# Snowy Egret and White Ibis

*Egretta thula, Eudocimus albus*

*Snowy egret (left) and white ibis (right). Photographs by FWC.*

## Species Overview

**Status:** Removed from Florida's Endangered and Threatened Species List.

**Current Protections**

68A-4.001, F.A.C., General Prohibitions — No wildlife or freshwater fish or their nests, eggs, young, homes or dens shall be taken, transported, stored, served, bought, sold, or possessed in any manner or quantity at any time except as specifically permitted by these rules nor shall anyone take, poison, store, buy, sell, possess or wantonly or willfully waste the same except as specifically permitted by these rules.

68A-1.004, F.A.C., Take — The term shall include taking, attempting to take, pursuing, hunting, molesting, capturing, or killing any wildlife or freshwater fish, or their nests or eggs by any means whether or not such actions result in obtaining possession of such wildlife or freshwater fish or their nests or eggs.

68A-16.003 (1), F.A.C., — Take of birds, nests, and eggs is prohibited pursuant to 68A-4.001, F.A.C., without a permit or authorization, except as authorized in Commission-approved guidelines.

Snowy egrets and white ibises, their active nests, eggs, and young are also protected under the Federal Migratory Bird Treaty Act and state Rule 68A-16.001, F.A.C.

## Biological Background

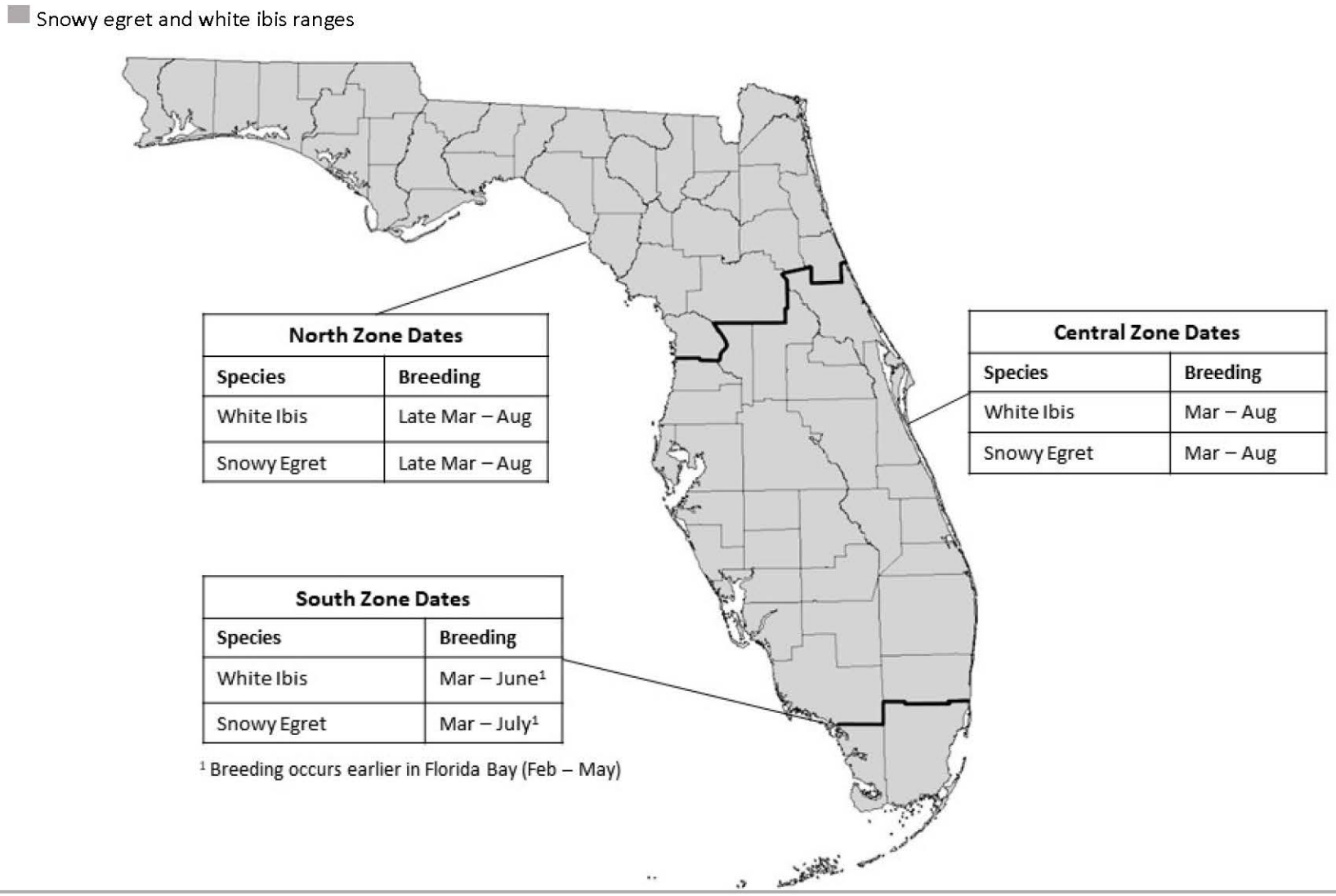
This section describes the biological background for these species and provides context for the following sections. It focuses on the habitats that support snowy egrets and white ibises, and the threats faced by both species.

