

# Nongame Session

## Habitat Protection Guidelines for Species Threatened by Large-scale Development

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*Abstract:* In Florida, virtually every wetland and upland habitat type is threatened by the effects of development. Large-scale developments which fall under the Developments of Regional Impact Program are reviewed by multiple agencies, including the Florida Game and Fresh Water Fish Commission. To provide review personnel with accurate life history information and biologically sound habitat protection recommendations, the Florida Game and Fresh Water Fish Commission began publishing habitat protection guidelines for those listed species which had frequently been an issue during large-scale development reviews. Recommendations in the publications reflect development-related actions considered necessary to perpetuate these species outside existing protected lands. Synopses from two of the publications are provided.

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Habitat loss, either through direct elimination, degradation, or disturbance or indirect contamination, fragmentation, or alteration of water regimes, is probably the most pressing issue in wildlife conservation. In Florida, large-scale developments and rapid population growth pose a threat to resident and migratory wildlife species and their habitats. During the last decade (1980-1990) Florida's human population increased by 32.8%, bringing the total population to 12,937,926 (Bur. Econ. and Business Res. 1990). Florida's population growth rate is highest among all southeastern states and third in the nation (Bur. Econ. and Business Res. 1990).

With the demand increasing for residential and commercial developments and recreational and agricultural areas, land remaining for wildlife is disappearing. In the last 50 years alone Florida has lost 21% of its forests and 56% of its herbaceous wetlands to accommodate new developments (Kautz 1993). During this period, 5 vertebrate taxa have become extinct as a result of habitat loss, and the number of species listed as endangered or threatened in Florida has increased.

The Florida Game and Fresh Water Fish Commission (FGFWFC) provides technical input into the regulatory programs of other agencies that have statutory responsibilities to consider impacts of development on fish and wildlife and their habitats. In this role wildlife biologists review and comment on a variety of developmental activities. However, it is difficult for review biologists to be knowledgeable of all wildlife species and habitats potentially affected by development activities. Florida supports approximately 668 species of nonmarine vertebrate animals (Millsap et al. 1990) and 3,500 species of vascular plants (Muller et al. 1989), and there are 41 major habitat types excluding open water estuarine and marine habitats (Fla. Nat. Areas Inventory 1990). Florida has a relatively high degree of endemism, with 235 plant taxa, 119 vertebrate taxa, and 13 plant communities considered endemic (Muller et al. 1989). The FGFWFC lists 33 species of mammals, 34 species of birds, and 28 species of reptiles and amphibians as either endangered, threatened, or species of special concern (Wood 1992).

Many biologists involved in the review process do not have the time or resources to obtain information regarding the wildlife species and community types potentially threatened by development. Many of the state and regional environmental regulatory agencies do not have staffs with strong wildlife backgrounds. Therefore, in 1987 the FGFWFC began publishing a series of habitat protection guidelines designed to provide information necessary to mitigate the impacts of development on selected species of wildlife and to provide consistency to agency comments.

Habitat protection guidelines address the habitat protection needs of species confronted by large-scale developments that fall under the Developments of Regional Impact (DRI) program administered by the Florida Department of Community Affairs (*Florida Statutes* 380.06). The DRI process is a multi-agency review of large-scale development proposals. The species addressed by habitat protection guidelines are those that have frequently been an issue during DRI reviews. The DRI reviews address state or federally listed species and include upland and wetland habitat protection. The FGFWFC is one of the many agencies which reviews proposed DRI projects.

### **Format of Habitat Protection Guidelines**

Habitat protection guidelines follow a simple format which may vary slightly based on the habitat requirements and life history of the species or habitat type involved. Information included in the guidelines can be grouped into 4 main sections. Each section is briefly described below.

#### **Life History Characteristics and General Biology**

This section introduces the biology of a species and its life history characteristics. A complete synthesis of biological information is provided, obtained from literature searches and reviews, meetings with research personnel involved with the species, and field inspections. The literature review focuses on research con-

ducted in Florida and other southeastern states. Those life history characteristics which are most important from a management point of view are described in detail.

