

Collections Data and Citizen Scientists Shaping the Conservation Decision-Making Process for At-Risk Butterflies



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Citizen Science Through Compound Eyes

Widely used to survey and assess populations, phenology, movement, etc.

Limited use for at-risk species evaluation due to permitting issues, expertise, survey methodology, habitat access and sensitivity, etc.

Seldom deployed strategically for a specific conservation need

- Statewide assessment of at-risk taxa





Florida Natural Areas Inventory (FNAI)

FNAI is one of 82 natural heritage programs operating in North and Latin America under the NatureServe umbrella.

FNAI maintains a statewide database on the locations and condition of federally- or state-listed plants, animals, and ecological communities as well as those that are deemed to be at risk of becoming rare, threatened, or endangered within Florida in the near future.

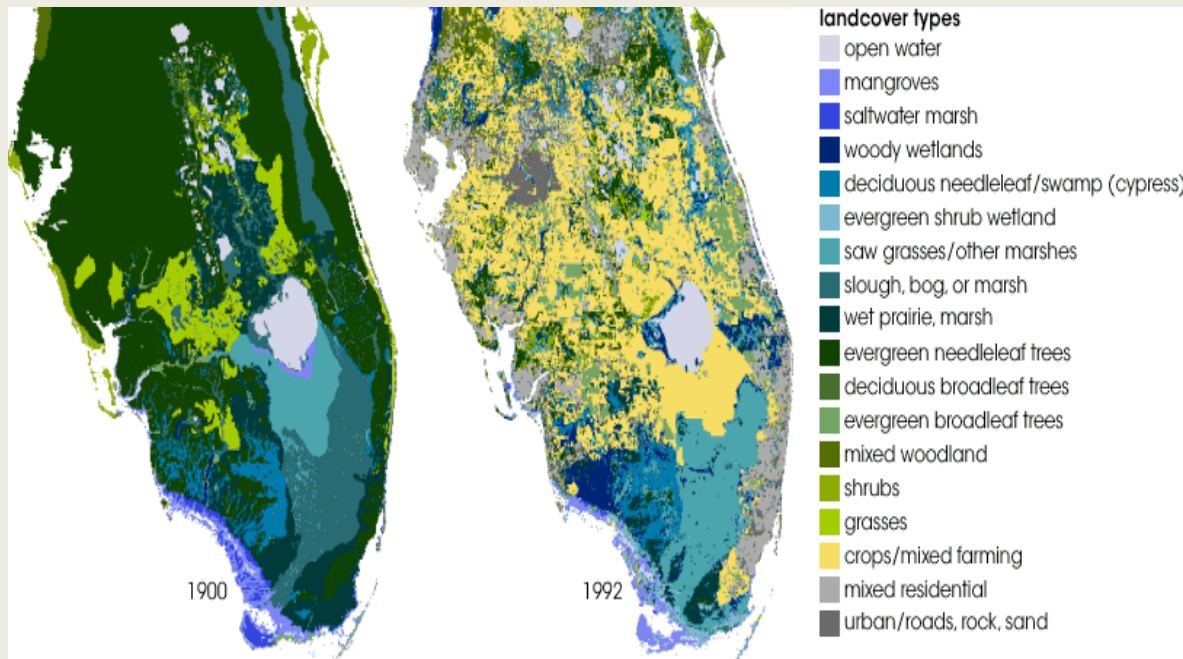
FNAI maintains a comprehensive database on the boundaries, ownership, and management of all (over 2500) conservation lands within Florida.

FNAI's databases are a key component in the state's decision-making process relative to conservation land acquisition and their management.



