U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Chromolaena frustrata* (= *Eupatorium frustratum*)

COMMON NAME: Cape Sable thoroughwort

LEAD REGION: 4

INFORMATION CURRENT AS OF: June 2007

STATUS/ACTION:

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

___ New candidate

_X_ Continuing candidate

__ Non-petitioned

X_ Petitioned - Date petition received: May 11, 2004

_ 90-day positive - FR date:

_ 12-month warranted but precluded - FR date:

_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, since publication of the last CNOR, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs) because most of our national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken, see the discussion of "Progress on Revising the Lists" in the current CNOR, which can be viewed on our Internet website (http://endangered.fws.gov/).

__ Listing priority change

Former LP: ___

New LP: ___

Date when the species first became a Candidate (as currently defined): October 25, 1999

___ Candidate removal: Former LP: ___

___ A - Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
___ F - Range is no longer a U.S. territory.
___ I - Insufficient information exists on biological vulnerability and threats to support listing.
___ M - Taxon mistakenly included in past notice of review.
___ N - Taxon may not meet the Act's definition of "species."
___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Asteraceae (Compositae), Aster Family

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Florida, U.S.A.

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Florida, Monroe County, U.S.A.

LAND OWNERSHIP: Varied, see Tables 1 and 2 based on Bradley and Gann (1999), Bradley and Gann (2004), and data from The Institute for Regional Conservation (IRC) (K. Bradley, IRC, pers. comm. 2007). The largest population is in private ownership at Big Munson Island (approximately 100 acres [40.5 hectares (ha)]), which is owned by The Boy Scouts of America.

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LEAD FIELD OFFICE CONTACT: South Florida Ecological Services Office, Paula Halupa, 772-562-3909 ext 257, paula_halupa@fws.gov

BIOLOGICAL INFORMATION:
Species Description: Bradley and Gann (1999) describe Cape Sable thoroughwort as an "erect fragrant herb 2-10 dm tall with 1-many stems, hirtellous-puberulent or short spreading hirsute throughout; leaves opposite, 3-nerved, 1.5-4 × 0.7-2 cm on a slender petiole 4-10 mm long, lance-ovoid to broadly ovate, toothed or subentire; heads in small clusters ending the numerous branches, forming a diffuse inflorescence; involucre 5.5-7.5 (-8) mm high; bracts strongly imbricate in several series; flowers ca. 20-25 or more, blue or lavender; achenes (3-) 3.5-4 mm long. (Adapted from Cronquist 1980)."

Taxonomy: Bradley and Gann (1999) provided a complete history of the taxonomy. "Chapman (1886) was the first to report this species in Florida, calling it *Eupatorium heteroclinium*, reporting it for the 'Keys of South Florida'." (Bradley and Gann 1999). *E. heteroclinium* had been named by Grisebach in 1864, as a species from Jamaica (Bradley and Gann 1999). John Kunkel Small also used this specific epithet, but he moved the species to the genus *Osmia* (Bradley and Gann 1999). In 1911, Benjamin Lincoln Robinson recognized the plant from the

Keys as an endemic, naming it *Eupatorium frustratum*. Small's floras (1913, 1933) called it *Osmia frustrata*, as did Ledin (1951). In 1970, R. M. King and H. E. Robinson placed this species in the genus *Chromolaena* (Bradley and Gann 1999). Floras by Long and Lakela (1971) and Cronquist (1980) reverted back to *Eupatorium* (which was traditionally treated as a large genus). Wunderlin (1998) and Wunderlin and Hansen (2003) use *Chromolaena frustrata* (Bradley and Gann 1999). In summary, this plant has been consistently recognized as a Florida Keys endemic since 1911.

The Integrated Taxonomic Information System (ITIS) (2007) indicates that the taxonomic standing for *Chromolaena frustrata* (B. L. Robinson) King and H. E. Robinson is accepted. Synonyms include: *Eupatorium frustratum* B. L. Robinson and *Osmia frustrata* (B. L. Robinson) Small (ITIS 2007). The online Atlas of Florida Vascular Plants (Wunderlin and Hansen 2004) uses the name *C. frustrata*. NatureServe (2006) uses the name *E. frustratum*. The Florida Department of Agriculture and Consumer Services (FDACS) also uses the name *E. frustratum*, but acknowledges that Wunderlin uses *Chromolaena frustratum* (Coile and Garland 2003). We have carefully reviewed the available taxonomic information to reach the conclusion that the species is a valid taxon.

