Florida Burrowing Owl

Athene cunicularia floridana

FWC Photograph by~~h courtes~~
Andy Wraithmell

Species Overview

Status: Listed as state Threatened on Florida's Endangered and Threatened Species List.

Current Protections

- 68A-27.003(a), F.A.C. No person shall take, possess, or sell any threatened species included in this subsection or parts thereof or their nests or eggs except as authorized by Commission rule or by permit from the Commission or when such conduct is authorized in a management plan as defined in this chapter and approved by the Commission, or as authorized in Commission-approved guidelines.~~No person shall take, possess, or sell any of the endangered or threatened species included in this subsection, or parts thereof or their nests or eggs except as allowed by specific federal or state permit or authorization.~~

- 68A-27.001(4), F.A.C. Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. The term "harm" in the definition of take means an act which actually kills or injures fish or wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. The term "harass" in the definition of take means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering.

- Florida burrowing owls, active nests, eggs, and young also are protected under the Federal Migratory Bird Treaty Act, state Rule 68A-16.001, F.A.C., and state Rule 68A-4.001, F.A.C.

Glossary

Abandoned burrow: An Abandoned burrow ~~are~~is a burrow~~s~~ where, due to natural processes (e.g., flooding), rather than human actions, the burrow entrance or a significant portion of the burrow tunnel is filled in, collapsed, or is blocked to the extent that burrowing owls cannot access the burrow. Burrows with collapsed or blocked entrances resulting from human actions are still considered Potentially Occupied burrows, because natural processes were not the cause of burrow collapse or blockage.

Active burrow: A Potentially Occupied burrow that contains eggs or is used by flightless young.

Breeding Season: The breeding season for Florida burrowing owls ~~is~~ extends from February 15 – July 10. See the biological background for more information.

Burrow centroid: In cases where there is more than one Potentially Occupied burrow, the burrow centroid is the average location of all Potentially Occupied burrows within 150 feet of each other. The burrow centroid is used to assess if significant habitat modification will occur due to the project activities (see Appendix E).

Burrow cluster: A burrow cluster represents the burrows potentially used by a single breeding pair of owls. It is defined as one or more burrows within 150 feet of each other. A burrow cluster can consist of burrows in a line, meaning that each burrow may not be 150 feet away from every burrow but must be within 150 feet of at least one burrow within the cluster.

Category 1 Project: Project activities that do not involve impacts or development to foraging habitat. Examples include when burrows obstruct lawful activities in cemeteries, athletic fields, school fields, utility line easements, golf courses, etc.

Category 2 Project: Project activities that result in destruction of burrows or harassment of burrowing owls but not significant habitat modification. Most residential and commercial developments fall into this category.

Category 3 Project: Large-scale project activities that result in destruction of burrows or harassment of burrowing owls and significant habitat modification (see definition below).

Inactive burrow: A Potentially Occupied burrow that does not contain eggs or flightless young. Inactive burrows provide important shelter for burrowing owls year-round, and impacts to Potentially Occupied burrows may cause take.

Incidental take: Take that results from, but is not a primary purpose of, carrying out an otherwise lawful activity.

Intentional take: Take that is not incidental to an otherwise lawful activity and is prohibited without a scientific collecting permit or unless the take is authorized under certain circumstances involving risks to property or human safety.

Potentially Occupied burrow: This classification includes burrows with obvious indications of use and those with minimal or no obvious indication of use (see Identifying Burrows and Appendix A). Obvious indicators of use include burrowing owls present in or near the burrow entrance or evidence around the entrance, such as whitewash, feces, pellets, prey remains, or adornments. Potentially Occupied burrows also include burrows previously occupied by burrowing owls where no indications of recent occupancy are evident, but the burrow entrance is still open. There are 2 subcategories of Potentially Occupied burrows: active and inactive burrows.

Registered Agent: An individual that has met the minimum qualifications to scope or excavate a burrow as part of an Incidental Take Permit and has been issued a Registered Agent Permit (see Minimum Qualifications).

Significant habitat modification: An activity that results in the loss of more than 50% of the total suitable foraging habitat within a 1,970-foot radius circle around a burrow centroid. (See Appendix E).

Suitable foraging habitat: Habitat that consists of open areas primarily dominated by low herbaceous vegetation. Vegetation height may fluctuate depending on disturbance intervals (e.g., cattle rotation, prescribed fire, mowing) but is primarily herbaceous with minimal woody vegetation.

Urban: For the purposes of these Guidelines, a burrowing owl is considered in urban habitat if the burrow centroid is on habitat classified under the urban class (1820) in the Florida Landcover Classification. If the burrow centroid is not classified under the urban class, then it is considered rural.

Biological Background

This section describes the biological background for this species and provides context for the following sections. It focuses on the habitats that support essential behaviors for the Florida burrowing owl, threats ~~faced by the species~~, and what constitutes take for the species. The Florida burrowing owl is a small, long-legged owl (averaging 9 inches in height) that uses burrows for breeding and sheltering. The Florida burrowing owl's distribution is localized and patchy, occurring primarily in peninsular Florida, with isolated pairs and small colonies found as far west as Eglin Air Force Base and as far south as the Dry Tortugas. The typical breeding season for the Florida burrowing owl is February 15 to July 10, though owls can breed earlier or later. For example, Millsap and Bear (1990) observed egg-laying as early as October 2 and as late as May 9. FWC staff (Zambrano, unpublished data) found that only 4.5% of 89 burrows scoped in south Florida between November 30, 2007, and February 8, 2008, contained eggs or flightless young. Incubation lasts about 4 weeks, and young first start to emerge from the burrow about 2 weeks after hatching (Zarn 1974). Juvenile burrowing owls start learning to fly about 4 weeks after hatching and ~~are~~ start~~ing~~ to fly well by 6 weeks of age (Zarn 1974). Juvenile burrowing owls continue to use their parents' burrows for 30-60 days after they start flying (Mealey 1997).

Habitat Features that Support Essential Behavioral Patterns

Florida burrowing owls use a breeding burrow and often 1 or more satellite burrows for the essential behaviors of breeding and sheltering. Florida burrowing owls usually dig their own burrows, which are typically 5 to 10 feet long and can be excavated by the owls in as little as 2 days (Millsap 1996). Burrowing owls in Florida are known to use burrows year-round, for roosting during the winter and for raising young during the breeding season (Millsap 1996; R. Mrykalo, personal communication). Some owls leave their burrows for part of the year due to flooding from seasonal rains (Mrykalo 2005). Burrowing owls prefer sandy, well-drained areas with low vegetation height and good visibility around burrows (Green and Anthony 1989, Uhmann et al. 2001, Lantz et al. 2007). Average vegetation (e.g., grasses, forbs, shrubs) height less than 5 inches is considered optimal near burrows (Uhmann et al. 2001, Klute et al. 2003). ~~FWC staff have noted that~~ Florida burrowing owls may abandon burrows if visibility becomes impaired by overgrown vegetation or other visual obstructions (FWC, unpublished data). Given this species' year-round use of burrows, activities that result in collapse, blockage, or abandonment of a burrow result in significant impairment of breeding and sheltering activities.

Burrowing owls live in pairs or loose colonies in open habitats that offer short groundcover for the essential behaviors of breeding, feeding, and sheltering. Historically, these habitat requirements were met by native dry prairies covering much of central Florida. As the availability of native dry prairie decreased, burrowing owls have inhabited human altered landscapes including pastures, urban parks, schools, agricultural fields, golf courses, airports and vacant lots (Millsap 1996, Bowen 2001).

Burrowing owls require sufficient foraging habitat around their burrows, and loss of foraging habitat can impair essential behaviors. In rural areas, potential foraging habitat includes the following landcover classes: dry prairie, mowed grass, vegetative berm, rural open (with few trees), row crops and field crops (where the vegetation height is low), improved pasture, sod farms, wet prairie, marshes, wetlands (where vegetation height is low), and other open areas (Mueller et al. 2011, Poulin et al. 2020, Rose 2020). ~~and depression marsh.~~ In urban areas, burrowing owls forage in vacant lots, yards, cemeteries, airports, golf courses, athletic fields, and other open areas (Millsap 1996, Bowen 2001, Poulin 2020). The terminology used above comes from the Florida Landcover Classification System (Kawula and Redner 2018~~2014~~). ~~which crosswalks to the Florida Land Use Cover and Forms Classification System (FLUCCS). In urban areas, burrowing owls forage in vacant lots, yards, cemeteries, airports, golf courses, athletic fields, and other open areas.~~

In 2 studies of western burrowing owls in rural areas, over 80% of foraging locations were within 1,970 feet of the nest burrow (Haug and Oliphant 1990, Gervais et al. 2003). Assuming a radius of 1,970 feet, foraging

occurs primarily within approximately 280 acres of the burrow for western burrowing owls. These guidelines consider foraging habitat to be within a radius of 1,970 feet of a burrow, but this definition will be updated in future revisions as additional data become available.

Threats

Major threats identified in A Species Action Plan for the Florida Burrowing Owl (FWC 2013) include loss of native habitat and resulting dependence on altered habitat (Millsap 1996, Bowen 2001). Lack of protected habitat also is a concern for the species, as is land use conversion that renders areas unsuitable to burrowing owls (Bowen 2001). Other threats include destruction of burrows by human activities and domestic animals and collisions with automobiles (Millsap 1996). Given that burrows are typically 5-10 feet long, most activities within 10 feet of a burrow can result in collapse of the burrow. Millsap and Bear (2000) found that nests within 33 feet of construction activity had significantly lower productivity. Environmental contaminants such as pesticides and rodenticides also have the potential to impact burrowing owls (James and Fox 1987, Gervais and Anthony 2003, Justice-Allen and Loyd 2017). However, the degree to which environmental contaminants are a threat to Florida burrowing owls is uncertain and requires further investigation (FWC 2013). The potential impact of non-native wildlife, such as Argentine black and white tegus ~~tegus~~ (~~*Tupinambis*~~ *Salvator merianae*), Nile monitors (*Varanus niloticus*), green iguanas (*Iguana iguana*) and ~~Gray's~~ black spiny-tailed iguanas (*Ctenosaura similis*) is of concern and requires further investigation. Green and black~~Gray's~~ spiny-tailed iguanas, for example, have been observed occupying burrowing owl burrows (Krysko et al. 2007; G. Campbell, personal communication).

Potential to Significantly Disrupt or Impair Essential Behavioral Patterns

Burrowing owls use their burrows year-round, so impacts to burrows can result in take via harassment by significantly disrupting breeding and sheltering activities. Collapsing or blocking of burrows can result in harm if burrowing owls are injured or killed or if eggs are destroyed. Disturbance near burrows during the breeding season can result in take via harassment by significantly disrupting breeding. Burrowing owls also require sufficient foraging habitat around their burrows, and reducing available habitat can result in significant habitat modification by impairing the essential behavior of foraging. Impacts that constitute take are described in more detail in the section below.

