

## **6.F.1 FISH, WILDLIFE, AND PLANTS**

The Detailed Study Area was evaluated for the potential for occurrences of Federal- and state-protected plant and animal species, and their respective habitats. Literature searches and field reviews were conducted to identify the potential for occurrence of protected species and designated Critical Habitat that may occur within the Detailed Study Area. Field surveys involved visual examination of all representative habitat types located within the Detailed Study Area, as well as underwater observations requested by the NMFS to identify submerged aquatic vegetation species (SAVs). No designated Critical Habitat is located within the Detailed Study Area.

The potential for the occurrence or presence of ten Federally-listed animal species and one Federally-listed plant species was assessed, based on literature searches, field reviews, and informal consultation with the U.S. Fish and Wildlife Service (USFWS) and the NMFS. The potential for occurrence or presence of 17 animal species and 35 plant species listed by the Florida Fish and Wildlife Conservation Commission (FFWCC) was also reviewed.

Lists of these species were provided to state and Federal resource agencies at the August 10, 2006 field meeting. A teleconference with the USFWS occurred on August 18, 2006 during which the Federal list and the FAA's affect determinations were reviewed. The USFWS generally concurred with the FAA's affect determinations identified in **Table 6.F.1-1, Summary of Potential Effects on Protected Wildlife Species For The Runway Development Alternatives**, and **Table 6.F.1-2, Summary of Potential Effects on Protected Plants For The Runway Development Alternatives**. Further consultation with the USFWS and NMFS occurred after issuance of the Draft EIS (March 2007) and those coordination letters are included in Appendix M, *Biological Resources*. All species included on these lists have the potential to, or have historically occurred within the Detailed Study Area. The FAA's determination of effect for Federal- and state-listed species is provided in the following sections.

The following tables provide a summary of the Federal- and state-listed fish, wildlife, and plants that may occur within the Detailed Study Area and the effect the runway development alternatives may have on them. A more detailed description of the potential impacts to each species or their habitat is presented in the following sections.

**Table 6.F.1-1  
SUMMARY OF POTENTIAL EFFECTS ON PROTECTED WILDLIFE SPECIES FOR  
THE RUNWAY DEVELOPMENT ALTERNATIVES  
Fort Lauderdale-Hollywood International Airport**

Species		Designated Status <sup>A</sup>		Probability of Occurrence	Likelihood of Affect
Common Name	Scientific Name	Federal	State		
<b>FISH</b>					
Mangrove rivulus	<i>Rivulus marmoratus</i>	-	SSC	Low	No effect
Smalltooth sawfish	<i>Pristis pectinata</i>	E	Prohibited <sup>B</sup>	Low-Medium	No effect/May affect-Is not likely to adversely affect <sup>b</sup>
<b>REPTILES AND AMPHIBIANS</b>					
American alligator	<i>Alligator mississippiensis</i>	T (S/A)	SSC	Medium	No effect
American crocodile	<i>Crocodylus acutus</i>	E	E	Low-Medium	No effect
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T	T	Low	No effect
Gopher tortoise	<i>Gopherus polyphemus</i>	-	T	Low	No effect
Gopher frog	<i>Rana capito</i>	-	SSC	Low	No effect
<b>BIRDS</b>					
American oystercatcher	<i>Hamaetopus palliates</i>	-	SSC	Low	No effect
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	T <sup>C</sup> (to be delisted)	Low	No effect
Black skimmer	<i>Rhynchops niger</i>	-	SSC	Low	No effect
Brown pelican	<i>Pelecanus occidentalis</i>	-	SSC	Low	No effect
Florida burrowing owl	<i>Athene cunicularias</i>	-	SSC	Low-Medium	No effect
Florida sandhill crane	<i>Grus canadensis pratensis</i>	-	T	Low	No effect
Kirtland's warbler	<i>Dendroica kirtlandii</i>	E	E	Low	No effect
Least tern	<i>Sterna antillarum</i>	-	T	Low	No effect
Limpkin	<i>Aramus guarana</i>	-	SSC	Low	No effect
Little blue heron	<i>Egretta caerulea</i>	-	SSC	Medium-High	No effect
Peregrine falcon	<i>Falco peregrinus</i>	-	E <sup>C</sup> (undergoing status reevaluation)	Low	No effect
Piping plover	<i>Charadrius melodus</i>	T	T	Low	No effect
Roseate spoonbill	<i>Ajaia ajaja</i>	-	SSC	Low	No effect
Snail kite	<i>Rostrhamus sociabilis plubeus</i>	E	E	Low	No effect
Snowy egret	<i>Egretta thula</i>	-	SSC	High	No effect

**Table 6.F.1-1, Continued  
SUMMARY OF POTENTIAL EFFECTS ON PROTECTED WILDLIFE SPECIES FOR  
THE RUNWAY DEVELOPMENT ALTERNATIVES  
Fort Lauderdale-Hollywood International Airport**

Species		Designated Status <sup>A</sup>		Probability of Occurrence	Likelihood of Affect
Common Name	Scientific Name	Federal	State		
<b>BIRDS (continued)</b>					
Southeastern American kestrel	<i>Falco sparverius paulus</i>	-	T	Low-Medium	No effect
Tricolored heron	<i>Egretta tricolor</i>	-	SSC	High	No effect
White ibis	<i>Eudocimus albus</i>	-	SSC	High	No effect
Wood stork	<i>Mycteria americana</i>	E	E	Medium	May affect-Is not likely to adversely affect
<b>MAMMALS</b>					
West Indian Manatee	<i>Trichechus manatus</i>	E	E <sup>C</sup> (to be reclassified to T)	Medium	No effect/May affect-Is not likely to adversely affect <sup>C</sup>

*Notes:*

- A. SSC = Species of Special Concern; T = Threatened; E = Endangered; T(S/A) = listed as Similar in Appearance to a Threatened Taxon (American Crocodile); all statuses were verified July 2006 with Federal Register 50 CFR Part 17 and Florida Administrative Code Rules 68A-27.003, 68A-27.004 and 68A-27.005.
- B. The smalltooth sawfish is protected by Florida Administrative Code Rule 68B-44.008 as a "prohibited" species. For the smalltooth sawfish, a Federally-listed species, a "no effect" determination was made if an alternative had no impact to mangrove wetlands. A "may affect/not likely to adversely affect" determination was made if an alternative impacted mangrove wetlands.
- C. Reclassification will not occur until FFWCC approves a management plan for each species. Management plans have been completed for the bald eagle (September 2007), and West Indian manatee (April 2007), but both are still undergoing finalization and have yet to receive FFWCC final approval. Approval for the bald eagle management plan is expected in 2008. Finalization of the West Indian Manatee management plan, as well as the peregrine falcon reevaluation, is ongoing.
- For the West Indian Manatee, a Federally-listed species, a "no effect" determination was made if an alternative did not have the potential to impact the Dania Cut-Off Canal. A "may affect/not likely to adversely affect" determination was made if an alternative had the potential to impact the Dania Cut-Off Canal.

**Table 6.F.1-2  
SUMMARY OF POTENTIAL EFFECTS ON PROTECTED PLANTS FOR THE  
RUNWAY DEVELOPMENT ALTERNATIVES  
Fort Lauderdale-Hollywood International Airport**

Species		Designated Status <sup>A</sup>		Probability of Occurrence	Likelihood of Affect
Common Name	Scientific Name	Federal	State		
<b>DRY HABITATS</b>					
Largeflower false rosemary	<i>Conradina grandiflora</i>	-	T	Low	No effect
Curtiss' hoarypea	<i>Tephrosia angustissima</i> var. <i>curtissii</i>	-	E	Low	No effect
<b>MOIST HABITATS</b>					
Marsh's dutchman's-pipe	<i>Aristolochia pentandra</i>	-	E	Low	No effect
Satinleaf	<i>Chrysophyllum oliviforme</i>	-	T	Low	No effect
Florida silver palm	<i>Coccothrinax argentata</i>	-	T	Low	No effect
Guiana plum	<i>Drypetes lateriflora</i>	-	T	Low	No effect
Skyblue clustervine	<i>Jacquemontia pentanthos</i>	-	E	Low	No effect
Twinberry; Simpson's stopper	<i>Myrcianthes fragrans</i>	-	T	Low	No effect
Giant sword fern	<i>Nephrolepis biserrata</i>	-	T	Low	No effect
Pineland passionflower	<i>Passiflora pallens</i>	-	E	Low	No effect
Florida Keys blackbead	<i>Pithecellobium keyense</i>	-	T	Low	No effect
Leafless-beaked ladies'-tresses	<i>Sacola lanceolata</i> (syn. <i>Stenorrhynchos lanceolatus</i> )	-	T	Low	No effect
Lace-lip ladies tresses	<i>Spiranthes laciniata</i>	-	T	Low	No effect
Abrupt-tip maiden fern	<i>Thelypteris augescens</i>	-	T	Low	No effect
Hoopvine	<i>Trichostigma octandrum</i>	-	E	Low	No effect
<b>MOIST OR WET HABITATS</b>					
Many-flowered airplant	<i>Catopsis floribunda</i>	-	E	Low	No effect
Nodding clubmoss	<i>Lycopodium cernuum</i>	-	C	Low	No effect
Hand fern	<i>Ophioglossum palmatum</i>	-	E	Low	No effect
Cinnamon fern	<i>Osmunda cinnamomea</i>	-	C	Low	No effect
Royal fern	<i>Osmunda regalis</i>	-	C	Low	No effect
Star-scaled fern	<i>Pleopeltis astrolepis</i>	-	E	Low	No effect
Southern matchsticks	<i>Phyla stoechadifolia</i>	-	E	Low	No effect
Yellow-flowered butterwort	<i>Pinguicula lutea</i>	-	T	Low	No effect
Florida clamshell orchid	<i>Prosthechea cochleata</i>	-	E	Low	No effect
Swamp plume polypody	<i>Polypodium ptilodon</i> (syn. <i>Pecluma ptilodon</i> )	-	E	Low	No effect

**Table 6.F.1-2, Continued  
SUMMARY OF POTENTIAL EFFECTS ON PROTECTED PLANTS FOR THE  
RUNWAY DEVELOPMENT ALTERNATIVES  
Fort Lauderdale-Hollywood International Airport**