Habitat: Bradley and Gann (1999) summarized the habitat as follows, "This herb has been observed most commonly in open sun to partial shade at the edges of rockland hammock and in coastal rock barren. It was historically known from coastal berm along the northern edges of Florida Bay. It is often found under other plant species, buffering it from full exposure to the sun. It has not been observed in disturbed areas. Coastal rock barrens are open communities with no tree canopy and a sparse subcanopy of understory hardwoods. Coastal rock barrens are composed of exposed Key Largo Limestone with a diverse assemblage of herbaceous plant taxa, many of which are halophytes." The ecology of coastal barrens is poorly understood. Periodic storm events may be responsible for maintaining the community (Bradley and Gann 1999).

Cape Sable thoroughwort sometimes occurs along the sparsely vegetated edges of rockland hammocks, which abut coastal swamp forest or buttonwood forests (Bradley and Gann 1999). In these cases, plants can be found on exposed bare rock or in a light layer of leaf litter in filtered sunlight (Bradley and Gann 1999).

Historical Range/Distribution: The historical range for Cape Sable thoroughwort was the Florida Keys from Key Largo to Boca Grande Key (12 miles west of Key West) and the southern mainland from the Cape Sable or Flamingo area to the Madeira Bay area in what is now Everglades National Park (ENP) (Bradley and Gann 2004).

Mainland (ENP) — Bradley and Gann (2004) provide the following history of this species on the mainland. In 1916, John Kunkel Small observed in a hammock near the west end of Madeira Bay, along the edge of Florida Bay in what later became ENP. In 1921, Small and others collected specimens farther west, in hammocks between West Lake and Flamingo (collection number 9995, New York Botanical Garden herbarium). Bruce Ledin made collections of the species in 1947, one labeled "Cape Sable" and another labeled "Stream Bank, above Cape Sable." However, the location of Ledin's collection is uncertain because botanical collectors have used the term "Cape Sable" to refer to the greater Cape Sable/Flamingo region, not just the

Cape itself. Avery (1983) observed plants in low hammocks at two locations, along the west side of the Buttonwood Canal north of Bear Lake Road and south of West Lake.

Florida Keys — Bradley and Gann (2004) stated, "*C. frustrata* was historically known from nearly the entire range of the Florida Keys, from Key Largo near the upper end, to Boca Grande Key, west of Key West. It has never been found on the islands north of Key Largo in Biscayne National Park, despite extensive survey work . . . . It has also never been found west of Boca Grande in the Marquesas or Dry Tortugas, areas that have also been well explored by botanists."

Bradley and Gann (2004) provided the following history:

- Big Pine Key — Collected between 1838 and 1853. Another collection, without locality data, was made in 1955. Recent surveys have not found this plant.
- Boca Grande Key — Collected in 1940, but not seen in 1996. Plants seen in 2003.
- Fiesta Key — Probably collected in 1875 by Alvan W. Chapman. This island is occupied by a campground and is devoid of natural vegetation.
- Key Largo — Northernmost island of occurrence. The species was collected in 1880 (Robinson 1911) and 1930. This large island has undergone extensive disturbance and development, so historic locations are likely to have been destroyed.
- Key West — Collected between 1838 and 1853 (Robinson 1911). Only a small fragment of hammock exists at Little Hamaca Park.
- Knights Key — Observed by George N. Avery in 1962. A collection was made in 1979. Residential development occupies the island's uplands. No suitable habitat remains on the island.
- Lignumvitae Key — Collected in the late nineteenth century. Now part of Lignumvitae Key Botanical State Park, plants still present.
- Long Key — First collected in 1875. Ann Buckley and Ted Hendrickson (in 1986) and Keith Bradley (in 1995) collected it in a coastal rock barren on the Florida Bay side of Long Key State Park. Plants still present.
- Lower Matecumbe Key — First collected in 1930. Plants recently reported by Janice Duquesnel (Florida Department of Environmental Protection [FDEP], pers. comm. 2005).
- Upper Matecumbe Key — Collected in 1892. Subsequent collections were made in 1919, 1962, 1968, and by Keith Bradley in 1998. Plants found in 2003.