Take of Florida Burrowing Owls

Take of Florida burrowing owls can be either incidental or intentional. **Incidental take** refers to take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. This type of take is prohibited without an ~~i~~incidental ~~t~~Take ~~p~~Permit or other authorization, in accordance with Rule 68A-27.003, F.A.C. Impacts to burrows ~~in the act of building a house~~resulting from construction activity is an example of incidental take. **Intentional take** is not incidental to an otherwise lawful activity and is prohibited without a Scientific Collecting Permit ~~or~~ unless the take is authorized under certain circumstances involving risks to property or human safety. Capturing and handling burrowing owls for research purposes is an example of intentional take.~~Defining take for burrowing owls requires classifying the status of burrows. Burrow status is classified into categories of Potentially Occupied and Abandoned, as defined below:~~

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

- Potentially Occupied b~~B~~urrow: ~~– It can be difficult to determine if a burrow is occupied, and burrowing owls may spend time away from the burrow at certain times of the year.~~ This classification includes burrows with obvious indications of use and those with minimal or no obvious indication of use (Appendix A~~.~~). Obvious indicators of use include burrowing owls present in or near the burrow entrance or evidence around the entrance, such as whitewash, feces, pellets, prey remains, or adornments. Note that burrows with obvious indications of use are referred to as "active" burrows in the Florida Agricultural Wildlife Best Management Practices (BMPs) and Florida Forestry Wildlife BMPs (Florida Department of Agriculture and Consumer Services 2014, 2015). However, for purposes of these guidelines, "active burrows" refer to Potentially Occupied burrows that contain eggs or flightless young. Potentially Occupied burrows also include burrows previously occupied by burrowing owls where no indications of recent occupancy are evident, but the burrow entrance is still open. There are 2 subcategories of Potentially Occupied burrows:
    - **Active burrow**~~:–~~ A~~a~~ Potentially Occupied burrow that contains eggs or is used by flightless young. ~~Please note that t~~The FWC typically does not issue permits for take of active nests, except in situations involving health and human safety. Removing an active nest may also require a Federal permit from the U.S. Fish and Wildlife Service.
    - **Inactive burrow**~~:–~~ A~~a~~ Potentially Occupied burrow that does not contain eggs or flightless young. Inactive burrows provide important shelter for burrowing owls year-round and impacts to Potentially Occupied burrows may cause take~~, even when burrows are inactive~~ (see Take section below).
- **Abandoned ~~B~~burrow**~~:s are An~~ Abandoned burrow are burrows where, due to natural processes (e.g., flooding), rather than human actions, the burrow entrance or a significant portion of the burrow tunnel ~~has~~ is filled in, collapsed, or is blocked to the extent that burrowing owls cannot access the burrow. Burrows with collapsed or blocked entrances resulting from human actions are~~will~~ still ~~be~~ considered Potentially Occupied burrows, because natural processes were not the cause of burrow collapse or blockage.
- **Burrow cluster**: A burrow cluster represents the burrows potentially used by a single breeding pair of owls. It is defined as one or more burrows within 150 feet of each other. This is the typical distance from which burrowing owls roost and loaf from their nest burrows (Haug and Oliphant 1990) and corresponds to approximately one-quarter of the mean nearest-neighbor distance (Millsap and Bear 1997) Moreover, Mealey (1997) observed several pairs with satellite burrows over 100 feet away from the nest burrow. A burrow cluster can consist of~~include~~ burrows in a line, meaning that each burrow may not be 150 feet away from every burrow but must be within 150 feet of at least one burrow in the cluster.
- **Burrow centroid**: In cases where there is more than one Potentially Occupied burrow, the burrow centroid is the average location of all Potentially Occupied burrows within 150 feet of each other. The burrow centroid is used to assess if significant habitat modification will occur due to the project activities (see Appendix E).
- **Urban**: For the purposes of these Guidelines, a burrowing owl is considered in urban habitat if the burrow centroid is on habitat classified under the urban class (1820) in the Florida Land Cover Classification. If the burrow centroid is not classified under the urban class, then it is considered rural.
- **Suitable Foraging Habitat**: Habitat that consists of open areas primarily dominated by low herbaceous vegetation. Vegetation height may fluctuate depending on disturbance intervals (e.g., cattle rotation, prescribed fire, mowing) but is primarily herbaceous with minimal woody vegetation.

- In rural areas, potential foraging habitat includes the following land cover classes (Florida Land Cover Classification, Kawula and Redner 2018): dry prairie,- mowed grass, vegetative berm, rural open (with few trees), row crops and field crops (where the vegetation height is low), improved pasture, sod farms, wet prairie, marshes, wetlands (where vegetation height is low), and other open areas.~~.~~
- In urban areas, burrowing owls forage in vacant lots, yards, cemeteries, airports, golf courses, athletic fields, and other open areas.

Take of burrowing owls includes any of the following:

1. Causing **injury or death** of burrowing owl adults, eggs, or young.
2. **Collapsing** a Potentially Occupied burrow or **blocking the entrance** of a Potentially Occupied burrow in a manner that prevents a burrowing~~n~~ owl from entering or exiting the burrow.
3. **Disturbances within 10 feet of a Potentially Occupied burrow entrance at any time of year** are expected to cause take, unless outlined below in Examples of activities not expected to cause take. Given this species' year-round use of burrows, impacts to burrows result in significant disruption of breeding and sheltering activities. Examples of this form of take include, but are not limited to, inserting objects or liquids into a burrow, impeding a burrowing owl's ability to take shelter in a burrow, or blocking visibility around the Potentially Occupied burrow by erecting structures or planting vegetation greater than 8 inches in height within 10 feet of the burrow.
4. **Disturbances within 33 feet of a Potentially Occupied burrow entrance during the breeding season** (February 15-July 10) are expected to cause take (Millsap and Bear 2000), unless they are included below in Examples of activities not expected to cause take.
5. **Intentionally and repeatedly forcing burrowing owls to fly or to exhibit signs of stress** (e.g., giving alarm calls, producing snapping sounds with their bill, bobbing up and down, crouching and weaving back and forth, remaining vigilant toward the intruder) is considered take via harassment. This clause applies to instances when this is the purpose of the activity rather than incidental to an otherwise lawful activity.
6. **Capturing, handling, and collecting** burrowing owls or eggs constitute take, as do banding, collecting, attaching auxiliary markers to, and drawing blood or other biological samples from burrowing owls.
7. **Use of a burrow scope** within a Potentially Occupied burrow is expected to cause take.
8. **Significant habitat modification** -~~-~~ An activity that results in the loss of ~~greater~~ more than 50% of the total suitable foraging habitat within a 1,970-foot radius circle around a ~~Potentially Occupied~~burrow centroid ~~burrow may result in significant habitat modification by impairing the essential behavior of foraging~~ (unless authorized under Florida Forestry Wildlife BMP's and Florida Agricultural Wildlife BMP's or Other authorizations for take). ~~FWC staff will evaluate activities that meet this criterion on a case by case basis to determine if significant habitat modification is likely to occur. When conducting this evaluation, FWC staff will consider Potentially Occupied burrows that are either on site or within 33 feet of the project boundary~~. Activities that may cause significant habitat modification include, but are not limited to, clearing, grading, paving, bulldozing, digging, building construction, and site preparation for development.

Distribution and Survey Methodology

The map on the following page represents the principle geographic range of the Florida burrowing owl, including intervening areas of unoccupied habitat. This map is ~~for~~ informational ~~purposes~~ only and is not for regulatory purposes.

Counties: Alachua, Brevard, Broward, Citrus, Charlotte, Collier, DeSoto, Duval, Flagler, Gilchrist, Glades, Hardee, Hernando, Hendry, Highlands, Hillsborough, Indian River, Lake, Lee, Levy, Manatee, Marion, Martin, Miami-Dade, Monroe, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St. Lucie, Sumter, Volusia.

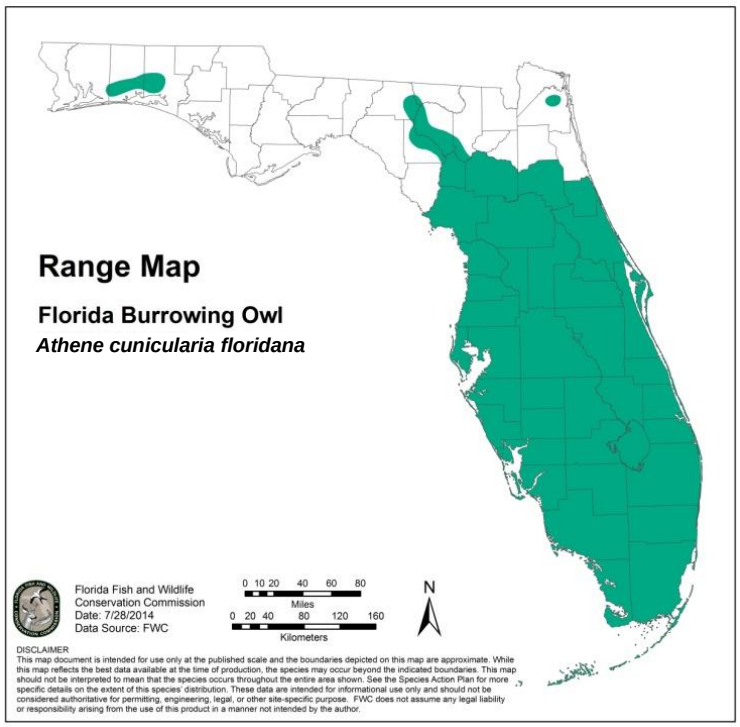

Figure 1. Distribution of burrowing owls in Florida.

Recommended Survey Methodology

Surveys are highly recommended in potential habitat to determine if burrowing owls are present and if an Incidental Take Permit is needed to avoid unauthorized take and violation of Rule 68A-27.003, F.A.C. If conducted in accordance with the methodology described below and the species is not detected, no FWC review or coordination on surveys is needed. Surveys are recommended during project planning and immediately prior to project activities:

1. **Project planning surveys during the early stages of a project identify burrowing owl burrows and aid in development of appropriate avoidance, minimization, and mitigation measures.**

    a) For small-scale projects (1 acre or less), surveys involve walking all potential burrowing owl habitat to record the number and location of Potentially Occupied and Abandoned burrows. Photos of each Potentially Occupied and Abandoned burrow should be included in permit applications.

    b) For larger-scale projects (greater than 1 acre), parallel transects spaced no more than 50 feet apart and covering all potential habitat should be sufficient to detect and record the number and location of Potentially Occupied and Abandoned burrows, provided surveys are conducted on days with good visibility. Photos of each Potentially Occupied and Abandoned burrow should be included in permit applications. If operating vehicles in the survey area, surveyors must take care to remain greater than 10 feet from Potentially Occupied burrows.

    c) Project planning surveys should cover 100% of the potential habitat on the project site.

    d) Additionally, surveys should include the area within 33 feet of the project footprint to detect burrows that may be impacted by project activities in a manner that could result in take, even if the burrows occur on adjacent properties. If lawful access cannot be achieved to adjacent areas, surveys can be performed by visual inspection from the project boundary.

    e) When evaluating applications for potential significant habitat modification, FWC staff will consider Potentially Occupied burrows that are either on site or within 33 feet of the project boundary, so applicants are not expected to survey within 1,970 feet of the project boundary.

    f) Project planning surveys should be conducted no more than 90 days prior to submission of a permit application.

g) This survey methodology does not require use of a burrow scope; use of a burrow scope in a Potentially Occupied burrow is considered take and is prohibited without a permit.

