



MEMORANDUM | April 9, 2014

TO U.S. Fish and Wildlife Service (Service)
FROM Industrial Economics, Incorporated (IEc)
SUBJECT Screening Analysis of the Likely Economic Impacts of Critical Habitat Designation for Florida Brickell-bush and Carter's Small-flowered Flax

On October 3, 2013, the Service published a proposed rule to designate critical habitat for Florida brickell-bush (*Brickellia mosieri*) and Carter's small-flowered flax (*Linum carteri* var. *carteri*) under the Endangered Species Act (the Act).¹ As part of the rulemaking process, the Service must consider the economic impacts, including costs and benefits, of the proposed rule in the context of two primary requirements:²

- **Executive Order (EO) 12866 *Regulatory Planning and Review***, which directs Agencies to assess the costs and benefits of regulatory actions and quantify those costs and benefits if an action may have an effect on the economy of \$100 million or more in any one year; and
- **Section 4(b)(2) of the Act**, which requires the Secretary of the Interior to consider economic impacts prior to designating critical habitat.³

This memorandum provides information to the Service on the potential for the proposed critical habitat rule to result in costs exceeding \$100 million in a single year. If costs do not exceed this threshold, EO 12866 suggests that a qualitative assessment may be sufficient. This memorandum also identifies the geographic areas or specific activities that could experience the greatest impacts, measured in terms of changes in social welfare, to inform the Secretary's decision under section 4(b)(2).⁴

To prepare this assessment, we rely on: (1) the proposed rule and associated geographic information systems (GIS) data layers provided by the Service; (2) the Service's incremental effects memorandum (described in greater detail later in this memorandum); (3) the results of the Service's outreach efforts to other Federal agencies concerning the likely effects of critical habitat; and (4) limited interviews with relevant stakeholders.

1 Proposed Critical Habitat Rule, 78 FR 61293.

2 Additional laws and executive orders require the consideration of the distribution of impacts on vulnerable subpopulations, such as small entities and state or local governments. These requirements for distributional analysis are beyond the scope of this memorandum.

3 Published September 20, 1993. As affirmed by Executive Order 13563, Improving Regulation and Regulatory Review, January 18, 2011.

4 The discipline of welfare economics focuses on maximizing societal well-being. (Just, R.E., D.L. Hueth, and A. Schmitz. 2004. *The Welfare Economics of Public Policy: A Practical Approach to Project and Policy Evaluation*. Edward Elgar Publishing: Northampton, MA.) It measures costs and benefits in terms of the opportunity costs of employing resources for the conservation of the species and individual willingness to pay to conserve those species. Opportunity cost is the value of the benefit that could have been provided by devoting the resources to their best alternative uses. Opportunity costs differ from the measurement of accounting costs (e.g., actual expenses). Welfare economics is recognized by the U.S. Office of Management and Budget (OMB) as the appropriate tool for valuing the costs and benefits of proposed regulatory actions. (U.S. Office of Management and Budget. 2003. Circular A-4.)

FINDINGS OF THE SCREENING ANALYSIS

Critical habitat designation for Florida brickell-bush and Carter's small-flowered flax is unlikely to generate costs exceeding \$100 million in a single year. Data limitations prevent the quantification of benefits.

Section 7 Costs

In occupied areas, the economic impacts of implementing the rule through section 7 of the Act will most likely be limited to additional administrative effort to consider adverse modification. This finding is based on the following factors:

- Any activities with a Federal nexus occurring within occupied habitat will be subject to section 7 consultation requirements regardless of critical habitat designation, due to the presence of the listed species; and
- In most cases, project modifications requested to avoid adverse modification are likely to be the same as those needed to avoid jeopardy in occupied habitat.

In unoccupied areas, incremental section 7 costs will include both the administrative costs of consultation and the costs of developing and implementing conservation measures needed to avoid adverse modification of critical habitat. Therefore, this analysis focuses on the likely impacts to activities occurring in unoccupied areas of the proposed critical habitat designation.

This analysis forecasts the total number and administrative cost of future consultations likely to occur for transportation and land management activities undertaken by or funded by Federal agencies within unoccupied habitat. In addition, the analysis forecasts costs associated with conservation efforts that may be recommended in consultation for those activities occurring in unoccupied areas. The total incremental section 7 costs associated with the proposed designation are estimated to be \$120,000 (2013 dollars) in a single year for both administrative and conservation effort costs.

Other Costs

- The designation of critical habitat is unlikely to trigger additional requirements under state or local regulations. This assumption is based on the protective status currently afforded pine rocklands habitat.
- The designation of critical habitat may cause developers to perceive that private lands will be subject to use restrictions, resulting in perceptual effects. Such costs, if they occur, are unlikely to result in costs reaching \$100 million when combined with anticipated annual section 7 costs.

Section 7 and Other Benefits

Various economic benefits may result from the incremental conservation efforts identified in this analysis, including: (1) those associated with the primary goal of species conservation (i.e. direct benefits), and (2) those additional beneficial services that derive from conservation efforts but are not the purpose of the Act (i.e. ancillary benefits). Due to existing data limitations, we are unable to assess the likely magnitude of these benefits.

Geographic Distribution of Impacts

Information regarding the distribution of impacts across subunits is provided in Exhibit 8 of this memo and in Exhibit 1 of our separate memorandum to the Service titled "Supplemental Information on Land Values - Critical Habitat Designation for Florida Brickell-bush and Carter's Small-flowered Flax" (March 25, 2014).