The snowy egret (*Egretta thula*) and white ibis (*Eudocimus albus*) were removed from Florida's Endangered and Threatened Species List in 2017. Both wading bird species are year-round residents in Florida and are found throughout the state (Greenlaw et al. 2014, Florida Ornithological Society, unpublished data). For more information about life history and conservation actions for snowy egrets and white ibises, please refer to A Species Action Plan for Six Imperiled Wading Birds (FWC 2013).

The following terms, as defined below, are used throughout these guidelines:

- **Active nest**: A nest that contains eggs or flightless young.
- **Inactive nest:** A nest that does not contain eggs or flightless young.
- **Breeding site**: The area used by wading birds for breeding, including the substrate (e.g., vegetation) supporting nesting and the shallow, open areas immediately adjacent to (i.e., within 50 ft [15 m] of) the nesting substrate. Adjacent shallow areas are important for young birds after they leave the nest and before they are capable of leaving the breeding site (Rodgers and Nesbitt 1980). Not all breeding sites will have shallow, open areas within 50 ft of the nest substrate. There is high interannual variability in breeding effort by wading birds, and some breeding sites are not used every year.
- **Colony:** Refers to breeding sites that contain more than one nesting pair of birds.
- **Active breeding site**: A breeding site with one or more active nests.

## Snowy Egret and White Ibis Ranges and Breeding Seasons by Zone




| North Zone Dates | |
|---|---|
| **Species** | **Breeding** |
| White Ibis | Late Mar – Aug |
| Snowy Egret | Late Mar – Aug |

| Central Zone Dates | |
|---|---|
| **Species** | **Breeding** |
| White Ibis | Mar – Aug |
| Snowy Egret | Mar – Aug |

| South Zone Dates | |
|---|---|
| **Species** | **Breeding** |
| White Ibis | Mar – June[1] |
| Snowy Egret | Mar – July[1] |

[1] Breeding occurs earlier in Florida Bay (Feb – May)

*Figure 1*. Breeding season dates for delisted wading birds in different zones of Florida (Kushlan 1973, Kushlan 1977, Maxwell and Kale 1977, Cook and Baranski 2017, 2018; Anderson 2018; personal communications with G. Anderson, V. Doig, P. Frederick, J. Lorenz, A. Paul, K. Smith, M. van Deventer, R. Zambrano).

Snowy egrets and white ibises commonly nest in mixed-species colonies (Frederick and Collopy 1989*a*, Heath et al. 2009, Cook and Baranski 2017, 2018) and may be found nesting with state-Threatened wading birds such as the little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), reddish egret (*Egretta rufescens*), and roseate spoonbill (*Platalea ajaja*). See Species Conservation Measures and Permitting Guidelines for State-Threatened Wading Birds for information on wading bird colonies with state-Threatened species present. The breeding season for the snowy egret and white ibis varies by species and by location across the state (Figure 1).