1. **Pre-activity** (pre-clearing or pre-construction) surveys are recommended in the active part of the project site (e.g., the area scheduled for clearing/grading) no more than~~within~~ 48 hours of project activities beginning to identify burrows that may have been established after project planning surveys and to ensure no active nests (burrows with eggs or flightless young) are present. Pre-activity surveys are not necessary if project planning surveys did not detect burrows. However, if previously-undetected burrows are found (either during pre-activity surveys or during project activities), avoidance of take is not feasible, and take of the burrows is not authorized by an ~~i~~Incidental ~~t~~Take ~~p~~Permit, the applicant should contact the FWC to discuss permitting options.

    a) If the permittee has received an ~~i~~incidental T~~t~~ake P~~p~~ermit to scope and excavate inactive burrows (burrows without eggs or flightless young), scoping and excavation typically is completed concurrently with pre-activity surveys (Appendix B), unless otherwise stated in permit conditions.

    b) Surveys should follow the methods described above for project planning.

    c) If no new burrows are found, no further action is required, and the permittee may execute the permit according to the permit provisions.

Identifying Burrows

Burrow entrances are roughly circular or oblong and vary in size, averaging about 5 inches wide by 3.5 inches in height (Sprunt 1954), often—but not always—with a mound of excavated soil at the entrance (Appendix A). During the breeding season, the entrance to the nesting burrow may contain adornments such as paper, shells, glass, pieces of plastic, animal fecal material, clumps of grass, animal parts, or other items (Millsap 1996, Mealey 1997). In addition to burrows that they excavate, burrowing owls ~~can~~ may use nine-banded armadillo (*Dasypus novemcinctus*), gopher tortoise (*Gopherus polyphemus*), or iguana burrows (Millsap 1996; G. Campbell, personal communication), as well as man-made structures like manholes, sidewalks, sewer drains, and concrete pipes (Appendix A). Armadillo burrow entrances are similar but tend to be slightly larger, averaging 8 inches wide by 6 inches in height (McDonough et al. 2000). Gopher tortoise burrows tend to have a half-moon shaped cross-section that closely approximates the shape of a gopher tortoise. Iguana burrows tend to be half-moon shaped, though more irregular in shape than a gopher tortoise burrow, usually with less of a mound of soil in front (K. Enge, personal communication) and sometimes with tail marks in the sand.

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.

- Avoid the use of pesticides, rodenticides, insecticides, fungicides and/or herbicides immediately around the burrow entrance. Reduce or avoid the use of pesticides, rodenticides, insecticides, fungicides and/or herbicides in burrowing owl foraging habitat to the extent practicable, especially during the nesting season. Use these products according to label instructions. Pesticides can contaminate or possibly limit the amount of food available for owls. Raptors can become sick and even die from eating prey that have consumed certain rodenticides (Murray 2017).
- In urban ~~and suburban~~ areas:
    - Reduce speed limits on construction sites.
    - Keep ~~remaining~~ foraging habitat open (e.g., limit planting of trees and shrubs).

- Maintain an average vegetation (e.g., grasses, forbs, shrubs) height of less than 5 inches within 10 feet of the burrow so owls are able to avoid predators. Use light equipment (e.g., weed trimmer) within 10 feet of the burrow entrance to avoid collapsing the burrow. See Appendix C for more information on habitat management.
- If invasive, non-native shrubs or trees are encroaching on a burrow, wait until after the breeding season to treat the vegetation, and remove the vegetation only if removal will not result in collapse of the burrow.
- Avoid building large or tall human structures (e.g., buildings, wooden fences, walls) that could obscure a burrowing owl's ability to visually detect predators within 33 feet of Potentially Occupied burrows.
- Post and place signage around burrows to provide protection from disturbance, but only when necessary (Appendix C).
- Provide t-shaped perches less than 24 inches tall near burrows. Perches provide hunting and observation sites for burrowing owls. Placing a t-perch within 10 feet of a burrow is not expected to cause take.
- On properties managed by local governments with burrowing owls, consider educational signage to raise awareness of burrowing owls.

- In rural areas:
  - Maintain low vegetation heights beneficial for burrowing owl foraging through mowing, prescribed grazing, and/or prescribed burning.
  - If cattle are present, consider a selective cattle-grazing regime (i.e., prescribed grazing). Cattle grazing can effectively be used to reduce vegetation height to a level that is beneficial for burrowing owls. However, at high stocking rates, cattle may degrade or destroy habitat and burrows by trampling or wallowing in them. Consider other vegetation treatment options such as prescribed burning or mowing to maintain vegetation that cattle do not graze. The Natural Resources Conservation Service can provide guidance for developing a prescribed grazing plan.
  - Manage invasive, non-native plant species if they reduce habitat quality for burrowing owls. If invasive, non-native shrubs or trees are encroaching on a burrow, wait until after the breeding season to treat the vegetation, and remove the vegetation only if removal will not result in collapse of the burrow.
  - Reduce the amount of foraging habitat converted to more intensive agricultural land uses (e.g., row crops, silviculture).
  - Consider placing a device that will allow full access for cattle to graze without collapsing the burrow. One example of such a device uses a 3-foot x 10-foot, 18-inch tall frame made of 1-inch angle iron (1/8-inch thick) for this purpose (Quest Ecology, Inc.; Appendix D). Care should be taken to select a low, open design that does not impede visibility for burrowing owls.

- Consider ~~attracting burrowing owls to safe places with~~creating suitable foraging and nesting habitat to increase available habitat for Florida burrowing owls.
  - Burrowing owls are attracted to areas with exposed soil, and even removing a 12-inch diameter plug of sod can attract burrowing owls in some situations.
  - Artificial burrows and starter burrows can be used to attract burrowing owls (see Appendix D for definitions and additional information).

- ~~o~~ Strategic placement of artificial burrows can help attract burrowing owls away from culverts or other areas prone to flooding (Appendix A).
- ~~Please note:~~ Installing starter or artificial burrows requires permission from the landowner.
- Choose open, treeless areas that will remain dry during heavy rains (see Appendix D for additional information on choosing a site).
- If artificial burrows or starter burrows are placed on a small parcel (i.e., quarter- or half-acre lot), the starter burrow should be placed as far as possible from sources of disturbance, such as building entrances and heavy vehicular traffic. Placement in the front of the lot near the corners typically is best, provided the area does not have heavy vehicular traffic.
- The high, dry portion of berms around drainage areas and built-up landscape features can provide sites for starter and artificial burrows in some developments.
- Appendix C contains information on maintaining habitat and, where necessary, posting burrows to protect them from disturbance.
- For private landowners interested in attracting and managing habitat for burrowing owls on their properties, the FWC offers Florida's Safe Harbor Program. This program is~~,~~ a voluntary conservation incentive plan that provides regulatory assurances against future land use restrictions in exchange for voluntarily implementing management practices. For more information, please visit https://MyFWC.com/SafeHarbor.

Measures to Avoid Take

Avoidance Measures that Eliminate the Need for FWC Incidental Take Permitting

The following measures will eliminate the need for an FWC ~~i~~Incidental T~~t~~ake P~~p~~ermit. For more information on projects that may cause intentional take (e.g., capturing and handling for research, intentional take to ensure human safety), please visit the intentional take section of this document. Projects may avoid incidental take by:

- Avoiding acts that can kill or injure burrowing owls or eggs~~;~~, and
- Maintaining at least a 10-foot buffer during the non-breeding season (July 11-February 14) and at least a 33-foot buffer during the breeding season (February 15-July 10) around the entrance of Potentially Occupied burrows (Please note: for projects started during the non-breeding season that unexpectedly need to extend into the breeding season, contact the FWC regarding permitting options)~~,~~: and
- Ensuring that the project does not cause significant habitat modification through the loss of ~~greater~~ more than 50% of the total suitable foraging habitat within a 1,970-foot radius ~~circle~~ around the burrow centroid~~a~~ ~~Potentially Occupied burrow~~(see definition). Activities that may cause significant habitat modification include, but are not limited to, clearing, grading, paving, bulldozing, digging, building construction, and site preparation for development.

In some circumstances, alerting people to the presence of burrows by installing a t-perch, posting, and/or signage can help avoid take (see Appendix C for suggestions on posting and signage). When assessing whether a project is likely to cause take, be sure to consider all aspects of the project (e.g., consider water, electric, sewer, and irrigation lines that also need to be installed when building a house). The flow chart below provides guidance for avoidance of incidental take.

The flow chart below is designed to assist in determining if take is avoidable.

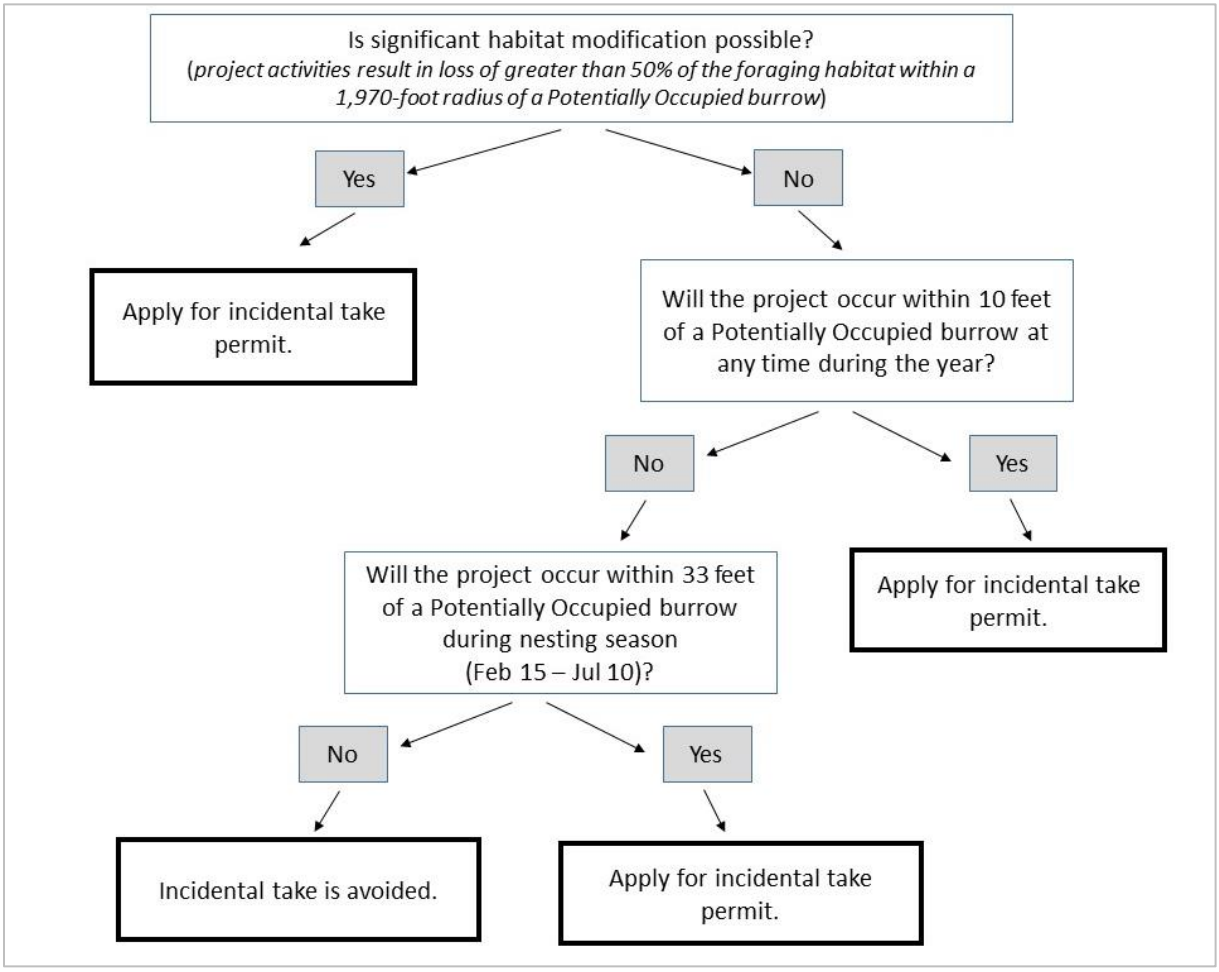

Figure 2. Is an Incidental Take Permit needed?