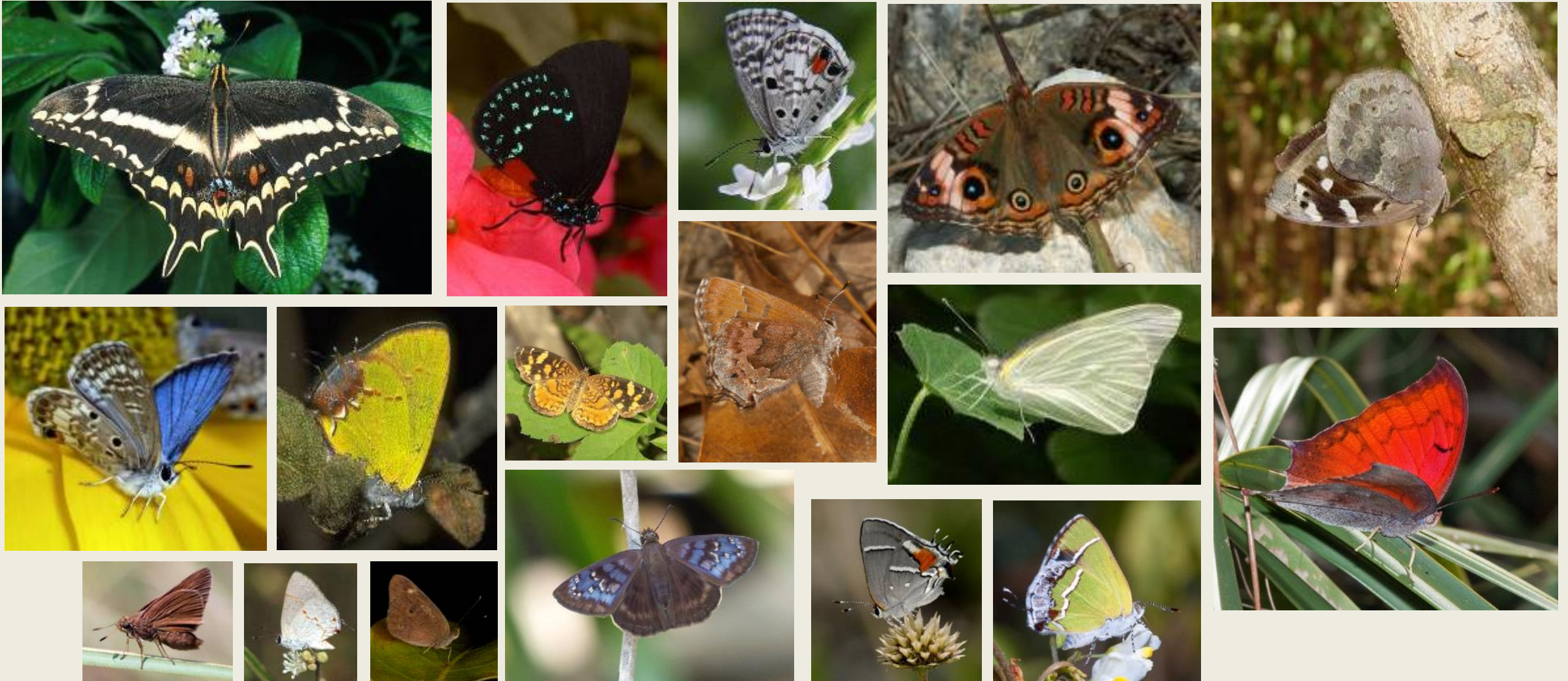
Incomplete Invertebrate Information

Until the mid-2000s, FNAI's database and research efforts were skewed towards plants, vertebrates, and natural communities – tracked the population status and location of only 9 butterfly taxa.



Rapid Decline of At-Risk Butterfly Populations: A South Florida Example

Over the last few decades, some 24 taxa have experienced significant declines



Rapid Decline of At-Risk Butterfly Populations: A South Florida Example



Ammon Blue
(*Cyclargus ammon*)