Information presented in this section includes descriptions of the species, indicators of the species' presence (e.g., gopher tortoise burrow), the species' range in the southeast and in Florida, and foraging and breeding habitat requirements. Population density and demography characteristics, such as home range and territory size, average density values, mortality, and dispersal distances are discussed. Information on diet, reproduction, and behavior is also presented. The information in this section forms the basis for the habitat protection recommendations.

#### Estimating Local Population Size and Habitat Quality

This section recognizes that when reviewing a proposal for a large-scale development project, it is necessary to determine if the site contains potentially important habitat or individuals of the species in question. The habitat protection guidelines recommend 2 steps to follow in order to evaluate the potential biological importance of a site. The first step involves development of a vegetation map for the area based on land use and land cover classes appearing in Florida Land Use, Cover and Forms Classification System (Fla. Dep. Transportation 1985) and 26 Ecological Communities of Florida (Soil Conserv. Serv. 1979). The guidelines list the habitat types which should be mapped for each species. The second step involves conducting a preliminary survey of the site to determine species presence.

The guidelines provide criteria for determining if the project site has potential value for a particular species based on the results of the vegetation map and preliminary survey. If a site has potential value for the species, an evaluation of habitat quality and quantity and species use of the site is recommended to determine which habitat protection measures are warranted and the location and size of habitat protection areas, if needed. Survey techniques for estimating local population size and locating active critical habitat areas (e.g., nest sites) are provided in the guidelines. Survey procedures are based on the species' habits and established methodology. Techniques and calculations to determine density are provided. This may be necessary for a species such as the gopher tortoise (*Gopherus polyphemus*) whose long-term survival is intimately linked to population size.

#### Procedures for Implementing Habitat Protection Measures

This section provides recommendations for establishment of habitat protection areas and development of long-term management plans for those areas. Habitat protection is recommended when a species (e.g., individual, pair, family group, colony) is using on-site habitat to fulfill basic needs such as nesting or foraging. Preservation of habitat critical for the survival and maintenance of a species can often be accomplished through either on-site habitat protection or off-site mitigative compensation. In most cases, the guidelines recommend on-site protection; however, they provide alternative recommendations for off-site compensation for habitat loss when on-site habitat protection is deemed unfeasible. Exclusive on-site

habitat protection is suggested whenever the site contains suitable habitat and the recommended acreage for the habitat protection area(s) is <25% of all developable uplands on site. Off-site mitigation is an acceptable alternative when the area is too small to support the species. Off-site mitigation allows large tracts of land to be protected rather than small patches of on-site habitat surrounded by development.

Habitat protection guidelines include recommendations for disturbance free buffer zones around critical areas (e.g., nest sites), size and configuration of protection areas, incorporation of several listed species into overlapping protection areas, and integration of protection areas into the development community. Management goals and recommendations encourage maintenance of the protection areas. Procedures for relocation of a species or removal/relocation of nest sites are also offered. The guidelines provide criteria for selecting the location of habitat protection areas for cases in which there is more suitable habitat on-site than recommended for the protection area. Criteria for location of a habitat protection area include: (1) highest quality habitat, (2) habitat known to contain other listed species, (3) areas as near as possible to protected natural habitat areas, and (4) areas as near as possible to off-site undeveloped lands that are expected to remain undeveloped.

#### Alternative Habitat Protection and Mitigation Techniques

This section provides alternative mitigation techniques that are acceptable when on-site habitat protection is unfeasible. One off-site mitigation option includes the purchase of suitable habitat within a mitigation park. Under this option, a developer may make a monetary contribution to a wildlife resource mitigation fund. The dollar amount of the contribution is based on the number of hectares recommended for protection and the average cost of a hectare of land in the mitigation park. The money is used with other such contributions to purchase natural areas with wildlife habitat values equivalent to those being lost. Thus, large tracts can be protected to enhance the long-term survival of a species rather than protecting many small patches of on-site habitat surrounded by development. The title and management of lands acquired through this program typically revert to the state, and the FGFWFC often becomes lead agency in the management of the lands.

