



## Imperiled Species Management Plan (ISMP) Economic Impacts Assessment: Draft Species Conservation Measures and Permitting Guidelines for the White Crowned Pigeon and the Everglades Mink

July 14, 2016

Prepared by Hazen and Sawyer  
For the Florida Fish and Wildlife Conservation Commission

## MEMORANDUM

**To:** Claire Sunquist  
Project Manager  
Florida Fish and Wildlife Conservation Commission

**Memo No:** 1

**From:** Grace Johns, Ph.D.  
Senior Associate and Economist

**Date:** June 15, 2016

**Subject:** FINAL Imperiled Species Management Plan (ISMP) Economic Impacts  
Assessment: Draft Species Conservation Measures and Permitting Guidelines for  
the White Crowned Pigeon

---

### **1.0 Study Description, Purpose and Method**

The purpose of this study is to estimate the range of total costs and marginal costs and provide an estimated projection of 5-year costs associated with the draft conservation measures and permitting guidelines for the White Crowned Pigeon (herein referred to as "Guidelines"). This draft document, dated November 2015, was prepared by the Florida Fish and Wildlife Conservation Commission (FWC).

Total cost refers to labor, materials, and opportunity costs associated with implementing each guideline. Marginal cost is the total cost of the guideline minus the cost of all or portions of that guideline that would still need to be incurred in order to comply with current land development regulations.

This study relied upon interviews with Monroe County, the City of Marathon, the Village of Islamorada, the Florida Keys Electric Cooperative, Keys Energy Services, and a local land development consultant. The purpose of these interviews was to assess the extent to which landowners have followed these guidelines in the past and how they might apply them in the future. Land development regulations and maps and other data sources were consulted. FWC provided a GIS map of the location of hardwood hammocks greater than 12 acres in Monroe County which was used to assess potential impacts of the draft Guidelines.

The organization of this memorandum is as follows: A summary of FWC's draft Guidelines; a summary of the relevant land use regulations of Monroe County, the City of Marathon and the Village of Islamorada; and the estimated total and marginal costs of the FWC draft Guidelines. This memorandum concludes with a summary of comments from those interviewed.

## 2.0 Summary of Draft FWC Measures and Guidelines

The White-Crowned Pigeon (WCPI) is protected by the U.S. Migratory Bird Treaty Act and as a State-designated Threatened Species by Florida's Endangered and Threatened Species Rule. Its distribution in Florida is restricted to Florida Bay, Biscayne Bay, and the Florida Keys, although some individuals probably nest in mainland Monroe County and inland Miami-Dade County.

The FWC draft Guidelines document addresses the preservation of tropical hardwood hammocks greater than 12 acres in size and mangrove islands of all sizes in Monroe County, in particular the Florida Keys. Mangrove islands provide breeding habitat and hardwood hammocks provide foraging habitat for the WCPI. The WCPI diet primarily consists of tropical hardwood tree fruits. The vast majority of tropical hardwood hammocks in south Florida outside of the Florida Keys are in some form of protected public ownership. However, there is a significant amount of privately-owned hardwood hammock in the Florida Keys that could potentially be developed.

The conservation measures and guidelines can be organized into four major categories: (1) Survey Methods; (2) Avoidance Measures; (3) Minimization Measures; and (4) Mitigation Measures. Survey methods are ways to conduct an effective survey to identify whether WCPIs are breeding, feeding, or sheltering in an area. Avoidance measures are ways to avoid harming or disturbing WCPI and their nests so that an FWC take permit is not required. Minimization measures are ways to reduce or minimize take of the species and lessen the mitigation necessary to offset take. These measures assume it is not possible to implement avoidance measures that will eliminate the need for FWC permitting because some level of take will occur. Mitigation measures are those that replace the disturbed or removed mangrove or hardwood hammock, either onsite or offsite, to lessen the negative impact.

The White-Crowned Pigeon Draft Species Conservation Measures and Permitting Guidelines are summarized as follows.

**I. Survey Methodology.** Surveys can be used to determine if white-crowned pigeons are breeding, feeding, or sheltering in an area. Surveys are not required but if conducted in accordance with the methodology described below and the species is not detected, no further action is required.

**a) Surveys of breeding habitat.** Mangrove island surveys conducted during the breeding season are useful for identifying and avoiding, minimizing, or mitigating for take of active nests, eggs, or young.

1. Three surveys should occur, spaced at least 2 weeks apart throughout the breeding season, to increase the probability of detecting the peak of nesting: 1 survey in mid-late June, 1 in mid-late July, and 1 in early-mid August.
2. Recommended survey methods include flight-line counts according to the protocol of Strong and colleagues. The objective of surveys is to estimate the number of nesting pairs.

Flight line counts should include enough boats and observers to detect WCPI approaching the colony from different directions. For small colonies, a single boat with

more than two observers usually is sufficient. For larger colonies, where it is difficult to see pigeons arriving from different directions, flight-line counts involve an observer in each of 3 boats spaced at approximately 120<sup>0</sup> intervals, or in a manner that maximizes the ability to detect incoming birds and minimizes double-counting.

Observers should remain 330 feet from the mangrove islands to avoid disturbance to nesting birds. The appropriate buffer has not been determined specifically for WCPI, but, in the interim, a buffer distance of 330 feet is effective for a suite of waterbirds that nest on tree islands in Florida.

Observers should count WCPIs that fly from the foraging areas to breeding islands from 8:20-10:10am. Observers then estimate the number of nesting pairs using the method outlined by Strong and colleagues.

Observers should avoid conducting surveys in rainy weather.

**b) Surveys of foraging habitat.** There is no recommended survey protocol for WCPI in foraging habitat at this time, and core foraging areas have not been identified. Patches of tropical hardwood hammock > 12 acres in size within the species distribution are significant for the essential behavior of feeding and are likely to be occupied.

**II. Recommended Conservation Practices.** Recommendations are general measures that could benefit the species but are not required.

1. Avoid trimming or alteration of mangroves on uninhabited islands or lands set aside for conservation, preservation, or mitigation per Florida Statute 403.9323(2).
2. Design projects to minimize loss of mangrove islands and tropical hardwood hammock.
  - (a) Consider provisions in the Monroe County Comprehensive Plan regarding protection of tropical hardwood hammocks and other native habitats (Monroe County 2015a).
  - (b) Adhere to Land Planning Regulations for the Florida Keys Area of Critical State Concern – Monroe County (Rule Chapter 28-20) and Sections 118-7, 118-10(1), and 118-10(4) of the Monroe County Land Development Code regarding designing development away from natural areas and sensitive habitats, restrictions to developing tropical hardwood hammock and mangrove habitats, and maintenance of native trees (State of Florida 2014, Monroe County 2015b).
3. Retain native fruiting trees whenever possible, including poisonwood, which is a particularly important species for nesting WCPI.
4. Plant appropriate native fruiting species to provide foraging opportunities for WCPI.
5. Educate project personnel regarding the species and its sensitivity to disturbance.
6. Avoid siting transmission and distribution lines through tropical hardwood hammock. Place markers on transmission and distribution lines where collisions are a potential hazard.

### III. Avoidance Measures (to Avoid Take)

**a) Avoidance Measures that will eliminate the Need for FWC Take Permitting:** This section describes all measures that would avoid the need for an applicant to apply for an FWC permit.

- Maintain a no-disturbance buffer of 330 feet around mangrove islands with active WCPI nesting colonies.
- Avoid trimming or killing native vegetation on mangrove islands that are used by WCPI for breeding.
- Avoid land use change or removal of native trees or shrubs in contiguous, or nearly contiguous, patches of tropical hardwood hammock > 12 acres in size.
- Avoid consistent, repeated flushing of birds within patches of tropical hardwood hammock > 12 acres in size.

**b) Examples of Activities Not Expected to Cause Take:** This list is not an exhaustive list of exempt actions.

- Activities within breeding habitat outside of the breeding season that do not result in trimming or killing of mangroves.
- Aerial activities at an altitude that does not cause flushing from nests. The reaction of white-crowned pigeons may vary depending on the type of aerial activity, and activities should cease or move to a higher altitude if flushing occurs.
- Maintenance of vegetation in existing linear utility and highway right-of-ways.
- Passive recreational activities on existing trails that result in short-term, occasional foot traffic (e.g., existing hiking along trails through hardwood hammocks) and do not cause any disturbance within the canopy of tropical hardwood hammocks.

**IV. Minimization Options.** The suite of options below can help reduce or minimize species take and lessen the mitigation necessary to offset take.

#### **a) Seasonal or Temporal Measures and Buffer Zones**

- Minimize, to the extent practicable, activities within 330 feet of active nests to minimize disturbance to nests, eggs, and young.
- If the project must occur within the buffer, minimizing time spent within the buffer in the breeding season minimizes take of nests, eggs, and young.
- For activities that may cause disturbance to foraging birds in patches of hardwood hammock greater than 12 acres, conduct project activities from mid-October to March, when 80-90% of the WCPI population in Florida overwinters in the Bahamas and Caribbean.

## b) Design Modification

- Minimize loss and disturbance of breeding habitat.
- Minimize loss or degradation of tropical hardwood hammock, especially fruiting trees, in patches of hardwood hammock greater than 12 acres.
- Minimize activities year round that cause WCPI to repeatedly flush in patches of hardwood hammock greater than 12 acres.
- Restrict activities that may cause disturbance of foraging birds to the periphery of patches of hardwood hammock greater than 12 acres.
- Minimize transmission and distribution lines through patches of tropical hardwood hammock greater than 12 acres.

## c) Method Modification

- Post educational signage to reduce disturbance around breeding colonies.
- When activities must occur within habitat occupied by WCPI, refer to the Seasonal or Temporal Restrictions above to minimize take.
- Educate project personnel regarding WCPI and their sensitivity to disturbance.
- Place markers on transmission and distribution lines where collisions are a potential hazard.

**V. Mitigation Options.** Mitigation is scalable depending on the impact, with mitigation options for significant impairment or disruption of essential behavioral patterns constituting take. The DEP's Environmental Resource Permitting (ERP) process can provide mitigation for loss or degradation of WCPI breeding habitat (i.e., mangrove islands), provided the mitigation includes mangrove islands suitable for WCPI nesting. Subsequent to or in conjunction with the ERP process, the FWC will review the resulting wetland mitigation to assess whether the mitigation meets the definition of "conservation benefit" for WCPI. For cases in which the mitigation includes approximately equivalent acreage of tidally-inundated mangrove islands suitable for breeding, wetland mitigation through the ERP process will satisfy the applicants' responsibilities under rule 68A-27, F.A.C., and associated rule enforcement policies. Potential options for mitigation are described below, including options to mitigate for significant habitat modification of foraging habitat and take of adults, eggs, and young through disturbance.