Species		Designated Status <sup>A</sup>		Probability of Occurrence	Likelihood of Affect
Common Name	Scientific Name	Federal	State		
<b>MOIST OR WET HABITATS (continued)</b>					
Florida royal palm	<i>Roystonea regia</i> (syn. <i>Roystonea elata</i> )	-	E	Low	No effect
Cardinal airplant; stiff-leaved wild pine	<i>Tillandsia fasciculata</i> var. <i>densispica</i>	-	E	Low	No effect
Giant wild pine	<i>Tillandsia utriculata</i>	-	E	Low	No effect
Soft-leaved wild pine	<i>Tillandsia valenzuelana</i>	-	T	Low	No effect
<b>WET HABITATS</b>					
Golden leather fern	<i>Acrostichum aureum</i>	-	T	Low-Medium	No effect
Brown-hair comb fern	<i>Ctenitis submarginalis</i>	-	E	Low	No effect
Florida butterfly orchid	<i>Encyclia tampensis</i>	-	C	Low	No effect
Dingy-flowered star orchid	<i>Epidendrum anceps</i>	-	E	Low	No effect
Johnson's seagrass	<i>Halophila johnsonii</i>	T	-	Low-Medium	No effect
<b>ALL MOISTURE REGIMES</b>					
Inflated wild pine	<i>Tillandsia balbisiana</i>	-	T	Low	No effect
Twisted air plant	<i>Tillandsia flexuosa</i>	-	T	Low	No effect

*Notes:*

- A. T = Threatened; E = Endangered; all statuses were verified with Federal Register 50 CFR Part 17 and Florida Administrative Code Rules 5B-40.0055 (amended 4-22-04).
- B. Sources for habitat information: Coile, Nancy. 2000. Notes on Florida's Endangered and Threatened Plants. Florida Dept. of Agriculture and Consumer Services. Bureau of Entomology, Nematology, and Plant Pathology – Botany Section. Contribution No. 38, 3rd edition, FNAI online field guide to the Rare Plants and Animals of Florida: <http://www.fnai.org/FieldGuide>, USF Atlas of Vascular Plants. USF Institute for Systematic Botany: <http://www.plantatlas.usf.edu>, record of vouchered specimens of listed plants for Broward County.

The analysis necessary for a Biological Assessment for the runway development alternatives is described in Sections 6.F.1.1 and 6.F.1.2. As a result of agency coordination, the FAA prepared a Biological Assessment in accordance with the Endangered Species Act (ESA) Section 7 for species regulated by the NMFS. This document and agency coordination letters are included in Appendix M, *Biological Resources*.

**6.F.1.1 Federally-Listed Species**

**6.F.1.1.1 FISH**

**Smalltooth sawfish (*Pristis pectinata*):** The smalltooth sawfish is listed as Endangered by the NMFS, and as a protected species by the FFWCC. In general, the smalltooth sawfish inhabits shallow coastal waters and can be found in sheltered bays, on shallow banks, in mangrove edges, in seagrass beds, and in

estuaries or river mouths, and is most often reported on the west coast of Florida and the Florida Bay. It has been observed in a tidally-influenced canal (i.e., the Florida Power and Light (FPL) Port Everglades power plant discharge canal) near the Detailed Study Area. The Dania Cut-Off Canal is located approximately one mile to the south of that location and represents habitat potentially used by the sawfish. As a result, the likelihood of occurrence of this species within the Detailed Study Area is considered to be low to medium. The Dania Cut-Off Canal and the mangrove areas that are hydrologically connected to the Dania Cut-Off Canal, would be the only habitat potentially utilized by the smalltooth sawfish.

To the west, Alternative B5 would have some impact on the bottom of the triangular waterbody that is contiguous to the Dania Cut-Off Canal. This is due to the installation of one approach light tower and an elevated walkway to service the light tower. A field survey conducted within that waterbody found the water depth to be 25 feet and the bottom of the waterbody to be devoid of any significant aquatic resource. For that reason, impacts resulting from installation of the light tower or its elevated walkway would be insignificant. The tower structure could provide vertical habitat within the waterbody where it currently does not exist. It is anticipated that a concrete pole three feet in diameter would be driven into the substrate. Assuming an impact equivalent to a six-foot diameter pole, it was estimated that 28.3 square feet (0.0006 acres) of barren substrate would be disrupted. The remainder of the light towers under this alternative would be placed in uplands. Those alternatives that require installation of cables under the Dania Cut-Off Canal (Alternatives B1, B1b, B1c, B4, B5, D1, and D2) would have no impact on aquatic habitat. Installation would be done using horizontal drilling or a similar technique, and would have no effect on the canal bottom or the triangular waterbody potentially used by the smalltooth sawfish.

Alternatives B1, B1b, B1c, B5, and D1 would result in potential impacts to mangrove habitat that is hydrologically connected to the Dania Cut-Off Canal (Wetlands 17c, W-25a, or W-25b). However, impacts to these wetlands would not result in any significant adverse effect to the smalltooth sawfish. Field surveys determined that these mangrove areas do not maintain sufficient water levels and have too much vegetative ground cover and debris to support smalltooth sawfish. In addition, W-17c, while partially mangrove, is predominated by Brazilian pepper and is severed from regular tidal connection, which would make it inaccessible to this species. It is highly unlikely that smalltooth sawfish use these areas for foraging and/or nursery habitat for juveniles.

High quality habitat for the smalltooth sawfish exists in John U. Lloyd State Park and West Lake Park. There are 288 acres of mangrove habitat in John U. Lloyd State Park and 990+ acres in West Lake Park. Both of these parks have higher-quality smalltooth sawfish habitat than the wetlands that would be potentially impacted from the runway development alternatives. The potential impact to hydrologically-connected mangrove wetlands for Alternatives B1b, B1c, or D1, would be, at most, 3.05 acres.<sup>1</sup>

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<sup>1</sup> Only Alternatives B1b, B1c, and D1 would potentially impact hydrologically-connected mangrove wetlands.

Proposed conceptual mitigation to offset the potential wetland loss is discussed in Section 6.J, *Conceptual Mitigation Measures Considered in the Draft EIS*.

Alternative B5 is the only runway development alternative that involves in-water construction due to the installation of an approach light tower. All in-water construction would follow NMFS smalltooth sawfish construction conditions (NMFS, Revised: March 23, 2006).<sup>2</sup> The FAA has reviewed the Draft Recovery Plan for the smalltooth sawfish, dated August, 2006, which was available for public review and comment from August 2006 through October 2006. This Plan is expected to become final in 2008. After the Recovery Plan is finalized, the FAA would ensure that the selected alternative would comply with the applicable components of the Recovery Plan.

The FAA has determined that the potential effects to the smalltooth sawfish would be insignificant. This determination is based on the minimal effect, if any, that the alternatives would have on the foraging and spawning behavior of the sawfish due to the limited areas of impacts, the low quality of the affected mangroves relative to habitat in surrounding areas, the use of NMFS's special construction conditions to avoid interaction with the species during implementation, and the proposed conceptual mitigation for unavoidable wetland impacts.

Because the potential effects to the sawfish would be considered insignificant and never reach a level of a "take" for the species, *implementation of Alternatives B1, B1b, B1c, B5, and D1 would result in a "May Affect-Is Not Likely to Adversely Affect" determination on the smalltooth sawfish. Alternatives B4, C1, and D2 would not impact aquatic or wetland resources that may provide habitat for the smalltooth sawfish and would result in a "No Effect" determination on the smalltooth sawfish.*

#### **6.F.1.1.2 REPTILES AND AMPHIBIANS**

**American alligator (*Alligator mississippiensis*):** The American alligator is listed by the USFWS as Threatened due to Similarity of Appearance to the American crocodile, and as a Species of Special Concern by the FFWCC. This large reptile is found throughout Florida in nearly every wetland habitat type with open water. American alligators are found in swamps, marshes, streams, rivers, lakes, and in coastal brackish water habitats. Due to the extent of its range and habitat, the probability of this species occurring within the Detailed Study Area is medium. Reservoirs, canals, and other waterbodies including stormwater management systems can provide habitat for the alligator. No net loss of available alligator habitat would result from any of the runway development alternatives. Implementation of the *runway development alternatives would result in a "No Effect" determination on the American alligator.*

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<sup>2</sup> National Marine Fisheries Service, *Sea Turtle and Smalltooth Sawfish Construction Conditions* (Revised: March 23, 2006). A copy of this document is provided in this EIS in Appendix M.1 of Appendix M, *Biological Resources*.

**American crocodile (*Crocodylus acutus*):** The American crocodile is listed as Endangered by both the USFWS and the FFWCC. The American crocodile inhabits freshwater and brackish water coastal habitats such as the saltwater sections of rivers, coastal lagoons, and mangrove swamps. Its designated Critical Habitat is located far south of FLL within southern Miami-Dade County and northern Monroe County (50 CFR 17.95(c)).<sup>3</sup> However, populations are known to occur in freshwater areas located well inland, including a number of reservoirs. This species is known to inhabit residential communities adjacent to West Lake Park. Limited suitable wetland habitats including canals, waterways, and forested mangrove wetlands exist within the Detailed Study. Therefore, the potential for occurrence of the American crocodile is ranked as low to medium. No net loss of available crocodile habitat would result from implementation of the runway development alternatives. Implementation of the *runway development alternatives would result in a "No Effect" determination on the American crocodile.*

**Eastern indigo snake (*Drymarchon corais couperi*):** The Eastern indigo snake is listed as Threatened by both the USFWS and the FFWCC. This snake is found in a variety of habitats and, although it requires very large tracts of land to survive, it may be found within small pockets of undisturbed habitat within residential areas. Due to the urban character of the Detailed Study Area, the occurrence of this species is highly unlikely. Implementation of the *runway development alternatives would result in a "No Effect" determination on the Eastern indigo snake.*

#### **6.F.1.1.3 BIRDS**

**Bald eagle (*Haliaeetus leucocephalus*):** The bald eagle is listed as Threatened by both the USFWS and the FFWCC, but may soon be reclassified by the FFWCC pending development and approval of a management plan being developed for the species. Bald eagles are considered a water-dependent species typically found near estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats. Their distribution is influenced by the availability of suitable nest and perch sites near large, open waterbodies, typically with high ratio of water-to-land edge. As of 2004, no bald eagle nests have been recorded by the FFWCC within the Study Area or Detailed Study Area. The Detailed Study Area lacks the habitat suitable for bald eagle nesting. The potential for occurrence of this species is ranked as low due to the availability of waterbodies on and in the immediate vicinity of FLL that could provide foraging/loafing opportunities for transient eagles. Implementation of the *runway development alternatives would result in a "No Effect" determination on the bald eagle.*

**Kirtland's warbler (*Dendroica kirtlandii*):** The Kirtland's warbler is listed as Endangered by both the USFWS and FFWCC. The Kirtland's warbler breeds within 13 counties of upper and lower Michigan and reportedly winters in the Bahamas. Although the known wintering islands in the Bahamas are relatively close to Florida, Kirtland's warblers have never been reported wintering in Florida. Those birds, which occasionally reach the U.S. mainland, have most likely been blown off course

