approximately 200,000 visitors to Pinckney Island NWR annually, the most of any of the seven refuges in the Complex. The island is used exclusively as a nature and forest preserve. Deed restrictions put in place when the Pinckney Island NWR was established limit the ability of the refuge to provide some visitor services. Studying, viewing, and photographing the island's wildlife and scenery are the most popular activities throughout the year. Visitor facilities at Pinckney Island NWR include informational kiosks, interpretive exhibit panels, parking area, and trails.

Public use opportunities on Pinckney Island NWR include: wildlife observation and photography; hiking/biking/trails; environmental education/interpretation; and hunting and fishing.

Wildlife Observation and Photography

Studying, viewing, and photographing the island's wildlife and scenery are popular activities throughout the year. There are nine named trails, all originating at the parking area near the refuge entrance. There are 14 miles of trails open to hiking and bicycling; however, no motorized vehicles are allowed north of the parking area. Wildlife viewing is best during the spring and fall months when migrations are at their peak.

Environmental Education and Interpretation

Requests for environmental education programs and interpretive tours for school, civic and conservation groups are handled on a case by case basis. These tours are generally given by refuge staff and/or trained refuge volunteers and therefore require a minimum of two weeks' notice.

Guided interpretive tours for the general public can be arranged through our special use permit holders. These tours are provided by private, commercial, or non-profit organizations that maintain a permit with the Service in order to conduct business on the refuge. Currently, there are three permit holders for Pinckney Island NWR who offer guided interpretive tours: Coastal Discovery Museum, Disney's Hilton Head Island Resort (tours for their guests only), and Wilderness Southeast (based in Savannah, GA).

Hunting and Fishing

Annually, the refuge hosts a one-day deer hunt to ensure that population numbers remain in balance with the surrounding habitat. Applications for this hunt must be received at the SCRC headquarters office by August 31, after which time 80 permits are drawn. The refuge is closed to the general public on the day of this hunt which is typically held in early November.

Sport fishing on Pinckney Island NWR is permitted year-round in the estuarine waters adjacent to the refuge. However, freshwater fishing is not allowed. South Carolina saltwater fishing license is required.

REFUGE HISTORY

Pinckney Island NWR is archaeologically rich, with numerous prehistoric and historic sites identified. Analysis of the prehistoric sites indicate human occupation dating from the Archaic Period (8000 - 1000 BC), with intensive use during the Mississippian Period (1000 - 1500 AD). Evidence of these early residents can be found in shell middens located on the island.

Historic artifacts indicate that small-scale, impermanent settlements were made on Pinckney by French and Spanish groups in the 16th and 17th centuries. Permanent settlements did not occur until 1708 when Alexander Mackay, an Indian trader, obtained title to 200 acres of Pinckney Island. By 1715, Mackay had acquired the rest of Pinckney and most of the other islands which compose the present refuge. In 1736, Mackay's widow sold the islands to Charles Pinckney, father of General Charles Cotesworth Pinckney. General Pinckney was a commander during the Revolutionary War, a signer of the United States Constitution and, in 1804 and 1808, a presidential candidate. Pinckney was an absentee landowner until 1804, when he moved to the island and began managing the property. The Pinckney family developed the islands into a plantation, removing much of the maritime forest and draining and tilling the fertile soil.

The plantation flourished until the Civil War when it was occupied by Union Troops. Small skirmishes took place on Pinckney Island. The most significant incident occurred on August 21, 1862, when the Confederate Beaufort Light Artillery/11th Infantry attacked the camp of Company H, Third Regiment, New Hampshire Volunteers, killing four Union soldiers and wounding ten men (eight Confederate, two Union). Army records also reflect that black troops were recruited for the Union Army from the area. Five military (U.S. Colored Infantry) headstones are located in a cemetery on the northwest side of Pinckney Island, indicating the possibility that slaves living on the plantation during the Civil War were recruited by the United States Army.