**a) Options that Provide Scientific Benefit:** This section describes research and monitoring activities that provide "scientific benefit," per rule 68A-27.007, F.A.C. Conducting or funding these activities can be the sole form of mitigation for a project with FWC approval of methodologies.

- Identification of Core Foraging Areas throughout the species' range in Florida.
- Development and implementation of a standardized monitoring protocol for breeding habitat throughout the species' range in Florida.

**b) Options that Address Habitat:** Habitat Protection/Acquisition or Management for Significant Modification of Breeding Habitat:

- The acquisition option for breeding habitat (i.e., mangrove islands) includes wetland mitigation through the ERP program.
- The FWC will review the ERP mitigation to evaluate whether it meets the definition of conservation benefit for WCPIs. Suitable mitigation includes protection/acquisition of tidally-inundated mangrove islands free of mammalian predators and of sufficient size to accommodate WCPI nesting.
- Provided the mitigation includes protection/acquisition of suitable breeding habitat, ERP mitigation is expected to satisfy the applicants' responsibilities under rule 68A-27, F.A.C, and associated rule enforcement policies, and an FWC permit may be subsequently issued based on the understanding that implementation of project commitments will satisfy the requirements of 68A-27.003 and 68A-27.007, F.A.C.

Habitat Protection/Acquisition or Management for Significant Modification of Foraging Habitat:

- Options include habitat protection via acquisition or easements, restoration of tropical hardwood hammock vegetation, and/or long-term commitment to manage invasive exotic vegetation in tropical hardwood hammock.
- When evaluating impacts to foraging habitat and whether proposed mitigation meets the definition of "conservation benefit" in 68A-27, F.A.C., important factors include (but are not limited to):
- The total acreage of the proposed impacted area and proposed mitigation,
- Habitat quality of the proposed impacted area and proposed mitigation area, including:
  - Species richness of native fruiting trees and shrubs,
  - Presence and density of fruiting species that are particularly important for nestlings,
  - Degree of fragmentation,
  - Degree of human disturbance,
  - Need for management (e.g., presence of invasive plants),
  - Whether the proposed impacted area and proposed mitigation occurs within or outside of a patch of tropical hardwood hammock > 12 acres in size,
  - Distance to nearest occupied breeding habitat,
  - Adjacency to other conservation land.

**c) Options that Address Funding:** No funding option has been identified at this time. However, funding options as part of mitigation will be considered on a case by case basis.

**d) Options that Address Information Gaps:** Mitigation can be used to support research projects consistent with actions in the Species Action Plan.

- Monitoring options can include multi-year monitoring that contributes to a portion of a statewide survey.
- The information option is appropriate for take of adults, eggs, or young via disturbance or in circumstances where ERP mitigation does not completely satisfy the FWC's definition of conservation benefit for WCPI.

**e) Programmatic Options:** No programmatic option available.

**f) Multispecies options:** A multi-species permitting option may be available for loss of foraging habitat in some parts of the Keys, where there is overlap with other state-listed species such as the Lower Keys population of the Florida brown snake, rim rock crowned snake, and possibly the Key ringneck snake.

### **3.0 Environmental Regulations of Monroe County**

The political subdivisions of Monroe County are comprised of the cities of Key West, Marathon, Key Colony Beach, and Layton; and the Village of Islamorada. The remaining areas of the Florida Keys and the mainland are unincorporated Monroe County. The environmental-related land development codes and regulations among the Monroe County political subdivisions are consistent with each other with minor variations.

Most of the mangrove islands are under the jurisdiction of Monroe County and some are located inside the city limits of Marathon, Key West and the village limits of Islamorada. The hardwood hammocks greater than 12 acres are found in the City of Marathon, the Village of Islamorada, and unincorporated Monroe County. These lands are subject to the land development codes and regulations of these respective political subdivisions.

#### **3.1 Unincorporated Monroe County**

The Monroe County Land Development Code addresses mangrove islands and hardwood hammocks and is consistent with the FWC draft Guidelines.

**Mangrove Islands.** Monroe County environmental regulations, which apply to the unincorporated areas of the County, prohibit development on any mangrove island in the Florida Keys.<sup>1</sup> Thus, only activities that take place near, but not on, a mangrove island, such as nearby construction activities, would be subject to the Guidelines. In this case the relevant

---

<sup>1</sup> Monroe County Comprehensive Plan Policies "Objective 102.6 - Monroe County shall regulate land use activities on offshore islands within the legal boundaries of Monroe County. Policy 102.6.1 - Within one year of the adoption of the Plan, Monroe County shall adopt land development regulations which will further restrict the activities permitted on offshore islands. These shall include the following: 1. development shall be prohibited on offshore islands (including spoil islands) which have been documented as an established bird rookery or nesting area based on resource agency best available data or surveys." The Monroe County Land Development Code. Section 118-4 further states: "Wetland Open Space Requirements. No development activities, except as provided for in this chapter, are permitted in submerged lands, mangroves, salt ponds, freshwater wetlands, freshwater ponds, or in undisturbed salt marsh and buttonwood wetlands; the open space requirement is 100 percent."

Guidelines would be the use of a 330 foot buffer zone around the mangrove island to minimize disturbance to nesting WCPI. If the construction or other activity must occur within 330 feet of the mangrove island, then the entity would need to apply for a FWC Take Permit.

**Hardwood Hammocks.** Monroe County environmental regulations also address the development of hardwood hammocks. All hardwood hammocks greater than 12 acres are located in the Native Area land use (zoning) district. Section 130-3941 of the Monroe County Land Development Code states that: “The purpose of the Native Area district is to establish areas that are undisturbed, with the exception of existing solid waste facilities, and because of their sensitive environmental character should be preserved in their natural state.”

All land within the Native Area district is zoned as Tier 1 for the purposes of regulating, allocating and awarding development permits. The open space requirement for Tier 1 parcels is found in the Monroe County Land Development Code: Final Adopted Version, April 13, 2016, Section 118-9 (b): Clearing Allowances. It states that clearing of upland native vegetation communities in Tier I shall be limited to:

“20 percent or 3,000 square feet, whichever is greater; but no greater than 7,500 square feet of upland native vegetation. For parcels greater than 30,000 square feet, with the exception of parcels on Big Pine Key and No Name Key, clearing for one driveway of reasonable configuration up to 18 feet in width is permitted to provide reasonable access to the property for each parcel and shall be exempt from maximum clearing limit of 7,500 square feet. Clearing for a driveway shall be recommended by a County Biologist and approved by the Planning Director. The proposed driveway design shall minimize fragmentation, avoid specimen trees, and take the shortest reasonable route. In no case shall clearing, including the driveway, exceed 20 percent of the entire site.”

This section also states that:

“Native plant communities shall be considered within required open space areas and shall not be cleared or otherwise disturbed, beyond the limits specified in subsection (b) [*provided above*], including ground cover, understory, midstory, and canopy vegetation. All such areas shall be maintained in their natural condition and shall be protected by a grant of conservation easement running in favor of the County.”

Requirements during construction on or near hardwood hammocks are addressed in Section 118-10 as follows: “(a) Hammock. All structures developed, used or occupied on land classified as hammock (all types and all levels of quality) shall be designed, located and constructed such that:

- (1) All areas of required open space are maintained in their natural condition, including the preservation of canopy, midstory, understory vegetation, ground cover and leaf litter layer; and
- (2) Clearing of native vegetation is limited to the area of approved clearing shown on the approved site plan, which shall include a construction impact

zone around all structures. Construction barriers shall be required at the outer edge of the construction impact zone and shall be visible and of durable material such as wood, fabric, wire fencing, plastic safety fencing, or similar types that provide openings to allow the passage of wind and water through them. Barriers shall be staked and remain in place and maintained in a functional condition until final inspection for a certificate of occupancy has been approved. During construction, there shall be no disturbances of the ground surface and vegetation within required open space areas. *[Underline added for emphasis.]*

General Environmental Design Criteria for hardwood hammocks are provided in Section 118-7 as follows: “No land shall be developed except in accordance with the following general criteria:

- (c) The habitat of protected plants and animals (including but not limited to species listed as endangered, threatened, species of special concern, or protected under laws such as the Migratory Bird Treaty Act) shall be preserved to the maximum extent practicable through the configuration of open space. Habitat includes, but is not limited to, foraging, roosting, breeding, and natural and artificial nesting habitat. This includes, but is not limited to, bird rookeries and bird nesting colonies. No habitat of protected species shall be disturbed without prior notification and approval by the County Biologist.”

Furthermore, Section 118-8 requires that the landowner pay a mitigation fee for the:

“removal of any listed threatened or endangered native plant species; any regionally important native plant species; any native plant species that reaches reproductive maturity at less than four (4) inches DBH as identified in Section 118-2(c); and any other native plant species with a diameter at breast height (DBH) of four inches or greater shall require payment to the Monroe County Environmental Land Management and Restoration Fund in an amount sufficient to replace each removed plant or tree on a 2:1 basis, as determined in accordance with subsection (b). The number, species, and sizes of trees and plants to be mitigated shall be identified in the existing conditions report provided pursuant to Section 118-2 and approved by the County Biologist.”

Section (b), Mitigation fees determination, states:

“The mitigation fee shall be based on the replacement cost of the specific plants and trees. The costs for replacement plants and trees shall be based upon a price schedule maintained and updated annually by the County Biologist. This schedule shall be based on price quotes by at least three private plant nurseries within the County or Miami-Dade County.”

Determination of the types and numbers of removed trees that would require the payment of a mitigation fee is provided by an Existing Conditions Report described under Section 118-2 of the Land Development Code. This Section states:

“As part of an application for approval on lands containing wetlands or upland native vegetation communities, the applicant shall prepare and submit an existing conditions report, including a survey that identifies the distribution and quality of native habitats and any endangered/threatened or protected species that are known to utilize the available habitats on the site and/or are observed within the parcel or lot proposed to be developed in accordance with the standards of this chapter...

