

## Eastern Indigo Snake Species Assessment Guide

July 29, 2013

The U.S. Fish and Wildlife Service's (Service) FEMA Biological Opinion (BO) dated April 30, 2010, and modified on December 14, 2010, identified 14,413 at-risk parcels, representing 14,960 acres, intersecting habitats that may occasionally be used by the threatened eastern indigo snake (indigo snake; *Drymarchon corais couperi*) in Monroe County. There are at-risk 10,921 acres and 10,711 parcels in unincorporated Monroe County; 1,406 acres and 1,433 parcels in Islamorada; 20 acres and 112 parcels in Key Colony Beach; 703 acres and 433 parcels in Key West; 1 acre and 6 parcels in Layton; and 1,910 acres and 1,718 parcels in Marathon. The BO also identified an additional 8,580 acres of at-risk lands outside Monroe County's parcel layer not subject to the Rate of Growth Ordinance program.

The at-risk properties were determined by overlaying the County's property parcel layer onto the County's 2009 land cover boundary maps (Monroe County 2009). The County's land cover boundary maps included 13 land cover types. Developed land, undeveloped land, impervious surface, and exotic are considered non-native land cover types. Hammock, pineland, scrub mangrove, freshwater wetland, salt marsh, buttonwood, mangrove, and beach berm are considered native land cover types. The water classification is also considered a native cover type. The minimum mapping unit for land cover polygons was 0.35 acre for hammock and 0.5 acre for all other cover types.

The County's boundary map land cover types containing suitable habitat for the indigo snake include undeveloped land, hammock, pineland, exotic, scrub mangrove, freshwater wetland, salt marsh, buttonwood, mangrove, and beach berm.

*Species Profile:* The Florida Keys are on the extreme southern end of the indigo snake's range. The indigo snake population in the Florida Keys is very small (Cox and Kautz 2000). Verified observations are rare and scattered; the latest was in 2009 on Little Knockemdown Key (Service 2010). In the last several years, three unsubstantiated observations of the indigo snake were reported, two on Grassy Key (City of Marathon) and one in the Village of Islamorada (Sheahan 2006). Indigo snake surveys were conducted on Big Pine and No Name Key in 2006 and 2007 (Schmidt et al. 2008) and, although 27 species of reptiles were noted (973 total observations), the indigo snake was not observed.

The Service issued a Section 10(a)(1)(B) Incidental Take Permit (ITP) to Monroe County, Florida Department of Transportation, and Florida Department of Community Affairs (applicants) in June 2006 for adverse effects from development on Big Pine and No Name Keys. The ITP authorizes take of 168 acres of suitable indigo snake habitat. The take will be incidental to land clearing for development and recreational improvements. The Service issued the ITP to the applicants based upon their development of a Habitat Conservation Plan (HCP) that sets guidelines for development activities on Big Pine and No Name Keys to occur progressively over the permit period (20 years). The HCP provides avoidance, minimization, and mitigation measures to offset impacts to covered species, including the indigo snake. Mitigation includes the protection of three mitigation units for each development unit of suitable habitat within the plan area.

*Threats:* Although the species may occur in all referenced habitats, it is suspected that they prefer hammocks and pine forest, because most observations occur in these habitats disproportionately to their presence in the landscape (Steiner et al. 1983). In the Florida Keys, the primary threat to the indigo snake is native habitat loss and fragmentation due to development. Residential housing is also a threat because it increases the likelihood of indigo snakes being killed by property owners.

*Assessment Guide:* In order to provide assistance in assessing threats to the indigo snake from a given project, the Service has developed the following guidance and recommendations that, if implemented, will minimize adverse effects to the indigo snake. If the use of this guide results in a determination of “no effect” for a particular project, the Service supports this determination. If the use of this guide results in a determination of “not likely to adversely affect” (NLAA), the Service concurs with this determination and no additional correspondence is necessary. If the use of this guide results in a “may affect” determination, the acreage of impacts will be subtracted from the take limits provided in the BO and/or the HCP. This guide is subject to revision as necessary.