Examples of Activities Not Expected to Cause Take

- Maintenance activities in golf courses, athletic fields, cemeteries, airports, or lawns that do not result in harm to burrowing owls and do not collapse or flood Potentially Occupied burrows:
    - Avoid mowing over burrow entrances and use light equipment (e.g., a weed trimmer) to maintain vegetation immediately around the burrow entrance to avoid collapsing the burrow.
    - Careful trimming of grass with a weed trimmer within 10 feet of a burrow at any time of year is unlikely to result in take, provided the action is infrequent, the action is of short duration (< 5 minutes), the person uses careful foot placement to avoid collapse of the burrow, and the person avoids any contact between equipment and owls that may be present at the burrow entrance. Maintaining an average vegetation height of less than 5 inches within 10 feet of the burrow is ideal.
    - Care should be taken not to trim too close to the ground, which can lead to erosion into the burrow entrance during rain storms.
    - Use pesticides, rodenticides, insecticides, fungicides and/or herbicides only according to label instructions in foraging habitat, and do not apply these products immediately around the burrow entrance.

- Activities in pastures and fields in rural areas that are conducted in accordance with Florida Forestry Wildlife BMP's and Florida Agricultural Wildlife Best Management Practices (BMPs).
- Re-sodding of a lawn near Potentially Occupied burrows that leaves a 3-foot radius without sod around the burrow entrance, provided the activity occurs outside of the breeding season and occurs on an existing lawn (i.e., not following clearing and grading for new construction).
- Work that occurs indoors after the exterior of a structure is complete, provided (1) it does not involve placement of construction materials, equipment, or vehicles within 10 feet of a Potentially Occupied burrow year round or within 33 feet during the breeding season; and (2) outdoor foot traffic within 33 feet of a Potentially Occupied burrow during the breeding season totals less than 1 hour in a 24 hour period.
- Standard vehicular and pedestrian traffic on roads and sidewalks near Potentially Occupied burrows, provided the project does not increase the intensity of these activities.
- Resurfacing existing roads, provided people and equipment remain on or within 1 foot of the existing paved road shoulder.
- Connecting utilities to a house during the breeding season, provided the activity is short-duration (less than 1 hour) and occurs greater than 10 feet from a burrow.
- Activities that impact Abandoned Burrows.
- Posting of burrowing owl burrows using the guidance in Appendix C.
- Placement of a t-perch less than 24 inches tall within 10 feet of a burrow.
- Placement of a device that will allow full access for cattle to graze without collapsing the burrow, provided such devices use a low, open design that maintains visibility for burrowing owls (see Appendix D for an example).
- Viewing or photographing burrowing owls, provided a distance is maintained that does not alter burrowing owl behavior. Indications of altered burrowing owl behavior include, but are not limited to, burrowing owls flying away, giving alarm calls, producing snapping sounds with their bill, bobbing up and down, crouching and weaving back and forth, remaining vigilant toward a wildlife viewer or photographer, or showing any other sign of agitation.
- Project activities between 10 and 33 feet from a Potentially Occupied burrow during the breeding season may be able to avoid take if similar activities already occur in comparable proximity to the burrow. Existing activities are "similar" if they are comparable in nature, size, duration, and intensity. If proposing a deviation from the 33-foot buffer, applicants should carefully document the existing activities on a site and whether project activities will increase these beyond the existing levels.

This list is not an exhaustive list of exempt actions. If in doubt, please contact FWC's ~~Species Conservation Planning~~Wildlife Diversity Conservation staff at the appropriate FWC regional office if you are concerned that you could potentially cause take.

Florida Forestry Wildlife BMP's and Florida Agricultural Wildlife BMP's

- Agriculture, as defined in Section 570.02, F.S., conducted in accordance with Chapter 5I-8, F.A.C., and the wildlife best management practices (BMPs) adopted in Rules 5I-8.001 and 5M-18.001, F.A.C., by the Florida Department of Agriculture and Consumer Services pursuant to Section 570.94, F.S., is authorized and does not require a permit authorizing incidental take despite any other provision of Rules 68A-27.007 or 68A-27.005, F.A.C.

- Enrollment in the Notice of Intent process for the Florida Forestry Wildlife BMPs and Florida Agricultural Wildlife BMPs program and implementation of these BMPs provides a presumption of compliance with regard to incidental take of Florida burrowing owls.
- Forestry and Agricultural BMPs include avoidings~~tate to avoid~~ contact with known and visibly apparent burrowing owl burrows year-round, locating concentrated heavy equipment operations away from known or visibly apparent active burrows (i.e., referred to as Potentially Occupied with indications of use in these guidelines), and marking and avoiding damage to burrow openings when heavy equipment operations must be located near burrows.

Other Authorizations for Take

- Activities within an airport property in accordance with Rule 68A-9.012, F.A.C.
- As described in Rule 68A-27.007(2)(c), F.A.C., land management activities that benefit wildlife and are not inconsistent with FWC Management Plans are authorized and do not require a permit authorizing incidental take. ~~Wildlife~~ Land management activities include but are not limited to: exotic species removal, prescribed burning, roller chopping, and brush- and tree-cutting to improve wildlife habitat.
- In accordance with local, state, and federal regulations (including, but not limited to, Federal Electric Reliability Council (FERC) Electric Reliability Standard FAC-003-3, National Electrical Safety Code (NESC) section 218, and Florida Public Service Commission (FPSC) mandates), routine vegetation maintenance activities within existing power line right of ways that avoid heavy equipment operation within 10 feet of active, known and visibly apparent Florida burrowing owl burrows (i.e., referred to as Potentially Occupied with indications of use in these guidelines) do not require a permit authorizing incidental take.
- 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 governmental entity, power restoration activities and non-routine removal or trimming of vegetation within linear right of way in accordance with vegetation management plan that meets applicable federal and state standards does not require an Incidental Take Permit from the state.
- Removal or modification of man-made structures (e.g., culverts, pipes, etc.) used by burrowing owls is authorized without a permit, provided the removal is conducted in accordance with the FWC's ~~policy on state-listed species and man-made structures~~policy on state-listed species and man-made structures, found in Florida's Imperiled Species Management Plan. Removal or modification of the structure is authorized without a permit, provided that:
    - an approved Wildlife/Habitat Management Plan (see definition in Florida's Imperiled Species Management Plan) is in place for the area where~~in which~~ the activity will occur~~;~~ or
    - at least 14 days prior notification is provided to the FWC's Wildlife Diversity Conservation Planning Biologist ~~Species Conservation Planning Biologist~~ in the region where the activity will occur; no eggs or dependent young are present, or the nesting cycle (or rearing of young) has been completed; and the activity is conducted in such a way so as to avoid direct physical injury of individual animals.
- Maintenance or removal of artificial burrows is authorized without a permit, provided the repairs or removal occur outside of the breeding season, when the burrow is inactive (i.e., no eggs or flightless young). Permittees wishing to remove an artificial burrow installed as mitigation under a valid FWC Incidental Take ~~p~~Permit must contact the FWC's Protected Species Permitting Office regarding a permit amendment to replace the mitigation.

Coordination with Other State and Federal Agencies

The FWC participates in other state and federal regulatory programs as a review agency. During review, FWC staff identifies and recommends measures to address fish and wildlife resources to be incorporated into other agencies' regulatory processes. FWC staff provides recommendations for addressing potential impacts to state listed species in permits issued by other agencies. If permits issued by other agencies adequately address all requirements for issuing a state-Threatened species take permit, the FWC will consider these regulatory processes to fulfill the requirements of Chapter 68A-27, F.A.C., with a minimal application process. This may be accomplished by issuing a concurrent take permit from the FWC, by a memorandum of understanding with the cooperating agency, or by a programmatic permit issued to another agency. These permits would be issued based on the understanding that implementation of project commitments will satisfy the requirements of Rule 68A-27.007, F.A.C.

Review of Land and Water Conversion Projects with State-Listed Species Conditions for Avoidance, Minimization and Mitigation of Take

- FWC staff, in coordination with other state agencies, provide comments to Federal agencies (e.g., the Army Corps of Engineers) on federal actions, such as projects initiated by a federal agency or permits being approved by a federal agency.
- FWC staff works with landowners, local jurisdictions, and state agencies such as the Department of Economic Opportunity on large-scale land use decisions, including long-term planning projects like sector plans, projects in Areas of Critical State Concern, and large-scale comprehensive plan amendments.
- FWC staff coordinates with state agencies such as the Department of Environmental Protection (DEP) and the 5 Water Management Districts that issue environmental resource permits (ERP). These permits cover activities such as dredging and filling in wetlands, flood protection, storm water management, site grading, building dams and reservoirs, waste facilities, power plant development, power and natural gas transmission projects, oil and natural gas drilling projects, port facility expansion projects, some navigational dredging projects, some docking facilities, and single-family developments such as for homes, boat ramps, and artificial reefs.
    - During the ERP process, FWC staff may provide guidance on avoidance, minimization, and mitigation measures for burrowing owls.
    - Conservation benefit as defined under Rule 68A-27, F.A.C. may be accomplished through avoidance, minimization, and mitigation measures included in an ERP, provided sufficient, suitable nesting and foraging habitat occurs on the mitigation site for burrowing owls, and there is a commitment to manage the habitat in a manner suitable for burrowing owls.

FWC Permitting: Incidental Take

According to Rule 68A-27.001, F.A.C., incidental take is take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Activities that result in take to burrowing owls are prohibited without an Incidental Take Permit from the FWC (see above for activities that do not require a permit). Incidental take permit applications are available on the online permitting site, currently under the name "migratory bird nest removal." The applicant must be the landowner or an agent designated in writing by the landowner.

In addition to state permits, the applicant is responsible for acquiring any necessary local or federal authorizations. Federal permits may be required from the U.S. Fish and Wildlife Service to comply with the Migratory Bird Treaty Act (16 USC 703-712). For example, removing an active nest (i.e., a nest with eggs or young) may require a federal permit in addition to the state permit. Please be aware that the FWC typically does not issue permits for excavation and filling of active burrows (i.e., burrows containing eggs or flightless young), except in situations involving health and human safety, and issuance of a state permit does not constitute federal authorization.

Permits will be issued when there is a scientific or conservation benefit to the species and only upon showing by the applicant that that the permitted activity will not have a negative impact on the survival potential of the species. Scientific benefit, conservation benefit, and negative impacts are evaluated by considering the factors listed in Rule 68A-27.007(2)(b), F.A.C. These conditions are usually accomplished through a combination of avoiding take when practicable, minimizing take that is unavoidable, and mitigating for the permitted take. The sections below describe the minimization measures and mitigation options available as part of the Incidental Take Permit process for take of burrowing owls. This list is not an exhaustive list of options.