Both snowy egrets and white ibises rely on wetland and small island habitats for nesting. They build nests of sticks, twigs, and finer materials in trees and shrubs (or occasionally herbaceous vegetation for white ibises; FWC 2003). Nests are typically on islands or over standing water (FWC 2003). Snowy egrets and white ibises nest in a variety of woody vegetation such as mangrove species (*Avicennia*, *Laguncularia* and *Rhizophora*), cypress (*Taxodium distichum*), red maple (*Acer rubrum*), willow (*Salix* sp.), buttonwood (*Conocarpus erectus*), and Brazilian pepper (*Schinus terebinthifolius;* Maxwell and Kale 1977, Girard and Taylor 1979, Parsons and Master 2000, Heath et al. 2009). White ibises occasionally nest in clumps of matted down vegetation such as sawgrass (*Cladium jamaicense*), cattail (*Typha* sp.), and black needlerush (*Juncus roemarianus;* Ogden 1996, Kushlan 1973, Frederick 1987). Water surrounding breeding sites impedes mammalian predators, which can prey upon offspring and cause abandonment of entire colonies (Frederick and Collopy 1989*a*). Wading birds often reuse breeding sites when conditions remain favorable, with some breeding sites used every year across multiple years (Cook and Kobza 2010, 2011, 2012; Cook 2013, 2014, 2016; Cook and Baranski 2017, 2018;). Interannual variability in breeding effort by wading birds often results from variation in water levels (Frederick and Ogden 2001), and many breeding sites are not used every year.

For both species, the nesting cycle takes approximately 2 to 3 months from egg-laying to juvenile independence and dispersal from the colony. The snowy egret incubates eggs for 3 weeks, and flightless young begin exploring branches near the nest as early as 10 days after hatching. Young birds remain near the colony for up to 8 weeks after hatching (Maxwell and Kale 1977). White ibises incubate eggs for 3 weeks after the last egg is laid (Heath et al. 2009). Young white ibises move out of the nest within 2 weeks of hatching but do not leave the colony until 7-10 weeks of age (Semones 2003, Heath et al. 2009).

Both snowy egrets and white ibises forage in shallow, open areas, and specialize on feeding in areas with a high concentration of prey (Gawlik 2002). White ibises search for prey tactilely in flocks and forage most efficiently in water depths from 2 to 4 inches (5 to 10 cm; Gawlik 2002, Heath et al. 2009). White ibises mainly consume aquatic prey, such as crustaceans and small fish (Kushlan 1977 Gawlik 2002, Dorn 2008). Snowy egrets primarily consume crustaceans and fish and use a variety of hunting tactics to flush prey, such as foot-stirring and wing flapping during active pursuit (Willard 1977, Stevenson and Anderson 1994). Snowy egrets mostly forage in shallow, brackish marine habitats, such as coastal estuarine and coastal freshwater marsh habitat (Willard 1977, Custer and Osborn 1978). Inland, snowy egrets forage in freshwater marsh and other wetland habitats (Parsons and Master 2000).

Wading birds require wetlands with variation in hydroperiods to ensure access to adequate year-round forage (Gawlik 2002). Gradual "dry-down" periods can create shallow water areas (less than 5 inches [13 cm]) that concentrate prey for foraging birds as water levels recede (Lorenz 2014). Receding water levels that concentrate prey are important for both snowy egrets and white ibises (Gawlik 2002). An increase in water depth or drought during the breeding season reduces prey availability and causes low productivity for both species (Frederick and Collopy 1989, Strong et al. 1997). When hydrological or vegetative conditions are not conducive to effective foraging, white ibises also prey upon ground arthropods in soft soils or lawns in urban settings, although this may decrease their productivity (Herring et al. 2010, Dorn et al. 2011).