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<sup>3</sup> U.S. Code of Federal Regulations 50 CFR Part 17.95(a). Title 50--*Wildlife and Fisheries*, Part 17--*Endangered and Threatened Wildlife and Plants*. Paragraph 95(a), *Critical habitat—fish and wildlife. Mammals.*

due to storms during migration. Kirtland warblers have been observed in Florida between early September and late November in Miami-Dade, Escambia, Collier, Martin, Palm Beach, St. Lucie, St. John's, and Wakulla counties. It is highly unlikely that the Kirtland's warbler would occur in the Detailed Study Area, given its extreme rarity in Florida and lack of recorded observations in Broward County. Implementation of the *runway development alternatives would result in a "No Effect" determination on the Kirtland's warbler.*

**Piping plover (*Charadrius melodus*):** The piping plover is listed as Threatened by both the USFWS and the FFWCC. The piping plover is a small shorebird that winters in Florida along barrier island beaches and spoil islands, mudflats, and sandflats. On the Atlantic Coast, piping plovers are most often found foraging in areas adjacent to large inlets and passes. Suitable wintering habitat does not exist within the Detailed Study Area.<sup>4</sup> In addition, piping plovers are believed to no longer winter in Broward County.<sup>5 6</sup> Implementation of the *runway development alternatives would result in a "No Effect" determination on the piping plover.*

**Snail kite (*Rostrhamus sociabilis plubeus*):** The snail kite is listed as Endangered by the USFSW and the FFWCC. Snail kite habitat consists of flooded freshwater marshes and shallow vegetated edges of lakes (natural and man-made) where apple snails, the primary food source for the snail kite, can be found. Nearly continuous flooding of wetlands for more than one year is needed to support apple snail populations required to sustain foraging by the snail kite.

With the exception of the dredged lakes to the west of Interstate-95, there are no freshwater marshes in the Detailed Study Area that provide the necessary sustained flooding to support the apple snail. This lack of apple snails would be expected to limit the snail kite's potential for occurrence. Therefore, the likelihood to affect this species is ranked as low. Implementation of the *runway development alternatives would result in a "No Effect" determination on the snail kite.*

**Wood stork (*Mycteria americana*):** The wood stork is listed as Endangered by both the USFWS and the FFWCC. The wood stork uses freshwater and estuarine habitats for nesting, roosting, and foraging. Because of their specialized feeding behavior, wood storks forage most effectively in shallow-water areas with highly-concentrated prey. Typical foraging sites include freshwater marshes and ponds; shallow, seasonally-flooded roadside or agricultural ditches; narrow tidal creeks or shallow tidal pools; managed impoundments; and depressions in cypress heads and swamp sloughs. Wood storks construct their nests in medium to tall trees in stands located in swamps or on islands surrounded by relatively-broad expanses of open water. During a November 2004 site visit to Fort Lauderdale-Hollywood International Airport (FLL), a wood stork was observed foraging within a swale along U.S. Highway 1 within the Detailed Study Area.

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<sup>4</sup> U.S. Code of Federal Regulations 50 CFR 17.95(a). Title 50--*Wildlife and Fisheries*, Part 17--*Endangered and Threatened Wildlife and Plants*. Paragraph 95(a) *Critical habitat—fish and wildlife. Mammals.*

<sup>5</sup> U.S. Fish and Wildlife Service. 1988. *Great Lakes and Northern Great Plains Piping Plover Recover Plan*. USFWS, Twin Cities, MI.

<sup>6</sup> U.S. Fish and Wildlife Service. 1995. *Piping Plover, Atlantic coast population*. Revised recovery plan. USFWS, Hadley, MA.

The closest wood stork nesting area, as determined by the USFWS, is located approximately 14 miles northwest of FLL.<sup>7</sup> Core Foraging Areas (CFAs) have been determined to be associated with nesting colonies for wood storks. A CFA, as defined by the USFWS, is an area approximately 18.6 miles in diameter centered on the nesting colony.<sup>8</sup> See Appendix M for an exhibit depicting the location of the wood stork CFA closest to FLL. The limits of disturbance for the runway development alternatives is located within the CFA of this wood stork nesting colony, and therefore, could potentially reduce foraging opportunities for the wood stork.

Based on coordination with the USFWS, the FAA reviewed the USFWS' *Draft Supplemental Habitat Management Guidelines for the Wood Stork in the South Florida Ecological Service's Consultation Area*.<sup>9</sup> The FAA will consider the USFWS-approved wood stork methodology in the analysis during the permitting phase of the project to ensure adequate mitigation is achieved for unavoidable impacts to wood stork foraging habitat that could result from the selected alternative.

The FAA has determined that implementation of the *runway development alternatives would result in a "May Affect-Is Not Likely to Adversely Affect" determination for the wood stork*. The USFWS has concurred with this determination.<sup>10</sup>

#### **6.F.1.1.4 MAMMALS**

**West Indian manatee (*Trichechus manatus*):** The West Indian manatee is listed as Endangered by both the USFWS and the FFWCC, but may be reclassified soon by the FFWCC to Threatened, pending USFWS approval of a state management plan. Manatees occur in both freshwater and saltwater habitats within tropical Florida. The distribution of manatees is related to proximity to warm water during cold weather, the availability of aquatic vegetation, and location of fresh water sources. This aquatic mammal is strictly herbivorous, feeding on both freshwater and marine vegetation. They favor channels that are six feet or more in depth, and prefer to follow established travel routes. While Critical Habitat has been designated for the manatee, none exists within Broward County.<sup>11</sup> The Dania

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<sup>7</sup> US Fish and Wildlife Service. Letter to the FAA dated December 20, 2007 regarding affect determinations for the Airport Sponsor's Proposed Action for species under USFWS jurisdiction, 2007.

<sup>8</sup> *DRAFT Standard Local Operating Procedures for Endangered Species*, Wood Storks, USFWS South Florida Ecological Services Office, July 28, 2002 (see Appendix M, *Biological Resources*).

<sup>9</sup> *Draft Supplemental Habitat Management Guidelines for the Wood Stork in the South Florida Ecological Services Consultation Area*. USFWS, 2002.

<sup>10</sup> Letter from the U.S. Department of the Interior, Fish and Wildlife Service, dated January 31, 2008, to Virginia Lane, FAA Orlando Airports District Office. Service Federal Activity Code: 41420-2007-0701.

<sup>11</sup> U.S. Code of Federal Regulations 50 CFR 17.95(a). Title 50--*Wildlife and Fisheries*, Part 17--*Endangered and Threatened Wildlife and Plants*. Paragraph 95(a), *Critical habitat—fish and wildlife. Mammals*.

Cut-Off Canal is a designated Manatee Protection Zone in Broward County,<sup>12</sup> which requires the establishment and posting of a year-round, slow-speed zone for the operation of motorboats to further protect the manatee.

Manatees have been sighted in the Dania Cut-Off Canal, as well as the shallow waters of West Lake, located approximately 1.5 miles southeast of the Detailed Study Area. Based on the information known about the manatee in Broward County and its use of the Dania Cut-Off Canal, the potential for occurrence is ranked as medium.

For the runway development alternatives, the installation of cables under the Dania Cut-Off Canal would not affect aquatic habitat. With implementation of Alternative B5, installation of an approach light tower within the triangular basin adjacent to the Dania-Cut-Off Canal would have minimal impacts on aquatic habitat (as described under the smalltooth sawfish).

The FAA has reviewed the *Florida Manatee Recovery Plan*, prepared by the USFWS.<sup>13</sup> The FAA would ensure that construction of the selected alternative would comply with the Standard Manatee Conditions for In-Water Work, also contained in the July 2005 U.S. Army Corps of Engineers (USACE) *Effect Determination Key for the Manatee in Florida*.<sup>14</sup> When evaluating all of the runway development alternatives using the July 2005 USACE *Effect Determination Key for the Manatee in Florida*, the determination "May Affect but Is Not Likely to Adversely Affect" was found to be appropriate for all alternatives except for Alternative C1, which will not impact any aquatic habitat potentially used by the manatee and would result in a "No Effect" determination. The USFWS has concurred with this determination.<sup>15</sup>

#### **6.F.1.1.5 PLANTS**

**Johnson's seagrass (*Halophila johnsonii*):** Johnson's seagrass is listed as Threatened by USFWS under the ESA. The distribution of Johnson's seagrass is very limited along the east coast of Florida from central Biscayne Bay to Sebastian Inlet, with the largest patches documented inside Lake Worth Inlet. Its southernmost distribution is reported to be in the vicinity of Virginia Key in Biscayne Bay. This species has been found in coarse sand and muddy substrates and in turbid waters and high tidal currents. While Critical Habitat has been designated for the Johnson's seagrass, none exists within Broward County.<sup>16</sup>

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<sup>12</sup> Florida Administrative Code 68C-22.010(1)(d)11. Manatees. Broward County Zones. SLOW SPEED ZONE (Year-round). 11. Dania Cut-off Canal Area — "Those waters of Dania Cut-off Canal westerly of the general contour of the westerly shoreline of the Atlantic Intracoastal Waterway, and easterly of the northerly extension of the centerline of S.W. 33<sup>rd</sup> Avenue; . . ."

<sup>13</sup> *Florida Manatee Recovery Plan (Trichechus manatus latirostris); Third Revision*. U.S. Fish and Wildlife Service, Southeast Region; October 30, 2001.

<sup>14</sup> The U.S. Army Corps of Engineers, Jacksonville District, and the State of Florida. *Effect Determination Key for the Manatee in Florida*, July 2005.

<sup>15</sup> Letter from the U.S. Department of the Interior, Fish and Wildlife Service, dated January 31, 2008, to Virginia Lane, FAA Orlando Airports District Office. Service Federal Activity Code: 41420-2007-0701.

<sup>16</sup> 50 CFR 226.213 ; Federal Register, Vol. 65, No. 66, Wednesday, April 5, 2000; *Designated Critical Habitat: Critical Habitat for the Johnson's Seagrass; [referenced in FAC 62-341.428(4)(i)]*.

Within the Detailed Study Area, this plant is known to occur within the Intracoastal Waterway and Whiskey Creek. To date, this species has not been observed within the Dania Cut-Off Canal, and it is believed that the habitat and salinities within the canal may not be suitable for this species. For the runway development alternatives, the installation of cables under the Dania Cut-Off Canal would not affect aquatic habitat. With implementation of Alternative B5, installation of an approach light tower off the west end of Runway 9R/27L would be required within the triangular waterbody adjacent to the Dania-Cut-Off Canal. The installation of this light tower would have minimal impact on aquatic habitat (as described under the smalltooth sawfish).