(d) Animal species list. A list of the endangered, threatened, or otherwise protected animal species observed during the site survey. This Section shall also include a list of protected species that may not have been actually observed, but may use the site for foraging, roosting, breeding, or nesting.”

The maximum permanent residential density and minimum open space requirements for land with the Mainland Native Area; and Native Area are provided in the County’s Land Development Code Section 130-157, Maximum permanent residential density and minimum required open space as follows: “The maximum permanent residential density for those uses permitted by this chapter and minimum required open space shall be in accordance with the following table.”

<b>Maximum Permanent Residential Density and Minimum Open Space</b>		
<b>Land Use District</b>	<b>Allocated Density Dwelling Units/Gross Acre of Upland</b>	<b>Minimum Open Space Ratio</b>
Mainland Native Area	0.01	0.99
Native Area	0.25	0.95

These residential density requirements restrict the amount of residential development on hardwood hammocks greater than 12 acres to 1 dwelling unit per 10 acres in mainland Monroe County and 1 dwelling unit per 4 acres in the unincorporated areas of the Florida Keys. The allocated density effectively restricts the amount of land that can be developed.

For example, since the minimum parcel size needed to build one dwelling unit in the Native Area is 4 acres, a 4 acre parcel (174,240 square feet) with Native Area zoning would have an open space requirement of 165,528 square feet (174,240 x 0.95). The development limit would be 8,712 square feet (174,240 x 0.05) which is the total development footprint allowed, regardless of habitat. On the same parcel, the Tier I designation would limit the total CLEARING of NATIVE HABITAT (HAMMOCK) to 7,500 square feet. So if the lot was completely covered by hammock, then the development footprint would be reduced to 7,500 square feet which is less than 5 percent of the parcel.

### 3.2 City of Marathon

The City of Marathon’s Land Development Regulations (LDR) are very similar to Monroe County’s Land Development Code and are consistent with the FWC draft Guidelines. The LDR has requirements similar to most if not all of the measures described in the Guidelines.

The following sections of Marathon’s LDR protect hardwood hammocks:

Section 103-07 Defines Conservation Districts: “(A) Conservation-Native Area (C-NA) Zoning District: The Conservation-Native Area (C-NA) Zoning District implements the Conservation designation on the Future Land Use Map. This zoning district shall be used for properties which have natural limitations to development because of their sensitive environmental character. Development in the C-NA district shall be permitted only as provided in this article consistent with the land use designation and in accordance with natural and historic resources protections in Chapter 106.”

Section 106.19. - Onsite Protection: “All high quality hammocks shall be designated and permanently protected in place on the site and managed in accordance with the standards in Article 8 of this chapter for Conservation Management Areas.”

Marathon’s Land Development Regulations, Section 106 – Natural and Historic Resources Protection classifies all tropical hardwood hammocks of 12.5 acres or greater as High Quality Hammocks and a habitat analysis is not required. The open space requirement is 90 percent. The open space requirement for mangroves is 100 percent. The regulated open space is to be dedicated to the City of Marathon as a Conservation Easement as specified in Section 106.57. - Permanent Protection as follows.

“Conservation management areas shall be permanently protected as follows:

- A. Dedication: All areas protected under this section shall be restricted from further subdivision, and protected in perpetuity using a legal instrument that runs with the land, in a form acceptable to the City and duly recorded in the public record which assures the preservation and continued maintenance of the conservation management area.
  - 1. The required legal instrument shall be a conservation easement in accordance with Fla. Stat. § 704.06, to be recorded in the public records of Monroe County, which shall restrict the use of the land in perpetuity to non-development uses and be expressly enforceable by the City.”

As with Monroe County, a mitigation fee must be paid as described in Section 106.20. - Alternatives to Onsite Habitat Protection as follows:

“If determined in writing by the City Biologist that onsite transplantation will not be conducive to the long term survivability of the plants, the applicant shall comply with one (1) of the following:

- 1. The applicant shall pay a fee, according to the schedule of fees established by Council into the City Restoration Fund; or
- 2. Subject to the consent of the City, the applicant shall donate nursery stock identical in species composition to that which will be lost to development. Stock shall be donated according to the replacement schedule established in Table 106.11.1 Tree Removal Mitigation Table.”

**Table 106.11.1  
Tree Removal Mitigation Table**

Tree Type	Number of Replacement Trees (per regulated tree)
Native greater than 4 inches DBH	3
Listed species (any size)	3
Regionally important plant species (any size)	3

### 3.3 Village of Islamorada

The Village of Islamorada's Land Development Regulations (LDR) are very similar to Monroe County's Land Development Code and are consistent with the FWC draft Guidelines.

The LDR applicable to mangroves and hardwood hammocks is found in Article V – Schedule of District Use and Development Standards and Article VII – Environmental Regulations. The LDR has requirements similar to most if not all of the measures described in the Guidelines. In summary, tropical hardwood hammocks greater than 5 acres are considered High Quality and a habitat analysis is not required. The minimum open space requirement is 90 percent of the parcel. For mangrove wetlands, the open space requirement is 100 percent for undisturbed and 90 percent for disturbed. The LDR requires that all such open space remain in its native state and the landowner must grant a conservation easement in perpetuity to the Village of Islamorada.

Hardwood hammocks located in Islamorada's Conservation Zoning District cannot be developed so the residential density is not applicable. The residential density for hardwood hammocks in Islamorada's Native Residential Zoning District is one dwelling unit plus one caretaker's cottage (no larger than 1,200 square feet) per four acres. A Vegetation Survey is required to determine the number and types of plant species that will be removed from the parcel.

Article VII, Section 30-1615. - Transplantation and restoration standards states:

- “(a) When existing non-invasive vegetation is removed or when vegetation that was to be preserved or relocated is damaged or destroyed during development activities, such vegetation shall be replaced, mitigated or restored in accordance with this section.
- (b) Each application for development approval shall include a transplantation or restoration plan...(4) Vegetation required to be restored or replaced shall meet the following replacement standards:

<b>TABLE 30-1615. TREE REPLACEMENT TABLE</b>			
<b>Canopy Spread of Tree (feet)</b>	<b>OR</b>	<b>Diameter of Trunk at 4 Feet Above Grade (inches)</b>	<b>Replacements Required</b>
90 or greater		37 or more	8
60—89		32—36	7
50—59		27—31	6
40—49		22—26	5
30—39		17—21	4
20—29		12—16	3
10—19		7—11	2
5—9		2—6	1
Less than 5 feet*		Less than 2 inches	0

\*Species listed as endangered, threatened or regionally important must be replaced at a minimum ratio of 1:1 of similar size and maturity.

- a. Replacement trees shall be at least eight feet in height, three inches diameter at breast height (dbh), and consist of non-invasive species.
- b. All native palms and shrubs replaced shall be of the same size and species, or similar species, as the plants removed.
- c. Nursery stock of 24 inches in height may be substituted at the ratio of three plants for every one plant proposed for removal as may be approved by the director of planning and development services.
- d. Nursery stock shall be of the same species whenever possible, or equally rare species as approved by the director of planning and development services.
- f. All transplantation or restoration shall be on the development site unless there is no suitable planting area available.
- i. All transplantation and restoration shall meet a survival rate of 100 percent after two years.
- j. Off-site transplantation and restoration. Where the survivability of transplanted plants is low, as determined by the director of planning and development services, the applicant shall be required to donate nursery stock or pay into the village restoration fund. The restoration fund shall be maintained by the village and shall be for the specific purpose of land acquisition and restoration within the village.
- l. Donated stock shall be donated at a ratio of 3:2 of that required in this section for on-site transplantation.

- m. Where payments are made in lieu of donations of stock, such payments shall be sufficient to purchase stock in numbers corresponding to the above replacement schedule. The applicant shall submit no less than three estimates from licensed nurseries and pay the average of the three estimates.”

#### **4.0 Costs Associated with FWC Draft Guidelines**

The costs associated with the measures described in the FWC draft Guidelines are organized in this Section as follows.

- Measures Consistent with Current and Future Land Development Regulations
- Measures Not Specifically Required by Current and Future Regulations in Monroe County
- Measures Related to Mitigating Loss or Degradation of WCPI Foraging and Breeding Habitat

Each category listed above is evaluated as follows.

#### **4.1 Guidelines Consistent with Current and Future Land Development Regulations**

Many of the specific WCPI measures described in the FWC draft Guidelines are already required by existing land development regulations in Monroe County. Regulations that protect mangrove islands and hardwood hammocks have been in place in some form since 1986. Costs associated with these WCPI measures were not estimated because the costs would vary significantly from one landowner to the next depending on the specific development activity and scope contemplated. Furthermore and, most importantly, while it can be argued that the earlier regulations were not as effective in protecting mangrove islands and hardwood hammocks as currently, there is no realistic or meaningful baseline land management activity from which to estimate these costs.

The measures described in the FWC Guidelines that fall into this category are listed below. These measures are among those listed in Section 2.0 of this memorandum. Multiple measures listed in the different sub-sections of the Guidelines and of Section 2.0 have been condensed for brevity.

- Avoid trimming, killing, or alteration of: native vegetation on mangrove islands; mangroves on uninhabited islands; or mangroves on lands set aside for conservation, preservation, or mitigation.
- Plant appropriate native fruiting species to provide foraging opportunities for WCPI.
- Consider provisions in the Monroe County Comprehensive Plan regarding protection of tropical hardwood hammocks and other native habitats.
- Adhere to Land Planning Regulations for the Florida Keys Area of Critical State Concern – Monroe County (Rule Chapter 28-20) and Sections 118-7, 118-10(1), and 118-10(4) of the Monroe County Land Development Code regarding designing development away from

natural areas and sensitive habitats, restrictions to developing tropical hardwood hammock and mangrove habitats, and maintenance of native trees (State of Florida 2014, Monroe County 2015b).

- Retain native fruiting trees whenever possible, including poisonwood, which is a particularly important species for nesting WCPI.
- Avoid land use change or removal of native trees or shrubs in contiguous, or nearly contiguous, patches of tropical hardwood hammock > 12 acres in size.
- Minimize loss and disturbance of breeding habitat.
- Minimize loss or degradation of tropical hardwood hammock, especially fruiting trees, in patches of hardwood hammock greater than 12 acres.

Because these measures are already required by the land development code of Monroe County and the land development regulations of the City of Marathon and the Village of Islamorada, the marginal cost of these measures is zero.