- A. Parcel is not in the species focus area and/or on the Real Estate (RE) parcel list .....***no effect***  
 Parcel is in the species focus area or on the RE parcel list.....***go to B***
- B. Parcel is on Big Pine Key or No Name Key.....***refer to HCP for coverage***  
 Parcel is not on Big Pine Key or No Name Key.....***go to C***
- C. Parcel contains the indigo snake’s native habitat (*i.e.*, hammock, pineland, scrub mangrove, freshwater wetland, salt marsh, buttonwood, mangrove, or beach berm) .....***go to D***  
 Parcel contains only non-native habitat (undeveloped land or exotic).....***go to G***
- D. The proposed action will not remove or modify the indigo snake’s native habitat.....***go to G***  
 The proposed action will remove or modify the indigo snake’s native habitat.....***go to E***
- E. The property is within a developed subdivision or canal subdivision and the area within 500 feet of the parcel is greater than 60 percent developed or scarified.....***go to G***  
 The property is not as above..... ***go to F***
- F. The applicant has proposed either on-site or off-site habitat compensation\* commensurate with the amount of native habitat lost, has received a copy of the Service’s indigo snake protection measures (attached), and has agreed to implement the measures and post the information sign on-site. Signed verification of this is in the permit file maintained by the NFIP participant community. Permit with indigo snake protection measures and habitat compensation\* .....***NLAA***

The applicant will not agree to the indigo snake protection measures, is not proposing habitat compensation\* or the proposed habitat compensation\* does not meet minimum compensation requirements ..... ***may affect, subtract project footprint from authorized Take\*\****

G. The applicant has received a copy of the Service’s indigo snake protection measures and has agreed to implement the measures and post the information sign on-site. Signed verification of this is in the permit file maintained by the NFIP participant community. Permit with indigo snake protection measures..... ***NLAA***

Not as above ..... ***may affect, subtract project footprint from authorized Take\*\****

**\*Habitat Compensation**

The minimum recommended habitat compensation is replacement of lost vegetation through protection or restoration of habitat, and/or monetary contributions to accomplish the aforementioned activities, according to the participating community’s land development regulations. The Service has reviewed the following participating communities’ Codes of Ordinances governing habitat compensation and found them to meet minimum recommended habitat compensation: Monroe County, Part II, Chapter 18, Sections 118-2 and 118-8; City of Marathon, Article 2, Chapter 106; Village of Islamorada, Part II, Chapter 30, Article VII, Division 4, Section 30-1616; and Key West, Part II, Subpart B, Chapter 110, Article V, Section 110-223 and Section 110-225, and Article VI, Division 2, Section 110-287 and Division 3, Section 324 and 327. The cities of Key Colony Beach and Layton were determined to not have ordinances that meet the minimum recommended habitat compensation. If the participating community proposes to modify the habitat compensation requirements of their ordinance, additional review by the Service will be necessary.

If habitat compensation is being provided in excess of the minimum recommended, the Service may consider the additional compensation as a credit to the not-to-exceed habitat acreage losses referenced in the BO. To be considered for credit, the compensation must be like for like habitat compensation and credit will be granted at half value. For example, if 4 acres of additional compensation are provided, the credit granted would be 2 acres. This partial credit is considered appropriate as existing vegetation currently provides benefit and the credit vegetation may not provide the same habitat benefit until later in time.

**\*\***For projects where take is subtracted, the participating community shall transmit a list of parcel numbers and acreage of take to the Service quarterly.

**Monitoring and Reporting Effects**

For the Service to monitor cumulative effects and to track incidental take exempted for the indigo snake, it is important for FEMA and the NFIP participants to monitor the number of permits and provide information to the Service regarding the number of permits issued. In order to meet the reporting requirements in the BO, we request that FEMA and/or the NFIP participants send to the Service an annual database summary consisting of: project date, permit number, project acreage, native impact acreage, amount of acres and/or number of trees/plants replaced as habitat compensation, and project location in latitude and longitude in decimal degrees.

**Literature Cited**

- Cox, J. and R.S. Kautz. 2000. Habitat conservation needs for rare and imperiled wildlife in Florida. Florida Game and Freshwater Fish Commission, Office of Environmental Services; Tallahassee, Florida.
- Duquesnel, J. 1998. Keys invasion by alien lizards continues. Florida Department of Environmental Protection, Florida Park Service, Resource Management Notes 10(1):9.
- Monroe County. 2009. Geospatial Land Cover Dataset of the Florida Keys. Photo Science, Incorporated. St. Petersburg, Florida
- Schmidt, P.M., R.R. Lopez, R.N. Wilkins, and N.J. Silvy. 2008. Recovery Permit # TE125517-0 Final Report to the U.S. Fish and Wildlife Service, Vero Beach, Florida.
- Sheahan, B. 2006. Personal communication. Senior planner. Village of Islamorada, Florida.
- Steiner, T.M., O.L. Bass, Jr., and J.A. Kushlan. 1983. Status of the eastern indigo snake in southern Florida National Parks and vicinity. South Florida Research Center Report SFRC-83i0 1, Everglades National Park; Homestead, Florida.
- U.S. Fish and Wildlife Service. 2010. Eastern indigo snake observation; Little Knockemdown Key. Email and photo provided to KDNWR, Big Pine Key, Florida.