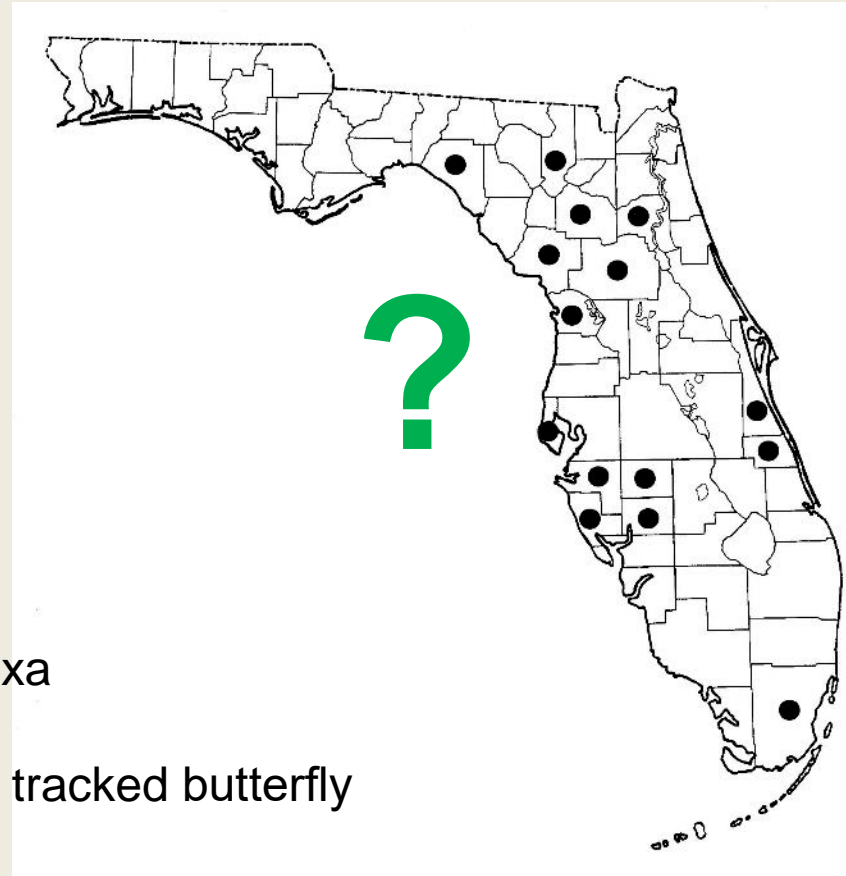
Rockland Grass Skipper
(*Hesperia meskei pinocayo*)



Zestos Skipper
(*Eparargyus zestos zestos*)

Statewide Assessment of the Current Distribution of At-Risk Butterflies on Florida's Conservation Lands

Goal 1: To develop a comprehensive database and maps for the at-risk FNAI-tracked butterflies that reflect current distributions