#### **4.2 Measures Not Specifically Required by Current and Future Regulations in Monroe County**

The following measures described in the FWC draft Guidelines are not specifically required of hardwood hammock and mangrove island private and public owners. In the event that FWC requires these measures or that the landowner implements these measures voluntarily in order to avoid WCPI take, then the total cost and the marginal cost of the FWC measure would be the same.

**WCPI Surveys.** The land development regulations of Monroe County, the City of Marathon, and the Village of Islamorada do not require animal surveys or habitat surveys of hardwood hammocks greater than 12 acres or mangrove islands.<sup>2</sup> This is because they are automatically classified as areas to be protected from development or areas where development is to be minimized. The methods by which an animal species or habitat survey should be conducted are not specified in the land development regulations of Monroe County, the City of Marathon or the Village of Islamorada.

The FWC Guidelines do not require a WCPI species survey. However, if a survey of WCPI on mangrove islands is conducted in accordance with the methodology described in the Guidelines and the species are not detected, then no further action is required. The estimated range of costs associated with conducting a WCPI species survey on mangrove islands is \$1,300 to \$3,000 per mangrove island surveyed.<sup>3</sup>

The low cost estimate is based on surveying a small island where 2 surveyors spend 4.5 hours each per survey (2 hours of preparation and transportation and 2.5 hours of surveying) at \$16

---

<sup>2</sup> However for certain Federally-listed species, the Monroe County Code specifies landowner compliance with U.S. Fish & Wildlife Service requirements that may include conducting surveys for Stock Island tree snail, Key Largo cotton mouse and Key Largo woodrat. The survey methodologies are provided by the Service.

<sup>3</sup> These costs estimates were based on information provided by FWC where the hours of preparation and transportation and the 3.0 multiplier were added.

per hour times a 3.0 multiplier for salary, benefits and overhead times 3 surveys ( $\$1,300 = 2 \times 4.5 \times 16 \times 3 \times 3$ ).

The high cost estimate is based on surveying a large island where 4 surveyors spend 4.5 hours each per survey (2 hours of preparation and transportation and 2.5 hours of surveying) at \$18 per hour times a 3.0 multiplier for salary, benefits and overhead times 3 surveys ( $\$3,000 = 4 \times 4.5 \times 18 \times 3 \times 3$ ).

FWC does not recommend any specific methodology for WCPI surveys on foraging habitat (hardwood hammock) because FWC assumes that patches over 12 acres are likely to be occupied by WCPI and any applicants wishing to apply for an FWC WCPI take permit for less than a 12 acre patch would likely have conducted opportunistic surveys which take minimal time.<sup>4</sup>

**Avoid Seasonal WCPI Disturbance from Activities.** For activities that may cause disturbance to foraging birds in patches of hardwood hammock greater than 12 acres, FWC Guidelines suggest that the landowner conduct project activities from mid-October to March, when 80 percent to 90 percent of Florida's WCPI population overwinters in the Bahamas and Caribbean.

Restricting activities during Florida's "winter" months (October to March) would only be feasible for construction and maintenance activities and for activities conducted by those who live on properties with hardwood hammocks. This measure would not be feasible for activities needed to provide goods and services to tourists and residents on a year-round basis. The estimated cost of avoiding construction and maintenance activities on or near hardwood hammocks from April through mid-October (6.5 months of the year) ranges from \$0 per activity to \$50,000 per activity.

The low cost estimate, \$0, reflects an activity that would have been conducted from mid-October to March anyway and could easily have been avoided from April to mid-October. The high cost estimate is based on a worst-case scenario where the financing of a building or a dwelling unit has been unavoidably obtained in April at a 5 percent annual rate of interest but construction does not begin until mid-October in order to minimize disturbance to foraging WCPI. Assuming the amount financed is \$250 per square foot of building footprint and the building covers the entire maximum amount of land that can be developed, 7,500 square feet, the estimated cost of waiting 6.5 months from the time of financing to the time of construction would be  $\$50,000 = \$250 \times 0.05 \times 7,500 \times 6.5/12$ . The actual cost would vary depending on the actual amount financed to construct the building, the months of delay between the time financing is obtained and the structure is built, and the interest rate paid.

**Transmission and Distribution Lines.** The FWC draft Guidelines suggest measures to minimize disturbances to WCPI breeding and foraging habitat. They are as follows.

- Avoid or minimize transmission and distribution lines through patches of tropical hardwood hammock greater than 12 acres.
- Place markers on transmission and distribution lines where collisions are a potential hazard.

---

<sup>4</sup> From FWC.

Representatives of the two electric utility companies that serve the Florida Keys: Florida Keys Electric Cooperative (FKEC) and Keys Energy Services (KES) were interviewed regarding their utility’s plans to build new power lines. FKEC provides service from the Miami-Dade/Monroe County line to the Seven Mile Bridge. KES provides service from the Seven Mile Bridge to Key West. Both stated that their utility service area is built out and they do not expect that any new transmission and distribution lines will be constructed in the Florida Keys. Any new power lines serving large developments are anticipated to be placed underground.

Both utilities recognize and respond to bird strikes along their power lines. KES does not have aerial markers on its power lines except at the Key West Airport and has no plans to install bird markers on its other lines in the future. The day after a bird strike, KES evaluates the location and assesses the best way to stop bird strikes. Options include covering over the wire, which is the usual choice, or modifying the line when it is rebuilt.

FKEC has an Avian Protection Plan that is currently being updated. Markers (orange balls) are installed on transmission lines where there have been bird strikes. FKEC is currently looking into installing markers on their distribution system lines. Wind loading is an issue so an engineering study would need to be completed.

Cost information was provided by FKEC to estimate the cost to install markers on transmission and distribution power lines. The cost is estimated to range from \$280 to \$470 per installed marker for transmission lines and \$400 to \$640 per installed marker for distribution lines. The estimated cost to install markers is provided in Table 4.1 and Table 4.2 for the low cost and high cost estimates, respectively.

**Table 4.1 - Estimated Range of Costs to Install Power Line Markers Based on Covering All FKEC Transmission and Distribution Lines - Low Cost Estimate (a)**

Item	Units	Number of Units	Cost per Unit	Total Cost
<b>Transmission Lines</b>				
(1) Engineering Wind Load Study	Lump Sum	1	\$200,000	\$200,000
(2) Markers to Cover 100 miles of transmission lines	Number	4,000	\$150	\$600,000
(3) Cost to Install Markers on Transmission Line:				
(a) Helicopter Installation with 2 person crew	Miles	100	\$2,778	\$277,778
(b) Mobilization / Demobilization	Lump Sum	1	\$30,000	\$30,000
<b>Total Cost</b>				<b>\$1,107,778</b>
<b>Cost per Marker</b>				<b>\$277</b>
<b>Distribution Lines</b>				
(1) Engineering Wind Load Study	Lump Sum	1	\$200,000	\$200,000
(2) Markers on 700 miles of distribution lines	Number	28,000	\$100	\$2,800,000
(3) Cost to Install Markers on Distribution Line:				
(a) Bucket truck with 2 person crew	Miles	700	\$11,333	\$7,933,333
<b>Total Cost</b>				<b>\$10,933,333</b>
<b>Cost per Marker</b>				<b>\$390</b>

(a) Based on information provided by FKEC.

**Table 4.2 - Estimated Range of Costs to Install Power Line Markers Based on Covering All FKEC Transmission and Distribution Lines - High Cost Estimate (a)**

Item	Units	Number of Units	Cost per Unit	Total Cost
<b>Transmission Lines</b>				
(1) Engineering Wind Load Study	Lump Sum	1	\$300,000	\$300,000
(2) Markers on 100 miles of transmission lines	Number	4,000	\$300	\$1,200,000
(3) Cost to Install Markers on Transmission Line:				
(a) Helicopter Installation with 2 person crew	Miles	100	\$3,333	\$333,333
(b) Mobilization / Demobilization	Lump Sum	1	\$30,000	\$30,000
<b>Total Cost</b>				<b>\$1,863,333</b>
<b>Average Cost per Marker</b>				<b>\$466</b>
<b>Distribution Lines</b>				
(1) Engineering Wind Load Study	Lump Sum	1	\$300,000	\$300,000
(2) Markers on 700 miles of distribution lines	Number	28,000	\$200	\$5,600,000
(3) Cost to Install Markers on Distribution Line:				
Bucket truck with 2 person crew	Miles	700	\$17,000	\$11,900,000
<b>Total Cost</b>				<b>\$17,800,000</b>
<b>Average Cost per Marker</b>				<b>\$636</b>

(a) Based on information provided by FKEC.

**Education of Project Personnel.** The FWC draft Guidelines suggest that personnel working on a construction or maintenance project be educated regarding the WCPI and its sensitivity to disturbance. The cost of this effort is not expected to be significant. The opportunity cost of personnel time spent preparing the information and the cost of personnel listening to the information could range from \$800 to \$1,500, primarily depending on the number of personnel who are educated. The personnel cost would probably not be an out of pocket cost because they would likely be working on site at the time they are educated. This cost instead represents the value of other tasks that they could have completed instead of being educated about WCPI. The cost calculations are provided in Table 4.3 and use 10 people under the low cost estimate and 20 people under the high cost estimate.

**Table 4.3 Estimated Cost per Site of WCPI Education of Project Personnel**

Item	Units	Number of Units	Cost per Unit	Total Cost
<b>Low Cost Estimate:</b>				
Preparation time	Hours	3.00	\$150	\$450
Personnel education time (10 people at 20 minutes per person)	Hours	3.33	\$100	\$333
Materials cost (Copies of Handouts)	Number	20	\$0.20	\$4
<b>Total Cost</b>				<b>\$787</b>
<b>High Cost Estimate:</b>				
Preparation time	Hours	3.00	\$150	\$450
Personnel education time (20 people at 20 minutes per person)	Hours	6.67	\$150	\$1,000
Materials cost (Copies of Handouts)	Number	30	\$0.20	\$6
<b>Total Cost</b>				<b>\$1,456</b>

**Educational Signage.** The FWC draft Guidelines suggest that educational signage be posted to reduce disturbance around breeding colonies. The cost to create and install a permanent sign will vary with the size and complexity of the sign and includes the sign, the post, and installation labor and materials. A ballpark cost range of \$800 to \$1,500 per installed permanent sign that is large enough to be easily visible provides a general idea of how much educational signage would cost.