After the war, the plantation did not prosper, and by the 1930s, was virtually abandoned. In 1937, after over 200 years of Pinckney ownership, the plantation was sold to Ellen Bruce, wife of James Bruce, a New York banker who used the property as a hunting preserve. Hardwoods and pines were planted, ponds were built to attract waterfowl and for irrigation, and 70 percent of the farm fields were placed back into cultivation.

Edward Starr and James Barker purchased the islands in 1954 and continued to manage them as a game preserve. In 1975, the islands were donated to the Service to be managed exclusively as a national wildlife refuge and as a nature and forest preserve for aesthetic and conservation purposes.

REFUGE HABITATS

The 4,053-acre Pinckney Island NWR includes Pinckney Island, Corn Island, Big Harry and Little Harry Islands, Buzzard Island, and numerous small hammocks. All together, the refuge is 2,729 acres of salt marsh and tidal creeks, 274 acres of forest, 240 acres of brush, 100 acres of grassland and fallow fields, 60 acres of roads and administrative land, and 38 acres of freshwater ponds; which collectively support a diversity of bird and plant life.

Pinckney Island NWR has several unique/threatened habitats: maritime forest, slash pine, saw palmetto, ephemeral wetlands, and bluff oak associated with magnolia and spruce pine. The north end of Pinckney Island NWR, including many small hammocks, is dominated by live oak with water oak, loblolly pine, and cabbage palm; secondary species include hickory, pecan, magnolia, sweet gum, red cedar, and lesser numbers of maple, southern red oak, laurel oak, sassafras, hackberry, redbud, and winged elm. A small number of longleaf, loblolly, and slash pine stands are located throughout the refuge. Brush and hedge rows are dominated by wax myrtle and sweet gum with lesser amounts of sassafras, sumac, sycamore, and black cherry. The salt marsh consists primarily of salt marsh cord grass. Other typical vegetation found in a narrow band around the islands and in the higher marsh hammocks includes glasswort, black needlerush, and sea oxeye.

Freshwater habitat on Pinckney Island NWR is limited to approximately 38 acres. There are between 30-50 small ponds/depressions, ranging from 0.5-acre up to 4 acres, which hold water during wetter periods of the year. Most of the named ponds (Ibis, Starr, Osprey, Nini Chapin, and Clubhouse) are man-made, not natural wetlands, which makes them even more susceptible to the effects of drought.

Maritime Forest

Crossing into the back dunes and beyond of the barrier islands, you will enter the realm of the maritime forest. The maritime forests of the southern coast are as unique and enchanting as any other forest in the United States. The intricately gnarled Live Oaks (*Quercus virginiana*) cloaked in Spanish Moss (*Tillandsia usneoides*) and Resurrection Fern (*Polypodium polypodioidies*) and surrounded by Saw Palmetto (*Serenoa repens*) seem to be relics of a slower and quieter past.

The spreading canopy of Live Oak, Southern Pine (*Pinus* sp.), Southern Magnolia (*Magnolia grandifolia*) and Cabbage Palm (*Sabal palmetto*) temper the harsh forces of wind and water that assault the dunes and beaches. Temperatures and winds are moderated under the tree canopy, which increases moisture levels and allows a dense understory of herbs and shrubs to develop.

Spanish Moss and Resurrection Fern are both epiphytes, plants that live on other plants entirely independent of the soil. Typically epiphytes require humid environments where they can absorb moisture directly from the atmosphere, so they are more common in the humid tropics than temperate regions.

In the understory dense clusters of Saw Palmetto provide excellent hiding places for Eastern Diamondback Rattlesnakes (*Crotalus adamanteus*), a shy and elusive predator vital to the maritime forest ecosystem.

Salt Marsh

Salt marshes are a mosaic of snaking channels called tidal creeks that fill with seawater during high tides and drain during low tides. Fish species including flounder and mullet live most of their lives in marsh creeks.