### Threats

The snowy egret and white ibis were previously listed as Species of Special Concern. Biological Status Reviews

(BSR) for both species were published in 2011 and found that neither met the criteria for state listing in Florida (FWC 2011*a*, FWC 2011*b*). Although population trends have stabilized for the snowy egret and white ibis, current threats to habitat and breeding sites remain a concern. Major threats identified in a Species Action Plan for Six Imperiled Wading Birds (FWC 2013) include loss of wetland habitat; habitat degradation due to changes in hydrology, water quality, and invasive non-native vegetation; disturbance at breeding sites; and elevated populations of native and non-native nest predators.

Loss and degradation of wetlands to development and other activities is a continuing threat for the snowy egret and white ibis. The alteration of the natural hydrology of wetlands reduces habitat quality and quantity (Lorenz 1999, Lorenz 2014). Both species face unique challenges due to their use of urban environments. For example, exposure to heavy metals and pesticides can impair reproduction (Frederick and Jayasena 2010, Jayasena et al. 2011). White ibises foraging in urban environments may consume lower quality food items and garbage (Dorn et al. 2011), and entanglement in fishing line regularly causes mortality at monitored wading bird colonies (Cook 2016, Cook and Baranski 2017, Cook and Baranski 2018).

Actions that result in altered hydrology, nutrient enrichment or input of environmental contaminants, or that otherwise affect the timing, quantity, distribution, or quality of water in wetlands can have significant impacts on wading bird foraging and breeding success. For example, certain water management practices can result in higher salinity in estuaries, which can result in reductions in prey populations (Paul 1996, Lorenz 1999, Lorenz and Serafy 2006). Reducing water depth around nesting colonies can make them vulnerable to mammalian predators, and rapid increases in water levels in nearby foraging habitat can induce colony abandonment due to a decrease in prey density (Rodgers 1987, Frederick and Collopy 1989*a*, *b*). Shallow coastal sites may become inundated due to a rise in sea level causing a decrease in available quality habitat (Zhang 2011).

Human disturbance is a significant threat for nesting wading birds. In response to disturbance, nesting birds may leave eggs and young unattended, thereby exposing eggs and young to predators, sun, and cold (Tremblay and Ellison 1979). White ibises often desert nests when disturbed before egg-laying (Heath et al. 2009) and nestling white ibises greater than 14 days old are prone to leaping from the nest when disturbed, which can lead to mortality (P. Frederick, personal communication). Take is expected to occur from actions that intentionally flush adults or nestlings from their nest or that intentionally flush young birds that are not flight-capable from the vegetation immediately surrounding the nest. Examples of activities that may flush birds from their nests or the vegetation immediately surrounding the nest include boating traffic, equipment operation, or passive recreational activities (e.g., wildlife viewing, paddling, photography, etc.; Rodgers and Smith 1995, Carlson and McLean 1996, Carney and Sydeman 1999, Bouton et al. 2005, Livezey et al. 2016).

Wading bird colonies are vulnerable to predators such as raccoons, snakes, fish crows, and laughing gulls (Frederick 1987, Rodgers 1987, Frederick and Collopy 1989*b*). Trash near the colonies attracts some predators and may increase the vulnerability of the colony. In the Everglades, recent observations of Burmese pythons preying on wading bird nests suggest that pythons could present a significant future threat to wading birds (Orzechowski et al. 2019).

## Distribution and Survey Methodology

The map in Figure 1 represents the geographic range of the snowy egret and white ibis in Florida.

**Counties:** All counties in Florida.

### Recommended Survey Methodology

Surveys are not required but are highly recommended in the circumstances described below. Snowy egrets and white ibises often nest in mixed-species colonies, which could include state-Threatened wading birds. Little blue herons and tricolored herons, for example, may be present in small numbers in a large colony

dominated by white ibises or snowy egrets. An initial site review is recommended to identify if potential wading bird nesting habitat is present on site or within 330 ft (100 m) of the site. In many cases, the initial site review is conducted as part of a permitting process for another agency (e.g., the Department of Environmental Protection's Environmental Resource Permit process). An initial site review consists of a desktop analysis and a field visit. FWC has two resources that may be useful in an initial desktop analysis to determine if a documented breeding site is present:

1. FWC's Historic Water Bird Colony Locator includes data from surveys in the 1970s-1990s, and
2. FWC's Wading Bird Guidelines Data includes recent breeding sites occupied by tricolored herons, little blue herons, reddish egrets, and roseate spoonbills. Snowy egrets and white ibises often nest in mixed-species colonies with these listed species.