SECTION 1. BACKGROUND

Florida brickell-bush and Carter's small-flowered flax (hereafter, the brickell-bush, the flax, and collectively the pine rocklands plants) are perennial herbs that are endemic to pine rocklands in Miami-Dade County, outside of Everglades National Park, in south Florida. Pine rocklands are a fire-maintained ecosystem characterized by an open canopy and understory and a limestone substrate. This habitat is dependent on some degree of disturbance, most importantly in the form of natural or prescribed fires, in order to maintain native vegetation (including the two plants) and to prevent succession from pine rockland to rockland hammock habitat.⁵

The Service proposes to designate approximately 1,071 hectares (2,646 acres) of critical habitat across seven units for the brickell-bush, and 1,054 hectares (2,605 acres) across seven units for the flax. Five of the seven units are occupied by the brickell-bush; the remaining two are within the plant's historical range, but are unoccupied. Three of the seven units are occupied by the flax. Much of the designated critical habitat for the two species overlaps; therefore, in total, the proposed designation encompasses 1,096 hectares (2,707 acres) across seven units for both species, all within Miami-Dade County, Florida.⁶

Approximately 46 percent of the total proposed designation for both species is located on county and local government lands, 22 percent on private lands, 20 percent on state lands, and 12 percent on Federal lands.⁷ Exhibit 1 provides an overview of the proposed critical habitat units, including the occupancy status at the time of listing and land ownership by Federal, state, county/local government, and private entities. Exhibit 2 provides an overview map of the proposed designation.

⁵ Proposed Critical Habitat Rule, 78 FR 61293.

⁶ *Ibid.*

⁷ Personal communication with the U.S. Fish and Wildlife Service on February 12, 2014. GIS Shapefiles of Proposed Critical Habitat with Parcel Data and Occupancy Data.