A second off-site mitigation option includes the purchase of land contiguous with public lands where management is compatible with the species involved. The amount of land is based on the number of hectares recommended for species protection and the average cost of a hectare of the land in question. The purchased land is donated to the agency that holds title to the public lands and the applicant is usually required to provide a one-time management action (e.g., prescribed burn) to optimize the habitat value of the off-site mitigation area for the species. A third off-site mitigation option involves acquisition of a conservation easement on privately-owned land that has habitat conditions similar to those being lost.

## Recommendation Summary

Habitat protection guidelines provide an outline of steps for users to follow in assessing the biological importance of a site. A dichotomous key or flow-chart of decisions and actions needed in the review of large-scale development projects accompany the recommendation summary. The outline provides readers with a quick understanding of their responsibilities regarding protection of a species and its habitat (Fig. 1).

If a site lacks potential value for a species, then extensive surveys and habitat protection measures are generally not recommended. However, if the proposed development site has potential value for the species, a thorough survey is recommended to assess the biological importance of the site. If the species inhabits a DRI site, further surveys may be recommended to determine locations of critical areas (e.g., nest sites). The level of protection recommended for a species typically is a function of the significance of the site to the conservation of the species. Options for off-site mitigation are described, when applicable. The recommendation summary also provides procedures for multiple listed species occurring on site, relocation or removal of a species or its nest site, and implementation of long-term management practices.

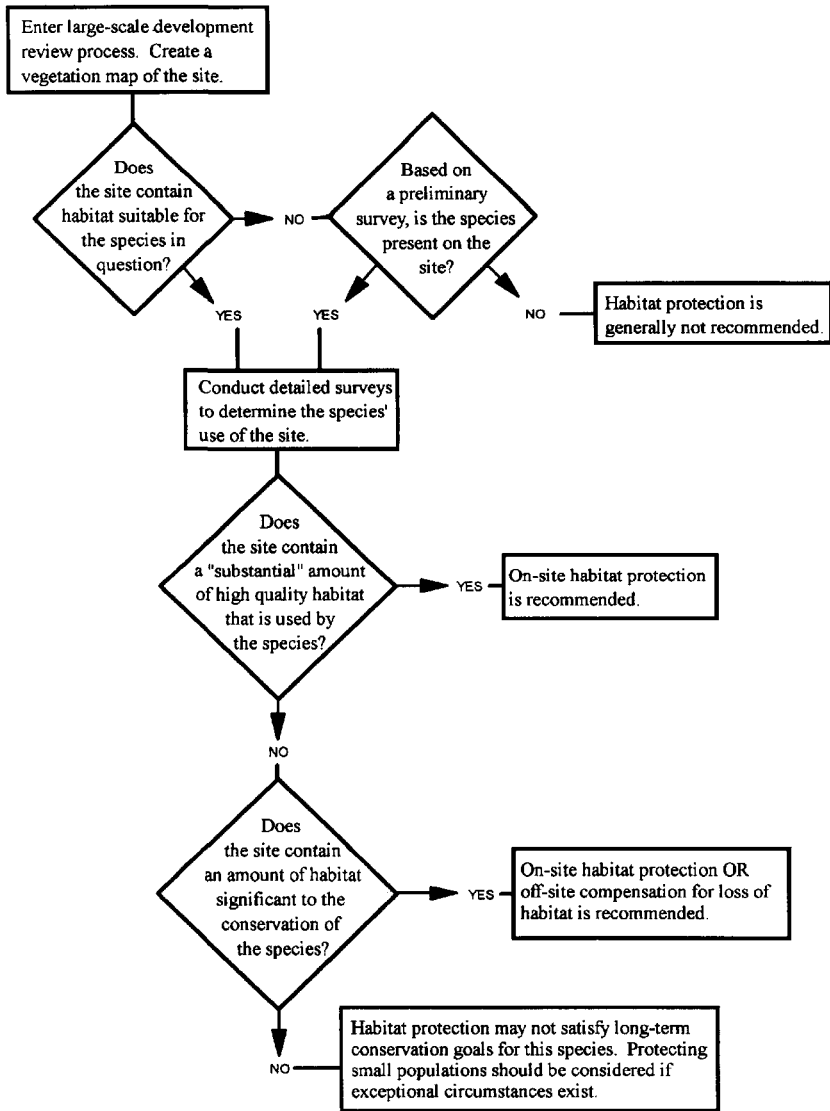
## Brief Synopsis of Recommendations from Current Guidelines