## Eastern Indigo Snake Protection Measures

It appears that harm to the eastern indigo snake occurs primarily through construction accidents, vehicular strikes, and habitat loss and/or degradation. These adverse effects can be minimized by maintaining a careful watch during construction and when traveling onsite to avoid killing snakes. In addition, protecting burrows and leaving native vegetation as refugia onsite for indigo snakes displaced by construction activity can benefit this species.

The eastern indigo snake is not likely to be adversely affected if the following measures are implemented for the project.

- 1) Burrows and onsite native vegetation should be protected. If such habitat must be disturbed, limit disturbance to a minimum and improve remaining habitat through exotic vegetation removal. Maintain native vegetation onsite as refuges for the snake.
- 2) Clearing and grading activities should be performed outside high activity months (June to November). Winter months (January to March) provide the best opportunity to initiate and complete construction activities that will not impact this species.
- 3) Post informational signs containing the following information throughout the construction site and along any proposed access road:
  - a) A description and picture of the eastern indigo snake, its habits, and protection under Federal Law;
  - b) Instructions not to injure, harass, or kill this species;
  - c) Directions to cease clearing activities and allow the eastern indigo snake sufficient time to move away from the site on its own before resuming clearing; and,
  - d) Telephone numbers of pertinent agencies to be contacted if a dead eastern indigo snake is encountered.

Other useful educational materials may consist of a combination of posters, videos, pamphlets, and lectures (*e.g.*, an observer trained to identify eastern indigo snakes could instruct construction personnel before any clearing activities occur).

- 4) Monitor eastern indigo snake activity onsite. Report any eastern indigo snake observations that occur during project activities (see monitoring report below). Document with photograph, if possible. If large snake skins are found, they may belong to an eastern indigo snake. Skins can be collected and sent to the Service's South Florida Ecological Services Office (attention: Monroe County FEMA Biologist, U.S. Fish and Wildlife Service, South Florida Ecological Services Office, 1339 20th Street, Vero Beach, Florida 32960) for positive identification. Provide information on the date and location collected.

**Monitoring Report:** A monitoring report should contain the following information: location, dates, and times for any sightings of eastern indigo snakes. Also include the results any of burrow searches and observations. If a snake is encountered during a burrow search, then a description of the outcome for the snake is needed. Document by photograph, if possible. Was the snake left in an intact burrow? Was the burrow excavated? If so, did the snake leave and where did it go? A site map with sighting locations marked would be helpful. If an indigo snake is observed onsite a copy of the report is to be sent to the Service at the address listed above within 60 days of the conclusion of the project.

**Dead, injured, or sick animals:** If a dead, injured, or sick eastern indigo snake is found onsite, notification should be made to the Service at the address listed above. Secondary notification should be made to the Florida Fish and Wildlife Conservation Commission; South Region; 3900 Drane Field Road; Lakeland, FL 33811; Wildlife Alert Number 1-800-404-3922.

**Example Eastern indigo snake informational sign.**

***WATCH OUT FOR THE EASTERN INDIGO SNAKE***



The Eastern Indigo Snake is the largest nonpoisonous snake in North America, growing up to 8 feet in length. The color of both adults and young is shiny bluish-black with some red or cream coloring on the chin or sides of the head. The indigo snake is usually found in high, dry, well-drained sandy soils, but may also be found in hammocks, swamps, and flatwoods habitats in south Florida. Burrows are used by many prey animals that are easily captured by the indigo snake in the burrow. Indigo snakes also use the burrows as dens for cover, and laying eggs. Other

potential dens are stumps of trees, cavities in the soil, and under piles of debris.

The decline in the population of indigo snakes is attributed to habitat loss due to development and overcollecting for the pet trade. Fragmentation of habitat by roads results in many indigo snakes killed by vehicle traffic.

**Every effort should be undertaken to avoid harming any snake observed during work on this construction site. Any indigo snakes encountered during construction activity should be allowed to crawl off on its own before continuing construction activities. If it appears that the construction activities will cause harm to the snake, construction must be stopped until the proper action can be determined.**

These rare snakes are protected by the U.S. Endangered Species Act (ESA) of 1973 makes it a violation to “harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect endangered or threatened species.” Violations can result in fines of up to \$20,000 and/or up to one year in prison. Only permitted personnel are allowed to handle the snakes.

Contact the following agencies if indigo snakes are observed:

**U.S. Fish and Wildlife Service 772-562-3909**

**Florida Fish and Wildlife Conservation Commission  
800-282-8002**