**FWC Measures For Which Cost Range Cannot Be Estimated.** Due to a lack of information regarding the types of activities that would be affected, the costs of the following measures described in the FWC draft Guidelines cannot be estimated.

- Maintain a no-disturbance buffer of 330 feet around mangrove islands with active WCPI nesting colonies.
- If the project must occur within the buffer, minimize time spent within the buffer during the breeding season and within 330 feet of active nests to minimize disturbance of and take of nests, eggs, and young.
- Avoid consistent, repeated flushing of birds within patches of tropical hardwood hammock > 12 acres in size.
- Minimize activities year round that cause WCPI to repeatedly flush in patches of hardwood hammock greater than 12 acres.
- Restrict activities that may cause disturbance of foraging birds to the periphery of patches of hardwood hammock greater than 12 acres.

The Monroe County land development code does require that “during construction, there shall be no disturbances of the ground surface and vegetation within required open space areas.”

#### **4.3 Measures Related to Mitigating Loss or Degradation of WCPI Foraging and Breeding Habitat**

FWC draft Guidelines provide mitigation options to offset take of WCPI. For breeding habitat, “the DEP’s ERP process can provide mitigation for loss or degradation of WCPI breeding habitat (i.e., mangrove islands), provided the mitigation includes mangrove islands suitable for WCPI nesting.” For both breeding (mangrove islands) and foraging (hardwood hammocks) habitats, options include research and monitoring activities that provide “scientific benefit”; and protection/acquisition or management when habitat is significantly modified.

Future development is not permitted on any mangrove island in the Florida Keys. The only possible exception is if there is a “disturbed” area on a mangrove island in the Village of Islamorada then up to 10 percent of the area could potentially be developed.

For land in unincorporated Monroe County, any native tree that is removed or damaged must be mitigated by paying Monroe County a specific fee per tree which goes into their Monroe County Environmental Land Management and Restoration Fund. The payment is equal to the number of removed/damaged trees by species times the species cost per tree times 2. The cost of each tree species is based on the replacement cost of the specific plants and trees. The

replacement cost per tree (before multiplying by 2) for select hardwood hammock trees is provided in Table 4.4. These costs are from Monroe County and are but a few of the 89 plant species which have been assigned replacement costs.

**Table 4.4 Monroe County Tree Replacement Cost Per Tree Used to Calculate Mitigation Fee  
Selected Hardwood Hammock Trees**

Common Name	Scientific Name	Small	Medium	Large	X-Large
Seagrape	<i>Coccoloba uvifera</i>	\$10.25	\$29.50	\$56.67	\$141.67
Strangler Fig	<i>Ficus aurea</i>	\$15.00	\$33.41	\$55.00	\$167.74
Gumbo Limbo	<i>Bursera simaruba</i>	\$12.50	\$37.04	\$66.13	\$136.25
Poisonwood	<i>Metopium toxiferum</i>	\$15.00	\$43.41	\$65.00	\$175.00
Pigeon Plum	<i>Coccoloba diversifolia</i>	\$14.43	\$44.54	\$78.63	\$166.50
Paradise Tree	<i>Simarouba glauca</i>	\$15.17	\$50.00	\$82.50	\$149.83
West Indian Cherry	<i>Prunus myrtifolia</i>	\$20.00	\$50.00	\$100.00	\$150.00
Blolly	<i>Guapira discolor</i>	\$15.00	\$50.91	\$72.50	\$120.00
Shortleaf Fig	<i>Ficus citrifolia</i>	\$17.50	\$55.91	\$77.50	\$150.00
White Stopper	<i>Eugenia axillaris</i>	\$12.38	\$63.17	\$62.00	\$150.00
Lignum Vitae	<i>Guaiaicum sanctum</i>	\$32.00	\$125.00	\$174.50	\$355.00

Source: Monroe County Mitigation Schedule Worksheet, 2016

The City of Marathon and Village of Islamorada use a similar system to collect fees for the purpose of restoring native areas. Marathon's multiplier is 3.0 and Islamorada's multiplier depends on the size of the tree that needs to be replaced.

In Monroe County, the mitigation fee that has been paid by landowners to mitigate for removing hardwood hammock trees ranges from \$5,000 to \$60,000. According to Monroe County, a standard hammock lot has about 3,000 square feet of clearing which usually results in a mitigation fee ranging from \$5,000 and \$15,000, and occasionally close to \$20,000. A 30,000+ square foot lot with a 7,500 square foot building with driveway clearing allowance could have a mitigation fee of up to \$50,000 to \$60,000. These fees are directed to the Monroe County Environmental Land Management and Restoration Fund which is used only for land management and not land acquisition. The Monroe County Comprehensive Plan Land Authority purchases properties for conservation purposes, including hardwood hammocks.

Monroe County manages 3,600 parcels (1,600 acres) of County owned lands and an additional 495 parcels (170 acres) of State owned lands to benefit native habitat. In FY2015, about \$180,000 of the Fund was spent on land management, including the salary of the Monroe County Land Steward for an average management cost of \$102 per acre. Management costs are not disaggregated by habitat type. Management projects included solid waste removal, exotic plant removal, native vegetation planting, hazardous tree trimming, and the like. Additionally, in FY 2015, about \$220,000 of FWC invasive plant removal funding was spent managing County lands for an additional expenditure of \$124 per acre. Thus, the total expenditure to manage native land in FY2015 was \$226 per acre.

## 5.0 Comments From Those Interviewed

The Guidelines document states that “loss or degradation of habitat (e.g., land use conversion or removal of native shrubs and trees) within patches of contiguous, or nearly contiguous, tropical hardwood hammock greater than 12 acres in size constitutes significant habitat modification that results in take for WCPI.” The land development consultant interviewed noted that the ambiguity of “nearly contiguous” makes it difficult to assess how the FWC Guidelines would affect landowners in the Florida Keys and recommends that this term be well-defined. He also noted that FWC Guidelines can ultimately be adopted into land development rules and therefore public workshops at government venues in the Florida Keys should be conducted to refine these guidelines. For the purposes of this study, the evaluation focused on the locations of hardwood hammocks that were provided by FWC.

Another interviewee noted that applying the Guidelines only to hardwood hammocks greater than 12 acres makes it more difficult to obtain grants for land acquisition. Grantors look to FWC for advice regarding native area and species protection and may limit funding to only those hardwood hammocks greater than 12 acres. WCPI forage in hardwood hammocks of all sizes and the eligibility to obtain these grants should not be constrained by the limited number of 12 acre tracts.

## 6.0 Estimated Projection of Five-Year Cost

This section provides estimates of the five-year costs associated with the Draft Species Conservation Measures and Permitting Guidelines of the WPCI. Many of the specific WPCI measures described in the FWC draft Guidelines are already required by existing land development regulations in Monroe County. Because regulations protecting mangrove islands and hardwood hammocks in Monroe County have been in place since 1986, the costs of most WCPI measures were not estimated because there is no realistic or meaningful baseline land management activity from which to estimate these costs.

The five-year costs of the measures described in the FWC draft Guidelines that are not specifically required of hardwood hammock and mangrove island private and public owners are provided in Table 6-1. A cost range is provided for each measure where the costs are the total estimated costs over the next five years and are not discounted. In the event that FWC requires these measures or that the landowner implements these measures voluntarily in order to avoid WCPI take, then the total cost and the marginal cost of the FWC measure would be the same. The mitigation cost per acre associated with native land managed by Monroe County is also included in Table 6-1. The total five year cost is estimated to range from \$66,000 to \$186,000. The assumptions used to estimate the five year costs are provided below.

**Table 6-1 Estimated Costs Over Next Five Years of the Draft Species Conservation Measures and Permitting Guidelines for the White Crowned Pigeon**

Measure	Unit	Low Cost Estimate			High Cost Estimate		
		Number	Unit Cost	Total Cost	Number	Unit Cost	Total Cost
WCPI Surveys	Survey	0	\$1,300	\$0	2	\$3,000	\$6,000
Avoid Seasonal WCPI Disturbance from Activities	Site	Not known or estimated because unit cost is \$0	\$0	\$0	1	\$50,000	\$50,000
Education of Project Personnel	Site	1	\$800	\$800	2	\$1,500	\$3,000
Educational Signage	Sign	5	\$800	\$4,000	5	\$1,500	\$7,500
Mitigation when needed beyond that required by State and local rule	Acre of managed native habitat	24	\$2,260	\$54,240	24	\$4,520	\$108,480
Place bird markers on transmission and distribution lines where collisions are a potential hazard:							
Transmission line	Marker	10	\$280	\$2,800	10	\$470	\$4,700
Distribution lines	Marker	10	\$390	\$3,900	10	\$640	\$6,400
<b>Total Five Year Cost</b>				<b>\$65,740</b>			<b>\$186,080</b>

**Unit Costs.** The unit costs of the measures listed in Table 6-2 are provided in Sections 4.2 and 4.3 of this Memorandum.

**Surveys.** Because development on mangrove islands would not be permitted in Monroe County, it is likely that no mangrove surveys would be conducted. However, there is a possibility that a public landowner might propose to install a dock or other recreation-related facility on a mangrove island. Therefore, it is assumed that as many as two mangrove islands might be surveyed over the next five years.

**Avoid Seasonal WCPI Disturbance from Activities.** Most landowners would be aware of FWC guidelines during the permitting stage of the project. Therefore, they would plan all construction activities from mid-October to March and the cost of this measure would then be \$0. It might be expected that from time to time, a landowner would plan construction activities without being aware of the measure and would need to make last minute changes to the construction schedule. For this reason the high cost estimate assumes that a landowner of one site would incur the high end estimate of cost per site.

**Education of Project Personnel.** The cost range assumes that from one to two site owners would be required to educate site personnel about the WCPI.

**Educational Signage.** The cost range assumes that five educational signs would be installed over the next five years under both the low end and high end cost estimate.