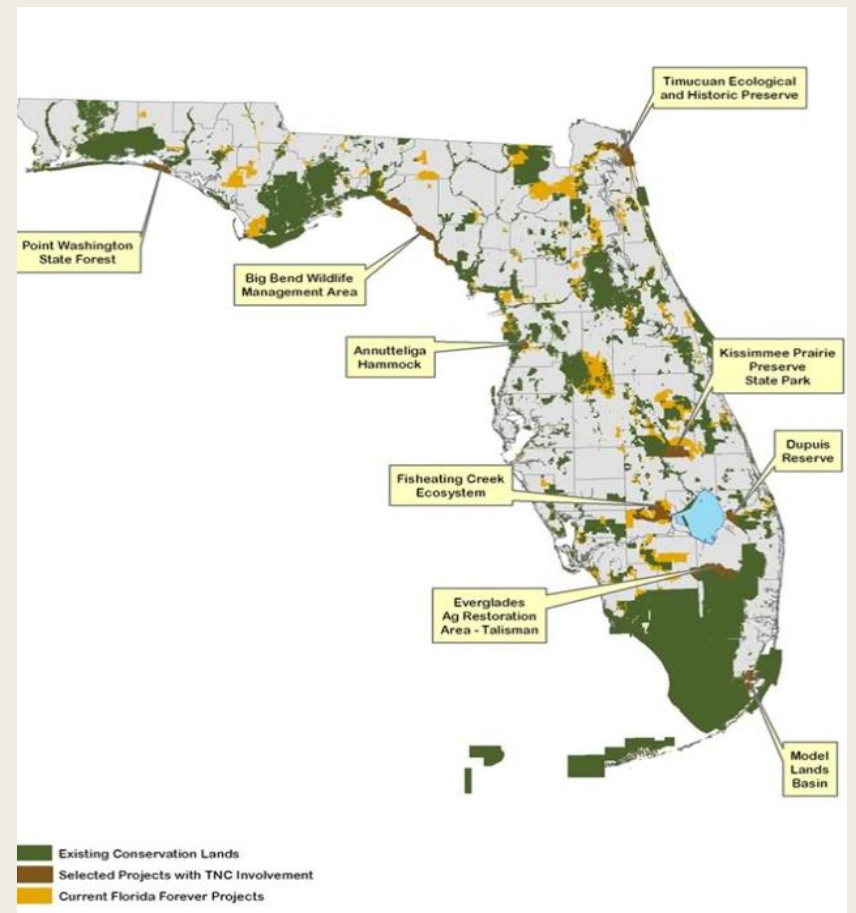


Prior to 2005, FNAI tracked 9 taxa

FNAI augmented the number of tracked butterfly taxa to 78

Statewide Assessment of the Current Distribution of At-Risk Butterflies on Florida's Conservation Lands

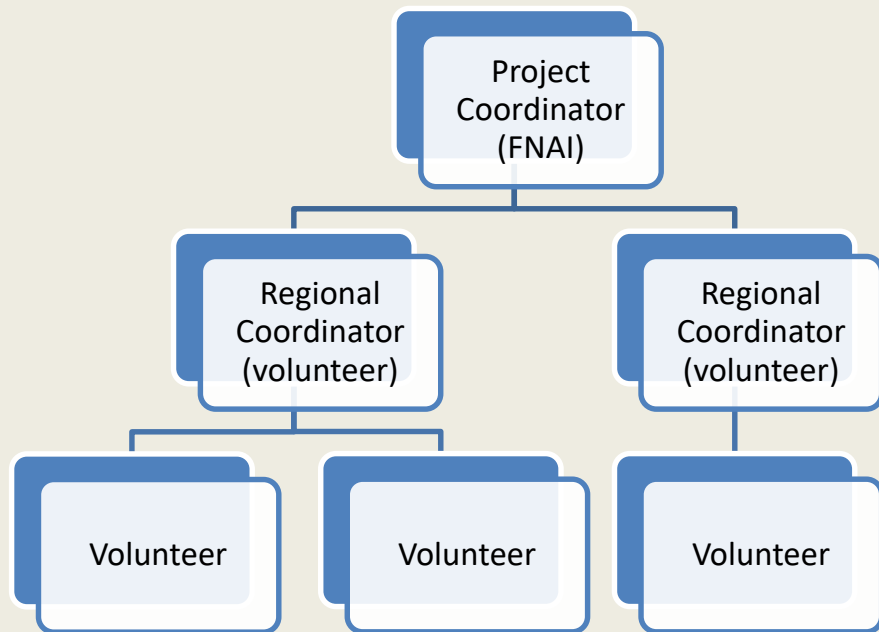
Goal 2: Assess the success of Florida's conservation lands program in protecting butterfly diversity and to identify potential gaps in protection



Statewide Assessment of the Current Distribution of At-Risk Butterflies on Florida's Conservation Lands

Six year project funded by Florida's State Wildlife Grant Program (2007-2013)

Strategic field surveys were conducted approximately monthly for butterfly taxa by regional field coordinators and trained volunteers



Statewide Assessment of the Current Distribution of At-Risk Butterflies on Florida's Conservation Lands

Citizen scientists were asked to report only the at-risk butterfly species that FNAI was tracking, not all species.

Because the goal was to quickly develop a statewide comprehensive database across all at-risk butterfly species, the citizen scientists were not asked to continue to monitor the numbers of a species at a site after the species was documented from that location.

Because the project intent was to target finding at-risk species, the project participants did not follow a linear transect but were free to wander within the boundaries of the conservation land they were surveying to try to find a given species.

Statewide Assessment of the Current Distribution of At-Risk Butterflies on Florida's Conservation Lands



Impact of Citizen Scientists

103 participants over 6 year project

Traveled more than 58,000 km (36,000 miles)