According to Bradley and Gann (2004), numerous reports appear suspect. These include: Roger Hammer (1995) from Greynolds Park, north of Buena Vista in Miami-Dade County; Moldenke (1940) from Buena Vista in Miami-Dade County (collection number 5459) and from "Turner's River Hammock" in Collier County (collection number 5770); and Small (1933) from hammocks of the Ten Thousand Islands.

Current Range/Distribution: Bradley and Gann (2004) found Cape Sable thoroughwort on five islands in the Keys (Upper Matecumbe Key, Lignumvitae Key, Big Munson Island, Boca Grande, Long Key) and one small area of the Everglades in ENP. Based upon Bradley and Gann (1999, 2004) and recent data from IRC (K. Bradley, pers. comm. 2007), this plant is extant at the

nine sites in Table 2. Information regarding threats at some sites was obtained from Janice Duquesnel (FDEP, pers. comm. 2005) and Hodges and Bradley (2006).

Table 2. Extant occurrences of Cape Sable thoroughwort.

Site	**Owner**	**County**	**Population Size**	**Threats**	**Post-Hurricane Wilma (populations / habitat)**
Everglades National Park (ENP)	National Park Service (NPS)	Miami-Dade, Monroe	<150	exotic plants	plants cannot be found, habitat altered
ENP, Coastal Prairie Trail	NPS	Monroe	unknown	not assessed	site probably destroyed by storm surge; plants cannot be found
Lignumvitae Key State Botanical Site, Klopp Tract, Lower Matecumbe Key	FDEP	Monroe	10-100 (~81)	exotic plants, trail maintenance, planned development	probably declined
Long Key Layton Coastal Rock Barren	private	Monroe	100-1,000 (~162)	exotic plants, development	probably declined / coastal rock barren inundated
Long Key State Park	FDEP and private land (on acquisition list)	Monroe	100-1,000 (~200+)	exotic plants, development (unacquired parcels only)	probably declined / rock barren received storm surge
Upper Matecumbe Key	private	Monroe	10-100	exotic plants, development	probably declined
Big Munson Island	The Boy Scouts of America	Monroe	1000s (several thousand)	herbivory, return of overstory (following Hurricane Georges in 1998), exotic plants, possible development in future (non-imminent)	probably declined
Boca Grande Key, Key West National Wildlife Refuge	Service	Monroe	25	not assessed	probably declined
Upper Matecumbe Key, Choate Tract (formerly Teatable Hammock, new addition to Lignumvitae Key Botanical State Park	FDEP	Monroe	18	not assessed (likely exotic plants, maintenance activities, illegal dumping, public use)	probably declined

Everglades National Park — Bradley and Gann (2004) searched the Flamingo region but did not visit areas south of West Lake or to Madeira Bay. They observed fewer than 150 plants. Colonies "occurred along the ecotone between coastal berm and salt marshes dominated by *Conocarpus erectus* and halophytes (e.g. *Sesuvium portulacastrum*, *Batis maritima*, *Salicornia perennis*). At all of the locations where *C. frustrata* was observed, the plants were found in a narrow sub-habitat along the ecotone, in areas of scattered sunlight dominated by *Dicliptera sexangularis* and *Alternanthera flavescens* in the herb layer and by various woody species including *C. erectus*, *Randia aculeate*, *Eugenia foetida*, *Sideroxylon celastrinum,* and *Capparis*

flexuosa. *C. frustrata* was found in nearly all of the localities surveyed where this assemblage was found." (Bradley and Gann 2004). "The edges of coastal berms in Everglades National Park have sustained human impacts such as road construction or clearing and exotic pest plant invasions that have probably caused a decline in the number of *C. frustrata* there…." (Bradley and Gann 2004).