**Mitigation when needed beyond that required by State and local rule.** The only circumstances under which a landowner would need to mitigate beyond that required by the County or its cities is if FWC determined that the mitigation was not sufficient for the WCPI. As requested by FWC, a range of per acre costs associated with Monroe County managing native land in

perpetuity was estimated. These estimates were based on the 2015 cost to Monroe County as it managed its land to benefit native habitat of \$226 per acre. The low cost estimate of \$2,260 per acre was based on the land being managed in perpetuity at an annual interest rate of 10 percent ( $\$226/0.10$ ). The high cost estimate of \$4,520 per acre was based on the land being managed in perpetuity at an annual interest rate of 5 percent ( $\$226/0.05$ ). The interest rate represents the time value of money to the public sector and will vary based on the financial, social and environmental benefits provided by alternative public investments. Assuming that 24 acres of land mitigation would be needed over the next five years under both the low cost and high cost estimate, the five year cost is estimated to range from \$54,200 to \$108,500.

**Bird Markers.** The number of markers that might be placed on transmission and distribution lines over the next five years is estimated to be 10 each under both the low cost and high cost estimates.

## MEMORANDUM

**To:** Claire Sunquist  
Project Manager  
Florida Fish and Wildlife Conservation Commission

**Memo No: 2**

**From:** Grace Johns, Ph.D.  
Senior Associate and Economist

**Date:** June 15, 2016

**Subject:** FINAL Imperiled Species Management Plan (ISMP) Economic Impact  
Assessment: Draft Species Conservation Measures and Permitting Guidelines for  
The Everglades Mink

---

### **1.0 Study Description, Purpose and Method**

The purpose of this study is to estimate the range of total costs and marginal costs and provide an estimated projection of 5 year costs associated with the draft conservation measures and permitting guidelines for the Everglades Mink (herein referred to as "Guidelines"). This draft document was prepared by the Florida Fish and Wildlife Conservation Commission (FWC).

Total cost refers to labor, materials, and opportunity costs associated with implementing each guideline. Marginal cost is the total cost of the guideline minus the cost of all or portions of that guideline that would need to be incurred anyway in order to comply with land development regulations.

This memorandum includes a summary of the FWC draft Guidelines and their estimated total and marginal costs.

### **2.0 Summary of Draft FWC Measures and Guidelines**

The Everglades Mink is a State-Threatened species. It is a subspecies of the American mink that historically roamed in the freshwater marshes and swamps of the Everglades, the Big Cypress area, and Lake Okeechobee. Most sightings and specimens have come from Collier County and Miami-Dade County and the Everglades Mink presumably inhabits northern Monroe County. Since 2011, Everglades Mink have been sighted near Fakahatchee Strand Preserve State Park; in Everglades National Park, and at Big Cypress National Preserve. Because of the cryptic nature of the Everglades mink, the FWC has limited data regarding habitat features that most directly affect essential behavior patterns. Current knowledge of Everglades mink distribution is limited to data from a small number of studies. The conservation measures and guidelines are summarized as follows.

## 2.1 Recommended Survey Methodology

Surveys are not required but can be used to determine if Everglades Mink are present in a given area. Because this is a cryptic species, surveys that are conducted in accordance with the methodology described below may not detect this species. At this time, no single survey method is considered effective for determining the presence of the Everglades Mink. Thus, use of multiple survey methods may be the most appropriate approach for conducting surveys.

- Camera-based survey protocols are currently recommended for detecting Everglades Mink. Two types of camera traps may be used to survey for mink, floating camera traps and trail cameras attached to trees.
- Night-time spotlight surveys can be conducted using 2 different methods. First, along pedestrian transects on trails or levees. Second, from boats in saltmarsh habitat at selected locations.
- Daytime observational surveys can be conducted at locations where the Everglades Mink are expected to roam. Surveys could be conducted at selected points, where the points would be near suitable wetland habitats. Observations could be conducted for specific amounts of time, at optimal times of the day.
- Live trapping methods for the Everglades Mink are not recommended. Any live trapping requires a scientific collecting permit.

Incidental sightings should be recorded and reported. Such sightings can be maintained in a database that is accessible to other agencies and the public for such reports. Incidental sightings can have a scientific benefit.

## 2.2 Recommended Conservation Practices

Recommendations are general measures that could benefit the species but are not required.

- Maintain or restore hydrology in areas where habitats are potentially suitable for the Everglades Mink. For example, incorporate culverts into new road designs that will allow for maintenance and/or restoration of natural hydrology.
- Avoid placement of impermeable surfaces, such as roads or parking lots, near or adjacent to wetlands suitable for the Everglades Mink in ways that would allow untreated runoff to go into those wetlands.
- Implement prescribed fire and other appropriate habitat management practices as necessary to maintain the quality of wetland habitats that are potentially suitable for the Everglades Mink.
- Silvicultural management activities that follow recommended Water Quality Best Management Practices (BMPs).
- Agricultural activities that follow recommended Water Quality BMPs.
- Channelization of streams and the removal of aquatic vegetation and woody debris in streams or other wetlands should be avoided as that can reduce the availability of vertebrate and invertebrate (e.g., crayfish) prey.

### 2.3 Measures to Avoid Take

Avoidance Measures that will eliminate the Need for FWC Take Permitting:

- Avoid removing or altering levees without checking for den sites.
- Avoid altering hydrology from early spring through early summer when young mink can be killed in flooded dens, or are incapable of traveling to distant wetlands for feeding.
- Avoid killing or injuring mink when they are observed, especially on or near roads.
- Identify Everglades mink den sites and avoid disturbance within 100 meters of known den sites, especially during those during times of the year when young mink are most likely to be present in them.

### 2.4 Minimization Options

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

- Avoid disturbance within 100 meters of known Everglades Mink den sites.
- Minimize disturbance to potentially occupied habitats surrounding project areas with a minimal buffer distance (10-15 feet) outside the specific footprint of planned development activities (i.e., outside the project work zone).
- Restore any impacts to natural habitat within buffer areas adjacent to project work zones and, whenever possible, within project work zones.
- Site designs should minimize areas where potentially occupied Everglades Mink habitat occurs, especially shallow freshwater marshes, swamp forests, coastal marshes, and mangroves.
- Minimize amount of suitable forested wetland habitat converted to other land uses.
- Design projects to minimize changes in timing, quantity, or quality of water that could degrade suitable forested wetland habitat.
- Design projects to minimize fertilizer, herbicide, and pesticide runoff into potentially suitable wetland habitat.
- Minimize placement of impermeable surfaces, such as roads and parking lots, adjacent to wetlands used by Everglades Mink. This reduces the chance of flooding and minimizes runoff.
- Efforts should be made to maintain connectivity with offsite areas of potentially suitable habitat.
- Design roads away from suitable wetlands to minimize habitat fragmentation and degradation, and to minimize road mortality.
- For road placement and other projects that may impede water flow, include culverts to maintain or restore natural hydroperiods and flow levels.

- Use silt fencing and other methods to minimize impacts to water quality (e.g., turbidity) in suitable wetland habitats.
- Avoid or minimize the release of heavy metals and other chemicals that may bio-accumulate, as well as other chemicals and pollutants, especially into surface water runoff that can drain into potentially suitable wetland habitats.
- In areas where Everglades Mink are believed to be present and vehicle-caused mortality has been observed, or is considered likely to occur, post signs to alert motorists to be watchful and avoid mink.
- Flag or otherwise mark known Everglades mink den sites, and avoid disturbance within 100 meters of these areas.
- Allow Everglades mink observed during construction activities to move safely away from an area by pausing activities until the animal has moved away.

## **2.5 Mitigation Options**

Multiple options for mitigation may exist that could be appropriate to offset impacts to essential behaviors resulting from a given project or action. From those options, the most appropriate combination of actions can be selected. Florida's Environmental Resource Permitting (ERP) process forms the basis of mitigation for loss or degradation of suitable Everglades Mink habitat. Following the ERP process, the FWC will review the resulting wetland mitigation to assess whether the mitigation meets the definition of "scientific or conservation benefit" for the Everglades Mink. In most cases, wetland mitigation through the ERP process will satisfy the applicant's responsibilities under rule 68A-27, F.A.C., and associated rule enforcement policies. However, under certain circumstances, the FWC may require mitigation specific for take of Everglades Mink to ensure a scientific or conservation benefit. Potential options for mitigation are described in the FWC draft Guidelines and are further discussed in Section 3.5 of this Memorandum.

## **3.0 Costs Associated with FWC Draft Guidelines**

The costs associated with the measures described in the FWC Draft Guidelines are organized in this Section as follows.

- Measures Required by State and Local Regulation
- Measures for Which Costs Have Been Estimated
- Measures for which costs are likely to be less than \$1,000 per construction project
- Measures for which costs have NOT been estimated
- Estimated Cost of Mitigation

Each category listed above is evaluated as follows.

### **3.1 Measures Required by State and Local Regulation**

In the course of obtaining the necessary permits for land development and construction, State and local regulations require that landowners implement actions that are consistent with the FWC Draft Guidelines. Many of the FWC Draft Guidelines are included in these

requirements. The FWC Draft Guidelines that are already required by State and local land development regulations, including Environmental Resource Permitting (ERP) and State water quality standards, are as follows.

- Silvicultural management activities that follow recommended Silviculture BMPs related to water quality are required by the Florida Department of Agricultural and Consumer Services (FDACS). These practices are minimum standards necessary for protecting and maintaining the State's water quality and certain wildlife habitat values during forestry activities and are intended to be applied on all such operations.<sup>1</sup>
- Agricultural activities that follow recommended Water Quality BMPs established by FDACS provides a presumption of compliance with state water quality standards for the pollutants addressed by the BMPs. The implementation and maintenance of these BMPs must be verified by FDACS. Agricultural BMPs are practical measures that producers can take to reduce the amount of fertilizers, pesticides, animal waste, and other pollutants entering water bodies and are designed to improve water quality while maintaining agricultural production.<sup>2</sup> FDACS publishes documents that describe the BMP actions specific to each type of agricultural activity. BMP documents are available for Florida Citrus; Florida Vegetable and Agronomic Crops; Florida Specialty Fruit and Nut Crops; Florida Sod Operations; Florida Equine Operations; Florida Sod Operations, Florida Nurseries, Florida Cow/Calf Operations and Florida Dairies.
- Site designs should minimize areas where potentially occupied Everglades Mink habitat occurs, especially shallow freshwater marshes, swamp forests, coastal marshes, and mangroves.
- Minimize amount of suitable forested wetland habitat converted to other land uses.
- Design projects to minimize changes in timing, quantity, or quality of water that could degrade suitable forested wetland habitat.
- Design projects to minimize fertilizer, herbicide, and pesticide runoff into potentially suitable wetland habitat.
- Minimize placement of impermeable surfaces, such as roads and parking lots, adjacent to wetlands used by Everglades Mink. This reduces the chance of flooding and minimizes runoff.
- Efforts should be made to maintain connectivity with offsite areas of potentially suitable habitat.
- Design roads away from suitable wetlands to minimize habitat fragmentation and degradation, and to minimize road mortality.
- Restore any impacts to natural habitat within buffer areas adjacent to project work zones and, whenever possible, within project work zones.