Levees are areas of higher ground that border the marsh creeks. Between the levees and tidal creeks are marsh flats, which contain pools and salt pannes. Salt pannes are shallow depressions that contain very high concentrations of salt. Pannes retain seawater for very short periods of time. When the seawater evaporates, the

salts remain and accumulate over many tidal cycles. Glasswort, a plant tolerant to very high salt concentrations, is one of the only organisms able to survive in salt pannes. Pools are generally deeper than pannes, and retain water all year long (Molles, 2002). Salt-marsh snails and green crabs are some of the creatures found in pools scattered across the marsh.

Low-lying areas of the marsh are often covered with large, flat expanses of mud called mud flats (Bertness, 1999; Smith and Smith, 2000). Composed of fine silts and clays, mud flats harbor burrowing creatures including clams, mussels, oysters, fiddler crabs, sand shrimp, and bloodworms.

Salt marshes are salty because they are flooded by seawater every day. They are marshy because their ground is composed of peat. Peat is made of decomposing plant matter that is often several feet thick. Peat is waterlogged, root-filled, and very spongy. Because salt marshes are waterlogged and contain lots of decomposing plant material, oxygen levels in the peat are extremely low—a condition called hypoxia. Hypoxia promotes the growth of bacteria which produce the rotten-egg smell that is attributed to marshes and mud flats.

Salt marshes are covered with salt-tolerant plants, or halophytes, like salt hay, black needlerush, and smooth cordgrass. However, these plants do not grow together in the same area. Marshes are divided into distinct zones, the high marsh and the low marsh. The difference in elevation between these two areas is usually only a few centimeters, but for the plants that inhabit each of these zones, a few centimeters makes a world of difference. The low marsh floods daily at high tide. The high marsh usually floods about twice a month during very high tides associated with new and full moons. The more often an area is flooded, the more saline it is. Plants living in salt marshes have different tolerances to salt. Those with higher tolerances are found in the low marsh, and those with lower tolerances to salt are found in the high marsh zones. Plants from one marsh zone are never found in the other.

Smooth cordgrass (*Spartina alterniflora*) dominates the low marsh all the way down to the estuary's edge. It is tall, sturdy, broad-leaved, and one of the main components of peat. As one moves toward the high marsh, salt hay (*Spartina patens*), a very fine-leaved grass about 1-2 feet tall, and spike grass (*Distichlis spicata*) dominate the area. The highest parts of the marsh are characterized by black needlerush (*Juncus roemerianus*), which grows in dense swaths.

Surrounding the high marsh are the upland habitats. Uplands are rarely, if ever, flooded with saltwater.

Freshwater Ponds

Pinckney Island NWR has approximately 38 acres of freshwater habitat, comprised of between 30 and 50 small ponds/depressions, ranging from one-half acre up to 4 acres in size. Many of these only hold water during wetter periods of the year. A few, however, hold water throughout the year and provide excellent roosting and nesting habitat for colonial wading birds like egrets, ibis, and herons. These birds nest on the small islands within the ponds, and the water surrounding the sites deters mammalian predators like raccoon from entering nests. Alligators patrolling these waters frequently provide an additional deterrent. Ibis Pond, which is just a mile walk from the refuge parking area, is a popular site for viewing wading birds and other pond life.

Ibis Pond

Ibis Pond, originally a borrow pit, was constructed in 1979-80 through a partnership with a local highway contractor who was working on the new bridge to Hilton Head Island. The contractor was permitted to remove fill dirt needed for the project, and in exchange, constructed the pond to specifications set by the refuge manager. The pond is approximately two acres in size and contains one small island. It has at times over the years supported one of the most productive colonial wading bird rookeries in the state. This productivity is totally dependent upon the availability of water though. In years of drought, even with the addition of a pump system donated by former refuge

volunteer Nini Chapin, water levels in Ibis Pond have gotten so low that the rookery all but disappeared for several years. Low water means no alligators patrolling the nesting island and trees, leaving the nests vulnerable to raccoons and other predators. For the past several years, the pond has been experiencing a period of good productivity with water levels remaining fairly constant and sufficient enough to attract nesting birds.