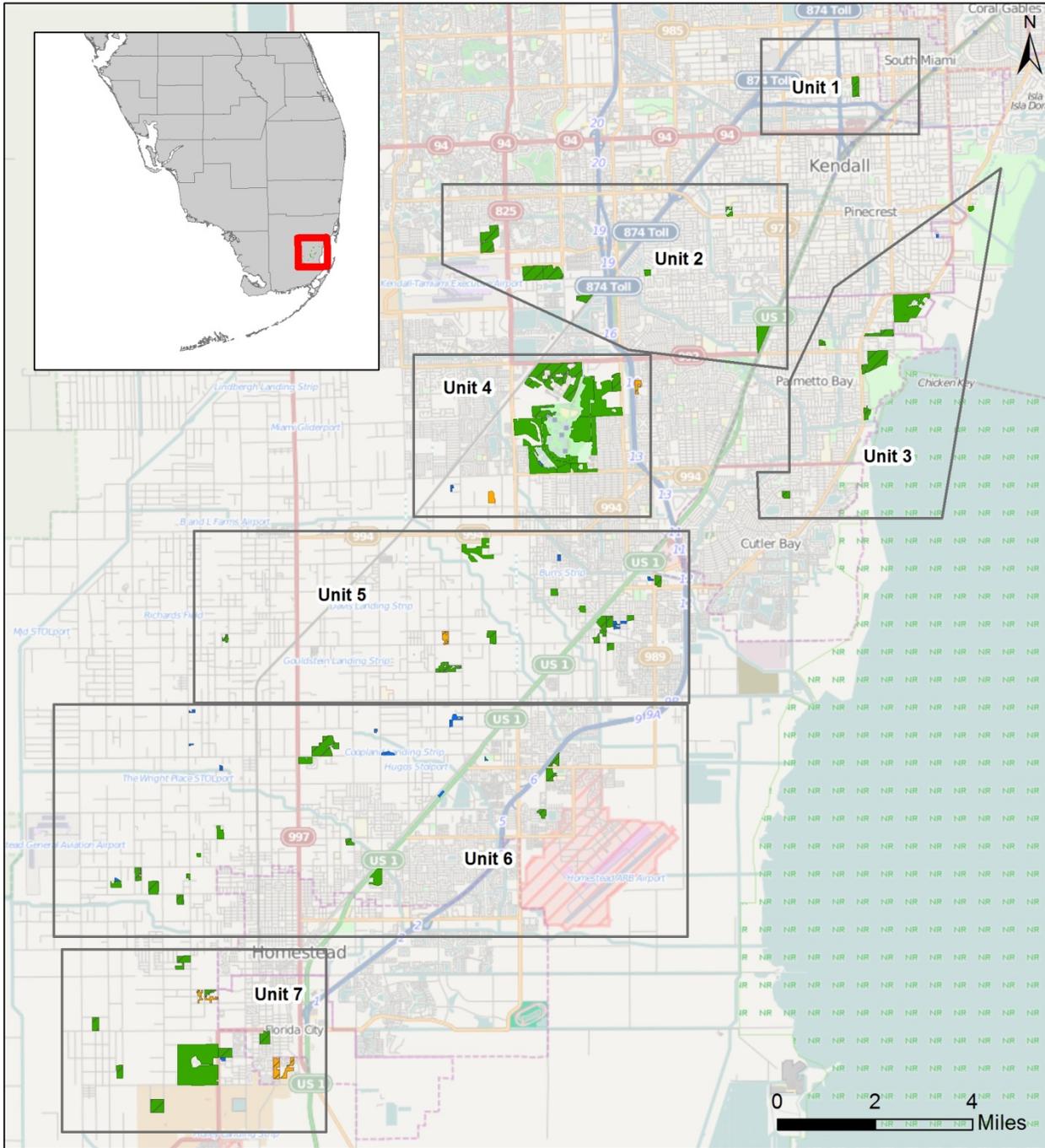
EXHIBIT 1. SUMMARY OF PROPOSED CRITICAL HABITAT UNITS

UNIT	OCCUPANCY	OWNERSHIP (ACRES)														
		FLORIDA BRICKELL-BUSH					CARTER'S SMALL-FLOWERED FLAX					2 PINE ROCKLANDS PLANTS				
		Fed	State	County/ Local	Priv./ Other	Total	Fed	State	County/ Local	Priv./ Other	Total	Fed	State	County/ Local	Priv./ Other	Total
1	Trinity Pineland	Occupied	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unoccupied	-	10	12	21	43	-	10	16	21	47	-	10	16	21	47
2	Nixon Smiley Pineland Preserve	Occupied	-	26	26	-	52	-	26	13	-	39	-	-	-	-
	Unoccupied	-	93	117	2	212	-	93	130	2	225	-	119	143	2	264
3	USDA Subtropical Horticultur al Research Station	Occupied	-	-	-	-	-	145	6	-	2	153	-	-	-	-
	Unoccupied	145	112	18	20	295	-	106	18	19	143	145	112	18	21	296
4	Richmond Pinelands	Occupied	55	-	518	88	661	-	-	-	-	-	-	-	-	-
	Unoccupied	136	-	52	117	305	191	-	571	180	942	191	-	571	208	970
5	Quail Roost Pineland	Occupied	-	62	-	8	70	-	-	-	-	-	-	-	-	-
	Unoccupied	-	41	28	99	168	-	103	33	106	242	-	103	33	120	256
6	Camp Owaissa Bauer	Occupied	-	10	29	28	67	-	9	9	4	22	-	-	-	-
	Unoccupied	-	34	115	69	218	-	35	135	123	293	-	44	144	127	315
7	Navy Wells Pineland Preserve	Occupied	-	85	245	-	330	-	-	-	-	-	-	-	-	-
	Unoccupied	-	74	64	87	225	-	141	302	54	497	-	159	309	89	557
TOTAL	Occupied	55	183	818	124	1,180	145	41	22	6	214	-	-	-	-	-
	Unoccupied	281	364	406	415	1,466	191	488	1,205	505	2,389	336	547	1,234	588	2,705
	Total	336	547	1,224	539	2,646	336	529	1,227	511	2,603	-	-	-	-	-
	%	13%	21%	46%	20%	100%	13%	20%	47%	20%	100%	12%	20%	46%	22%	100%

Source: Personal communication with the U.S. Fish and Wildlife Service on February 12, 2014. GIS Shapefiles of Proposed Critical Habitat with Parcel Data and Occupancy Data.

Note: Totals may vary slightly from those presented in the Proposed Rule due to rounding.

EXHIBIT 2. OVERVIEW OF PROPOSED CRITICAL HABITAT



Legend

2 Pine Rocklands Plants proposed Critical Habitat

- Florida brickell-bush only
- Carter's small-flowered flax only
- Both species
- Unoccupied Habitat

- Data Sources:
1. US Fish and Wildlife Service
 2. Open Street Map
 3. ESRI

Coordinate System: NAD 1983 HARN
Albers Conical Equal Area



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SECTION 2. FRAMEWORK

Guidelines issued by the U.S. Office of Management and Budget (OMB) for the economic analysis of regulations direct Federal agencies to measure the costs and benefits of a regulatory action against a baseline (i.e., costs and benefits that are “incremental” to the baseline). OMB defines the baseline as the “best assessment of the way the world would look absent the proposed action.”⁸ In other words, the baseline includes any existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users absent the designation of critical habitat. The baseline includes the economic impacts of listing the species under the Act, even if the listing occurs concurrently with critical habitat designation. Impacts that are incremental to the baseline (i.e., occurring over and above existing constraints) are those that are solely attributable to the designation of critical habitat. This screening analysis focuses on the likely incremental effects of the critical habitat designation.

We consider incremental effects of the designation in two key categories: 1) those that may be generated by section 7 of the Act; and 2) other types of impacts outside of the context of section 7:

- **Incremental section 7 impacts:** Activities with a Federal nexus that may affect listed species are subject to section 7 consultation to consider whether actions may jeopardize the existence of the species, even absent critical habitat.⁹ As part of these consultations, critical habitat triggers an additional analysis evaluating whether an action will diminish the recovery potential or conservation value of the designated area. Specifically, following the designation, Federal agencies must also consider the potential for activities to result in the destruction or adverse modification of critical habitat. These consultations are the regulatory mechanism through which critical habitat rules are implemented. Any time and effort spent on this additional analysis, as well as the costs and benefits of implementing any recommendations resulting from this review, are economic impacts of the critical habitat designation.
- **Other incremental impacts:** Critical habitat may also trigger additional regulatory changes. For example, the designation may cause other Federal, state, or local permitting or regulatory agencies to expand or change standards or requirements. Regulatory uncertainty generated by critical habitat may also have impacts. For example, landowners or buyers may perceive that the rule will restrict land or water use activities in some way and therefore value the resource less than they would have absent critical habitat. This is a perceptual, or stigma, effect of critical habitat on markets.

⁸ OMB, “Circular A-4,” September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4. Circular A-4 provides “guidance to Federal Agencies on the development of regulatory analysis as required under Section 6(a)(3)(c) of Executive Order 12866...” (p. 1)

⁹ A Federal nexus exists for activities authorized, funded, or carried out by a Federal agency.