Contributed an estimated 5,132 h of time

Nearly \$77,000 estimated labor value

680 observations of over 75 different taxa

Surveyed over 200 conservation lands



South Florida Conservation Lands

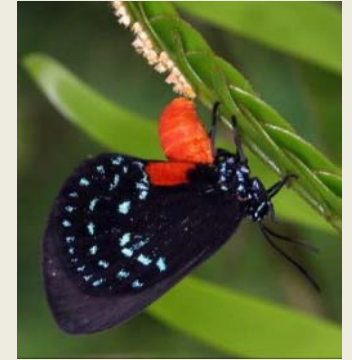
Broward: 104 conservation land visits

Miami-Dade: 131 conservation land visits

Monroe: 51 conservation land visits

Palm Beach: 93 conservation land visits

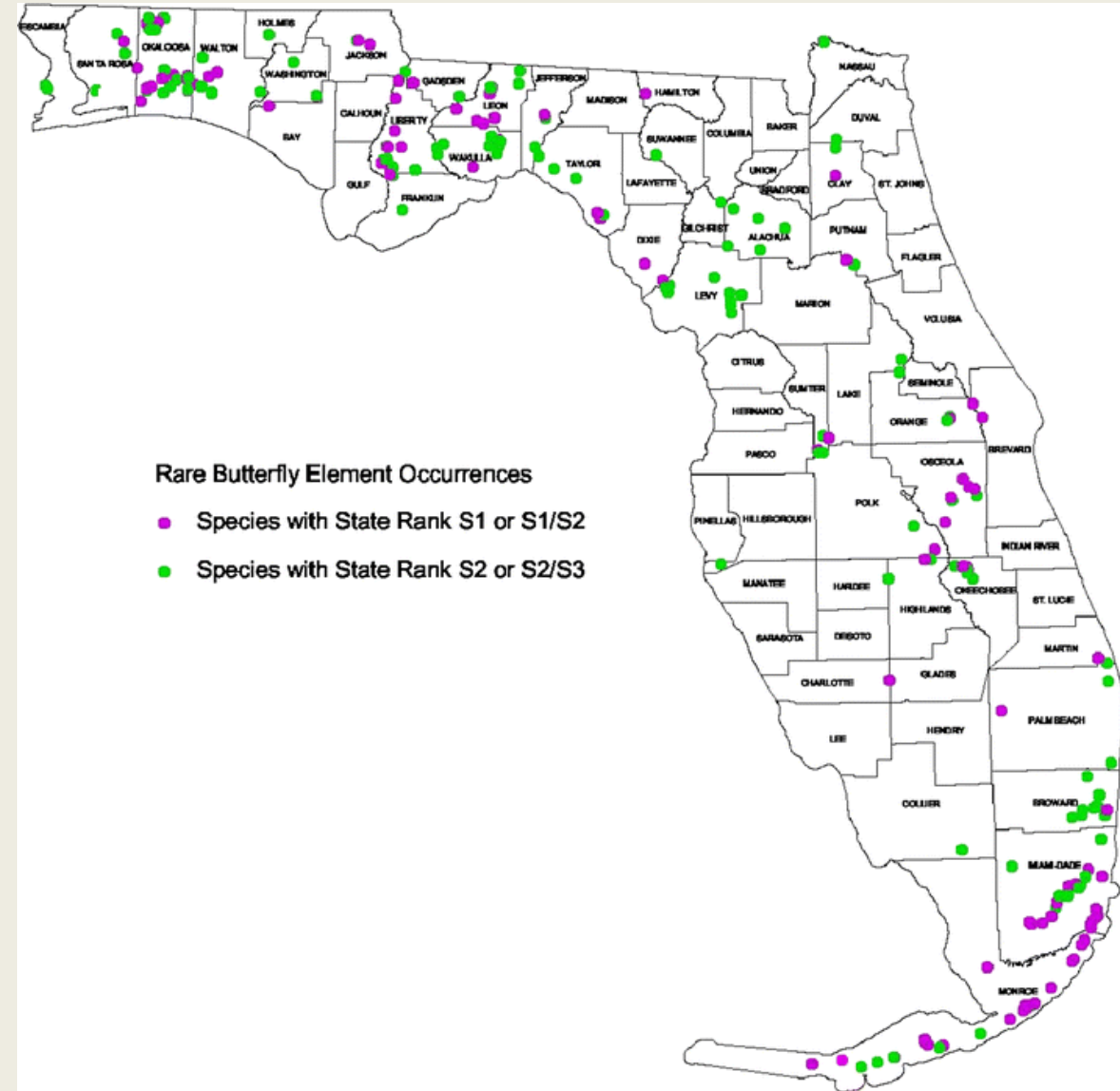
Documented at least one FNAI-tracked butterfly taxon on over 59 different conservation lands in south Florida



Populations of At-Risk Butterfly Taxa Mapped

The number of documented at-risk butterfly taxa grew from 16 in June 2007 to 69 by October 2013, an increase of over 400%.