Applicants should be aware that the FWC resources above do not offer comprehensive, statewide coverage of all breeding sites, and an active breeding site may still be present on a project area even if one or both of these two resources indicate that no breeding site is present. If the initial field visit discovers potential nesting habitat on an adjacent property within 330 ft of project activities, contacting the adjacent landowner is recommended because the landowner may have information on the presence and location of a recent or active breeding site on their property.

If the initial site review indicates that potential wading bird nesting habitat is present, surveys using the methodology described in Species Conservation Measures and Permitting Guidelines for State-Threatened Wading Birds are highly recommended to determine if an active breeding site is present that contains state-Threatened wading birds. During the surveys, note if white ibises, snowy egrets, or other species protected under the Federal Migratory Bird Treaty Act and state Rules 68A-4.001 and 68A-16.001, F.A.C., are present, and if they are exhibiting breeding behavior. If active nests are observed, see the Prohibitions and Permitting section below on how to plan activities to avoid a wildlife violation.

## Recommended Conservation Practices

Recommendations are general measures that could benefit the species but are not required. No FWC permit is required to conduct these activities. For additional actions that benefit wading birds, please see the Species Action Plan for Six Imperiled Wading Birds (FWC 2013) and Species Conservation Measures and Permitting Guidelines for State-Threatened Wading Birds.

- Avoid actions that result in loss or modification of habitat within breeding sites or that render a breeding site unsuitable for breeding (e.g., via disturbance or changes in water quantity or quality).
- Maintain wetlands of different hydroperiods on the landscape to ensure access to adequate year-round forage.
- Maintain a 330 ft (100 m) buffer around active nests to reduce disturbance.
- Maintain a 200 ft (61 m) buffer (in vertical height as well as horizontal distance) from an active nest when operating an unmanned aerial system (UAS) or remotely-controlled boat (see Appendix A for best practices when flying UAS near birds). Please note that approaching or entering a colony to retrieve a UAS that has landed or crashed could result in take, which is prohibited without a permit.
- Operate manned or unmanned aircraft in a manner that does not result in flushing of birds from active nests or active breeding colonies.
- Follow the Florida Department of Agriculture and Consumer Service's Florida Forestry Wildlife BMPs and Florida Agricultural Wildlife BMPs.
- Reduce risks from mammalian predators where the threat of predators occurs (e.g., by precluding access to breeding sites by either managing hydrology or removing floating vegetation, removing predators that have accessed islands, avoiding placement of trash and other food sources that may attract nest predators, etc.).

- Create shallow shelves on new water features to provide suitable foraging habitat. Please note that this practice is not recommended for highly urbanized areas, locations adjacent to heavy vehicular traffic, or areas that may have high levels of environmental contaminants.
- Avoid, or minimize to the extent practicable, the application of pesticides and fertilizers and the loading of heavy metals and other contaminants.
- Do not feed or allow the feeding of snowy egrets and white ibises, and manage trash and other food sources responsibly.
- Design docks, piers, and similar recreational facilities with conservation measures to minimize threats from entanglement in fishing line. Examples include marked repositories or lidded trash cans for discarding fish carcasses, educational signage, and participation in the Monofilament Recovery and Recycling Program. Promote fishining line cleanup activities. Educate fishers and other stakeholders to avoid feeding wading birds and other waterbirds, which if attacted to fishing activities can become entangled in fishing line that can be brought back to a breeding colony.
- Remove fishing line from breeding sites to reduce the probability of entanglement, provided the removal occurs outside of the breeding season, with appropriate state and local authorizations, and with landowner permission.
- Improve or create suitable foraging and nesting habitat on spoil islands.
- When creating new water features, consider creating islands with vegetation suitable for wading bird nesting following guidance in Nesting Island Creation for Wading Birds (White et al. 2005).
- For private landowners, developers, consultants and government agencies proposing land use plans or development and construction projects with the potential to convert wildlife habitat to other land uses, utilize technical assistance available from the FWC Office of Conservation Planning Services.
- General information on fish and wildlife species and habitat conservation measures can be accessed through the Florida Wildlife Conservation Guide (http://myfwc.com/conservation/value/fwcg/), which includes planning tools for ecologically-based, landscape-level conservation. Project-specific requests for fish and wildlife coordination can be emailed to ConservationPlanningServices@MyFWC.com. Regional staff can assist with listed species coordination, pre-application project review, wildlife survey and other conservation recommendations such as with help enhancing or managing wading bird habitat.