SECTION 3. SECTION 7 COSTS OF THE CRITICAL HABITAT RULE

In this section, we discuss the likelihood that the proposed designation of critical habitat will result in incremental costs through the section 7 consultation process. In the baseline, section 7 of the Act requires Federal agencies to consult with the Service to ensure that their actions will not jeopardize the pine rocklands plants. Once critical habitat is designated, section 7 also requires Federal agencies to ensure that their actions will not adversely modify critical habitat. Thus, a key focus of this screening analysis is whether the designation of critical habitat would trigger project modifications in order to avoid adverse effects to critical habitat that would be above and beyond any modifications triggered by adverse effects to the species itself.

The incremental section 7 costs of the proposed designation are likely to differ depending on whether a project occurs in unoccupied or occupied areas of the proposed designation, as follows:

- **Occupied Habitat:** In occupied areas, activities with a Federal nexus will be subject to section 7 consultation requirements regardless of critical habitat, due to the presence of the listed species. According to the Service, modifications to the primary constituent elements of critical habitat are closely tied to adverse effects to these plants; therefore, activities that would require consultation to consider the potential for adverse modification to critical habitat are primarily the same as activities that would require consultation to consider the potential to jeopardize these taxa. In addition, project modifications that may be needed to avoid jeopardizing the plants would simultaneously avoid adverse modification of critical habitat. The Service does not anticipate requesting project modifications to avoid impacts to critical habitat that are different from those needed to avoid jeopardy.¹⁰ When section 7 consultations occur, incremental costs are therefore likely to be limited to the additional administrative effort to consider adverse modification during the consultation process.
- **Unoccupied Habitat:** In unoccupied areas, activities with a Federal nexus would not be subject to section 7 consultation requirements absent critical habitat because the species is not present. Therefore, incremental costs in these areas could include both the administrative costs and the costs of developing and implementing conservation measures needed to avoid adverse modification of critical habitat.

As described in Section 1, five of the seven proposed critical habitat units for the brickell-bush are currently occupied by the species, and three of the seven proposed critical habitat units for the flax are currently occupied by the species. Within each proposed critical habitat unit, the Service delineates subunits identifying individual patches, or multiple patches having the same occupancy status that are separated only by a road.¹¹ Based on the information provided by the Service on the occupancy status of all of the subunits (103 in total), we isolate the unoccupied subunits of proposed

¹⁰ According to the Service, “[b]ased on the known projects that could occur in critical habitat, we do not anticipate project modifications to avoid impacts to critical habitat that are different than to avoid jeopardy in occupied habitat.” (U.S. Fish and Wildlife Service. March 11, 2014. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Florida Brickell-bush and Carter’s Small-flowered Flax. p. 22)

¹¹ Ibid.

critical habitat (73 total), as these are the units where we would expect the greatest incremental section 7 impacts.^{12,13}

Next, we identify those unoccupied subunits that fall within Florida Conservation Lands using the Florida Natural Areas Inventory.¹⁴ These lands are Federal, state, local, and private lands that are permanently protected and managed for conservation.¹⁵ We do not expect significant incremental impacts to occur in the unoccupied subunits that fall within these lands because they are already protected from the primary threats identified by the Service and are already managed for conservation. Therefore, we focus our analysis on the unoccupied subunits that fall outside of the Florida Conservation Lands (hereafter, “unoccupied and unprotected subunits”).

Finally, we determine which activities occurring in these unoccupied and unprotected subunits are likely to have a Federal nexus that would lead to section 7 consultation. The Service’s incremental effects memorandum identifies commercial and residential development and road construction and maintenance as the primary economic activities that constitute threats to the plants. The Service identifies inadequate fire management and incompatible management as additional principal threats to the species.¹⁶ We discuss each of these activities in greater detail in the following sections.

DEVELOPMENT

The most common Federal nexus for development activities is through section 404 of the Clean Water Act, which requires parties to obtain a permit from the U.S. Army Corps of Engineers prior to discharging dredge or fill into waters of the United States.¹⁷ Because the pine rocklands habitat does not contain streams or wetlands, it is unlikely that a 404 permit would be required for development, and a Federal nexus compelling section 7 consultation in proposed critical habitat is unlikely.¹⁸

Development projects undertaken by Federal agencies directly may also require section 7 consultation. However, according to feedback on the incremental effects memorandum from Federal landowners (the U.S. Coast Guard (USCG), U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration

12 Personal communication with the U.S. Fish and Wildlife Service on February 12, 2014. GIS Shapefiles of Proposed Critical Habitat with Parcel Data and Occupancy Data.

13 A total of 30 subunits are currently occupied by the species. If we assume that one formal consultation occurs for each of these subunits in a given year, and we estimate that the administrative costs of considering adverse modification in a formal consultation are \$5000, then the total incremental costs associated with the occupied subunits would be \$150,000. (This estimate of per-consultation administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2013, and a review of consultation records from several Service field offices across the country conducted in 2002.) However, this likely overstates the costs of critical habitat designation in occupied areas because projects requiring consultation are unlikely to occur in every subunit of the proposed designation in a given year.

14 Florida Natural Areas Inventory. December 2013. Florida Conservation Lands (FLMA) Shapefile. Accessed <http://fnai.org/gisdata.cfm>, March 4, 2014.

15 Personal communication with Conservation Lands Biologist, Florida Natural Areas Inventory on March 6, 2014.

16 U.S. Fish and Wildlife Service. March 11, 2014. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Florida Brickell-bush and Carter’s Small-flowered Flax.

17 16 U.S.C. § 1344.