Population Estimates/Status: See Table 2 above. The only large population is on Big Munson Island (Bradley and Gann 2004). Bradley and Gann (2004) stated that "fewer than 5,000 plants are estimated to exist, with all but about 500 of these present on a single privately owned island." The population in ENP was estimated at 150, but it has not been located since Hurricane Wilma (K. Bradley, pers. comm. 2007). Botanists from the IRC, ENP, and Fairchild Tropical Botanic Garden looked for the two populations at ENP after Hurricane Wilma, but did not find any signs of either population and noted that the habitat was significantly altered (J. Maschinsky, Fairchild Tropical Botanic Garden, pers. comm. 2007). Based upon information from Keith Bradley (pers. comm. 2007) and Janice Duquesnel (pers. comm. 2005), it appears that all occurrences of Cape Sable thoroughwort either probably declined or the site was impacted (e.g., rock barren inundated) due to Hurricane Wilma.

The global status of Cape Sable thoroughwort is considered to be G1, critically imperiled (NatureServe 2006, Florida Natural Areas Inventory 2006). IRC considers this plant to be critically imperiled (Gann et al. 2002). Cape Sable thoroughwort is listed as endangered by the State.

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.
Most of this species' habitat has been negatively altered or destroyed by human activity. Although this species was found on five Keys in a recent survey, it no longer is known from six other islands where it had been collected, largely due to development (Bradley and Gann 2004). Former sites in Islamorada, Knight's Key, Lower Matecumbe Key, Key Largo, and Key West have been lost due to extensive development. Most of the ecosystems on the Keys have been impacted by humans, through widespread clearing of rockland hammocks in the 19th century for farming or building of homes and businesses (Hodges and Bradley 2006). Extensive areas of rockland hammock, pine rockland, and other ecosystems have been lost (Hodges and Bradley 2006). Bradley and Gann (2004) estimated that the Cape Sable thoroughwort has been extirpated from half of the islands where it occurred.

Extant occurrences on private land remain threatened by development (Table 2) (Bradley and Gann 1999, Bradley and Gann 2004) and habitat destruction is considered a major threat (Gann et al. 2002). Any suitable rock barren habitat or rockland hammock on private lands within the species' historic range is threatened by development. Monroe County, which consists of the Keys and mostly-uninhabited mainland, is expected to experience moderate population growth. Average annual population growth for Monroe County, 2000-2004 is 0.62 percent per year and the trend is 1 percent per year or less (Florida Trend 2004). Monroe County has limits on development and considerable areas of natural vegetation have been set aside. However, a more recent report suggests that between 2005 and 2060

Florida's population is projected to double from approximately 18 to 36 million people (Zwick and Carr 2006). Assuming a similar pattern of development at current gross urban densities for each county, this translates into the need to convert an additional 7 million acres of undeveloped land into urban land uses (Zwick and Carr 2006). All vacant land in the Keys is projected to be consumed by development by 2060, including lands not necessarily accessible by automobile (1000 Friends of Florida 2006).

Prior to Hurricane Wilma, the Cape Sable thoroughwort population was estimated at less than 5,000 plants, with all but 500 present on a single privately owned island (Bradley and Gann 2004). At this time, we do not believe that this site, owned by the Boy Scouts of America, is at risk for development. However, as development pressure and public use needs increase in the Keys, this situation may change. Bradley and Gann (2004) stated that acquisition of the privately owned North Layton Hammock, however, should be a priority. While the State has acquired a portion of this area, further habitat protection is necessary (Bradley and Gann 2004).

In addition, a few occurrences for Cape Sable thoroughwort on public land have been impacted and will likely continue to be impacted by development. The edges of coastal berms in ENP have sustained human impacts such as road construction or clearing, which have probably caused a decline in the number of plants there (Bradley and Gann 2004). With increased public use, this is likely to continue. After discovery of Florida indigo (*Indigofera mucronata* var. *keyensis*), a candidate species, at the Klopp Tract, which is part of Lignumvitae Key Botanical State Park and owned by FDEP, a road was constructed through the population by the State of Florida for access to new park headquarters and maintenance facilities; additional development is planned (Hodges and Bradley 2006). Cape Sable thoroughwort may also be at risk at the Klopp tract because it occurs in the same habitat type.