Butterfly Garden

Located between the main road and Ibis Pond, a butterfly garden was planted in 2007 through a partnership forged between a former refuge volunteer, a local Hilton Head Island High School teacher, and the Hilton Head Audubon Society. Student's from the school's Environmental Club conducted research to determine the best plants to use, taking into consideration factors like avoiding invasive and/or exotic plants and using native plants that are drought and deer resistant, as well as good attractors for butterflies. Refuge volunteers prepared the garden site prior to the students joining them for the planting. A pump system was installed later, by refuge staff, to provide volunteers an easier way of watering the garden. Since planting, the routine maintenance of the garden has been conducted by the Lowcountry Master Gardener's Association. Throughout the summer and early fall months, the garden flourishes and changes colors, attracting around 20 species of butterflies. On the massive passion vine planted on the garden's trellis, visitors can view all four stages of the life cycle of the Gulf Fritillary.

REFUGE WILDLIFE

A variety of wildlife species occurs on the refuge, including a number of species federally listed as endangered, threatened or as species of concern. Two federally listed endangered and threatened species known to occur within the boundary of the refuge are the wood stork, which feed and roost on the refuge but do not nest, and the West Indian manatee, which occurs in waters adjacent to the refuge and are frequently sighted near Daws Island and in Port Royal Sound.

The refuge bird list contains over 250 species. The most popular and colorful is the painted bunting, a common summer resident on the island and in brushy habitat throughout the area. In fall and early winter, warblers are common among the live oaks and in the scrub/shrub habitat. Waterfowl, shorebirds, wading birds, raptors, and neotropical migratory birds are common on the refuge—Pinckney Island NWR is one of the best places in South Carolina to see breeding yellow-crowned night herons. Other species of wading birds breeding on the refuge include: great egret, snowy egret, white ibis, tri-colored heron, little blue heron, and black-crowned night heron. These breeding birds are joined in summer by a few non-breeding wood storks.

A variety of reptiles and amphibians occur on the refuge and in the waters in the immediate vicinity. American alligators are a common sight, especially around the refuge's freshwater ponds.

Some of the more common snake species seen on the refuge include:

- Black racer
- Red rat snake (corn snake)
- Yellow rat snake (chicken snake)
- Eastern garter snake
- Rough green snake
- Cottonmouth (water moccasin)

Mammals common to the refuge include:

- White-tailed deer
- Bobcat
- Raccoon
- Opossum
- Eastern gray squirrel
- Fox squirrel
- River otter
- Red fox