18 Personal communication with U.S. Fish and Wildlife Service on March 6, 2014.

(NOAA), and U.S. Department of Agriculture (USDA)), there are no plans for development in the unoccupied and unprotected proposed critical habitat units.¹⁹

TRANSPORTATION

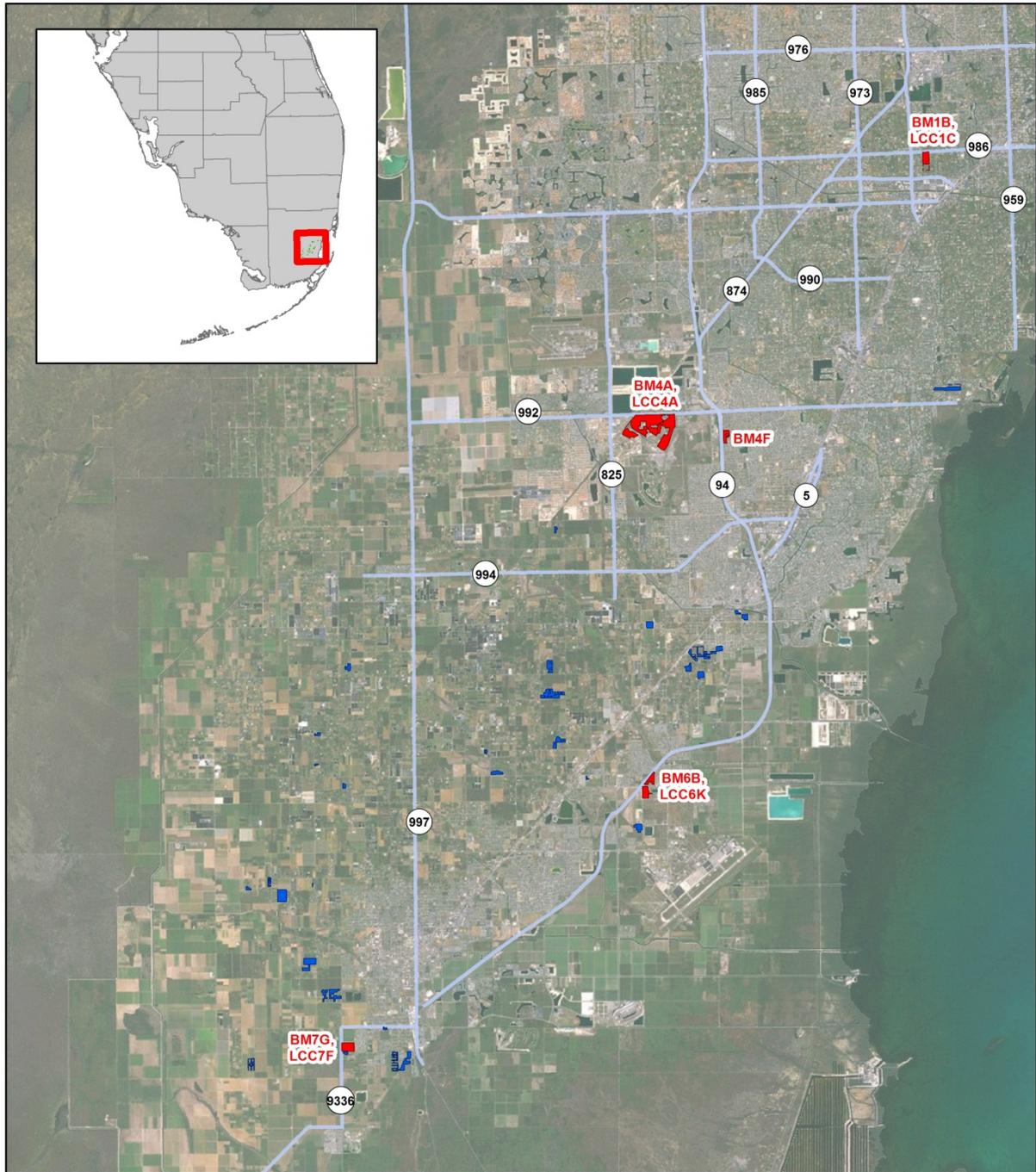
Transportation activities often rely on Federal funding from the U.S. Department of Transportation. This funding serves as a nexus for consultation with the Service under the Act. Florida Department of Transportation (FDOT) typically uses Federal funds for several projects each year that occur on State roadways (SRs) throughout Miami-Dade County.^{20,21} The following nine SRs occur in the area containing proposed critical habitat: 986, 990, 5, 992, 821, 994, 989, 997, and 9336. Only four of these SRs (986, 992, 821, and 9336) have unoccupied and unprotected critical habitat units adjacent to them. Exhibit 3 identifies these roadways as well as the adjacent unoccupied and unprotected proposed critical habitat units.

¹⁹ Personal communication with U.S. Fish and Wildlife Service on February 6, 2014.

²⁰ Personal communication with Florida Department of Transportation on March 18, 2014.

²¹ According to FDOT, most Federally-funded transportation projects in Miami-Dade County occur on SRs. Although it is possible that Federal funding may be allocated to local agencies for projects on roadways other than SRs, these projects are less common. We therefore focus our transportation analysis on SRs.

EXHIBIT 3. TRANSPORTATION ANALYSIS



Legend

— State roadways (SR)

Unoccupied and Unprotected Subunits

■ Adjacent to state roadways

■ Other

Data Sources:

1. US Fish and Wildlife Service
2. Florida DOT
3. US Census Bureau
3. ESRI

Coordinate System: NAD 1983 HARN
Albers Conical Equal Area



0 2 4 Miles

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According to FDOT, the majority of transportation projects occurring on these roadways are “RRR projects” – standard resurfacing, restoration, and rehabilitation projects.²² The work involved in these projects typically takes place on existing asphalt and in the existing right-of-way.²³ It is unlikely that the Service would request conservation measures for standard RRR projects where the project footprint does not extend past the currently paved roadways. More infrequently, FDOT undertakes larger-scale projects that involve expanding roadways by adding travel lanes.²⁴ For the purposes of this analysis, we consider the likely impacts associated with this type of larger-scale projects should they occur adjacent to the unoccupied and unprotected critical habitat units identified above.