The FAA has reviewed the Johnson's Seagrass Recovery Plan,<sup>17</sup> dated September 2002. The FAA would consider the implementation of the applicable components of the Recovery Plan.

The FAA has determined that the *implementation of the runway development alternatives would result in a "No Effect" determination on Johnson's seagrass.*

### **6.F.1.2 State-Listed Species**

Of the 27 animals listed in Table 6.F.1-1, *Summary Of Potential Effects On Protected Wildlife Species For the Runway Development Alternatives*, and Table 6.F.1-2, *Summary of Potential Effects on Protected Plants For the Runway Development Alternatives*, 17 animals are listed by the FFWCC as Endangered, Threatened, or Species of Special Concern that are not covered or protected by the Federal ESA. They are offered some limited protection under the Florida Administrative Code (FAC) 68A-27, *Rules Relating to Endangered or Threatened Species*.

The 17 state-listed species that are described in this EIS analysis as potentially or historically occurring within the Detailed Study Area are discussed individually in detail below. Also refer to Table 6.F.1-1, *Summary of Potential Effects on Protected Wildlife Species*, and Table 6.F.1-2, *Summary of Potential Effects on Protected Plants*.

#### **6.F.1.2.1 FISH**

**Mangrove rivulus (*Rivulus marmoratus*):** The rivulus is designated as a Species of Special Concern by the FFWCC. This small fish is often not discovered during conventional fish surveys conducted in mangrove forest habitat. The mangrove rivulus is found in and adjacent to mangrove swamps and high salt marsh areas, usually over marl substrates where aquatic vegetation is sparse and detritus is common. Preferred habitat includes stagnant pools with low oxygen and a range of salinities from zero to 32 parts per thousand. The potential for occurrence of this species in the Detailed Study Area is ranked as low, due to the lack of suitable habitat, including tidally-influenced mangrove forests and ditches associated with the Dania Cut-Off Canal.

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<sup>17</sup> *Final Recovery Plan for Johnson's Seagrass (Halophila johnsonii Eiseman)*; prepared for the National Marine Fisheries Service, National Oceanic and Atmospheric Administration.

The impacts resulting from construction of the runway development alternatives are expected to be minimal and limited to installation of the runway lighting system and construction of associated access roads. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the mangrove rivulus.*

#### **6.F.1.2.2 REPTILES AND AMPHIBIANS**

**Gopher tortoise (*Gopherus polyphemus*):** The gopher tortoise is designated as a Threatened Species by the FFWCC. Gopher tortoises live in subterranean burrows in dry upland habitats; primarily longleaf pine sandhills, xeric oak hammocks, scrub, pine flatwoods, dry prairies, and coastal dunes. Tortoises can live in man-made environments such as pastures, old fields, and grassy roadsides. The habitat must have well-drained sandy soils for digging burrows, an availability of herbaceous food plants, and open sunny areas for nesting and basking.

In general, South Florida does not have the sandy, well-drained soils preferred by gopher tortoises. Limestone near the surface prevents excavation of burrows and the water table is typically high even within uplands. Tortoises in South Florida tend to select spoil piles or berms from ditch dredging for burrow placement. The Detailed Study Area contains limited suitable habitat for the gopher tortoise, and no tortoises or tortoise burrows have been observed during field surveys. Therefore, its potential for occurrence is ranked as low. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the gopher tortoise.*

**Gopher frog (*Rana capito*):** The gopher frog is listed as a Species of Special Concern by the FFWCC. This frog is found in association with the gopher tortoise. This species prefers dry, sandy uplands; chiefly sandhill and scrub habitats including isolated wetlands or large ponds within approximately one mile of the upland habitat. Gopher frogs prefer to breed in seasonally flooded temporary ponds. The gopher frog has a low potential for occurrence in and around FLL due to the limited availability of suitable habitat (primarily a lack of dry, sandy uplands). The lack of gopher tortoise burrows also contributes to the low potential for occurrence of this species. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the gopher frog.*

#### **6.F.1.2.3 BIRDS**

**American oystercatcher (*Haematopus palliatus*):** The American oystercatcher is listed as a Species of Special Concern by the FFWCC. The American oystercatcher inhabits isolated beaches, mudflats, dredged-material islands, and shell bars. They have been observed nesting in salt marshes and within coastal Australian pine woodlots. The potential for this species to occur is ranked as extremely low to non-existent because nesting and foraging habitats do not exist within the Detailed Study Area. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the American oystercatcher.*

**Black skimmer (*Rhynchops niger*):** The black skimmer is listed as a Species of Special Concern by the FFWCC. The black skimmer resides year round along Florida's coastlines, fishing along beaches, inlets, and estuaries. It nests on barren beaches of sand, gravel, or shells; on dry mudflats and salt flats; and at sand and gravel pits along rivers. Suitable nesting habitat is absent from the Detailed Study Area. Because it feeds primarily in habitats immediately along the coastline, the black skimmer is unlikely to occur in the area. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the black skimmer.*

**Brown pelican (*Pelecanus occidentalis*):** The brown pelican is listed as a Species of Special Concern by the FFWCC. Brown pelicans are found in coastal nearshore habitats such as beaches, sandbars, docks, and dredge-spoil islands. They nest in trees on coastal islands and feed by diving for prey in nearshore waters. The Dania Cut-Off Canal provides foraging opportunities for mullet and other fish, which may attract brown pelicans. Pelicans are attracted by fishing and "chillin" opportunities within the marina located within the western portion of Detailed Study Area. Limited suitable nesting habitat exists in this area of Broward County for pelicans, so their potential for occurrence is ranked as low. Implementation of the runway development alternatives would not result in impacts on habitats used by the brown pelican. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the brown pelican.*

**Florida burrowing owl (*Athene cunicularias*):** The Florida burrowing owl is listed as a Species of Special Concern by the FFWCC. Florida burrowing owls inhabit open native prairies and cleared areas that offer an expanse of short, herbaceous groundcover, such as pastures, golf courses, fallow agricultural fields, vacant lots, airports, and athletic fields. They are attracted to elevated areas, such as roadway berms and canal banks.

Suitable nesting habitat for the burrowing owl has been reported on airport property. Field surveys conducted for this EIS in November 2004 found no burrowing owl activity on-airport. Therefore, the potential for occurrence is ranked as low. However, additional fieldwork should be conducted within the appropriate habitat to determine the presence or absence of this species no less than 90 days prior to the beginning of construction to ensure that the species has not recurred.

With the added precaution of additional field work to confirm absence of this species the FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the Florida burrowing owl.*

**Florida sandhill crane (*Grus canadensis pratensis*):** The Florida sandhill crane is listed as Threatened by the FFWCC. Florida sandhill crane habitats include wet and dry prairies, maidencane and slough communities, and low-growth emergent vegetation associated with freshwater marshes and ponds. Cranes nest in herbaceous wetlands, up to about 0.5-acre in size, associated with freshwater ponds or marshes. Cranes will frequent agricultural areas like feed lots, crop fields, golf courses, and other open lawns, especially in winter and early spring.

Nesting habitat for Florida sandhill cranes is limited or absent from the Detailed Study Area, although a small amount of low quality foraging opportunities exist. The potential occurrence of the Florida sandhill crane is ranked as low. The FAA has determined that the implementation of the *runway development alternatives* would result in a "No Effect" determination on the Florida sandhill crane.

**Least tern (*Sterna antillarum*):** The Least tern (*Sterna antillarum*) is considered Threatened by the FFWCC. The species is Federally-protected (listed as Threatened) elsewhere in the nation, but not in the State of Florida. While some rooftops within the Detailed Study Area may harbor suitable gravel habitat for nesting by this species, no nesting or foraging habitat exists within the footprint of the runway development alternatives. The potential occurrence of the Least tern is low. The FAA has determined that the implementation of the *runway development alternatives* would result in a "No Effect" determination on the least tern.

**Limpkin (*Aramus guarana*):** The limpkin is listed as a Species of Special Concern by the FFWCC. The limpkin is an endemic<sup>18</sup> wading bird found in freshwater habitats statewide that contain large aquatic snail or bivalve (i.e., clams, oysters, etc.) populations. Typical breeding habitats for limpkins include rivers, lakes, and marshes. They construct their nests in a wide variety of settings including slowly sinking piles of aquatic vegetation, supporting them between cypress knees, high in cypress branches, or in the tops of sabal palms.

Freshwater mussels and apple snails, both staples of the limpkins' diet, require prolonged inundation, which is not generally present in the reservoirs and wetlands within the Detailed Study Area. The lack of suitable habitat and food source for this bird ranks as low potential for occurrence. The FAA has determined that the implementation of the *runway development alternatives* would result in a "No Effect" determination on the limpkin.

**Little blue heron (*Egretta caerulea*):** The little blue heron is listed as a Species of Special Concern by the FFWCC. The little blue heron prefers freshwater wetland habitats; however, it is not rare in coastal areas. Its diet is more varied than that of other herons and includes insects, shrimp, amphibians, and fish. Little blue herons often feed alone, walking along the edges of canals, streams, rivers, and lakes, or on the top of floating vegetation. Accessible foraging and nesting habitat is provided by the stormwater drainage areas within the Detailed Study Area. Therefore, the potential for occurrence of this species is ranked medium to high. Implementation of the runway development alternatives would result in no net loss of these habitats. The FAA has determined that the implementation of the *runway development alternatives* would result in a "No Effect" determination on the little blue heron.

**Arctic Peregrine falcon (*Falco perigrinus tundrius*):** The Arctic Peregrine falcon (*Falco peregrinus tundrius*) has been delisted by the USFWS due to species recovery, but is still considered as Threatened by the FFWCC. This species may be observed within South Florida during winter migrations, with most sightings occurring along the coasts and islands. A carnivorous species, the falcon is also

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<sup>18</sup> Native to a particular region.

found in cities with large populations of pigeons. The potential for occurrence of this species is ranked as low. The Detailed Study Area does not offer habitat typical for the species. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the Arctic Peregrine falcon.*

**Roseate spoonbill (*Ajaia ajaja*):** The roseate spoonbill is listed as a Species of Special Concern by the FFWCC. The roseate spoonbill forages in shallow water of variable salinity, including marine tidal flats and ponds, coastal marshes, mangrove-dominated inlets and pools, and freshwater sloughs and marshes. It nests primarily in mixed-species (bird) colonies on coastal mangrove islands or in Brazilian pepper on man-made dredge spoil islands near suitable foraging habitat.