Minimum Qualifications for Scoping and Excavating Burrows

Incidental Ttake Ppermits often involve the destruction of Potentially Occupied burrows in order to conduct otherwise lawful activities. Permittees or their designated agent use a burrow video scope to evaluate whether the burrow is inactive, followed by careful excavation of the burrow by hand. Please refer to Appendix B for guidance on scoping and excavation of burrows authorized under an Iincidental Ttake Ppermit. Properly scoping and excavating burrows during execution of a permit requires skill and training to minimize the possibility of harming burrowing owls or their eggs, particularly because burrowing owls sometimes breed earlier or later than typical breeding season dates. Therefore, applicants must either meet the minimum qualifications below or designate an agent that meets the qualifications. Experience gained during projects under which a permit ~~or rule~~ violation or an infraction~~an infraction~~ occurred shall not be claimed or accepted as experience toward the following qualifications.

1. Documentation of at least 10 hours observing burrowing owl behavior in the field. This experience is helpful for determining when young are capable of flight and a permit can be executed.
2. Documented experience using a burrow video-scope:
    a. Documentation of scoping 10 burrowing owl burrows for Migratory Bird Nest Removal or Incidental Take Permits and documentation of a FWC online refresher training module, **or**
    b. Documentation of scoping at least 3 burrowing owl burrows under the supervision of someone that meets the minimum qualifications plus completion of an FWC online training module, **or**
    c. Documentation of scoping at least 10 gopher tortoise burrows (or a combination of burrowing owl and gopher tortoise burrows) plus completion of an FWC on-line training module, **or**
    d. Completion of an FWC-approved in-person training course.
3. **Documented experience excavating burrows:**
    a) Documentation of excavating 10 burrows for Migratory Bird Nest Removal or Incidental Take Permits for burrowing owls and documentation of an FWC online refresher training module, **or**

b) Authorization to excavate gopher tortoise burrows by hand shovel and documentation of a FWC online refresher training module, **or**
c) Documentation of excavation of 2 burrowing owl burrows under the supervision of someone that meets the minimum qualifications plus completion of a FWC online training module, **or**
d) Completion of an FWC-approved in-person training course.

Applicants or their agent must submit documentation of minimum qualifications, including a list of training received and the permit numbers under which experience was obtained, when applicable. Minimum qualifications can be submitted as part of an ~~i~~incidental T~~t~~ake P~~p~~ermit application. However, for those likely to submit multiple applications over time, the FWC strongly encourages landowners and consultants to upload minimum qualifications as part of an application for a self-issuing Registered Agent P~~p~~ermit in the online permitting site. This approach will allow applicants to upload minimum qualifications ~~only~~ once rather than repeatedly uploading them in each Incidental Take Permit application.

In the ~~i~~incidental T~~t~~ake P~~p~~ermit application, applicants or their agent must swear and affirm that they have committed no wildlife violations in Florida, the information submitted in the application and supporting documents is complete and accurate, any false statement may result in criminal penalties, and the applicant agrees to abide by all applicable state, federal, and local laws. Training modules for scoping and excavation of burrowing owl burrows can be found at https://learningmyfwc.remote-learner.net/.

Minimization Options

The suite of options below can help to reduce or minimize take of the species~~,~~ and lessen the mitigation necessary to counterbalance take. All of the options below assume that adhering to avoidance measures that eliminate the need for FWC permitting described above is not possible, and that some level of take may occur.

Seasonal, Temporal, and Buffer Measures

- Conducting project activities outside of the breeding season (February 15-July 10) minimizes take.
- If all burrows cannot be avoided, maintaining a 10-foot buffer around at least some Potentially Occupied burrows all year minimizes take.
- If all burrows cannot be avoided, maintaining a 33-foot buffer around at least some Potentially Occupied burrows during the breeding season (February 15-July 10) minimizes take via harassment.

Design Modification

- Reducing the number of impacted Potentially Occupied burrows minimizes take.
- Reducing the amount of foraging habitat converted to development or other incompatible land uses (i.e., land uses that do not provide the low, open habitat required by the species) within 1,970 feet of a Potentially Occupied burrow minimizes take.
- For those not enrolled in Agricultural Wildlife BMPs, reducing the amount of foraging habitat converted to intensive agricultural uses (e.g., row crops, silviculture) minimizes take.
- Avoiding erecting structures or planting vegetation greater than 8 inches in height within 10 feet of Potentially Occupied burrows minimizes take (note that maintaining vegetation height at less than 5 inches is ideal [Appendix C]).
- Maintaining vegetation height around Potentially Occupied burrows in accordance with Appendix C minimizes take.
- Keeping remaining foraging habitat open (e.g., limiting planting of trees and shrubs) minimizes take.

- Using posting and signage, where appropriate, in accordance with Appendix C minimizes take.

Method Modification

- Providing pre-construction training about burrowing owl protections to contractors, sub-contractors, and other project personnel minimizes take. Pre-construction training should make personnel aware of burrowing owls on adjacent properties; otherwise, take may occur from parking of vehicles, storage of equipment, or placement of materials on adjacent properties.
- Reducing speed limits on construction sites minimizes take.
- Posting and placing signage around burrows (see Appendix C) during construction activities can minimize take by making project personnel aware of burrow locations. After construction, posts and signage can be removed if they are no longer necessary to address disturbance issues. Provided permission is granted from the landowner(s), posting of burrows on adjacent properties minimizes take that may occur from parking of vehicles, storage of equipment, or placement of materials on adjacent properties.
- Avoiding the use of silt fence around burrows during construction~~,~~ or using only the minimum amount necessary for erosion control, minimizes take. Use silt fence on the uphill side – and only when necessary~~ – –~~ to ~~-~~prevent soil and debris from construction from encroaching upon a burrow~~,~~ and avoid completely encircling burrows with silt fencing whenever possible.
- If cattle are present, avoiding high stocking rates, employing a selective cattle-grazing regime (i.e., prescribed grazing), or using devices around burrows to reduce the possibility of collapse minimizes take for those not enrolled in Agricultural Wildlife BMPs.
- Using passive relocation techniques (sensu Trulio 1995) to encourage burrowing owls to move to safe, suitable on-site habitat minimizes take. Passive relocation involves the placement of artificial burrows in advance of project activities – and preferably less than 330 feet from burrows that must be destroyed – with the goal of encouraging burrowing owls to relocate to suitable on-site habitat. Passive relocation is only appropriate in cases where sufficient, suitable habitat will remain on-site following project activities.

Mitigation Options

Mitigation requirements correspond with the level of impact. ~~is scalable depending on the impact, with mitigation options for take that significantly impairs or disrupts essential behavioral patterns.~~ Mitigation measures below include options for take via removal of burrows, ~~and~~ take via harassment of burrowing owls (i.e., activities within 33 feet of Potentially Occupied burrows during one ~~the~~ breeding season), and take via significant habitat modification.~~.~~

For determining appropriate mitigation, most project activities fall into 3 categories: (1) activities that do not involve changes to foraging habitat, (2) activities that result in changes to foraging habitat but do not cause significant habitat modification, and (3) activities that result in significant habitat modification (Table 1). Potential options for mitigation are described below.

Table 1. Summary of mitigation options for 3 categories of project activities.

Category	The project activity will:	Mitigation options (see text for details)
1	Destroy burrow(s) or harass breeding pairs, but ~~not changes~~not impact suitable foraging habitat	1. Onsite starter or artificial burrow(s) 2. Offsite starter or artificial burrow(s) plus financial contribution 3. Financial contribution
2	Destroy burrow(s) or harass breeding pairs, ~~with~~ and ~~changes to foraging~~impact suitable foraging habitat, but ~~no~~ not result in significant habitat modification	1. Financial contribution 2. Onsite starter burrows plus financial contribution 3. Onsite artificial burrows plus financial contribution **4. Offsite starter burrows or artificial burrows plus financial contribution**
3	Result in s~~S~~ignificant habitat modification, with or without burrow destruction.	1. ~~**1. Scientific benefit**~~ **Financial contribution** 2. **Habitat protection, restoration, or management**~~**3. Financial contribution4. Information need**~~ 4.3. **Scientific benefit**~~**5. Education6. Non-native species control**~~

This list of categories and mitigation options is not exhaustive. For scenarios that do not fit these categories, stakeholders may contact the FWC's Protected Species Permitting Office for technical assistance. Programmatic permits are possible and will be evaluated on a case-by-case basis. All mitigation contributions support burrowing owl conservation actions consistent with the Species Action Plan for the Florida Burrowing Owl (FWC 2013) or those identified by FWC subject matter experts as emerging needs for the species.

Currently, there is uncertainty regarding the effectiveness of some mitigation options typically employed for burrowing owls, such as the placement of starter burrows and artificial burrows on lots following development. FWC staff intend to coordinate with partners to learn more about the effectiveness of different mitigation options, and the FWC will revisit and revise mitigation options in these guidelines as necessary and as more information becomes available.

Category 1: Mitigation for project activities that do not involve ~~changes~~ impacts to~~in~~ foraging habitat

Applicants sometimes need to remove Potentially Occupied burrows or harass burrowing owls to conduct otherwise lawful activities that do not require development or some other change in burrowing owl foraging habitat. Examples include when burrows obstruct lawful activities in cemeteries, athletic fields, school fields, utility line easements, golf courses, etc. In these cases, burrows may need to be destroyed, but the foraging habitat remains intact. The FWC strongly encourages on-site mitigation whenever possible for these circumstances. Mitigation options include:

1. Installation of 2 starter burrows or 1 artificial burrow for each burrow destroyed or breeding pair harassed in on-site areas. The objective of this mitigation option is to passively relocate (*sensu* Trulio 1995) burrowing owls to designated, suitable on-site areas.

a) Starter burrows or artificial burrows shall be sited and installed using guidance in Appendix D.
b) Please note that artificial burrows may be necessary if soils are not appropriate for starter burrows (see Appendix D).
c) The Permittee shall install starter burrows or artificial burrows at least 7 days prior to the initiation of project activities, to allow burrowing owls to find the new burrows, unless the applicant can provide a justification for why this is not feasible.
d) Vegetation shall be maintained in accordance with Appendix C for the duration listed on the permit (typically 3 years).
e) If necessary to reduce the potential for disturbance, posting and signage shall be placed in accordance with Appendix C and maintained for the duration listed on the permit (typically 3 years).
f) Permittees will keep the entrance of starter burrows and artificial burrows free of debris or eroded soil until burrowing owls occupy the site or for the duration of the permit, whichever occurs first.
g) Permittees will provide a report to FWC's Protected Species Permitting Office of all activities engaged in pursuant to the permit within 90 days of the permit's expiration date or upon application for a permit renewal, whichever comes first. The reports will include photographs of the mitigation.

2. If the applicant can demonstrate that on-site mitigation is not feasible or would not provide conservation benefit:

a) The applicant may make a financial contribution in the amount of $1,900 per burrow destroyed or harassed to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund, or
b) The applicant may install 2 starter burrows or 1 artificial burrow on an off-site mitigation area per burrow destroyed or breeding pair harassed, provided the following conditions are met:

i. The applicant agrees to provide a financial contribution of $600 per burrow destroyed or breeding pair harassed to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund.
ii. The off-site mitigation area has been approved by the FWC. This may necessitate a site visit by FWC staff, at the discretion of the FWC.
iii. The applicant can demonstrate that the site contains suitable foraging habitat, sufficient open space, and well-drained areas suitable for nesting.
iv. The landowner of the off-site mitigation area has provided written permission; a commitment to habitat management for burrowing owls in accordance with Appendix C for the duration listed on the permit; a commitment to keep starter burrows and artificial burrows in usable condition until burrowing owls use the site or for the duration of the permit, whichever occurs first; and annual reporting for the duration listed on the permit (typically 3 years).