According to the Service, should a transportation project involving roadway expansion occur adjacent to an unoccupied and unprotected critical habitat unit, the Service would likely work with FDOT to determine whether impacts to critical habitat could be avoided or minimized.^{25,26} Depending on the extent of the impacts, the Service may recommend that FDOT develop and implement a land management program for the affected site, which may include the following efforts:^{27,28}

1. Coordinating with a designated Service point of contact regarding prescribed fire and other habitat restoration or maintenance activities, including control of nonnative species.
2. Adjusting placement of new construction, roads, trails, firebreaks, and other developments to reduce impacts to Florida brickell-bush and Carter’s small-flowered flax critical habitat.
3. Providing training for staff and contractors involved with project implementation.
4. Preventing mechanical and herbicidal damage to Florida brickell-bush and Carter’s small flowered flax critical habitat.
5. Implementing measures to prevent the introduction of nonnative plant species by the use of heavy equipment into critical habitat.
6. Increasing or assisting in dispersal and recovery of Florida brickell-bush and Carter’s small flowered flax by conducting or promoting landscaping with these plants in natural areas and backyard gardens.

The Service estimates that the land management measures it would request in consultation with FDOT would cost approximately \$35 per acre on an annual basis.²⁹ This is the management cost that the Service uses when it asks applicants to generate

22 Personal communication with Florida Department of Transportation on March 18, 2014.

23 Ibid.

24 Ibid.

25 Note that consultation on such a project would only occur if the project involved Federal funding.

26 Personal communication with the U.S. Fish and Wildlife Service on March 19, 2014.

27 Ibid.

28 U.S. Fish and Wildlife Service. March 11, 2014. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Florida Brickell-bush and Carter’s Small-flowered Flax.

29 Personal communication with the U.S. Fish and Wildlife Service on March 19, 2014.

escrow funds for perpetual management of natural lands, and the Service believes this is a conservative (i.e., high end) estimate for the management of pine rocklands.³⁰

For the purposes of this screening analysis, we consider a situation in which, in a single year (2014), transportation projects involving roadway expansion occur adjacent to all of the unoccupied and unprotected proposed critical habitat units identified above. We estimate the costs that would be incurred if formal consultations take place for all of these projects and if, as a result of these consultations, FDOT implements land management activities in each of these units. Exhibit 4 presents the costs associated with this scenario, including the costs of formal section 7 consultations for each project as well as the land management costs. The total costs are estimated to be \$86,000 (2013 dollars).

EXHIBIT 4. INCREMENTAL COSTS ASSOCIATED WITH TRANSPORTATION ACTIVITIES (2013\$)

SUBUNIT	SIZE OF SUBUNIT (ACRES)	FORMAL CONSULTATION COSTS	LAND MANAGEMENT COSTS	TOTAL COSTS
BM1B/LCC1C	30	\$15,000	\$1,000	\$16,000
BM4A/LCC4A	199	\$15,000	\$6,900	\$22,000
BM4F	13	\$15,000	\$450	\$15,000
BM6B/LCC6K	35	\$15,000	\$1,200	\$16,000
BM7G/LCC7F	27	\$15,000	\$930	\$16,000
TOTAL	303	\$75,000	\$11,000	\$86,000
<p>Notes: The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.</p>				

The consultation costs presented in Exhibit 4 are estimated based on information collected previously from consultation records and discussions with multiple Service field offices. The estimated incremental administrative costs of a new formal consultation considering only adverse modification is \$15,000.³¹

LAND MANAGEMENT

We anticipate that Federal land managers will consult with the Service at the time of critical habitat designation to evaluate the impact of the activities outlined in their management plans to the proposed critical habitat. Two Federal agencies own land overlapping unoccupied and unprotected critical habitat subunit BM4A/LCC4A; USCG

³⁰ Personal communication with the U.S. Fish and Wildlife Service on March 19, 2014.

³¹ IEC analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2013, and a review of consultation records from several Service field offices across the country conducted in 2002. Estimates reflect average hourly time required by staff. The level of effort per consultation represents approximate average based on the best available cost information. The cost estimate is accordingly rounded to two significant digits to reflect this imprecision.

owns approximately 14 acres and USACE owns approximately 91 acres.³² We conservatively forecast that formal consultations will occur with each landowner following the designation of critical habitat in 2014, and that the Service will recommend that each landowner implement land management activities for critical habitat.³³ We apply the Service’s cost estimate of \$35 per acre for land management efforts to the total acreage owned by USCG and USACE that overlaps with unoccupied and unprotected proposed critical habitat. Exhibit 5 presents the costs associated with these forecasted consultations and land management efforts.

EXHIBIT 5. INCREMENTAL COSTS ASSOCIATED WITH LAND MANAGEMENT ACTIVITIES (2013\$)

SUBUNIT	FORMAL CONSULTATION COSTS	LAND MANAGEMENT COSTS	TOTAL COSTS
BM4A/LCC4A	\$30,000	\$3,700	\$34,000
TOTAL	\$30,000	\$3,700	\$34,000

Notes: The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.

SECTION 4. OTHER COSTS OF THE CRITICAL HABITAT RULE

This section discusses the potential for incremental costs to occur outside of the section 7 consultation process. These types of costs include triggering additional requirements or project modifications under state laws or regulations, and perceptual effects on markets. These types of impacts may occur even when activities do not have a Federal nexus for consultation.