Foraging opportunities within the Detailed Study Area are limited to the edges of mangrove communities, larger stormwater ponds (some tidally influenced), and the shallow edges of waterways for this specialized feeder. The roseate spoonbill's potential for occurrence is ranked as low. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the roseate spoonbill.*

**Snowy egret (*Egretta thula*):** The snowy egret is listed as a Species of Special Concern by the FFWCC. The snowy egret is a small white egret that forages in both freshwater and saltwater habitats, where it often actively pursues its prey, usually in flocks with other wading birds. It prefers small fish, but will eat shrimp and small vertebrates. The snowy egret nests in mixed-species (birds) colonies in swamps and mangroves on islands or in emergent vegetation over water. Accessible foraging and nesting habitat is available in several types of wetlands within the Detailed Study Area, such as the shallow stormwater drainage areas, making the potential for occurrence of this species ranked as high. Implementation of the runway development alternatives would result in no net loss of these habitats. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the snowy egret.*

**Southeastern American kestrel (*Falco sparverius paulus*):** The southeastern American kestrel is listed as Threatened by the FFWCC. Southeastern American kestrels require open terrain with enough cover to support small terrestrial prey animals, vegetation low and sparse enough to ensure adequate hunting opportunities, elevated hunting perches, and an adequate supply of nesting sites. They can be found in open habitats, such as pine savannas, longleaf pine-turkey oak sandhills, pine flatwoods, farmlands, and even suburban golf courses and residential areas. They nest in cavities excavated by woodpeckers and in artificial objects such as power poles and buildings.

The large amount of open area within the Detailed Study Area (including barren land, disposal areas, and mowed and maintained grassy areas) could provide significant foraging opportunity for the kestrel. Preferred nesting sites are limited; but this species is adaptable to artificial sites and tolerant of human activity. The potential for occurrence of this species is ranked as low because the Florida

Breeding Bird Atlas<sup>19</sup> documents no records of this species in Broward County. The Florida Natural Areas Inventory field guide<sup>20</sup> documents no occurrence in Broward County. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the southeastern American kestrel.*

**Tricolored heron (*Egretta tricolor*):** The tricolored heron is listed as a Species of Special Concern by the FFWCC. The tricolored heron is found in saltwater, brackish-water, and freshwater habitats. It forages alone, using a variety of capture techniques to glean small fish. Tricolored herons nest in colonies with other heron and ibis species. This heron breeds inland and along the coast, most commonly in the southern peninsula. Accessible foraging and nesting habitat is available in several wetlands within the Detailed Study Area, particularly the shallow stormwater drainage areas. The potential for occurrence of this species is ranked as high. The FAA has determined that the implementation of the runway development alternatives would result in no net loss of these habitats. *Implementation of the runway development alternatives would result in a "No Effect" determination on the tricolored heron.*

**White ibis (*Eudocimus albus*):** The white ibis is listed as a Species of Special Concern by the FFWCC. The white ibis is a wading bird often found foraging in a group with other ibises. They forage in a variety of habitats, including freshwater and brackish marshes, salt flats and salt marsh meadows, many types of forested wetlands, wet prairies, swales, seasonally inundated fields, and man-made ditches. They feed on aquatic prey, including crayfish, crabs, insects, snakes, frogs and toads, and fish. They breed in mixed-species (birds) colonies located over standing water, within freshwater marshes or ponds, or on coastal islands. Foraging is available in several wetlands within the Detailed Study Area, particularly the shallow stormwater drainage areas; therefore, the potential for occurrence of this species is ranked as high. Implementation of the runway development alternatives would result in no net loss of these habitats. The FAA has determined that the implementation of the *runway development alternatives would result in a "No Effect" determination on the white ibis.*

#### **6.F.1.2.4 PLANTS**

Of the 36 plants listed on Table 6.F.1-2, only Johnson's seagrass is Federally-listed and protected under the ESA. The remaining 35 plants are provided protection under FAC 5B-40, *Preservation of Native Flora of Florida.*

The list contained in Table 5.F.1-4, *Protected Plants Potentially Present in Southern Broward County*, generally describes the preferred habitats and protected species reported in southern Broward County, but that may no longer be present within the Detailed Study Area. No detailed survey of flora was conducted for this EIS, but field reviews were conducted in the areas potentially affected by the runway

<sup>19</sup> Florida Fish and Wildlife Conservation Commission. 2003. *Florida's breeding bird atlas: A collaborative study of Florida's birdlife.* Internet web site: <http://www.myFFWCC.com/bba/> (accessed July 2006).

<sup>20</sup> Florida Natural Areas Inventory. 2006. *Field Guide to the Rare Plants and Animals of Florida Online.* FNAI. Internet web site: <http://www.fnai.org/FieldGuide/> (accessed July 2006).

development alternatives. No state-protected species were observed during the field reviews. All of the habitats have historically been disturbed or otherwise impacted by man's activities. Draining, ditching, agriculture, and forestry are the most common disturbances. With the exception of one upland hammock<sup>21</sup> remnant in the extreme northwest corner of FLL, an area not affected by any of the runway development alternatives, all habitats have been disturbed by human activities.

Many of the state-listed species are dependent upon upland habitats which no longer exist within the Detailed Study Area. Those plants that naturally occur in mixed wetland forests and cypress domes are limited within the Detailed Study Area. Most of the plants listed in Table 6.F.1-2 were determined to have a very low probability of occurrence within the Detailed Study Area. The FAA has determined that the implementation of the runway development alternatives would have no affect on them.

**Royal palm (*Roystonea elata* syn. *Roystonea regia*):** Only one of the listed species, the royal palm (*Roystonea elata* syn. *Roystonea regia*), was encountered during the field investigations conducted for this EIS. This palm, while listed by the state as Endangered, is planted in a tree farm to the east of FLL. Alternatives B1, B1b, B1c, B4, B5, D1, and D2 would impact the tree farm. It is anticipated that the trees would be harvested by the tree farmer prior to the onset of any construction in that area. These and other landscape trees that are located within the project footprint away from the tree farm would be similarly accommodated through tree removal permits. The FAA has determined that the implementation of the runway development alternatives would have a determination of "No Effect" on the royal palm.

**Golden leather fern (*Acrostichum aureum*):** The golden leather fern (*Acrostichum aureum*) is listed by the state as Threatened. A related species, the giant leather fern (*Acrostichum danaefolium*), is similar in appearance and was observed at the edges of W-25 and in the Brazilian pepper wetlands (W-17 and W-33) within the Detailed Study Area. Random samples of the ferns were examined for the presence of *A. aureum*, however none were identified. The FAA has determined that the implementation of the runway development alternatives would result in a "No Effect" determination on the golden leather fern.

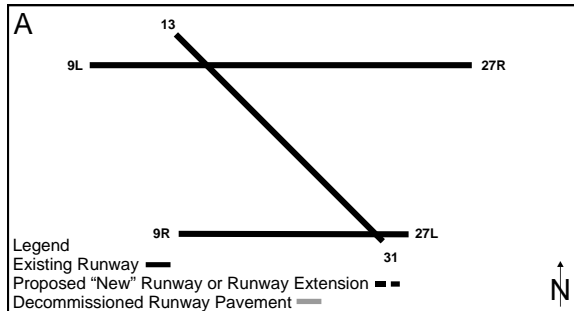
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<sup>21</sup> Localized, thick stand of hardwood tree species that grow on naturally elevated areas. These natural 'high spots' are rarely flooded and can be located within marshes, pinelands, or mangrove swamps.

**6.F.1.3 Impacts of the Alternatives on Listed Species**

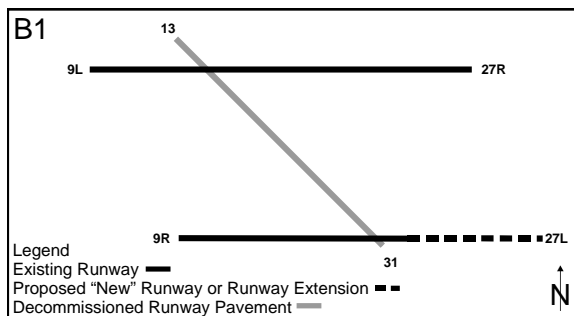
**6.F.1.3.1 DIRECT EFFECTS**

**ALTERNATIVE A: NO ACTION**

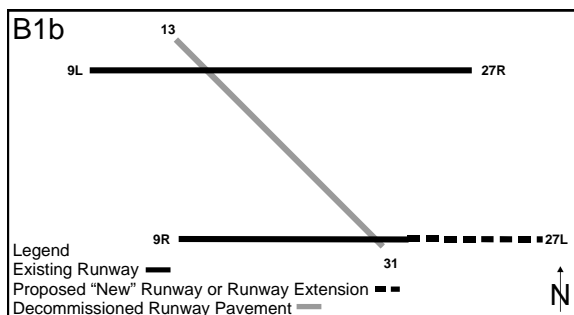


For Alternative A, no changes would be made to the existing airfield and airport facilities. *Alternative A would have no significant impacts to Federally- or state-listed endangered or threatened species.*

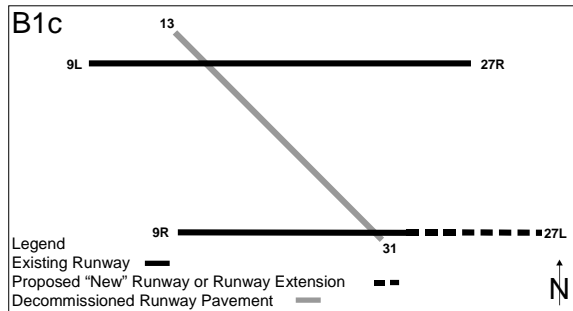
**ALTERNATIVE B1: REDEVELOP AND EXTEND EXISTING RUNWAY 9R/27L TO AN 8,600-FOOT BY 150-FOOT ELEVATED RUNWAY**



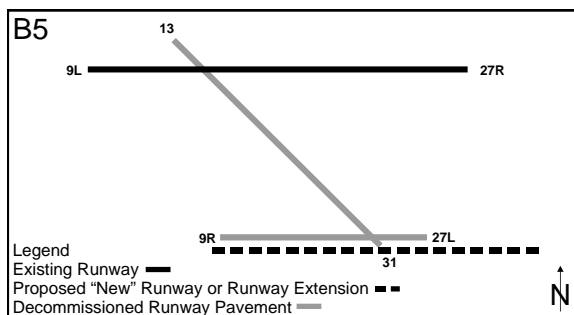
**ALTERNATIVE B1b: REDEVELOP AND EXTEND EXISTING RUNWAY 9R/27L TO AN 8,000-FOOT BY 150-FOOT ELEVATED RUNWAY WITH EMAS**



**ALTERNATIVE B1c: (AIRPORT SPONSOR'S PROPOSED PROJECT)  
REDEVELOP EXISTING RUNWAY 9R/27L TO AN  
8,000-FOOT BY 150-FOOT ELEVATED RUNWAY WITH  
EMAS; RUNWAY USE DETERMINED BY BROWARD  
COUNTY'S INTERLOCAL AGREEMENTS.**



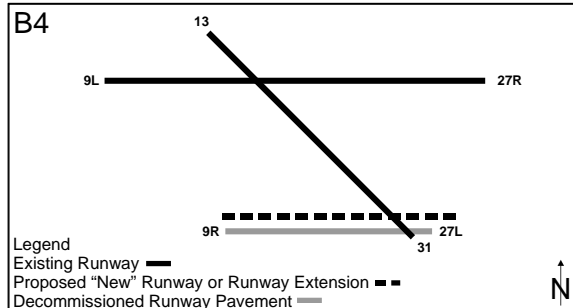
**ALTERNATIVE B5: BUILD A 7,800-FOOT ELEVATED RUNWAY WITH EMAS  
LOCATED 320 FEET SOUTH OF EXISTING SOUTH  
RUNWAY (TO REPLACE EXISTING RUNWAY 9R/27L)**



Based on field surveys, literature reviews, and informal consultation with Federal and state agency personnel and other specialists, Alternatives B1, B1b, B1c, or B5 would not adversely affect any Federally- or state-listed endangered or threatened species.