Category 2: Mitigation for project activities with ~~changes in~~impacts to foraging habitat but no significant habitat modification

This category includes project activities that result in destruction of burrows or harassment of burrowing owls but not significant habitat modification (i.e., less than 50% of the foraging habitat is lost within~~-~~ a 1,970-foot radius of the burrow centroid ~~a Potentially Occupied burrow~~). Most residential and commercial developments fall into this category. Mitigation options include providing one of the following:

1. A financial contribution to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund in the amount of $1,900 for each burrow cluster~~*~~ in which Potentially Occupied burrows are destroyed or breeding pairs are harassed.

2. A minimum of 2 on-site starter burrows per burrow cluster~~*~~ in which Potentially Occupied burrows are destroyed or breeding pairs are harassed, plus $850 per burrow cluster to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund.

    a) Starter burrows shall be installed in accordance with Appendix D and maintained for a minimum of 3 years according to the guidelines in Appendix C. Permittees will keep the entrance of starter burrows and artificial burrows free of debris or eroded soil until burrowing owls occupy the site or for the duration of the permit, whichever occurs first.
    b) Permittees will provide a simple report each year for 3 years according to the template provided by the FWC's Protected Species Permitting Office. The reports will include photographs of the mitigation.
    c) During the duration of the permit, permittees shall provide a minimal level of access to the property by FWC staff or FWC's research partners for research into the effectiveness of starter burrows.

3. A minimum of 2 on-site artificial burrows per burrow cluster~~*~~ in which Potentially Occupied burrows are destroyed or breeding pairs are harassed, plus $600 per burrow cluster to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund.

    a) Artificial burrows shall be installed in accordance with Appendix D and maintained for a minimum of 3 years according to the guidelines in Appendix C. Permittees will keep the entrance of starter burrows and artificial burrows free of debris or eroded soil until burrowing owls occupy the site or for the duration of the permit, whichever occurs first.
    b) Permittees will provide a simple report each year for 3 years according to the template provided by the FWC's Protected Species Permitting Office. The reports will include photographs of the mitigation.
    c) During the duration of the permit, permittees shall provide a minimal level of access to the property by FWC staff or FWC's research partners for research into the effectiveness of artificial burrows.

4. Off-site mitigation using either starter or artificial burrows and a financial contribution (as described in options 2 and 3 above), provided the following conditions are met:

    a) The off-site mitigation area has been approved by the FWC. This may necessitate a site visit by FWC staff, at the discretion of the FWC.
    b) The applicant can demonstrate that the site contains suitable foraging habitat and open, well-drained areas suitable for nesting.

c) The landowner of the offsite mitigation area has provided written permission; a commitment to habitat management for burrowing owls in accordance with Appendix C for the duration listed on the permit; a commitment to keep starter burrows and artificial burrows in usable condition until burrowing owls use the site or for the duration of the permit, whichever occurs first; and annual reporting for a minimum of 3 years.

~~*A **burrow cluster** is 1 or more burrows within 150 feet of each other. For the purposes of calculating mitigation, the burrow cluster is meant to represent the burrows potentially used by a single breeding pair of owls. 150 feet represents approximately 1/4 of the mean nearest-neighbor distance in Cape Coral (Millsap and Bear 1997) and the approximate distance from nest burrows that burrowing owls typically roost and loaf (Haug and Oliphant 1990). Mealey (1997) observed several pairs with satellite burrows over 100 feet away from the nest burrow.~~

In ~~most~~ cases where the project activities are within 33 feet of proposed mitigation burrows, the Permittee shall install starter burrows or artificial burrows after project activities are complete and before the start of the next breeding season. However, for larger projects where the proposed mitigation is greater than 33 feet from project activities, the FWC strongly recommends installation of burrows on-site prior to project activities to encourage the burrowing owls to passively relocate (*sensu* Trulio 1995), unless the applicant can justify that such techniques are not feasible or would be unsafe for the burrowing owls.

Category 3: Mitigation for project activities that result in significant habitat modification

~~Mitigation for large-scale project activities that may result in significant habitat modification will be evaluated on a case-by-case basis.~~ Significant habitat modification ~~may~~ occurs when more ~~greater~~ than 50% of the foraging habitat is lost within a ~~of the burrow centroid (see definitions).~~ 1,970-foot radius ~~circle of a Potentially Occupied burrow~~of the burrow centroid (see definitions).. When evaluating applications for potential significant habitat modification, FWC staff will consider Potentially Occupied burrows that are either on-site or within 33 feet of the project boundary. ~~Please note that~~ pPermits will not be issued solely for proposed infrastructure (e.g., roads and utilities) that are part of a larger common development plan, project, plat, or subdivision. Issued permits must address all burrows to be impacted on the entire project, development, plat, or subdivision site plan (the development footprint). Mitigation packages may seek to meet either scientific or conservation benefit and may include one of the following options or a combination of options:

Scientific Benefit

This section describes research and monitoring activities that can provide scientific benefit, per Rule 68A-27.007, F.A.C. Conducting or funding these activities ~~can~~ may be the sole form of mitigation for a project with FWC approval of methodologies, or part of a mitigation package. Applications will be evaluated by FWC staff on case-by-case basis to determine if scientific benefit requirement has been met. If the research activities are not being fulfilled as outlined in the permit conditions, FWC may suspend authorization for take under the Incidental Take Permit until the permittee is in compliance with all permit conditions. A concurrent Scientific Collecting Permit may be required depending on the study.

- ~~A study comparing demography in different habitat types (e.g., rural vs. urban, dry prairie vs. pasture).~~
- Development or implementation of a statewide population monitoring protocol.
- ~~A study of movements, survival, and productivity of burrowing owls displaced by development.~~
- A study of survival and productivity of translocated burrowing owls versus burrowing owls displaced by permitted activities.

To meet scientific benefit, research proposals included in Incidental Take Permit applications must fulfill the following criteria:

1. No conflict of interest: The research proposal must demonstrate the absence of conflicts of interest that could compromise the objectivity and integrity of the study.
2. Comprehensive research plan: The research proposal must provide a detailed outline of the methods that will be employed, including a timeline for the project and a clear description of how the data will be collected and analyzed.
3. Adequate resources: The applicant must demonstrate that they possess the necessary expertise, facilities, and resources required to successfully carry out the research objective.
4. Scientific or Conservation Purpose: The study will meet the seven factors outlined in Rule 68A-27.007(2)(a), F.A.C to meet Scientific or Conservation Purpose for Scientific Collecting Permits, plus additional informational gains to meet conservation benefit.
5. FWC Review: The research plan will be reviewed and approved by FWC staff. Coordination may occur prior to permit application submission, provided the potential applicant supplies FWC a written summary of the research proposal via email (WildlifePermits@MyFWC.com).

Habitat Protection, Restoration, or Management

- **On-site preserve areas** with sufficient, suitable foraging habitat (see definitions); a commitment for long-term management with a habitat management plan; and installation and maintenance of artificial burrows. On-site preserve areas (that are not within a conservation easement) cannot be the sole form of mitigation provided. Preserve area size, location, and habitat management plan will be evaluated on a case-by-case basis. Applicants shall use passive relocation techniques (*sensu* Trulio 1995) to encourage burrowing owls to occupy on-site preserves, unless the applicant can justify that such techniques are not feasible. ~~Burrows shall be maintained and m~~Monitoring of burrowing owls shall occur during the breeding season for a period of 5~~10~~3 years, and burrows and habitat ~~will~~ shall be maintained for at least 10 years. An agreement between FWC and the landowner, separate from the permit, shall be required for the full duration of habitat management (e.g., 10 years). Permittees will provide a simple report per year for 5~~10~~3 years according to the template provided by the FWC's Protected Species Permitting Office. The reports will include photographs of the mitigation.

- **Fee simple acquisition or conservation easements** of potential habitat, with a commitment for long-term management (10 years minimum) and a habitat management plan, in areas with sufficient foraging habitat either on the mitigation site or when taken in combination with properties adjacent to the mitigation site. The amount of mitigation will be scalable based on whether the proposed mitigation site is occupied by burrowing owls, is unoccupied but is within a reasonable distance from occupied areas, or is unoccupied but has potential nesting and foraging habitat.

- For either option above, the habitat management plan must cover a ten-year duration and include details on frequency, time of year, and type of management that will be executed. Invasive species removal (e.g., iguanas) may be included as part of the habitat management plan in areas where competition between iguanas and burrowing owls occur. The habitat management plan may also include restoration of potential burrowing owl habitat through fire, mechanical techniques, or control of invasive exotic vegetation that restores the open conditions needed by the species.

~~**Support for or long-term commitment to use land management techniques (e.g., fire, mowing, treatment of invasive non-native species) that maintain habitat conditions suitable for burrowing owls in areas that are occupied by burrowing owls and have sufficient foraging habitat.**~~

~~**Restoration of potential burrowing owl habitat on public or private conservation lands through fire, mechanical techniques, or control of invasive exotic vegetation that restores the open conditions needed by the species. The chosen conservation land(s) should have a management plan or other commitment to habitat management that benefits burrowing owls.**~~

Financial Contribution

Contribution to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund, which will be used to fund priority actions included in or consistent with the Species Action Plan for the Florida Burrowing Owl. This option can be used as the sole form of mitigation or in combination with other forms of on-site or off-site mitigation. The amount of mitigation for this category can be reduced by combining other mitigation

options with a financial contribution, for example, including scientific benefit and financial contribution in the mitigation package.

- A financial contribution to the Fish and Wildlife Foundation of Florida's Imperiled Species Permitting Conservation Fund in the amount of $19,000 per burrowing owl cluster. ~~pairta~~

n via significant habitat modification. The amount of mitigation for this category can be reduced by combining other mitigation options with a financial contribution.

Information: Contribution to burrowing owl research or monitoring consistent with the Species Action Plan or other FWC-identified priorities for burrowing owls.

Education: Educational programs can be effective for reducing harassment of burrowing owls and vandalism of their burrows. Educational materials or curricula can be part of a mitigation package but shall not be the sole form of mitigation.

Non-native species control: Contribution to control of non-native plants or non-native predators of burrowing owl adults, eggs, or young.

The amount of mitigation for this category can be reduced by employing Minimization Options.

Programmatic Options

- Multi-year or long-term permits (five-years) are possible and will be considered on a case-by-case basis. Examples include, but are not limited to, large-scale ecological restoration projects or public works projects.
- Programmatic permits are issued for a maximum duration of five years and are not eligible for extension. If the project extends beyond five years, the applicant may needwill need to apply for a new permit.
- If the permittee wishes to alter the permit within the five-year timeframe (e.g., add additional authorization for take, expand the area that the permit covers), then the terms of the permit, including permit condtions, will be updated to meet current regulations.

Multispecies Options

- No multispecies mitigation options have been proposed at this time.

The FWC considers translocation of burrowing owls to be experimental, and translocation is therefore not considered a mitigation option at this time to achieve conservation benefit, except in rare circumstances. A rigorous scientific research project comparing survival and productivity of translocated birds to those displaced by development is an acceptable option to achieve scientific benefit.