BREEDING BIRDS AT IBIS POND

| | Name | Food | Nest | Eggs | Incubation | Nesting Period | Broods | Courtship, etc. |
|---|----------------------------|--|--|--------------------------------|--------------------|----------------|--------|--|
| Heron & Egrets – breed at 2-3 years old | Great Egret | Mostly fish, but also crustaceans, frogs, salamanders, snakes, and aquatic insects | Male builds platform and either he or both will complete | 1-6 pale greenish-blue | 23-27 days by both | 21-25 days | 1 or 2 | Includes stretching neck, pointing bill skyward, circular flights, and calls. Patch of skin on face turns neon green and long plumes grow on back |
| | Snowy Egret | Fish, insects, and crustaceans | Male starts and female takes over; male brings sticks | 3-5 (2-6) pale greenish-blue | 24-25 days by both | 21-25 days | 1 | Includes pointing bill up, raising plumes and pumping head up and down while calling. Also, circular flights; flies high, then tumbles down. Grows curvy, wispy plumes on their heads, necks and backs. Bare skin on face changes from yellow to reddish |
| | Great Blue Heron | Variable - mostly fish, but also frogs, salamanders, turtles, snakes, rodents, birds, insects, etc. | Male brings sticks; female builds nest | 3-5 (2-7) pale blue | 25-30 days by both | 49-79 days | 1 or 2 | Includes stretching neck with bill pointed skyward, circular flights w/ neck extended, stretching neck with head and neck feathers erected, then snapping bill |
| | Little Blue Heron | Mostly fish and crustaceans. Also, insects, tadpoles, frogs, snakes, etc. | Male brings sticks - female builds nest, male may assist | 3-4 (1-6) pale bluish green | 22-23 days by both | 35-49 days | 1 | Neck stretching and bill snapping. Pairs may nibble at each other's plumage, and cross and intertwine necks |
| | Tricolored Heron | Mostly fish. Also insects, tadpoles, frogs, lizards | Male selects site and brings female sticks. Female builds nest | 3-4 (2-7) pale blue green | 21-25 days by both | 15 -21 days | | Male displays on nest site with neck stretching and head bowing. Also circular display flights |
| | Green Heron | Mostly fish and crustaceans. Also, insects, tadpoles, frogs, grasshoppers, snakes | Male starts and female takes over; male brings sticks | 3-5 (2-7) pale green to bluish | 19-21 days by both | 16-17 days | 1 or 2 | Includes stretching neck forward and down and snapping bill, and pointing bill up while swaying back and forth. Both may perform display flights |
| | Yellow-crowned Night-Heron | Mainly crabs, also mollusks, frogs, insects, and fish. Inland, more variable | Both - male carries sticks to female then both complete nest | 4-5 (2-8) pale bluish green | 24-25 days by both | 30-43 days | 1 | Includes neck stretches with bill pointed up, crouching with plumes erected, and giving a loud call. Pairs greet each other with raised crests, calling, touching bills and nibbling at each other's feathers |
| | Black-crowned Night-Heron | Mostly fish, but variable and includes crustaceans, aquatic insects, frogs, snakes, clams, mussels, eggs and young birds | Male starts and female takes over; male brings sticks | 3-4 (1-7) greenish blue | 24-26 days by both | 29-34 days | 1 | Includes stretching neck up and forward with feathers ruffled and slowly bowing while raising feet alternately. Also giving hissing buzz at lowest point in bow |

BREEDING BIRDS AT IBIS POND

| | | | | | | | | |
|-----------------------|------------------|---|--|---|----------------------|---|--------|---|
| 2 years | White Ibis | Crustaceans – crayfish and crabs, but also snails, frogs, worms, small fish | Male brings sticks – female builds most of nest | 2-3 (5) pale blue green (to white) blotched with brown | 21 days by both | 21 days | 1 | Male will conduct ritual preening, leaning and grasping sticks in bill, and will point bill skyward and lower head on back. |
| | Anhinga | Mostly fish, with a small amount of invertebrates and crustaceans. Sometimes snakes and small turtles | Male begins nest before attracting a mate. Male will bring sticks and female completes the nest. Excrement builds up on the nest edge so it may look white | 4 (2-5) whitish to pale blue, and becoming nest-stained | 25-29 days by both | 21 days, but young may leave after 14 days if disturbed, at least temporarily | 1 | Includes waving wings, raising of tail up over back, pointing bill up and then bowing deeply |
| Coots & Rail – 1 year | American Coot | Mostly leaves, stems, and seeds. Also insects, tadpoles, small fish and eggs of other birds | Floating nest set in dense stands of reeds, cattails, grasses, etc. Built by both. Several platforms may be built - one or two used | 8-12 buff pink or gray, with brown or black spots | 23 - 25 days by both | 6 hours! | 1 or 2 | Male pursues female through water. Swims with head and neck lowered, wings arched and tail raised to show white patches |
| | Common Gallinule | Leaves, stems and seeds of grasses and sedges - some insects and snails | Floating bowl of grasses and sedges anchored to vegetation. | 3-15 gray or buff with speckles & splotches | 19-22 days by both | Begin to swim shortly after hatching | 1 or 2 | Male chases female, both stop, bow deeply and preen. May also lower head and raises tail, exposing white patches under tail |

Notes:

When eggs hatch, young will emerge

- In herons, egrets, ibis, and anhinga – **Altricial** (or semi-altricial) – meaning young are nearly naked, eyes closed, and helpless.
- In American coot and Common gallinule – **Precocial** – meaning born with down and soon mobile, needing little direct care.