---

<sup>1</sup> Florida Department of Agriculture and Consumer Services, "Silviculture Best Management Practices", Revised 2008.

<sup>2</sup> From <http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy/Enroll-in-BMPs>

- Avoid or minimize the release of heavy metals and other chemicals that may bioaccumulate, as well as other chemicals and pollutants, especially into surface water runoff that can drain into potentially suitable wetland habitats

These measures are required by State and local agencies as appropriate for the particular characteristics and location of the site and the type of development activity being contemplated. The requirements to implement these BMPs and measures for the purpose of protecting water quality and water resources have been in existence for over 20 years. Costs associated with these measures were not estimated because they would vary significantly from one landowner to the next depending on the specific location, development activity and scope contemplated. Furthermore and, most importantly, there is no realistic or meaningful baseline land management activity from which to estimate these costs because they have been implemented as appropriate for over 20 years. Because these BMPs and measures as already required, the marginal cost of these BMPs and measures is \$0.

### 3.2 Measures for Which Costs Have Been Estimated

The costs of the following measures are presented in this Section.

- Conduct Surveys
- Install Culverts
- Post Signs
- Install Silt Fencing

Each is discussed in turn below.

**Conduct Surveys.** The cost per acre of Mink habitat to survey for Everglades Mink was estimated for the four types of surveys.

**Camera-Based Survey** - The cost to implement camera-based survey protocols using floating camera traps and trail cameras attached to trees is estimated to cost from \$785 to \$12,300 per site. The number of camera traps will depend on the size of the area surveyed. Some in-depth surveys have been based on 12 camera traps installed per acre surveyed but in other surveys two baited traps per acre were placed along transects. The cost of each camera trap can range from \$200 to \$700 depending on the brand of the camera. Installation, removal and review of the photos takes about 4 to 6 hours per camera trap.

The low cost estimate was calculated using two-\$200 cameras per acre and 4 hours per camera trap. Using a labor cost of \$16 per hour with a 3.0 multiplier for salary, benefits and overhead, the low cost estimate is \$785 per site ( $\$785 = [\$200 \times 2] + [4 \times 2 \times \$16 \times 3]$  rounded up).

The high cost estimate was calculated using 12-\$700 cameras per acre surveyed and 6 hours per camera trap. Using a labor cost of \$18 per hour with a 3.0 multiplier, the high cost estimate is \$12,300 per acre surveyed ( $\$12,300 = [\$700 \times 12] + [6 \times 12 \times \$18 \times 3]$  rounded up).

**Night-time Spotlight and Day-time Observational Surveys** - Night-time spotlight surveys use pedestrian transects and/or boat locations. The number of locations and transects by boat or

on foot will depend on the site’s size and vegetation. Daytime observational surveys take place at locations where Everglades Mink are expected to roam. FWC recommends surveying 20 percent of suitable habitat for the first 3 hours after dawn and first 3 hours after dusk, for a total of 6 hours per day, for 3 days per week over 3 months which totals of 234 hours per transect.

The estimated cost of night-time spotlight surveys and daytime observational range from \$500 to \$1,300 per acre for surveyed habitats at least 10 acres in size. For smaller habitat areas, the estimated cost per acre would be higher and in the range of about \$1,300 per acre for a 9 acre habitat to as high as \$13,000 for habitats that are one acre or less. The estimated cost calculations are provided in Table 3-1.

**Table 3.1 - Estimated Cost Per Acre of Night-time Spotlight or Daytime Observational Surveys (a)**

Row No.	Item	Low Cost Estimate	High Cost Estimate
		Labor Cost per Transect/Location	
(1)	Units	Hours	Hours
(2)	Cost per Unit (b)	\$48	\$54
(3)	Number of Units (c)	234	234
(4) = (2) x (3)	<b>Total Cost</b>	<b>\$11,232</b>	<b>\$12,636</b>
(5)	Number of Habitat Acres Surveyed Per Transect/Location	25	10
(6) = (4) / (3)	<b>Cost per Acre Surveyed</b>	<b>\$449</b>	<b>\$1,264</b>
(7)	Number of Habitat Acres Surveyed Per Transect/Location	9	1
(8) = (4) / (7)	<b>Cost per Acre Surveyed</b>	<b>\$1,248</b>	<b>\$12,636</b>

(a) Estimated Costs do not include boat rental or fuel. Therefore, costs assume that pedestrian transects are used for both types of surveys.

(b) Hourly labor cost is \$16 x 3 and \$18 x 3 for low and high cost estimate, respectively. The \$16 and \$18 is from FWC and the 3.0 labor multiplier is a Hazen and Sawyer in-house estimate.

(c) From FWC

**Incidental Sightings** - Everglades Mink might be observed by those who work at or visit the project site. All sightings should be recorded and reported and can be maintained in a database that is accessible to other agencies and the public. The expense and labor time associated with recording and reporting such sightings is expected to be very small.

**Marginal Cost of Surveys** - Because Everglades Mink surveys are not likely to be required by any State, Federal or local regulation, the marginal cost to survey for Everglades Mink is equal to the total cost ranges estimated above.

**Install Culverts.** The FWC Draft Guidelines recommend the maintenance or restoration of hydrology in areas where habitats are potentially suitable for Everglades Mink. For example, new road designs should incorporate culverts that will allow for maintenance and/or restoration of natural hydrology. The estimated materials and construction cost to install culverts beneath new roadways ranges from \$12,000 per culvert to \$21,000 per culvert,

depending on whether the culvert is 2 feet or 4 feet in diameter, respectively. The required size and number of culverts will depend on the hydrology of the site. The cost estimate calculations are provided in Table 3.2. To the extent that installation of culverts beneath new roadways located in these types of habitats would be required by State of Florida regulations, the marginal cost is likely to be \$0.

**Table 3.2 - Estimated Cost of Culvert Through Two Lane Road During Road Construction (a)**

Item	Quantity (b)	Units	Unit Price	Total
<b>Low Cost Estimate</b>				
<b>Two-Foot Culvert</b>				
Mobilization, Grading, Earthwork, Dewatering, and Demobilization	1	Lump Sum	\$6,500	\$6,500
2-ft diameter, corrugated aluminum pipe	44	Linear Foot	\$120	\$5,280
<b>Total Cost per Culvert</b>				<b>\$11,780</b>
<b>High Cost Estimate</b>				
<b>Four-Foot Culvert</b>				
Mobilization, Grading, Earthwork, Dewatering, and Demobilization	1	Lump Sum	\$13,000	\$13,000
4-ft diameter, corrugated aluminum pipe	44	Linear Foot	\$175	\$7,700
<b>Total Cost per Culvert</b>				<b>\$20,700</b>

(a) The cost estimates reflect the additional cost of with including a culvert in road design and installation.

(b) The linear feet of pipe is based on a two lane road with 12 feet per lane and two shoulders with 10 feet per shoulder including slope.

**Post Signs.** FWC Draft Guidelines recommend that motorist warning signs to avoid Everglades Mink be posted along roads in areas where mink are believed to be present and vehicle-caused mortality has been observed, or is considered likely to occur. It is not likely that this action would be required by State or local regulations. This type of sign would likely need to be custom-made since there is not likely to be mink caution signs available in the marketplace. The cost to purchase and install the sign is estimated to range from \$800 to \$1,500 depending on the size and quality of the sign and post; and the hourly labor cost and time needed for installation. The cost estimate calculations are provided in Table 3.3. Because there are no State, Federal or local regulations that require the posting of motorist warning signs for Everglades Mink, the marginal cost of posting signs is equal to the total cost range estimated in the Table, \$800 to \$1,500 per sign.

**Table 3.3 Estimated Cost of Everglades Mink Caution Sign Along Roadway**

Item	Quantity	Units	Unit Price	Total
<b>Low Cost Estimate</b>				
Sign Design and Installation Labor	4	Hours	\$150	\$600
Caution Sign, Post, and Weight	1	Sign	\$200	\$200
<b>Total Cost per Sign</b>				<b>\$800</b>
<b>High Cost Estimate</b>				
Sign Design and Installation Labor	5	Hours	\$230	\$1,150
Caution Sign, Post and Weight	1	Sign	\$300	\$300
<b>Total Cost per Sign</b>				<b>\$1,450</b>

**Install Silt Fencing.** FWC Draft Guidelines recommend the use of silt fencing and other methods to minimize impacts to water quality (e.g., turbidity) in suitable wetland habitats. Where appropriate, silt fences are one of the BMPs chosen to capture sediment from construction activities under Florida's stormwater regulatory program.<sup>3</sup> This program requires the use of BMPs during and after construction to minimize erosion and sedimentation and to properly manage runoff for both stormwater quantity and quality. A silt fence is appropriate sediment capture under sheetflow conditions not for channel flow conditions or in live streams or waterways. It is a temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts and entrenched and sometimes wire reinforced for support. According to DEP, "The most effective application is to install two parallel silt fences spaced a minimum of three feet apart."

The estimated materials and installation cost of two parallel silt fences surrounding the construction site ranges from about \$1,800 for a one acre construction site installed under ideal conditions to \$7,600 for a 10 acre construction site installed under adverse conditions. These costs are based on labor, materials, overhead and profit to install silt fences from RSMEANS Heavy Construction Cost Data. Because State water quality regulations require silt fencing, where appropriate, on every land development and construction project, the marginal cost of this measure is \$0.

**Table 3.3 Estimated Cost per Site to Install Silt Fencing at Construction Site**

Item	Quantity	Units	Unit Price (a)	Total
<b>Low Cost Estimate:</b>				
<b>One Acre Construction Site - Installed Under Ideal Conditions</b>				
Materials and Installation under ideal conditions, including overhead and profit: Silt, polypropylene, 3 feet high, <u>double-fenced</u> - all components	1,670	Linear Feet of Fence	\$1.05	<b>\$1,755</b>
<b>High Cost Estimate:</b>				
<b>Ten Acre Construction Site</b>				
Materials and Installation under adverse conditions, including overhead and profit: Silt, polypropylene, 3 feet high, <u>double fenced</u> - all components	5,280	Linear Feet of Fence	\$1.44	<b>\$7,596</b>

(a) Source of unit prices is RS Means Heavy Construction Cost Data, 24th Annual Edition, 2010 inflated to 2016 dollars using the GDP Chained Price Index from Table 10.1 of The White House Historical Data (<https://www.whitehouse.gov/omb/budget/Historicals/>).