*Alternatives B1, B1b, B1c, or B5 would have "No Effect" on the listed species described previously, except for the smalltooth sawfish, West Indian manatee, and the wood stork for which a determination of "May Affect-Is Not Likely to Adversely Affect" was found to be appropriate.*

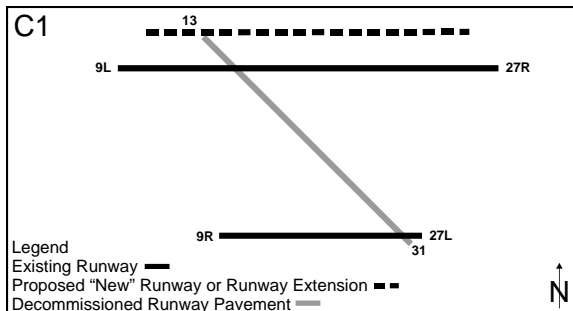
**ALTERNATIVE B4: BUILD A NEW 6,001-FOOT AT GRADE RUNWAY WITH EMAS LOCATED 340 FEET NORTH OF EXISTING SOUTH RUNWAY (TO REPLACE EXISTING RUNWAY 9R/27L)**



Based on field surveys, literature reviews, and informal consultation with Federal and state agency personnel and other specialists, Alternative B4 would not adversely affect any Federally- or state-listed endangered or threatened species.

*Alternative B4 would have "No Effect" on the listed species described previously, except for the West Indian manatee and the wood stork, for which a determination of "May Affect-Is Not Likely to Adversely Affect" was found to be appropriate.*

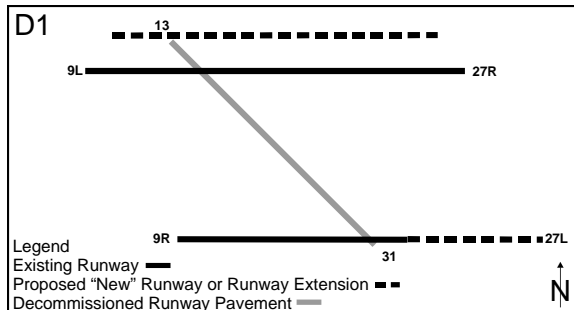
**ALTERNATIVE C1: BUILD A 7,721-FOOT AT GRADE RUNWAY LOCATED 850 FEET NORTH OF EXISTING RUNWAY 9L/27R (A DEPENDENT PARALLEL RUNWAY TO EXISTING RUNWAY 9L/27R)**



Based on field surveys, literature review, and informal consultation with Federal and state agency personnel and other specialists, implementation of Alternative C1 is unlikely to adversely affect any Federally- or state-listed endangered or threatened species.

*Alternative C1 would have "No effect" on the listed species described previously, except for the wood stork where a determination of "May Affect-Is Not Likely to Adversely Affect" was found to be appropriate.*

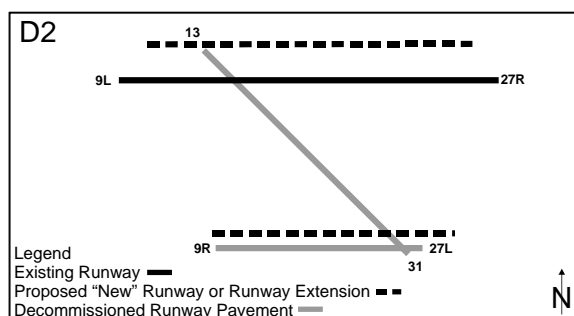
**ALTERNATIVE D1: REDEVELOP AND EXTEND EXISTING RUNWAY 9R/27L TO 8,000 FEET AND BUILD A NEW 7,721-FOOT RUNWAY NORTH OF EXISTING RUNWAY 9L/27R (COMBINATION OF ALTERNATIVES B1b AND C1)**



Based on field surveys, literature review, and informal consultation with Federal and state agency personnel and other specialists, implementation of Alternative D1 is unlikely to adversely affect any Federally- or state-listed endangered or threatened species.

*Alternative D1 would have "No Effect" on the listed species described previously, except for the smalltooth sawfish, West Indian manatee, and the wood stork for which a determination of "May affect-Is Not Likely to Adversely Affect" was found to be appropriate.*

**ALTERNATIVE D2: BUILD A NEW 6,001-FOOT AT GRADE RUNWAY WITH EMAS LOCATED 340 FEET NORTH OF EXISTING SOUTH RUNWAY AND BUILD A 7,721-FOOT AT GRADE RUNWAY LOCATED 850 FEET NORTH OF EXISTING RUNWAY 9L/27R (COMBINATION OF ALTERNATIVES B4 AND C1)**



Based on field surveys, literature review, and informal consultation with Federal and state agency personnel and other specialists, implementation of Alternative D2 is unlikely to adversely affect any Federally- or state-listed endangered or threatened species.

*Alternative D2 would have "No Effect" on the listed species described previously, except for the West Indian manatee and the wood stork, for which a determination of "May Affect-Is Not Likely to Adversely Affect" was found to be appropriate.*

#### **6.F.1.4 Essential Fish Habitat (EFH) Assessment**

As part of the National Environmental Policy Act (NEPA) process, an Essential Fish habitat (EFH) consultation is being conducted. The Airport Sponsor's Proposed Project is described in Chapter Two, *The Proposal*; all of the runway development alternatives are described in Chapter Four, *Alternatives*. Section 5.F.1.6, *Essential Fish Habitat*, in Chapter Five, *Affected Environment*, identifies potentially affected EFH within the Detailed Study Area. The purpose of this EFH Assessment is to describe how the runway development alternatives may affect EFH identified within the Detailed Study Area.

EFH is designated by the NMFS and South Atlantic Fisheries Management Council (SAFMC). The EFH identified in *Fishery Management Plan Amendments of the SAFMC*<sup>22</sup> includes estuarine areas, estuarine emergent wetlands, estuarine scrub/shrub mangroves, submerged aquatic vegetation, oyster reefs and shell banks, intertidal flats, palustrine emergent and forested wetlands, aquatic beds, and estuarine water column.

The EFH potentially affected by the runway development alternatives includes all tidally influenced wetlands and surface waters and the hydrologically connected freshwater wetlands that occur within the Detailed Study Area. The main project areas of concern involve the man-altered mangrove wetlands in the eastern portion of the Detailed Study Area, and the Dania Cut-Off Canal and associated waterbody that flanks FLL to the south and the west.

The SAFMC has a listing of current EFH and habitat areas of particular concern (EFH-HAPC) for penaeid shrimp, red drum, and snapper-grouper species. Those habitats that may be found within or proximal to the Detailed Study Area include the following:

- Tidal freshwater (palustrine) (Shrimp, Red drum)
- Estuarine and marine emergent wetlands (e.g., intertidal marshes) (Shrimp, Red drum, Snapper-Grouper)
- Tidal palustrine forested areas (Shrimp)
- Estuarine scrub/shrub (mangroves and mangrove fringe) (Shrimp, Red drum, Snapper-Grouper, Spiny lobster)
- Estuarine and marine submerged aquatic vegetation (e.g., seagrass) (Shrimp, Red drum, Snapper-Grouper, Spiny lobster)
- Subtidal and intertidal non-vegetated flats (Shrimp)
- Oyster reefs and shell banks (Red drum, Snapper-Grouper)
- Unconsolidated bottom (Red drum, Snapper-Grouper, Spiny lobster)

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<sup>22</sup> Essential Fish Habitat (EFH). NOAA Fisheries: Habitat Protection Division, Office of Habitat Conservation Habitat Protection Division. Internet web site: [www.nmfs.noaa.gov/habitat/habitatprotection/efh](http://www.nmfs.noaa.gov/habitat/habitatprotection/efh)

The *Generic Amendment to the Fisheries Management Plan*<sup>23</sup> also identifies EFH in the Detailed Study Area as Estuarine Water Column. The following summarizes the EFH and EFH-HAPC for each management unit.

#### **6.F.1.4.1 PENAEID SHRIMP**

EFH for penaeid shrimp includes inshore estuarine nursery areas and all interconnecting waterways. Mangroves within and proximal to the Detailed Study Area provide potential inshore estuarine nursery habitat for the penaeid shrimp. HAPC are coastal inlets, state-designated nurseries, and state-identified overwintering habitats. The penaeid species pink shrimp (*Farfantepenaeus duorarum*), redspotted shrimp (*F. brasiliensis*), and brown shrimp (*F. aztecus*) are the most economically important inshore shrimp fisheries in Florida. These shrimp species hatch in oceanic waters and migrate into bays and estuaries. Juvenile shrimp prefer, as forage areas and protection from surging waters, the interfaces between marshes characterized by *Spartina maritima* grass and open water. As they age, juveniles and subadults migrate from the periphery of bays and estuaries to lower bays and deeper holes, and then into higher salinity oceanic waters.