ADDITIONAL STATE AND LOCAL REGULATION

Indirect incremental impacts may occur if the designation of critical habitat increases awareness of the presence of the species or the need for protection of its habitat. As shown in Exhibit 6, several programs in Miami-Dade County are already established to protect pinelands. Although these programs may not provide sufficient protection in and of themselves, their existence suggests that state agencies are likely to be aware of the habitat and the presence of environmentally sensitive species. We therefore assume that the designation of critical habitat is unlikely to trigger additional county-level restrictions as a result of increased awareness of the species and its habitat. The Service did not receive any public comments on the proposed rule suggesting this conclusion was incorrect.

³² Note that other Federal landowners own lands within the proposed critical habitat designation, but these lands are either occupied by the species or fall within the Florida Conservation Lands.

³³ The U.S. Army Corps of Engineers does not yet have an Integrated Natural Resources Management Plan (INRMP) in place. According to the Sikes Act (16 USC 670a-f), INRMPs are required to provide for the conservation and rehabilitation of natural resources on military installations. The cost of developing an INRMP is therefore not considered to be an incremental effect of the rule; however, the development and implementation of land management specifically for the critical habitat would be considered incremental impacts of the designation.

EXHIBIT 6. CURRENT PROTECTIONS FOR THE 2 PINE ROCKLANDS PLANTS AND HABITAT

PROGRAM	PROTECTION AFFORDED THE SPECIES AND HABITAT
Miami-Dade's Environmentally Endangered Lands (EEL) Program	Concerned about the continuing loss of pinelands and other natural areas, Dade County voters approved a two-year property tax increase in 1990 to acquire, protect, and manage environmentally endangered lands. The EEL program aims to purchase high value pineland and other natural areas from willing sellers, as funds permit, and to protect them from development. Since the program's inception, 850 acres of privately held pineland have been selected for acquisition.
EEL Covenant Program	In 1979, Miami-Dade County enacted this program, which reduces taxes for private landowners of natural forest communities (including pine rocklands) who agree not to develop their property and to manage it for a period of 10 years, with the option to renew for additional 10-year periods. Although these temporary conservation easements provide valuable protection for their duration, they are voluntary agreements and not regulatory in nature.
Pine Rockland Initiative	Since 2005, the Service has funded the Institute for Regional Conservation (IRC) to facilitate restoration and management of privately owned pine rocklands habitat in Miami-Dade County. These programs include prescribed burns, nonnative plant control, light debris removal, hardwood management, and other efforts. One of these programs, called the Pine Rockland Initiative, includes 10-year cooperative agreements between participating landowners and the Service/IRC to ensure restored areas are managed appropriately.
<p>Sources:</p> <ol style="list-style-type: none"> 1. Miami-Dade County. 2014. Environmentally Endangered Lands Program. Accessed http://www.miamidade.gov/environment/pine-rocklands.asp, March 20, 2014. 2. U.S. Fish and Wildlife Service. March 11, 2014. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Florida Brickell-bush and Carter's Small-flowered Flax. 	

POSSIBLE IMPACTS OF PUBLIC PERCEPTION

Comments received regarding proposed designations of critical habitat in various locations throughout the United States indicate that the public perceives critical habitat designation as possibly resulting in incremental changes to private property values, above and beyond those associated with specific forecast project modifications under section 7 of the Act.³⁴ These commenters believe that, all else being equal, a property that is inhabited by a threatened or endangered species, or that lies within a critical habitat designation, will have a lower market value than an identical property that is not inhabited by the species or that lies outside of critical habitat. This lower value results from the perception that critical habitat will preclude, limit, or slow development, or somehow alter the highest and best use of the property. Public attitudes about the limits and costs that the Act may impose can cause real economic effects to the owners of property, regardless of whether such limits are actually imposed. Over time, as public awareness grows of the regulatory burden placed on designated lands, particularly

³⁴ See, for example, public comments on the possible impact of designating private lands as critical habitat for the Northern spotted owl (as summarized in Industrial Economics, Incorporated. Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl: Final Report. Prepared for the U.S. Fish and Wildlife Service. November 20, 2012. (p. 5-21) and the cactus ferruginous pygmy owl (as summarized in Industrial Economics, Incorporated. Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl. Prepared for the U.S. Fish and Wildlife Service. June 1999. p. 44)).

where no Federal nexus compelling section 7 consultation exists, the effect of critical habitat designation on properties may subside.

To evaluate the possible magnitude of such costs, we conduct a bounding analysis. We estimate the land values for privately-owned properties within the designation that may be subject to development pressure in the foreseeable future. In this case, because the proposed designation is located within Miami-Dade County, we assume all of the properties may be subject to development pressure except for those located in Florida Conservation Lands.

Public perception may diminish land values by some percent of these total values. Data limitations prevent us from estimating the size of this percent reduction. Assuming that the entire value of the land located in proposed critical habitat is lost would likely overstate impacts. In addition, these properties may experience similar perception-related effects for a variety of other reasons, including the presence of the listed species, reducing the incremental portion of the impact attributable to the proposed critical habitat. Thus, the total value of the private lands overlapping proposed critical habitat (outside of Florida Conservation Lands) represents the upper bound on possible costs rather than a best estimate of likely costs.

We identify approximately 447 acres of privately-owned, unprotected land within the proposed critical habitat designation. Using data from the Property Tax Data Files for Miami-Dade County, we estimate the total value of these parcels. Costs resulting from public perception of the effect of critical habitat designation would likely represent some fraction of this total value.³⁵

SECTION 5. SECTION 7 AND OTHER ECONOMIC BENEFITS

The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the two pine rocklands plants. As described in the previous sections of this memorandum, the designation may result in incremental conservation efforts for the plants, including implementation of land management efforts for pine rocklands habitat.