## Prohibitions and Permitting

Snowy egret and white ibis are protected by the general prohibitions outlined in Rule 68A-4.001, F.A.C.: no wildlife or freshwater fish or their nests, eggs, young, homes, or dens shall be taken, transported, stored, served, bought, sold or possessed in any manner or quantity at any time except as specifically permitted by these rules nor stall anyone take, poison, store, buy, sell, possess or wantonly or willfully waste the same except as specifically permitted these rules. Take is defined in Rule 68A-1.004, F.A.C., as pursuing, hunting, molesting, capturing, or killing (or attempting to do those things). A permit is required for any other activity that involves the possession, capture, sale, purchase, transport, hunting or killing of snowy egret or white ibis.

State permits are issued for justifiable purposes as outlined in Rule 68A-9.002, F.A.C. Justifiable purposes are scientific, educational, exhibition, propagation, management or other justifiable purposes. Snowy egret and white ibis nests, eggs and young are also protected by the federal Migratory Bird Treaty Act (MBTA) and state Rule 68A-16.001, F.A.C. Applicants should contact the U.S. Fish and Wildlife Service to determine if a federal authorization is needed.

Actions expected to cause take of snowy egrets and white ibises include, but are not limited to, the following:

- Activities that cause injury or death of snowy egret or white ibis adults, eggs, or young.

- Removal of active nests. Applicants should be aware that the FWC typically does not issue permits for removal of active nests, except in cases of health and human safety. Removal of inactive nests does not require a permit, as described in the following section.
- Intentionally flushing birds from their nest (i.e., forcing adults or nestlings to move from active nests) or intentionally flushing young birds that are not flight-capable from the vegetation around the nest cause take.
- Capturing, handling, or collecting wading birds. This includes banding, collecting, attaching auxiliary markers to, and drawing blood or collecting other biological samples from wading birds.
- Possessing, storing, or transporting snowy egret and white ibises, their nests, or their eggs is prohibited without a permit, except as authorized below.
- Buying, selling, or serving (Rule 68A-4.001, F.A.C.) snowy egret and white ibises, their nests, or their eggs is prohibited without a permit.

### No Permit Needed

The following activities are authorized to be conducted without an FWC-issued permit:

- Emergency actions necessary for human health and safety, such as water management activities for flood control.
- Activities within an airport security area in accordance with Rule 68A-9.012, F.A.C., which describes circumstances under which wildlife may be taken on airport property without further state authorization for an imminent threat to aircraft or human safety.
- Vegetation removal or trimming in the linear right of way for power restoration. This applies only in cases where there is an immediate danger to the public's health and/or safety (including imminent or existing power outages that threaten public safety) or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local government entity, and only to non-routine removal or trimming of vegetation within the linear right of way, in accordance with a vegetation management plan that meets applicable federal and state standards. If conducted under these circumstances, no FWC take permit is required.
- In accordance with Rule 68A-16.003, F.A.C., no permit is required for the onsite removal and destruction of an inactive (i.e., no eggs or flightless young) snowy egret or white ibis nest. However, attempting to remove inactive nests during the breeding season is discouraged as it may be difficult to detect active nests and there is a greater likelihood take could occur. Additionally, snowy egrets and white ibises frequently nest in mixed-species colonies which may also contain state-Threatened wading birds. Actions taken to remove or destroy inactive white ibis and/or snowy egret nests cannot be legally conducted if they result in harm to or harassment of state-Threatened wading birds. Please note that federal authorization is necessary if the removed nest is possessed or transported away from the site.
- If a federal salvage permit is obtained from the U.S. Fish and Wildlife Service, no additional FWC permit is needed for possession of dead specimens of any native bird species, including white ibises and snowy egrets, their nests, their parts or infertile eggs.