Presently, 3 habitat protection guidelines have been published by the FGFWFC. The existing guidelines address the habitat protection needs of the gopher tortoise, Florida scrub jay (*Aphelocoma coerulescens coerulescens*), and southeastern American kestrel (*Falco sparverius paulus*). The following accounts give a brief synopsis of the habitat protection guidelines for the gopher tortoise and the Florida scrub jay.

### Gopher Tortoise

The gopher tortoise population in Florida may be reduced by 68% from 1975 to 2000 (Auffenberg and Franz 1982). The greatest threat to gopher tortoises in Florida is the loss of habitat accompanying human population growth (Auffenberg and Franz 1982, Diemer 1986). The FGFWFC lists the gopher tortoise as a species of special concern (Wood 1990) and the Florida Committee on Rare and Endangered Plants and Animals (FCREPA) considers the gopher tortoise to be a threatened species (McDiarmid 1978).

Recommendations for the gopher tortoise are linked to the size of the affected populations and the likelihood that small gopher tortoise populations will persist through time (Cox et al. 1987). A population of at least 40–50 individuals provides a minimum level of protection against extinction as a result of inbreeding or environmental variability. Depending on habitat quality, populations of 40–50 gopher tortoises require 10–20 ha. A proposed development site is considered to have a probability of containing gopher tortoise habitat or populations if the site contains either 10 ha of 1 or more suitable habitat types or at least 25 active and inactive



**Figure 1.** Flow-chart of steps to take in the review of large-scale development projects. In this example, habitat protection measures are based on the amount of suitable habitat located on the proposed development site. Diamonds represent points of decision-making (i.e., answering a “yes-no” question) and blocks represent recommendations that apply.

burrows. If 1 of these conditions is met, transect surveys which cover at least 15% of the potential gopher tortoise habitat are recommended.

Recommended habitat protection measures are then based on average density of gopher tortoises found on the site. If a site contains an average density of  $\geq 1.9$

individuals per hectare within any  $\geq 10$ -ha area and contains  $\geq 40$  individuals, it is considered to be "valuable" gopher tortoise habitat and on-site habitat protection is recommended. The on-site habitat protection area should contain  $\geq 40$  individuals and be the larger of either 10–20 ha or 15%–25% of the appropriate gopher tortoise habitat on the site. If the average density is between 0.9 and 1.9 individuals per hectare within any  $\geq 10$ -ha area and contains  $\geq 40$  individuals, it is considered to be "suitable" gopher tortoise habitat and either on-site habitat protection or off-site compensation is recommended. If on-site habitat protection is considered unfeasible, then off-site mitigation for habitat destruction coupled with population relocation is an alternative means of protecting gopher tortoise populations and habitat. Habitat suitability indices are provided and their use is recommended in exceptional populations of less than 40–50 individuals or populations confined to fewer than 10 ha. Protective measures for smaller populations are developed on a case-by-case basis.

Management recommendations include methods of maintaining open habitat required by the gopher tortoise. Prescribed burning, mowing, and roller chopping are several of the recommended management techniques; however, burning is preferred where feasible.

When on-site habitat protection is deemed unfeasible, the 15%–25% criterion for habitat protection areas is used to establish the minimum compensation needed for the loss of gopher tortoise habitat. Sites with higher quality habitat conditions should provide more habitat protection than sites containing lower quality habitat conditions.

### Florida Scrub Jay

The Florida scrub jay resides and breeds only in periodically burned, low-growing oak scrub with abundant bare sand and a few scattered tall pines (Fitzpatrick et al. 1991). The Florida scrub jay population began declining as humans discovered that the ancient dunes which support scrub habitat are of superior quality for agriculture and residential developments. In 1975 the FGFWFC listed the Florida scrub jay as threatened, and in 1987 the scrub jay was listed as threatened by the U.S. Fish and Wildlife Service (Federal Register vol. 52, no. 106, pp. 20715–20719, 3 June 1987). The following summary is based on Florida scrub jay habitat protection recommendations from Fitzpatrick et al. (1991).