Given the small number of plants at most sites and the species' restricted range, it is not clear that existing occurrences are large enough to persist. Persistence of Cape Sable thoroughwort throughout its range will likely be largely dependent upon the implementation and success of management measures, such as exotic plant control.

B. Overutilization for commercial, recreational, scientific, or educational purposes. None known.

C. Disease or predation. Bradley and Gann (2004) reported that the large population on Big Munson Island suffered from severe herbivory, but no insects were observed on any plants. We consider this a natural situation; it does not appear to constitute a threat to the species at this time.

D. The inadequacy of existing regulatory mechanisms. FDACS has designated *Chromolaena frustrata* (= *Eupatorium frustratum*) as endangered under Chapter 5B-40, Florida Administrative Code. This listing regulates take without permission of the landowner. It provides little or no habitat protection beyond the State's Development of Regional Impact process, which serves to disclose impacts from projects, but provides no regulatory protection for plants listed by FDACS on private lands. Without local or county ordinances

preventing the destruction of the plant, conservation does not occur.

E. Other natural or manmade factors affecting its continued existence. Exotic plants are a threat to Cape Sable thoroughwort at nearly all extant occurrences (Table 2) (Bradley and Gann 2004; K. Bradley, pers. comm. 2007). Brazilian pepper (*Schinus terebinthifolius*) and latherleaf (*Colubrina asiatica*) are of most significant concern for this species (Bradley and Gann 1999, Bradley and Gann 2004). Brazilian pepper occurs in all habitats where this species occurs and is a serious problem in coastal rock barrens and rockland hammock ecotones (Bradley and Gann 1999). Brazilian pepper forms dense thickets of tangled woody stems that completely shade out and displace native vegetation (Langeland and Craddock Burks 1998). This can make habitat conditions unsuitable for Cape Sable thoroughwort, which requires open sun to partial shade. Latherleaf is invading large areas of hammocks within ENP along the edge of Florida Bay (Bradley and Gann 1999). However, habitat loss and modification on public lands and one private site is considered less imminent. Nearly all occurrences are currently threatened by exotic species, removal of exotics, or incompatible management practices. However, some efforts are underway to control exotics on conservation lands. Hurricane Wilma has impacted existing occurrences in the short-term; long-term effects are unknown. Overall, the threat from hurricanes is considered imminent. Problems associated with small and isolated occurrences are likely currently occurring. Viable populations of short-lived herbs may be tens of thousands of individuals; the total population size for this species was thought to be only 5,000 prior to Hurricane Wilma. Threats associated with small population size are likely currently occurring; not even the largest occurrence may be viable. Viability is even more uncertain following Hurricane Wilma. Overall, threats are imminent.

Rationale for Change in Listing Priority Number (insert if appropriate): N/A

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. Although the population size and overall viability is in question following Hurricane Wilma, this species is somewhat protected on several public lands. With proper management, some threats to this species can be removed or reduced. There is potential to reintroduce this species to suitable habitat within its range.

DESCRIPTION OF MONITORING: The Service funded a status survey and monitoring for this species performed by IRC in 2003 (Bradley and Gann 2004), but monitoring for this species is not being actively or regularly conducted.

Monitoring of plants on State Park properties is conducted every five years. The Service remains in contact with land managers in the Keys.

COORDINATION WITH STATES
Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: The Service requested new information (observations, data, reports) regarding the status of this plant or any new information regarding threats to this species from numerous agencies, organizations, academic institutions, and other interested parties, including the following: FDACS, NPS, Service (National Wildlife Refuges), FDEP,

Florida Natural Areas Inventory, IRC, Historic Bok Sanctuary, The Nature Conservancy, Fairchild Tropical Botanic Garden, Archbold Biological Station, Miami University, University of Central Florida, University of Florida, Princeton, and other botanists. Keith Bradley (IRC) provided new information or data, which has been incorporated into this assessment. Previously, Janice Duquesnel (FDEP) provided information regarding the species status and efforts to remove exotics at select parks, owned and managed by FDEP; this information has been incorporated into this assessment.