#### **6.F.1.4.2 RED DRUM**

EFH for the red drum occurring within the Detailed Study Area includes estuarine scrub/shrub (i.e., mangroves and mangrove fringe), oyster reefs and shell banks, and unconsolidated bottom areas. Therefore, the red drum could be present within or proximal to the Detailed Study Area. HAPC for red drum include all coastal inlets, all state-designated nursery habitats of particular importance to red drum, documented sites of spawning aggregations, and submerged aquatic vegetation. These habitats are necessary to complete the fish's life cycle, especially for larval and juveniles that require specific estuarine conditions in the spawning and nursery grounds. Spawning occurs in the fall when daylight hours and water temperatures decrease. After hatching, larvae are transported into shallow estuary areas. Juveniles inhabit seagrass beds or muddy bottoms until they begin to mature and migrate into the ocean around age one year. Adults and subadults prefer shallow bay bottoms and oyster reefs and return to the estuary when weather conditions are more favorable. Smaller juveniles feed primarily on invertebrates such as mysids and copepods. Small fish is the dominant food type for juveniles and subadults. Adults also feed on fish, but arthropods, especially crabs, are the predominant food item.

#### **6.F.1.4.3 SNAPPER-GROUPER COMPLEX**

EFH for the snapper-grouper complex found within the study areas are tidal creeks, estuarine scrub/shrub (i.e., mangrove fringe), oyster reefs and shell banks, and unconsolidated bottom areas. HAPC for the snapper-grouper complex include mangrove habitat and oyster/shell habitat. Many species within this complex require a broad assortment of habitats to complete their respective lifecycles. Juveniles may be found in seagrass beds and over muddy bottoms.

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<sup>23</sup> The Generic Amendment to the Fisheries Management Plan; Federal Register June 4, 2001, Volume 66, Number 107; p. 29924.

Seasonal changes and maturation cause these species to move from inshore waters to congregation points in or near oceanic waters. The diet of each species depends on morphological and ecological conditions. Younger age classes and those species with stout jaw structures consume harder prey items like mollusks, barnacles, and echinoderms. Adults and larger species consume larger prey items like fish.

#### **6.F.1.4.4 SPINY LOBSTER**

EFH for spiny lobster includes nearshore shelf/oceanic waters, shallow subtidal bottom, seagrass habitat, unconsolidated bottom, coral and live/hard bottom habitat, sponges, algal communities, and mangrove prop roots. HAPC for the spiny lobster include Florida Bay, Biscayne Bay, Card Sound, and coral/hard bottom habitat from Jupiter Inlet, Florida through the Dry Tortugas.

The spiny lobster occupies three major habitats during its life cycle. Larvae occur in the open ocean in the epipelagic (i.e., surface water) zone. Postlarvae and juveniles occupy shallow coastal waters of bays, lagoons, and reef flats, habitats that are supported by the production of seagrasses, benthic algae, and phytoplankton and detritus from mangroves. Postlarvae are found on rocks, red mangrove prop roots, pilings, seawalls and boat bottoms. Juveniles take shelter in sponges, natural holes and crevices, and among sea urchins. As their size increases, the lobsters move towards deeper water reef and rubble areas. The lobsters use the reef for shelter in daytime and forage among seagrasses and rubble areas for mollusks and other food items at night.

### **6.F.1.5 Assessment of Impacts to EFH**

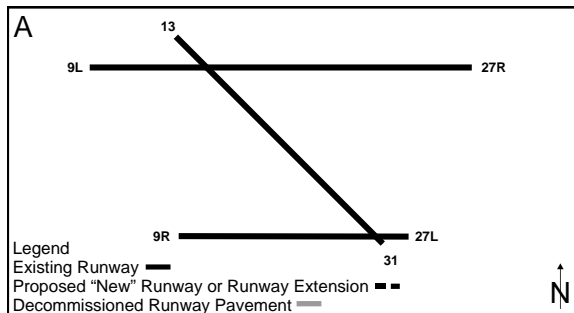
#### **6.F.1.5.1 DIRECT EFFECTS**

The EFH within the Detailed Study Area potentially affected by the runway development alternatives include mangroves hydrologically-connected to the Dania Cut-Off Canal (W-17c, W-25a, W-25b, and W-N4), as well as estuarine water column and unconsolidated bottom areas in the Dania Cut-Off Canal and adjacent triangular waterbody. SAFMC-managed species including penaeid shrimp, red drum, snapper-grouper complex, and other aquatic species utilize these habitats as part of their life history. As explained below, managed species could be temporarily displaced during the construction phases of the runway development alternatives. However, similar refuge, forage, and other habitat areas exist within the Detailed Study Area and additional habitat would be enhanced and/or created through mitigation (See Section 6J). Permanent direct impacts to mangrove habitat would occur as a result of construction of the road fill required for installation and future maintenance access of the approach light towers. Given the location and area of the access roads, impacts to the mangrove system would be considered minimal. Due to the abundant availability of water column, unconsolidated bottom, and mangrove habitat in the immediate area, these permanent direct impacts are not likely to affect EFH for managed species.

For Alternative B5 described in Chapter Four, *Alternatives*, installation of the runway approach light tower and associated walkway within the triangular waterbody associated with the Dania Cut-Off Canal could provide vertical hard

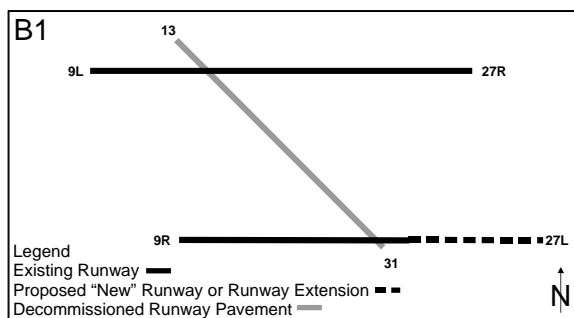
substrate to which algae and sessile invertebrate food sources could attach. This type of vertical substrate is not currently present with the waterbody. It is anticipated that this additional hard substrate would more than offset the minor impacts associated with the minor amount of new shading created by the walkway. No long-term impacts to the Dania Cut-Off Canal EFH or the mangrove EFH would result from implementation of the runway development alternatives. The following is a description of the potential direct impacts to EFH of the runway development alternatives.

**ALTERNATIVE A: NO ACTION**



There would be no changes to the existing airfield and airport facilities with implementation of Alternative A. *Alternative A would have no impacts to EFH.*

**ALTERNATIVE B1: REDEVELOP AND EXTEND EXISTING RUNWAY 9R/27L TO AN 8,600-FOOT BY 150-FOOT ELEVATED RUNWAY**

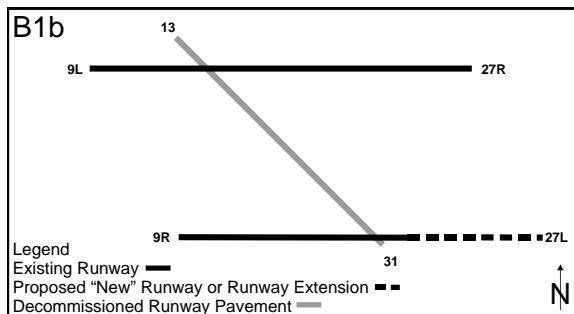


Expansion of Runway 9R/27L to the east would directly impact 2.67 acres of W-17c. This impact would result in 1.25 Uniform Mitigation Assessment Method (UMAM) functional gain (FG) credits needed for mitigation. The installation of the runway approach lights and associated access roads in the east would impact 0.14 acres of W-25a, resulting in 0.08 UMAM FG credits needed for mitigation. Alternative B1 would have no impact on the Dania Cut-Off Canal. No direct impacts would occur to W-N4 due to its location outside of proposed limits of construction. Exhibit 6.E.2-1 graphically depicts the limits of disturbance and impacts to wetlands resulting from implementation of Alternative B1. A detailed description of the installation of the approach light system to support Runway 9R/27L is provided in Appendix M, *Biological Resources*.

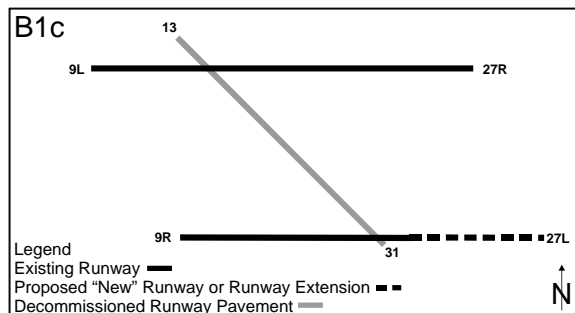
Proposed conceptual mitigation to offset wetland losses is described in Section 6.J, *Conceptual Mitigation Measures Considered in the Draft EIS*.

*A total of 2.81 acres of direct impacts to EFH would occur with implementation of Alternative B1, resulting in 1.33 UMAM FG credits needed for mitigation.*

**ALTERNATIVE B1b: REDEVELOP AND EXTEND EXISTING RUNWAY 9R/27L TO AN 8,000-FOOT BY 150-FOOT ELEVATED RUNWAY WITH EMAS**



**ALTERNATIVE B1c: (SPONSORS PROPOSED PROJECT) REDEVELOP EXISTING RUNWAY 9R/27L TO AN 8,000-FOOT BY 150-FOOT ELEVATED RUNWAY WITH EMAS; RUNWAY USE DETERMINED BY BROWARD COUNTY'S INTERLOCAL AGREEMENTS**

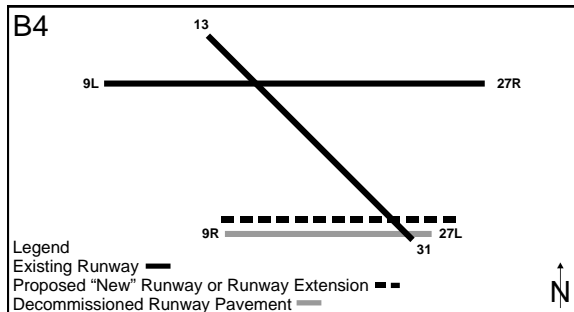


Redevelopment of Runway 9R/27L to the east would impact 2.67 acres of W-17c, resulting in 1.25 UMAM FG credits needed for mitigation. Further east, the installation of the runway approach lights and associated access roads would impact 0.20 acres of W-25a and 0.18 acres to W-25b, resulting in 0.12 and 0.13 UMAM FG credits needed for mitigation, respectively. Alternatives B1b and B1c would have no impact on the Dania Cut-Off Canal. No impacts would occur to W-N4 due to its location outside of the proposed limits of construction. Exhibit 6.E.2-2 graphically depicts the limits of disturbance and impacts to wetlands resulting from implementation of Alternatives B1b and B1c. A detailed description of the installation of the approach light system to support Runway 9R/27L is provided in Appendix M, *Biological Resources*.