<sup>3</sup> Information regarding Florida's requirements for using, installing and maintaining silt fences is found in "Florida Stormwater Erosion and Sedimentation Control Inspector's Manual", Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008.

### **3.3 Measures for which costs are likely to be less than \$1,000 per construction project**

The following FWC Draft Guidelines are not likely to require a significant amount of time or cost. They are listed as follows.

- Avoid removing or altering levees without checking for den sites.
- Avoid killing or injuring mink when they are observed, especially on or near roads.
- Flag or otherwise mark known Everglades Mink den sites, and avoid disturbance within 100 meters of these areas.
- Allow Everglades mink observed during construction activities to move safely away from an area by pausing activities until the animal has moved away.

### **3.4 Measures for which costs have NOT been estimated**

Due to a lack of information regarding the types of activities that would be affected, the costs of the following measures described in the FWC draft Guidelines cannot be estimated.

- Avoid placement of impermeable surfaces, such as roads or parking lots, near or adjacent to wetlands suitable for Everglades Mink in ways that would allow untreated runoff to go into those wetlands.
- Implement prescribed fire and other appropriate habitat management practices as necessary to maintain the quality of wetland habitats that are potentially suitable for Everglades Mink.
- Avoid channelization of streams and the removal of aquatic vegetation and woody debris in streams or other wetlands as that can reduce the availability of vertebrate and invertebrate (e.g., crayfish) prey.
- Avoid altering hydrology from early spring through early summer when young mink can be killed in flooded dens, or are incapable of traveling to distant wetlands for feeding.
- Identify Everglades mink den sites and avoid disturbance within 100 meters of known den sites, especially during those during times of the year when young mink are most likely to be present in them.
- Minimize disturbance to potentially occupied habitats surrounding project areas with a minimal buffer distance (10-15 feet) outside the specific footprint of planned development activities (i.e., outside the project work zone).

### **3.5 Estimated Cost of Mitigation**

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 impacts to Everglades Mink can require an Incidental Take Permit from the FWC. The FWC may issue an Incidental Take Permit when there is a “scientific or conservation benefit” to the species and upon a showing by the applicant that the permitted activity will not have a negative impact on the survival potential of the species.

Scientific or conservation benefit for the Everglades Mink can be achieved through mitigation in which the landowner undertakes activities or actions that are expected to more than offset the negative Mink impacts of the landowner's activity. The required mitigation can be reduced by implementing some or all of the minimization and avoidance actions identified in the FWC Draft Guidelines.

The State of Florida's Environmental Resource Permitting (ERP) process forms the basis of mitigation for loss or degradation of suitable Everglades Mink habitat. Following the ERP process, the FWC will review the resulting wetland mitigation to assess whether the mitigation meets the definition of "scientific or conservation benefit" for the Everglades Mink.

An ERP is required for development or construction activities to prevent flooding, to protect surface water quality from stormwater pollution, and to protect wetlands and other surface water bodies. The South Florida Water Management District is the agency that issues ERPs in Collier, Miami-Dade and Monroe counties. This District issues ERPs for residential and commercial developments, roadway construction and agriculture; while DEP issues ERPs for power plants, ports, wastewater treatment plants and single-family home projects.

An ERP is needed for:

- Dredging and filling in wetlands or surface waters
- Constructing flood protection facilities
- Providing storm water containment and treatment
- Site grading
- Building dams or reservoirs
- Other activities affecting state waters

When these agencies review an ERP application that would result in wetland impacts, the agency reviewers first identify applicant actions that would eliminate or reduce impacts. If wetland impacts are still expected after elimination and reduction, mitigation will be required.

Under Chapter 373.414, F.A.C. the water management districts may accept the donation of money as mitigation where the donation is specified in a duly noticed environmental creation, preservation, enhancement, or restoration project, endorsed by the governing board.

"Scientific benefit" includes conducting or funding research and monitoring activities per 68A-27.007, F.A.C, Permits and Authorizations for the Take of Florida Endangered and Threatened Species, and may be the sole form of project mitigation.

"Conservation benefit" includes Habitat Protection, Acquisition and/or Management. In the case of the Everglades Mink, selected mitigation sites should be within Collier, Miami-Dade, and Monroe counties that encompass potentially occupied habitats. Preference is given to sites that are adjacent to, or increase the connectivity of, existing conservation lands. Suitable mitigation sites would include the restoration or creation of forested wetlands connected to similar habitat on conservation lands. With few exceptions, ERP mitigation is expected to satisfy the

applicants' responsibilities under rule 68A-27, F.A.C., and associated rule enforcement policies, and no FWC permit would be necessary. However, under certain circumstances, the FWC may require mitigation specific for take of Everglades Mink to ensure a scientific or conservation benefit.

Mitigation management includes restoring the natural hydrology within the historic range of the Everglades Mink and restoring any disturbed ground cover with native species following project completion. Management also includes following the recommended procedures to maintain/ enhance habitat quality for Everglades Mink.

The ERP process can act as a multi-species option for Everglades Mink and other species that use shallow freshwater marshes, swamp forests, coastal marshes, and mangroves. In many cases, mitigation provided through the ERP process may be sufficient to cover take of Everglades Mink and other State-Threatened and/or Federally-protected wetland dependent species.

The incidental take permit applicant has the option of creating his or her own mitigation sites in compliance with State regulations or, more commonly, may purchase mitigation credits from State-approved wetland mitigation banks. The purchase of mitigation credits from approved mitigation banks is thought to be less risky and less costly for companies that are not experts in creating, restoring and/or managing wetland habitats.

One mitigation credit is equivalent to the wetland ecological value associated with the complete restoration of one acre of land. Through the ERP process followed by the applicant, the number of mitigation credits required is determined. The applicant may then shop around for a freshwater forested wetland mitigation bank located in Collier, Miami-Dade and Monroe counties to obtain the best quality and lowest cost mitigation credits required. The credit price paid by the applicant is not routinely collected by government agencies and is considered to be a private matter between the applicant and the mitigation bank. Only proof that the required number of credits has been purchased for the required type of mitigation from a State-approved mitigation bank is provided by the applicant to the DEP or Florida Water Management District.

Fortunately, mitigation credit prices were informally collected by DEP in 2013 and updated in 2015. These prices are only intended to give applicants an idea of what they might pay prior to contacting the mitigation banks themselves. The mitigation prices collected for freshwater forested and herbaceous wetlands is provided in Table 3.4. The mitigation price per credit for freshwater forested wetlands ranges from \$35,000 to \$172,000. The price generally reflects the cost of land, the cost of creating, restoring and managing the habitats, the habitat quality of the mitigation bank, and the demand for and supply of freshwater forested and herbaceous wetlands.

**Table 3.4 Mitigation Price Quotes from Selected Wetland Mitigation Banks in Florida, 2015**

Name of Bank	County	Freshwater	
		Forested	Herbaceous
		Price Per Credit	
North Golden Gate Estates	Collier	\$34,560	Not available
Panther Island	Collier	\$61,000	\$61,000
Myakka / Boran Ranch	Desoto	\$149,000	\$118,000
Peace River	Hardee	\$172,000	\$125,000
Big Cypress	Hendry	\$60,000	\$60,000
Corkscrew Regional	Lee	\$95,000	\$95,000
Little Pine Island	Lee	\$125,000	\$82,000
Hatchineha Ranch Mitigation Bank	Polk	\$145,000	\$145,000
Average		\$105,195	\$98,000

Source: Florida Department of Environmental Protection, informal survey of mitigation banks in 2013.

Mitigation for Everglades Mink impacts would likely already be required by landowners planning to develop land on or near freshwater wetlands where mink are expected to roam. Therefore, the marginal cost of the FWC Draft Guidelines relative to what the landowner would need to due under Florida's ERP regulations is expected to be \$0.

#### 4.0 Estimated Projection of Five Year Cost

It is very unlikely that a landowner would incur costs associated with the Draft Species Conservation Measures and Permitting Guidelines of the Everglades Mink because its protection is provided by other regulations protecting the types of wetlands that are mink habitat. In addition, an Everglades Mink survey that detected no mink would not avoid the need for a take permit. Therefore, the five year cost projection is \$0. A summary of the unit costs associated with the Everglades Mink draft measures is provided in Table 4.1.

**Table 4-1 Estimated Range of Costs Associated with the Draft Species Conservation Measures and Permitting Guidelines for the Everglades Mink**

Measure	Unit	Cost Per Unit	
		Low Estimate	High Estimate
Survey: Camera-based	Acre	\$785	\$12,300
Survey: Night-time Spotlight or Daytime Observational			
Site Surveyed is at least 10 acres	Acre	\$450	\$1,300
Site Surveyed is less than 10 acres	Acre	\$1,300	\$12,700
Install Culvert under road during construction	Culvert	\$11,800	\$20,700
Post Motorist Warning Sign	Sign	\$800	\$1,500
Install Silt Fencing around construction activities	Site	\$1,800	\$7,600
Mitigation – Forested Freshwater Wetland Bank	Mitigation Acre	\$35,000	\$172,000

A summary of the unit cost range and total cost of the activities described in the FWC Draft Guidelines is provided in Table 4-2. If one of each of these activities were required of a landowner, then the total cost to the landowner is estimated to range from \$15,000 to \$42,500 per site.

**Table 4-2 Estimated Range of Costs Associated with the Activities Described in the  
Draft Species Conservation Measures and Permitting Guidelines for the Everglades Mink**

Measure	Unit	Cost Per Unit	
		Low Estimate	High Estimate
Surveys – All Types: Camera-based	Acre	\$450	\$12,700
Install Culvert under road during construction	Culvert	\$11,800	\$20,700
Post Motorist Warning Sign	Sign	\$800	\$1,500
Install Silt Fencing around construction activities	Site	\$1,800	\$7,600
<b>Total Cost if Each Activity Required</b>		<b>\$14,850</b>	<b>\$42,500</b>