The primary goal of the scrub jay habitat protection guidelines is to minimize further decline of the remaining scrub jay population. Two levels of habitat protection and management are recommended: (1) protection of adequate habitat for every jay group occurring on a proposed development site (i.e., "territory refuges"); and (2) protection of suitable unoccupied habitat on site (i.e., "satellite refuges"). Satellite refuges are recommended when there is much suitable habitat on site relative to the number of scrub jay groups present.

Habitat protection measures are recommended when: (1) scrub jays are on site; or (2) scrub jays are not on site, but suitable habitat exists on site and is within normal dispersal distance (8 km) of scrub jays that occur off site. If either condition is met, surveys are recommended to determine the number of scrub jay

groups and amount of suitable habitat on site. The total area recommended for on-site protection as territory refuges is calculated by multiplying the number of scrub jay groups on site by 10 ha (i.e., average territory size for a scrub jay group), or the total number of hectares of developable uplands on site, whichever is less. If the total area of scrub jay habitat on site is greater than the total number of hectares designated for territory refuges, establishment of 1 or more on-site satellite refuges also is recommended. The total area of habitat to be preserved as satellite refuges is equal to 25% of the scrub jay habitat remaining on site after accounting for the habitat to be included in the territory refuges.

If a site contains suitable scrub jay habitat but scrub jays are not found, available records should be searched for evidence of the presence of scrub jays within 8 km of the scrub jay habitat on the development site. Any off-site area in which scrub jays have been documented since 1975 is considered inhabited by scrub jays. If there are records of scrub jays within 8 km of the unoccupied scrub jay habitat on site, then the establishment of 1 or more satellite refuges on site is recommended, with the total number of hectares to be preserved equaling 25% of all scrub jay habitat on site. This recommendation presumes that scrub jays dispersing from nearby sites will eventually recolonize any presently unoccupied habitat if the habitat is protected.

Management recommendations for on-site scrub jay habitat protection areas focus on maintaining scrub habitat. Prescribed burning at frequencies of 5–20 years is preferred to maintain scrub jay habitat. No more than 25% of an occupied refuge should be burned at any one time to assure that scrub is present to support jays during the recovery period for burned areas. Alternative management recommendations include above-ground mechanical treatments such as roller chopping.

On-site habitat protection is recommended in most instances, but off-site compensation is acceptable. If the area designated for protection is greater than 25% of all developable uplands on site, then recommendations include on-site protection of at least 25% of all developable uplands and off-site compensation for any remaining hectares recommended for the scrub jay protection area. If the on-site area designated for protection is too small to support a family of scrub jays, it is often of greater value to protect the same amount of scrub jay habitat in a mitigation park or elsewhere off site.

### **Philosophy of Habitat Protection Guidelines**

Habitat protection guidelines provide accurate information regarding the habitat requirements of a species, reliable techniques for determining on-site occurrence, and effective habitat protection recommendations for lands undergoing large-scale development. The primary goal of the habitat protection guidelines program is to provide information to persons who are responsible for making decisions regarding species or habitat protection. The level of protection recommended for a particular species is based on the status of the species involved. Those species which are listed as either threatened or endangered receive stronger protection recommendations than a species listed as a species of special concern. Habitat protection



guidelines allow for off-site mitigation for that fraction of the recommended habitat protection area that is >25% of the developable uplands on a project site. The purpose of this threshold is to allow a developer use of most of his uplands and to avoid the "taking" issue.

Although the recommendations set forth in the habitat protection guidelines are not site specific and may not apply to all cases, they do provide a logical thought process that can be tailored to specific needs. The standardized recommendations reduce the possibility of review personnel contradicting one another on procedure and implementation of habitat protection.

Species selected for future habitat protection guidelines include Florida sandhill crane (*Grus canadensis pratensis*), wading birds, nesting shorebirds, wintering shorebirds, and fox squirrel (*Sciurus niger*).

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