| | | | | | | |
|--|--|---|---|--|---|--|
| American Alligator (Largest reptile in N.A.) up to 14 feet and 500 lbs., 80 teeth that are replaced when worn down | Adult eats fish, turtles, snakes, small mammals and carrion, mostly in the water | Reaches breeding age at around 10 years. Mates in late spring. Female builds mound of grass and mud – up to 3 ft. high, then digs a depression with back legs in top of mound to deposit eggs | 35-50 eggs Incubated at 82-86° F = females 90-93° F = males | Incubated by outside temperature for a little over a month | Young begin to squeal just before hatching telling female it's time to remove top vegetation. She carries them in mouth or on back to water | Male attracts female and wards off other males with a loud roar. Male butts against female and taps her snout with his. Female aggressively defends young in first year. Young eat insects, shrimp, tadpoles, frogs, and small fish. Alligators can live 35 years in the wild. |
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GEOLOGY AND GEOGRAPHY

Pinckney Island is found in South Carolina's Coastal Plain which makes up two thirds of the State's land mass. Here Mesozoic and Cenozoic sediments and sedimentary rock overlay the crystalline rocks of the Piedmont. Running along South Carolina's coast from Horry County southward are the barrier islands and the more interior islands, known as sea islands. These sea islands are older than the ocean facing barrier islands and islands such as Pinckney were formed during the Pleistocene Epoch, which ended about 10,000 ybp. The Pleistocene Epoch was a time of sea level rise and fall.

Quoting from a UGA publication:

"These islands were shaped before the last great continental ice sheet formed. At that time when sea level was about 6 feet above the present sea level, the beaches of the older islands formed. During the last freeze of the Pleistocene Epoch so much seawater was frozen that the sea level was lowered by 300 to 500 feet. At this time shoreline was nearly 80 miles offshore from the shoreline we have today."

From Carolina Rocks, by Carolyn Hanna Murphy we learn

- Sea Islands are formed out of mainland sediments that were surrounded by water as sea levels rose.
- Some barrier islands attached to these isolated pieces of mainland
- Soils are rich enough to support forest of hardwood and pine as well as supporting farming. On these islands with a long growing season the famed long island cotton was grown.

Located at 32.2 N and 80.76W, between Hilton Head Island and the mainland, Pinckney NWR is bounded on the east by Skull Creek and on the west by Mackay Creek. Both of these bodies of water are saline. The climate of Pinckney Island is humid subtropical; average rainfall amounts are 50 inches per year with the summer months being the wettest.

ADDITIONAL RESOURCES

U.S. Fish and Wildlife Service / National Wildlife Refuge System

<https://www.fws.gov>

<https://www.fws.gov/refuges>

Wildlife

Species Information (Mammals/Fish/Reptiles & Amphibians)

<http://www.dnr.sc.gov/wildlife/species.html>

Species Information (Birds)

<https://www.allaboutbirds.org/guide/search>

Colonial Nesting Birds

<http://www.dnr.sc.gov/cwcs/pdf/Colonialnestingwadingbird.pdf>

Species Information (Plants and trees)

<https://plants.usda.gov>

Species Information (Butterflies and moths)

<http://www.butterfliesandmoths.org/gallery>

Invasive Species

<https://www.fws.gov/invasives>

Habitat Types

Salt Marsh: A wonderful discussion of plants along the salt marsh and its upper regions

http://www.clemson.edu/extension/hgic/water/resources_stormwater/life_along_the_salt_marsh_protecting_tidal_creeks_with_vegetative_buffers.html

History

Charles Cotesworth Pinckney

<http://www.let.rug.nl/usa/biographies/charles-cotesworth-pinckney/>

Eliza Lucas Pinckney

<http://www.encyclopedia.com/people/history/historians-miscellaneous-biographies/eliza-lucas-pinckney>

<http://cwh.ucsc.edu/SocialBiog.Martin.pdf>