In addition, a previous version of this form was sent to IRC and Historic Bok Sanctuary. Cheryl Peterson, Conservation Program Manager at Historic Bok Sanctuary, forwarded a previous version of this form to the Rare Plant Task Force, which is comprised of more than 80 members. However, no new information was received to date as a result of that effort.

Indicate which State(s) did not provide any information or comments: Florida. However, information from Janice Duquesnel (FDEP) regarding this species at select FDEP properties was obtained and incorporated into this assessment.

Although not included in the State Wildlife Action Plan since Florida's plan does not specifically list plant species, the global status of Cape Sable thoroughwort is considered to be G1, critically imperiled (NatureServe 2006, Florida Natural Areas Inventory 2006) and IRC considers this plant to be critically imperiled (Gann et al. 2002). Cape Sable thoroughwort is listed as endangered by the State.

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Appendix 1. Threats Assessment: Cape Sable thouroughwort

Factor	Stressor	Source	Scope	Immediacy	Intensity	Exposure	Response	Overall Threat Level
A: Destruction, Modification, or Curtailment of Habitat	loss of habitat	residential, commercial, urban development; agriculture	Moderate	Historical, imminent, and future	High	Very significant (historic); significant (current)	Basic need inhibited, reduction in survival and reproduction, mortality	High
B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes	Not applicable - no current threat exists	NA	NA	NA	NA	NA	NA	NA
C: Disease or Predation	Not applicable - no current threat exists	NA	NA	NA	NA	NA	NA	NA
D: Inadequacy of Existing Regulatory Mechanisms	no substantive protection of occupied or suitable habitat	inadequate regulations	Moderate	Historical, imminent, and future	Moderate	Very significant (historic); significant (current)	Basic need inhibited, reduction in survival and reproduction, mortality	Moderate
E: Other Natural or Man-made Factors	loss and modification of habitat	invasive exotic species	Moderate	Imminent, historical, and future	High	Very significant	Basic need inhibited, reduction in survival and reproduction, mortality	High
	loss and modification of habitat	control of exotic species, habitat restoration work	Localized	Imminent, historical, and future	High	Moderate	Basic need inhibited, reduction in survival and reproduction, mortality confirmed	Moderate

	loss and modification of habitat, disturbance	trail maintenance, incompatible management practices	Localized	Imminent, historical, and future	High	Moderate	Basic need inhibited, reduction in survival and reproduction, mortality confirmed	Moderate
	prolonged saltwater exposure, debris following storm, alteration of habitat	hurricanes, tropical storms, storm surge[1]	Regional	Historical, imminent, and future	High	Very significant	Basic need inhibited, reduction in survival and reproduction, mortality	High
	loss and modification of habitat	sea level rise	Regional	Future, imminent, and historical	High	Small (current); Very Significant (future)	Basic need inhibited, reduction in survival and reproduction, mortality	Low (current), Severe (future)
	loss and modification of habitat	changes in fresh water deliveries, construction of the Buttonwood Canal	Localized	Future	Unknown	Unknown	Unknown	Unknown
	genetic drift, inbreeding, loss of genetic variability, random or chance changes to environment	small population size, isolated locations	Moderate	Imminent, historical, and future	High	Very significant	Reduction in viability; basic need inhibited, reduction in survival and reproduction, mortality	High

[1] Periodic storm events may be responsible for maintaining the coastal barren community (Bradley and Gann 1999). However, Cape Sable thoroughwort is also vulnerable to natural events such as hurricanes, which could extirpate existing occurrences and alter habitat. The population at Big Munson Island may have responded positively to occasional hurricanes or tropical storms (e.g., Hurricane Georges) that thin hammock canopies, providing more light (Bradley and Gann 2004). More recently, it appears that all occurrences of Cape Sable thoroughwort either probably declined or the site was impacted due to Hurricane Wilma (K. Bradley, pers. comm. 2007, J. Maschinsky, pers. comm. 2007, J. Duquesnel, pers. comm. 2005).

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: _____ June 15, 2007
for Regional Director, Fish and Wildlife Service Date

Concur: Kenneth Stansell November 27, 2007
Acting Director, U.S. Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 25, 2007; revised June 12, 2007
Conducted by: Paula Halupa, South Florida Ecological Services Office