### Permits for Justifiable Purposes

#### Scientific Collecting and Educational Use

Scientific collecting permits may be issued for snowy egrets and white ibises for any research or monitoring that involves capturing, handling, or marking of wildlife; approaching or entering breeding sites for scientific purposes; conducting biological sampling; or other research that may cause take. Applicants can apply for scientific collecting permits on the FWC's online permitting site.

- Scientific collecting permit applications should include a justification, objectives, and scope of

the project.

- Applications should include detailed description of project methods, including duration, sample size, disposition of individuals, and capture/handling procedures (including measures taken to reduce the risk of injury or death).
- Trapping and handling protocols should identify measures to lessen stress for captured individuals.
- Methodologies for any collection of tissues such as blood should be clearly detailed, including measures taken to reduce stress/injury to the birds.
- Applications should include all relevant expertise, qualifications, and resources available to accomplish project objectives.
- Entering breeding sites can result in take of eggs or young birds at both target nests and at nearby nests. White ibises often desert nests when disturbed before egg-laying (Heath et al. 2009), and white ibis chicks greater than 14 days old are particularly prone to jumping from nests when disturbed, which can lead to mortality (P. Frederick, personal communication, Teal 1965). Abandonment of the breeding site also may occur if proper precautions are not in place. Applicants that propose to work near or within breeding sites must include measures for minimizing disturbance to target nests, neighboring nests, and the entire colony. Species Conservation Measures and Permitting Guidelines for State-Threatened Wading Birds (Appendix A) provides a reference for applicants working in or near colonies.
- Flight-line counts do not need a permit, provided surveyors remain 330 ft (100 m) from an active nest and the birds do not flush from active nests or active breeding areas.
- Aerial surveys with a UAS do not need a permit if operated greater than 200 ft (61 m) from active nests. Please note that approaching or entering a colony to retrieve a UAS that has landed or crashed could result in take, which is prohibited without a permit. See Appendix A for more information.
- Aerial surveys in manned vehicles do not need a permit, provided the flight altitude is above that which would cause birds to flush from active nests or active breeding sites. Intentionally causing birds to flush from active nests or active breeding sites results in take.
- Any mortality must be reported to the FWC as specified in permit conditions, and specimens should be disposed of following guidance in the permit conditions.
- A final report should be provided to the FWC in the format specified in the permit conditions.

Although issuance of a state permit does not depend on the possession of local or federal authorizations, permittees must obtain all necessary local and federal authorizations before executing the state permit. Please note federal permits may be required from the U.S. Fish and Wildlife Service to comply with the Migratory Bird Treaty Act and may be required from the United States Geological Survey (USGS) Bird Banding Lab for banding, color-marking, specific capture methods, sampling of blood/tissues, collection of feathers, and attachment of transmitters or other data gathering mechanisms.

**Captive Possession, Educational Use, and Rehabilitation**

- Captive possession of snowy egrets and white ibises is prohibited without a federal authorization from the U.S. Fish and Wildlife Service and a Class III No-cost Personal Pet Permit or Class III License for Exhibition or Public Sale from the FWC in accordance with 372.3761 and 372.3762 Florida Statutes and Rule 68A-6, F.A.C. Additionally, applicants that wish to possess live wading birds for educational purposes must abide by caging requirements in Rule 68A-6.004, F.A.C.
- Possessing snowy egrets and white ibises for rehabilitation purposes is prohibited without a Joint State/Federal Special Purpose Permit for Wildlife and Migratory Bird Rehabilitation issued under Rule 68A-9.006, F.A.C., and Federal Regulation 50 CFR 13.

**Other Permits**

For any other justifiable purpose permit that does not fall under scientific collecting or educational use, please submit your request to WildlifePermits@myfwc.com.