Various economic benefits may result from these incremental conservation efforts, including: (1) those associated with the primary goal of species conservation (i.e. direct benefits), and (2) those additional beneficial services that derive from conservation efforts but are not the purpose of the Act (i.e. ancillary benefits).

In order to quantify and monetize these benefits, information would be needed to determine (1) the incremental change in the probability of plant conservation expected to result from the designation, and (2) the public's willingness to pay for such beneficial changes.³⁶ Although numerous published studies estimate individuals'

³⁵ For additional detail describing our identification of acres most likely to be subject to development pressure in the foreseeable future and the value of these acres, see Industrial Economics, Incorporated. Memorandum to the U.S. Fish and Wildlife Service on "Supplemental Information on Land Values - Critical Habitat Designation for Florida Brickell-bush and Carter's Small-flowered Flax." March 25, 2014.

³⁶ For a detailed discussion of these data limitations, see Flight, M. and R. Unsworth, Industrial Economics, Incorporated. 2011. Quantifying Benefits of Critical Habitat Designation for Listed Species. Memorandum to Douglas Krofta, U.S. Fish and Wildlife Service.

willingness to pay to protect endangered species, we are not aware of any published studies that estimate the value the public places on preserving the plants.³⁷ In addition, we do not have information on the expected change in species population levels that may result from critical habitat designation for the plants. Lacking these data, we are not able to quantify the primary species conservation benefit of the critical habitat designation.

We therefore provide a qualitative summary of the categories of benefits that may result from implementation of the incremental conservation efforts described in this memorandum. Exhibit 7 provides information on these ancillary benefits and where they are expected to occur. In addition to the benefits listed in Exhibit 9, the maintenance or enhancement of use and non-use values for coexisting species, or for biodiversity in general, may also result from the incremental conservation efforts for the plants.

EXHIBIT 7. POSSIBLE INCREMENTAL CONSERVATION EFFORTS FOR THE PLANTS AND ASSOCIATED BENEFITS

POSSIBLE INCREMENTAL CONSERVATION EFFORT	ASSOCIATED BENEFITS	RELEVANT UNITS
Adjusting placement of new construction, roads, trails, and other developments	<ul style="list-style-type: none"> Improved quality of pine rocklands Ecosystem health for coexisting species 	BM1B/LCC1C; BM4A/LCC4A; BM4F; BM6B/LCC6K; BM7G/LCC7F
Providing training for staff and contractors involved with project implementation	<ul style="list-style-type: none"> Educational benefits 	BM1B/LCC1C; BM4A/LCC4A; BM4F; BM6B/LCC6K; BM7G/LCC7F
Implementing measures to prevent the introduction of nonnative species and promoting landscaping with the plants in natural areas to increase recovery of the species	<ul style="list-style-type: none"> Ecosystem health for coexisting native species 	BM1B/LCC1C; BM4A/LCC4A; BM4F; BM6B/LCC6K; BM7G/LCC7F
<p>Note: All conservation efforts are intended to support the survival and/or recovery of the species.</p>		

SECTION 6. SUMMARY

This analysis estimates section 7 and other costs likely to result from the proposed critical habitat designation for the plants. To determine section 7 costs, the analysis forecasts the total number of future consultations likely to occur for transportation and land management activities with a Federal nexus occurring within proposed unoccupied critical habitat. In addition, the analysis forecasts costs associated with conservation efforts that may be recommended in consultation for these activities. The total quantifiable incremental section 7 costs associated with the proposed designation are estimated to be \$120,000 (2013 dollars) in 2014. Exhibit 8 presents the total costs by

³⁷ See, for example, Loomis, J.B. and Douglas S. White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis. *Ecological Economics*, 18(3): 197-206.

subunit, indicating that subunit BM4A/LCC4A is expected to generate the greatest incremental costs. This is due to the fact that consultations are forecast to occur in this unit for both transportation and land management activities.

EXHIBIT 8. TOTAL ESTIMATED INCREMENTAL COSTS (2013\$)

UNIT	TOTAL COSTS
BM1B/LCC1C	\$16,000
BM4A/LCC4A	\$56,000
BM4F	\$15,000
BM6B/LCC6K	\$16,000
BM7G/LCC7F	\$16,000
TOTAL	\$120,000
<p>Notes: The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.</p>	

As to other costs, this analysis concludes that the designation of critical habitat is unlikely to trigger additional requirements under state or local regulations. In addition, an analysis contained in a separate supplemental memorandum assessing the potential perceptual effects on development concludes that the aggregate land value of private lands overlapping proposed critical habitat units (outside of Florida Conservation Lands) is less than \$100 million.

Based on the sum total of the section 7 costs and the aggregate value of private lands potentially susceptible to perception effects, we conclude that critical habitat designation for the plants is unlikely to generate costs exceeding \$100 million in a single year. The magnitude of benefits is highly uncertain, and quantification would require primary research and the generation of substantial amounts of new data, which is beyond the scope of this memorandum and Executive Order 12866.³⁸

³⁸ Executive Order 12866 directs agencies to base regulatory decisions on “the best reasonably obtainable scientific, technical, economic, and other information concerning the need for, and consequences of, the intended regulation” (58 FR 51736). For a detailed discussion of data limitations associated with the estimation of critical habitat benefits, see Flight, M. and R. Unsworth, Industrial Economics, Incorporated. 2011. Quantifying Benefits of Critical Habitat Designation for Listed Species. Memorandum to Douglas Krofta, U.S. Fish and Wildlife Service.