These options may be combined by the applicant when creating a mitigation package. None of the options above are mandatory components of any such package. Additional or alternative mitigation options may be considered by the FWC's Protected Species Permitting Office, provided the applicant can provide sufficient justification of scientific or conservation benefit. Approved Wildlife/Habitat Management Plans may include these or alternative options.

The mitigation contribution amounts amounts maywill be adjusted over time to keep pace with inflation. Tying these changes to the Consumer Price Index will ensure mitigation contributions are adjusted relative to actual price increases or decreases. The FWC will use the "All Urban Consumers Price Index" (CPI-U), which reflects the highest percentage of the population, and the CPI-U for the Southeast region. Information on the Consumer Price Index is available online at www.bls.gov/cpi. If adjustments to the contribution amount are made, Adjustments to the contribution amountthey will take effect on JulyMarch 1 of each year because the CPI for the previous year is usually not available until mid-February. The contribution will be calculated based on the date that a completed application is received by FWC. Updated mitigation contribution amounts will be published at MyFWC.com.

FWC Permitting: Intentional Take

Intentional take is not incidental to otherwise lawful activities. Per Chapter 68A-27, F.A.C., intentional take is prohibited and requires a permit. For state-Threatened species, intentional take permits may only be considered for scientific or conservation purposes (defined as activities that further the conservation or survival of the species taken). Permits are issued for state-Threatened species following guidance in Rule 68A-27.007(2)(a), F.A.C. Intentional take is authorized under certain circumstances that involve risks to property or human safety, such as on airport property (see above).

Scientific Ccollecting Ppermits for intentional take may be issued using guidance found in Rule 68A-27.007(2)(a), F.A.C. Applicants can apply for sScientific cCollecting Ppermits on the FWC's online permitting site. Research activities requiring a permit include any projects that involve capturing, handling, or marking burrowing owls; conducting biological sampling; or other activities that may cause take. Scientific collecting permit applications should include a justification of how the project furthers the conservation or survival of the species; objectives and scope of the project; detailed description of project methods, including duration, sample size, disposition of individuals, and capture/handling procedures; coordination with others conducting similar work in Florida; and expertise, qualifications, and resources available to accomplish project objectives.

Scientific cCollecting pPermit applications for educational use of live burrowing owls must include an evaluation by an independent rehabilitator and a veterinarian demonstrating that the individual cannot be released into the wild; must demonstrate appropriate educational use; and must include information about the ability of the applicant(s) to conduct the educational activities, their history of performing such activities, and resources for maintaining burrowing owls. For burrowing owls, appropriate educational use means that the burrowing owl must be housed at a non-profit scientific or educational facility, must be on public display with the intent of conservation education whenever the facility is open to the public (provided the bird is in good health), and must not be displayed for commercial purposes (i.e., any manner that implies personal use or that promotes or endorses any product, merchandise, good, service, business or organization). Additionally, applicants that wish to possess live burrowing owls for educational purposes must abide by caging requirements (Rule 68A-6, F.A.C.), obtain a license for exhibition/public sale (379.3761, ~~372.921~~, Florida Statutes), and provide access to at least 1 natural or artificial burrow per owl for refuge. For possession of dead burrowing owls, or their parts or infertile eggs, an applicant must meet the definition of appropriate educational use provided above, except that specimens may be housed in a manner appropriate for their preservation, provided they are still accessible for public use.

~~Please note that applicants also must have appropriate Federal permits to comply with the Federal Migratory Bird Treaty Act.~~ Federal permits may be required from the U.S. Fish and Wildlife Service to comply with the Migratory Bird Treaty Act. Additionally, federal permits~~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. Federal salvage permits are also required to collect any dead individuals (i.e., mortality not due to research activities or incidental take from research activities) or parts of deceased individuals including feathers and tissues.

Risks to Property or People

Intentional take for Human Safety

- Rule 68A-9.012, F.A.C., describes circumstances under which burrowing owls may be taken on airport property without further state authorization for an imminent threat to aircraft or human safety.

- Permits will be issued only under limited and specific circumstances, 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 governmental entity. Applications submitted for this permit must include all information that is required from any other applicant seeking a permit, along with a copy of the official declaration of a state of emergency, if any.

Aversive Conditioning

- Not applicable for the Florida burrowing owl.

Scientific Collecting and Conservation Permits

Scientific Ccollecting Ppermits may be issued for the burrowing owl using guidance found in Rule 68A-27.007(2)(a), F.A.C. Activities requiring a permit include any research or educational use that involves capturing, handling, or marking wildlife; conducting biological sampling; or other research that may cause take.

Considerations for Issuing a Scientific Collecting Permit

1) Is the purpose adequate to justify removing the species (if the project requires this)?
    - Permits will be issued if the identified project is consistent with the goal of the Species Action Plan for the Florida Burrowing Owl (i.e., improvement in status that leads to removal from Florida's Endangered and Threatened Species List), or addresses an identified data gap important for the conservation of the species.
2) Are there direct or indirect effects of issuing the permit on the wild population?
    - Trapping, capturing and handling owls may impact the wild populations' ability to forage, breed, or rear young. Trapping and handling protocols must be included in the permit application and should identify measures to lessen the impacts to burrowing owl populations.
3) Will the permit conflict with a program intended to enhance survival of species?
    - Applications should identify where trapping or handling will occur (privately owned or public lands). Coordination with land managers and partners (county, city, state or national) should be addressed in the application.
4) Will issuance of the permit reduce the likelihood of extinction?
    - Projects consistent with the goal of the Species Action Plan or that fill identified data gaps in species life history or management may reduce the likelihood of extinction. Applications should clearly explain how the proposed research will provide a scientific or conservation purpose for the species.
5) Have the opinions or views of other scientists or other persons or organizations having expertise concerning the species been sought?
6) Is applicant expertise sufficient?
    - Applicants must have prior documented experience with this or similar species, and applicants should have met all conditions of previously issued permits.

Relevant to all Scientific Collecting for Florida Burrowing Owls:

- Applications must include a proposal that clearly states the objectives and scope of work of the project, including a justification of how the project will result in a conservation or scientific purpose that benefits the species. The proposal also must include a thorough description of the project's methods, time frame, and final disposition of all individuals. Permit amendment and renewal applications must be "stand alone" (i.e., include all relevant information on objectives and methods).
- Scientific Ccollecting ~~p~~Permit applications must include detailed qualifications or training for all individuals that will be capturing or handling burrowing owls. For those likely to submit multiple applications over time, the FWC strongly encourages applicants to upload minimum qualifications as part of an application for a self-issuing Registered Agent Pp~~p~~ermit in the online permitting site. The FWC also encourages applicants to include qualifications of sub-permittees in the Registered Agent Pp~~p~~ermit. This approach will allow applicants to upload minimum qualifications ~~only~~ once rather than repeatedly uploading them in each Ss~~s~~cientific Cc~~c~~ollecting Pp~~p~~ermit application.
- Camera trapping using "no glow" cameras, line transects, and point counts do not require ss~~s~~cientific Cc~~c~~ollecting P ~~p~~ermits, provided they occur ~~greater~~more than 10 feet from a burrow. Avoid the use of hip chains when surveying for burrowing owls, as owls can become entangled in hip chain string that is left in the field.
- Use of a burrow camera (scope) to examine or film Potentially Occupied burrows for educational or scientific purposes requires a Ss~~s~~cientific Cc~~c~~ollecting Pp~~p~~ermit.
- Non-destructive habitat sampling does not require~~need~~ a permit, provided observers conduct sampling outside of the nesting season and take care not to collapse burrows.
- Permits may be issued to display a specimen if the specimen was obtained via a rehabilitation facility or was encountered dead.
- Permits may be issued for captive possession (removal from the wild) if the individual is deemed non-releasable.
- Trapping and handling protocols, and a justification of trapping methods, must be included in the permit application and should identify measures to lessen stress for captured burrowing owls.
- Methodologies for any collection of tissues such as blood should be clearly spelled out, including measures taken to reduce stress/injury to the birds.
- Disposition involving captive possession for any period of time must include a full explanation of whether the facility has the appropriate resources for accomplishing the objectives and for maintaining the animals in a safe and humane manner.
- 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. Federal permits are required from the USFWS to comply with the Migratory Bird Treaty Act and from the 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. Federal salvage permits are also required to collect any dead individuals (i.e., mortality not due to research activities or incidental take from research activities) or parts of deceased individuals including feathers and tissues.
- Any mortality should be reported to the FWC, and FWC staff will provide guidance on proper disposal of specimens in the permit conditions.

- Active burrow clusters should be reported to the FWC as specified in the permit conditions.
- A final report should be provided to the FWC in the format specified in the permit conditions.

Additional information – 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. Examples of Potentially Occupied Burrowing Owl Burrows

A.1. Burrowing owl burrow entrances are roughly circular or oblong and vary in size, averaging about 5 inches wide by 3.5 inches in height (Sprunt 1954), often—but not always—with a mound of excavated soil at the entrance.

A.2. Potentially Occupied burrowing owl burrows are not always easy to detect and may be obscured by vegetation at certain times of year. Photos taken by FWC staff.

A.3 Burrowing owls sometimes create burrows under or within man-made structures. Removal of man-made structures (e.g., culverts, pipes, etc.) used by burrowing owls must comply with the FWC's policy on state-listed species and man-made structures.

Appendix B. Guidance for Executing a Permit to Excavate and Fill Inactive Burrows

Either the original permit or a complete copy must be prominently posted at the affected site at all times while engaged in the permitted activities (e.g., during burrow excavation and subsequent construction of a house), per condition of the permit. The posted permit must be clearly visible for inspection by all authorized officials (including but not restricted to FWC, the U.S. Fish and Wildlife Service, local government staff, and law enforcement).

The FWC typically issues permits only for excavation and filling of inactive burrows (i.e., burrows that do not contain eggs or flightless young), except in situations involving health and human safety. Please note that although the typical nesting season is from February 15 to July 10, nesting may occur year-round.

Excavation and filling of burrows must occur within the 48 hours before initiating activities in the active part of the project site (e.g., the area scheduled for clearing/grading), unless otherwise specified in the permit. If the Permittee is unable to begin project activities within 48 hours of excavating and filling the burrow(s), the Permittee may be required to conduct daily monitoring as a provision in the permit to ensure that burrowing owls do not attempt to return to the site, and additional mitigation may be necessary if burrowing owls must be harassed to keep them from returning to the site. If the delay between burrow excavation/filling and project activities is not authorized in the original permit, the Permittee will need to submit a permit amendment to address monitoring and any additional mitigation. If burrowing owls return to the site during the 48 hours before initiation of activities, the permittee may excavate and fill the burrows, provided they are inactive.

Burrows should be observed carefully by a qualified individual before excavation for signs of the nest burrow being active (i.e., containing eggs or flightless young). The following observations provide clues that a burrow may be active:

- The burrow has debris such as twigs, feathers, prey items (insects or animals), animal fecal material, pieces of glass, paper, or other odd items at the entrance hole.
- If 2 owls are seen at the burrow entrance, but 1 consistently disappears into the nest burrow for a period of time, it could indicate that the female is tending to eggs or young. An owl carrying prey (e.g., insects, small mammals, frogs, lizards) into a burrow may indicate a male providing food to the incubating female or to chicks.
- The presence of 3 or more owls at the entrance hole. Since near fledged young (i.e., almost capable of sustained flight) are difficult to distinguish from adults, one should observe the birds carefully over a period of time to determine if they are able to fly.

If one observes the evidence described above, it is best to wait to execute the permit until after the nesting season.