Proposed conceptual mitigation to offset wetland losses is described in Section 6.J, *Conceptual Mitigation Measures Considered in the Draft EIS*.

*A total of 3.05 acres of direct impacts to EFH would occur with implementation of Alternative B1b or B1c, resulting in 1.50 UMAM FG credits needed for mitigation.*

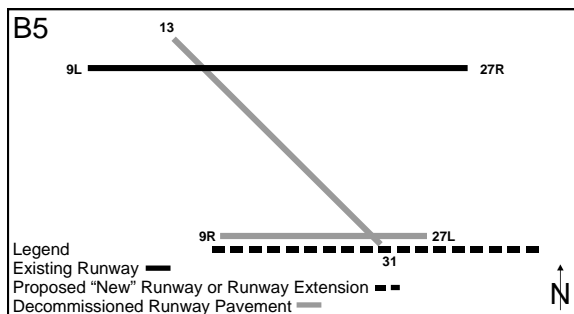
**ALTERNATIVE B4: BUILD A NEW 6,001-FOOT AT GRADE RUNWAY WITH EMAS LOCATED 340 FEET NORTH OF EXISTING SOUTH RUNWAY (TO REPLACE EXISTING RUNWAY 9R/27L)**



Alternative B4 would not impact W-17, W-25, W-N4, or the Dania Cut-Off Canal. Exhibit 6.E.2-3 graphically depicts the limits of disturbance and impacts to wetlands resulting from implementation of Alternative B4.

*No impacts to EFH would occur with implementation of Alternative B4.*

**ALTERNATIVE B5: BUILD A 7,800-FOOT ELEVATED RUNWAY WITH EMAS LOCATED 320 FEET SOUTH OF EXISTING SOUTH RUNWAY (TO REPLACE EXISTING RUNWAY 9R/27L)**

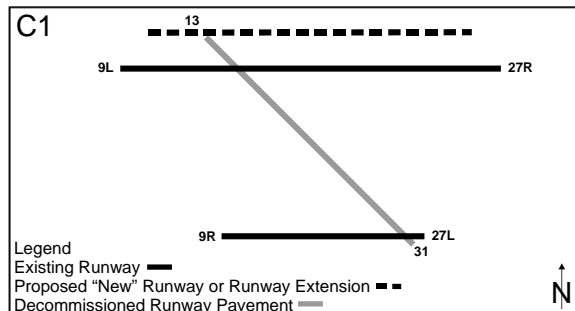


Redevelopment of Runway 9R/27L would impact 2.67 acres of W-17c, resulting in 1.25 UMAM FG credits needed for mitigation. Further east, the installation of the runway approach lights and access roads would impact 0.18 acres of W-25b, resulting in 0.13 UMAM FG credits needed for mitigation. W-25a would not be impacted by this alternative. No impacts would occur to W-N4 due to its location outside of the proposed limits of disturbance. Alternative B5 would impact the triangular waterbody that borders the Dania Cut-Off Canal to the west of the runway, due to the installation of one approach light tower and an elevated walkway to service it. Exhibit 6.E.2-4 graphically depicts the limits of disturbance and impacts to wetlands resulting from implementation of Alternative B5. A detailed description of the installation of the approach light system to support Runway 9R/27L is provided in Appendix M, *Biological Resources*.

Proposed conceptual mitigation to offset wetland losses is described in Section 6.J, *Conceptual Mitigation Measures Considered in the Draft EIS*.

*A total of 2.85 acres of direct impacts to EFH would occur with implementation of Alternative B5, resulting in 1.50 UMAM FG credits needed for mitigation.*

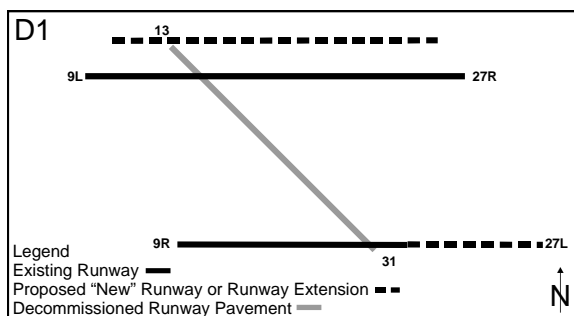
**ALTERNATIVE C1: BUILD A 7,721-FOOT AT GRADE RUNWAY LOCATED 850 FEET NORTH OF EXISTING RUNWAY 9L/27R (A DEPENDENT PARALLEL RUNWAY TO EXISTING RUNWAY 9L/27R)**



Alternative C1 would not impact W-17, W-25, W-N4, or the Dania Cut-Off Canal. Exhibit 6.E.2-5 graphically depicts the limits of disturbance and impacts to wetlands resulting from implementation of Alternative C1.

*No impacts to EFH would occur with implementation of Alternative C1.*

**ALTERNATIVE D1: REDEVELOP AND EXTEND EXISTING RUNWAY 9R/27L TO 8,000 FEET AND BUILD A NEW 7,721-FOOT RUNWAY NORTH OF EXISTING RUNWAY 9L/27R (COMBINATION OF ALTERNATIVES B1b AND C1)**

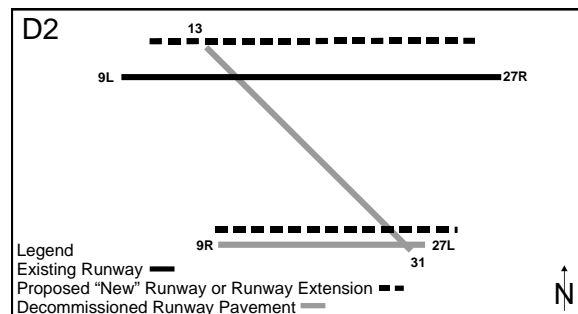


Impacts to wetlands designated as EFH caused by implementation of Alternative D1 are the same as those described under Alternative B1b (see previous sub-section). Exhibit 6.E.2-6 graphically depicts the limits of disturbance and impacts to wetlands resulting from implementation of Alternative D1. A detailed description of the installation of the approach light system to support Runway 9R/27L is provided in Appendix M, *Biological Resources*.

Proposed conceptual mitigation to offset wetland losses is described in Section 6.J, *Conceptual Mitigation Measures Considered in the Draft EIS*.

*A total of 3.05 acres of direct impacts to EFH would occur with implementation of Alternative D1, resulting in 1.50 UMAM FG credits needed for mitigation.*

**ALTERNATIVE D2: BUILD A NEW 6,001-FOOT AT GRADE RUNWAY WITH EMAS LOCATED 340 FEET NORTH OF EXISTING SOUTH RUNWAY AND BUILD A 7,721-FOOT AT GRADE RUNWAY LOCATED 850 FEET NORTH OF EXISTING RUNWAY 9L/27R (COMBINATION OF ALTERNATIVES B4 AND C1)**



Alternative D2 would not impact W-17, W-25, W-N4, or the Dania Cut-Off Canal. Exhibit 6.E.2-7 graphically depicts the limits of disturbance and impacts to wetlands resulting from implementation of Alternative D2.

*No impacts to EFH would occur with implementation of Alternative D2.*

#### **6.F.1.5.2 SECONDARY EFFECTS**

The area surrounding FLL is urban with numerous anthropogenic impacts to the remaining natural habitat. As described in Section 6.E.1, *Water Quality*, secondary impacts to EFH resulting from a change in hydrological and/or water quality properties (i.e., chemical, physical, and biological) would not be expected to be significant as a result of the implementation of the runway development alternatives.

Other secondary impacts resulting from construction activities could potentially occur from the following:

- Temporary disturbance and displacement of fish species,
- Increased sediment loads and turbidity in the water column,
- Temporary loss of food items to fisheries, and
- Limited disruption or destruction of live bottom habitats.

Impacts would be temporary and could be offset by special construction techniques and/or environmental protection guidelines, including the use of Best Management Practices (BMPs) as required by the U.S. Environmental Protection Agency's (USEPA's) National Pollution Discharge Elimination System (NPDES) stormwater

permit for construction activities; FAA Advisory Circular 150/5370-10B, *Standards for Specifying Construction of Airports*; as well as state and local requirements. Therefore, the effectiveness of these BMPs in protecting biotic and human health from surface water degradation would be assessed through this monitoring program.

A discussion of potential secondary impacts to wetlands, including wetlands designated as EFH, is provided for the FAA's Preferred Alternative in Chapter Eight, *FAA's Preferred Alternative*.

### **6.F.1.5.3 CUMULATIVE EFFECTS**

A discussion of cumulative impacts to wetlands and EFH is provided in Chapter Seven, *Cumulative Impacts*.

### **6.F.1.6 Avoidance/Minimization/Potential Mitigation Measures for EFH**

A discussion of avoidance, minimization, and potential mitigation measures for EFH and wetlands is included in Section 6J, *Conceptual Mitigation Measures Considered in the Draft EIS*. A conceptual mitigation plan for the FAA's Preferred Alternative is provided in Chapter Eight, *FAA's Preferred Alternative*.

#### **6.F.1.6.1 AGENCY COORDINATION**

On August 10, 2006, an interagency meeting was held at Broward County's offices in Fort Lauderdale. The FAA invited the USACE, Broward County Division of Environmental Resources (BCDER), FAA, NMFS, SFWMD, USFWS, and USEPA. Representatives from the USACE, BCDER, FAA, NMFS, and SFWMD attended the field meeting along with members of the FAA EIS Team.

This meeting included a presentation of the proposed project and a field visit to review the jurisdictional wetland sites and EFH. Discussions during the meeting lead to the field survey of the Dania-Cut-Off Canal and its associated triangular waterbody. Agency discussions that took place during these field surveys focused on the potential project impacts, functional wetland evaluation UMAM<sup>24</sup> scores, threatened/endangered species issues, and wetland mitigation concepts. The meeting materials are provided in Appendix M, *Biological Resources*.

Since publication of the Draft EIS, and as a result of agency coordination with NMFS, the FAA prepared additional information for secondary and cumulative affects for EFH. This information is provided in Appendix M, *Biological Resources*.

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<sup>24</sup> UMAM means Uniform Mitigation Assessment Method, which mandated for use by all State and local agencies by Florida Statute 374.414(18) and Florida Administrative Code, Chapter 62-345.

### **6.F.1.7 Summary**

The FAA has determined there will be no significant impacts to EFH resulting from the implementation of any of the runway development alternatives, based on project design; the minimal short-term and permanent impacts associated with the installation of light tower foundations, utility cables, and access roads required for the proposed runway approach light configurations; and the mitigation proposed for unavoidable wetland impacts.