## Additional information

The datasets for historic waterbird colonies and recently active state-Threatened wading bird breeding sites are available at http://geodata.myfwc.com/pages/upland

Information on economic assessment of these Guidelines can be found in the Resources section at http://myfwc.com/wildlifehabitats/imperiled/management-plans/

## Contact

For permitting questions or to report mortalities, contact the FWC at (850) 921-5990 or WildlifePermits@myfwc.com. For more regional information visit http://myfwc.com/contact/fwc-staff/regional-offices.

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# Appendices

## Appendix A. Guidance for Using Unmanned Aerial Systems (UAS) Near Wading Birds

The following guidance applies to uses of UAS near snowy egrets, white ibises, and any other wading birds which are not classified as a state-Threatened species. For guidance on use of UAS near state-Threatened wading birds, refer to Species Conservation Measures and Permitting Guidelines for State-Threatened Wading Birds. Flying close to birds may cause disturbance, which can lead to take. To avoid disturbance to birds, please follow these guidelines.

1. Check current UAS rules and notices on the property.
   - Use of UAS is prohibited on some properties and requires permits on others.
   - Keep the privacy of others in mind during all UAS flights.

2. Be familiar with FAA rules regarding operation of UAS.
   - Always remain within line-of-sight of your UAS while flying.
   - Flying your UAS even at relatively low altitudes can be a violation of federal airspace regulations.

3. Check for birds before you fly.
   - Check with people that know, such as the property's resource manager, to inquire if sensitive or nesting birds may be present along the entirety of your intended UAS flightpath from takeoff to landing.
   - Perform a pre-flight check immediately before takeoff to determine the location of any nearby birds.

4. To minimize disturbance, maintain UAS at least 200 ft* away from birds, especially nesting birds and flightless chicks.
   - Please note that this includes the airspace above the active nest or birds.
   - Do not fly over an island occupied by colonial wading birds. If the UAS crashes into the colony, you may not be able to retrieve it without causing a wildlife violation.

5. Avoid launching your UAS directly at birds.
   - Birds are more likely to be disturbed by UAS running at full throttle as they gain altitude.
   - Launch and land your UAS away from birds, and preferably out of their sight.

6. Avoid changing direction, speed, or altitude above or in the vicinity of birds.
   - Banking motions and changes in altitude, speed, or direction can make your UAS behavior appear like a predator to birds.
   - Special care should be taken when using a fixed-wing UAS, whose profile could be perceived as an aerial predator.
   - Birds are less likely to view your UAS as a threat if you fly over them at a fixed direction, speed, and altitude.

7. Launch and land your UAS > 600 ft from birds (and preferably out of sight).
   - Birds are particularly frightened by UAS as they take off or land.
   - Please note that approaching or entering a colony to retrieve a UAS that has landed or crashed could result in take, which is prohibited without a permit.

8. Cease UAS activity immediately if you observe birds flushing or becoming agitated.

- Signs of disturbance include birds moving away from the UAS as it passes overhead, decreasing other natural behaviors to watch the UAS, or nodding their heads up and down to continuously size up the distance between themselves and the UAS.

9. Be aware that birds are protected by both State and Federal law.
   - Your use of UAS could lead to impacts that violate these laws (e.g., the Federal Migratory Bird Treaty Act; the Federal Endangered Species Act; the Bald and Golden Eagle Protection Act; Rules 68A-4, 68A-16, and 68A-27 F.A.C.).
   - Maintain UAS at least 200 ft away from active nests of wading birds on Florida's Endangered and Threatened Species List. If you cannot maintain this distance, we recommend that you contact the FWC's Protected Species Permitting Office to discuss an Incidental Take Permit.
   - Flushed birds can lose valuable energy, and flushing birds from nests leaves the eggs and young vulnerable to predators and the elements.

*The 200-ft buffer was determined based on literature review and expert opinion (Hanson et al, 2014, Drever et al. 2015, McEvoy Et al. 2016, Barr 2017, M. Burgess, personal communication).

M. Burgess made important contributions to this appendix.