If the qualified individual suspects that the burrow is inactive based on initial observations, the qualified individual shall use a burrow video-scope to confirm that the burrow is inactive before executing the permit. Any juvenile capable of flying or adult owls physically present at the burrow may be gently flushed away without physical contact using non-injurious methods to facilitate burrow inspection. If the scoping results are inconclusive (i.e., one cannot determine the contents of the burrow due to obstruction or other causes), assume the burrow is active. If the burrow is active, stake and rope off at least a 33-foot radius (if possible) and wait until the chicks are able to fly, before executing this permit.

The qualified individual may carefully excavate the burrow once the burrow is determined to be inactive (i.e., does not contain eggs or flightless young) with no burrowing owls present in the burrow. If burrowing owls retreat into the burrow, use non-injurious methods prior to burrow excavation to gently encourage owls to leave the burrow. Wait to excavate a burrow if the owl does not flush from the burrow. To excavate or dig a burrow, start digging from the entrance of the burrow, working towards the end, a small section at a time, either by hand or with a trowel, taking care to remove the roof of the burrow without making contact with any potential burrow contents. A piece of PVC pipe no longer than 3 feet may be used to gently probe inside the burrow and to keep the burrow opening in sight as the burrow is excavated. These precautions are meant to protect any undetected eggs or flightless young. The qualified individual may fill the burrow with substrate upon determining that the end of the burrow has been reached and that there are no eggs or flightless young present. Burrowing owls may attempt to return, so it is prudent to render the area inaccessible for further owl nesting activity. Examples of potential deterrent methods include, but are not limited to, covering disturbed ground immediately with thick sod, mulch, rocks, plastic or metal mesh, or other resistant substrate.

Should one find eggs or flightless young within the burrow(s), **stop excavating**, and immediately attempt to carefully reconstruct the burrow by placing a piece of 6-inch diameter corrugated drain-field tubing in the section of the burrow that was excavated and cover with soil. Alternatively, one can use 6" PVC pipe or corrugated drain-field tubing with a 3" slot cut out of the bottom to allow the owls to walk on soil. Plywood or something similar can be placed over the excavated portion to shelter the eggs or chicks until the tubing or PVC can be obtained and put in place. Observe to see if the adult birds return to the nest burrow. Contact the FWC's Protected Species Permitting Office immediately at (850) 921-5990 or WildlifePermits@myFWC.com, Monday-Friday during business hours for further instructions. Contact the Wildlife Alert Line at 888-404-FWCC during non-work hours, weekends, or holidays. You should state that you have an Incidental Take Permit (and give your permit number), then explain that you need assistance involving an active burrowing owl nest. Provide an overview of the burrow reconstruction effort, report the number of eggs and/or young observed in the burrow, and record the behavior of the adult owls. The information also must be reported by email at WildlifePermits@myFWC.com when conducted during non-business hours.

Feel free to contact our Protected Species Permit staff at (850) 921-5990 should you have any questions or need additional information.

Appendix C. Habitat Maintenance and Posting

Habitat Maintenance

Maintain an average vegetation (e.g., grasses, forbs, shrubs) height of less than 5 inches within 10 feet of burrow entrances, with light hand-held equipment (e.g., weed trimmer). Use of heavier equipment could collapse the burrow.

- Careful trimming of grass with a weed trimmer within the 10-foot buffer during either the non-breeding or breeding season is unlikely to result in take, provided the action is infrequent, the action is of short duration (less than 5 minutes), the person uses careful foot placement to avoid collapse of the burrow, and the person avoids any contact between equipment and owls that may be present at the burrow entrance.
- Care should be taken not to trim vegetation too close to the ground, which can lead to erosion into the burrow entrance during rainstorms.

- Surrounding foraging habitat on-site should be kept low and open to provide burrowing owls with an unobstructed view of potential predators.
  - Grasses should be maintained by mowing, grazing, or prescribed fire.
  - No new trees or dense shrubs should be planted within 10 feet of the burrow.
  - No solid wood fences or other tall structures that block visibility of surrounding areas from owls should be erected within 10 feet of a burrow.

Posting

Posting can be an effective way to reduce encroachment within recommended buffers, to minimize disturbance, and to reduce the probability of burrow collapse. However, it is important to remember that burrowing owls prefer open areas and require adequate visibility to see and avoid predators. The FWC recommends using only as much posting as is necessary to address potential sources of disturbance. In some cases, posting may actually be detrimental by attracting attention to areas that might not otherwise be disturbed.

In some cases, posting may include only a t-perch to help landowners avoid activities near the burrow. In other situations, sturdier options may be necessary, such as low, post-and-rail fences with a single rail in areas of heavy vehicular or foot traffic.

If posting is warranted, use open designs that do not obstruct visibility for owls and allow for maintenance of the habitat. Examples include placing 1 to 4 PVC poles or 2”x1”x4’ wooden stakes around a burrow. Temporary posting within construction sites may require additional poles or stakes but should employ the minimum number necessary to keep project personnel out of designated buffer zones.

Avoid caution tape and twine, which can disintegrate quickly.

Silt fencing is discouraged for burrowing owls, except when needed to prevent soil and debris from construction from encroaching upon a burrow. In these instances, use silt fence on the uphill side, but avoid completely encircling burrows with silt fencing whenever possible.

Posting and signage should be placed at least 10 feet from the burrow entrance to avoid puncturing the burrow.

Educational signage also can be posted to reduce the probability of disturbance. Care should be taken to place signage in a manner that maintains visibility for burrowing owls and is far enough away for people to read the sign without approaching too close to the burrow. Interested groups can obtain burrowing owl signage by contacting the FWC's ~~Species Conservation Planning~~Wildlife Diversity Conservation Planning staff at the Southwest Regional Office, 863-648-3200, or South Regional Office, 561-625-5122. Contacts for other regional offices are available on the FWC's website. Signs and postings should only be put up with the property owner's permission.

Appendix D. Starter Burrows and Artificial Burrows

Starter Burrows

A starter burrow is a partially excavated tunnel used to attract burrowing owls, which then finish digging the burrow. Starter burrows shall be established by drilling or excavating a 6-inch diameter hole at a 30- to 45-degree angle to a length of 12-18 inches using a trowel, 4-inch auger bit, post hole digger, or similar method. Loose soil resulting from drilling or excavating the hole shall be left in a loose, shallow mound at the starter burrow entrance.

Artificial Burrows

An artificial burrow involves creating a nest box and tunnel for the owls. Multiple designs have been used in Florida, and the FWC does not endorse any particular company or organization for construction or installation of artificial burrows. In urban and suburban areas, one example of a successful design uses a 10-inch diameter irrigation/drain field box as a nest chamber with a 3.3-foot, 6-inch diameter PVC tube attached as a tunnel (South Florida Audubon, unpublished data). A 3-inch wide notch is cut out of the bottom of the PVC tube to allow the owls to walk on soil and to keep rainwater from running down the tube and flooding the chamber (South Florida Audubon, unpublished data).

In rural areas, one successful example is a design used for western burrowing owls (Johnson et al. 2010) and modified for use in Florida (Quest Ecology, Inc., unpublished data). The design uses half of a 55-gallon food grade plastic drum as a nest chamber, with a curved, 10-foot long section of 6-inch diameter unperforated drainage pipe with a thin layer of soil added via a make-shift plunger once the pipe is installed (Johnson et al. 2010; Quest Ecology, Inc., unpublished data).

Figure D-1. Metal device used to prevent collapse of artificial burrows while allowing full access for cattle to graze. Photograph by Quest Ecology, Inc.

A device with a low, open design may be placed over the artificial burrow entrance to allow full access for cattle to graze, while protecting the burrow from collapse (Figure D1). An example is a 3-foot x 10-foot, 18-inch tall frame made of 1 inch angle iron (Quest Ecology, Inc., unpublished data).

Placement of Starter and Artificial Burrows

Starter burrows should be placed only in sandy soils, which will allow owls to finish the burrow on their own. An artificial burrow would be more appropriate in soils that would inhibit further excavation. Both starter burrows and artificial burrows should be placed in an open, well-drained area away from visual obstructions such as bushes, trees or structures. If placed on a small parcel (i.e., quarter- or half-acre lot), the starter burrow should be placed in the front of the lot near the corners and greater than 10 feet from bushes, trees, driveways, or structures. Starter and artificial burrows should be sited as far as possible from sources of disturbance, such as building entrances and heavy vehicular traffic. In rural areas, starter and artificial burrows should be sited at least 300 feet from a forested edge (D. Gordon, personal communication). In urban and suburban areas, built-up landscaping features and the high, dry portion of berms around drainage areas can provide sites for starter and artificial burrows (G. Campbell, personal communication). It is helpful to place a wooden, t-shaped perch, not to exceed 24 inches in height, near the burrow entrance.

Appendix E. Additional information for calculating project type

Suitable foraging habitat consists of open, treeless areas primarily dominated by low herbaceous vegetation. FWC recommends using the Florida Land Cover Classification System and aerial imagery to determine suitable foraging habitat. See FWC's website for burrowing owl Incidental Take Permits (myfwc.com/license/wildlife/protected-wildlife-permits/burrowing-owl/) for information on a landcover web application to assist determining category type.

Steps to determine category type (2 or 3):

1. Plot GPS coordinates for potentially occupied burrows. Burrows that are greater than 150 feet away from each other are considered different burrow clusters. To determine if a group of Potentially Occupied Burrows are part of one cluster, buffer each burrow with a 75-ft radius. Burrows where the 75-ft buffer intersect are considered a single burrow cluster. Each burrow cluster equates to a single burrowing owl pair.
2. Calculate the average of the latitudes and the average of the longitudes of each burrow within the burrow cluster (if needed) to determine the burrow centroid.
3. Plot a 1,970-ft radius from the burrow centroid.
    a. The resulting circle represents the extent of potential foraging habitat for the pair of burrowing owls. Note that foraging habitat can overlap if multiple pairs of owls are nesting near one another, however the foraging habitat calculations should be determined separately for each burrow cluster.
4. Calculate the number of acres of suitable foraging habitat (see definitions) available within the 1,970-ft radius circle and subtract the number of acres of suitable foraging habitat within the project boundary to arrive at the number of acres of suitable foraging habitat that will not be affected by development.
    a. For rural areas, the Florida Land Cover Classification System (Kawula and Redner 2018) can be used to perform a desktop analysis of suitable foraging habitat. See FWC's Burrowing Owl webpage for assistance.
        i. In cases where the Florida Land Cover Classification System does not provide accurate information on suitable foraging habitat available, the applicant may use aerial photos and/or ground truthing to demonstrate suitable foraging habitat is present but not captured by the Florida Land Cover Classification System.
    b. For urban areas, suitable foraging habitat analysis must be determined either through aerial photos and/or ground truthing. In urban areas, burrowing owls forage in vacant lots, yards, cemeteries, airports, golf courses, athletic fields, and other open areas.
5. Determine if significant habitat modification will occur. **Note that habitat created post-construction will not be available to owls during construction, and therefore should not be counted in post-development acreage to determine if significant habitat modification will occur.**
    a. If the total remaining suitable foraging habitat post-development is greater than 50% of the total pre-development foraging habitat, the project falls under Category 2 and significant habitat modification will not occur.
    b. If the remaining total suitable foraging habitat post-development is less than 50% of the total pre-development foraging habitat, the project falls under Category 3 and is considered significant habitat modification.