The number of element occurrences (i.e., distinct populations) of at-risk butterflies increased from just 33 in 2007 to 396 in 2013, an increase of over 1200%.



J Insect Conserv
DOI 10.1007/s10841-014-9733-6

ORIGINAL PAPER

A successful model for citizen scientist involvement in building a statewide at-risk butterfly database

Dean K. Jue · Jaret C. Daniels

Taxa Determined to be More Rare

Common name	Scientific name	Original rank	Current rank
Common Roadside-Skipper	<i>Amblyscirtes vialis</i>	S1S2	S1
Cuban Crescent	<i>Anthanassa frisia frisia</i>	S2	S1
Florida White	<i>Appias drusilla neumogenii</i>	S2S3	S1
Golden Banded-Skipper	<i>Autochton cellus</i>	S2S3	S1
Brown Elfin	<i>Callophrys augustinus ssp.^a</i>	Not tracked	S1
Silver-banded Hairstreak	<i>Chlorostymon simaethis simaethis</i>	S1S2	S1
Florida Duskywing	<i>Ephyriades brunneus floridensis</i>	S2	S1
Lyside Sulphur	<i>Kricogonia lyside</i>	SNA	S1
Gray Ministreak	<i>Ministrymon azia</i>	S2S3	S1
Hoary Edge	<i>Achalarus lyciades</i>	S2S4	S2
Pink-spot Sulphur	<i>Aphrissa neleis^a</i>	Not tracked	S2
Eastern Pine Elfin	<i>Callophrys niphon niphon</i>	S3S4	S2
Atala	<i>Eumaeus atala</i>	S3	S2
Broad-winged Skipper	<i>Poanes viator zizaniae</i>	S2S3	S2
King's Hairstreak	<i>Satyrium kingi</i>	S2S3	S2
Malachite	<i>Siproeta stelenes biplagiata</i>	S2S3	S2
Hayhurst's Scallopwing	<i>Staphylus hayhurstii</i>	S3S4	S2
Appalachian Brown	<i>Satyrodes appalachia appalachia</i>	S3S4	S2S3
Neamathla Skipper	<i>Nastra neamathla</i>	S4?	S2S3



^aTaxon that was not tracked at the start of the FNAI SWG project because not previously known in Florida

S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences)

S2 = Imperiled in Florida because of rarity (6–20 occurrences)

S3 = Very rare and local in Florida (21–100 occurrences)

S4 = Apparently secure in Florida (may be rare in parts of its range)

Taxa Determined to be Less Rare

Common name	Scientific name	Original rank	Current rank
Dusky Roadside-Skipper	<i>Amblyscirtes alternata</i>	S1	S2
Hessel's Hairstreak	<i>Callophrys hesseli angulata</i>	S1	S2
Berry's Skipper	<i>Euphyes berryi</i>	S1	S2
Dion Skipper	<i>Euphyes dion</i>	S2	S2S3
Sweadner's Juniper Hairstreak	<i>Callophrys gryneus sweadneri</i>	S2	S3
Dotted Skipper	<i>Hesperia attalus slossonae</i>	S2S3	S3
Lace-winged Roadside-Skipper	<i>Amblyscirtes aesculapius</i>	S3	S3S4
Zabulon Skipper	<i>Poanes zabulon</i>	S3S4	S4
Little Glassywing	<i>Pompeius verna verna</i>	S3S4	S4



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S4 = Apparently secure in Florida (may be rare in parts of its range)

Dukes' Skipper (*Euphyes dukesi calhouni*) (G3T1/S1)

Journal of the Lepidopterists' Society
49(1), 1995, 6-23

THE BIOGEOGRAPHY AND ECOLOGY OF *EUPHYES DUKESI* (HESPERIIDAE) IN FLORIDA

JOHN V. CALHOUN¹

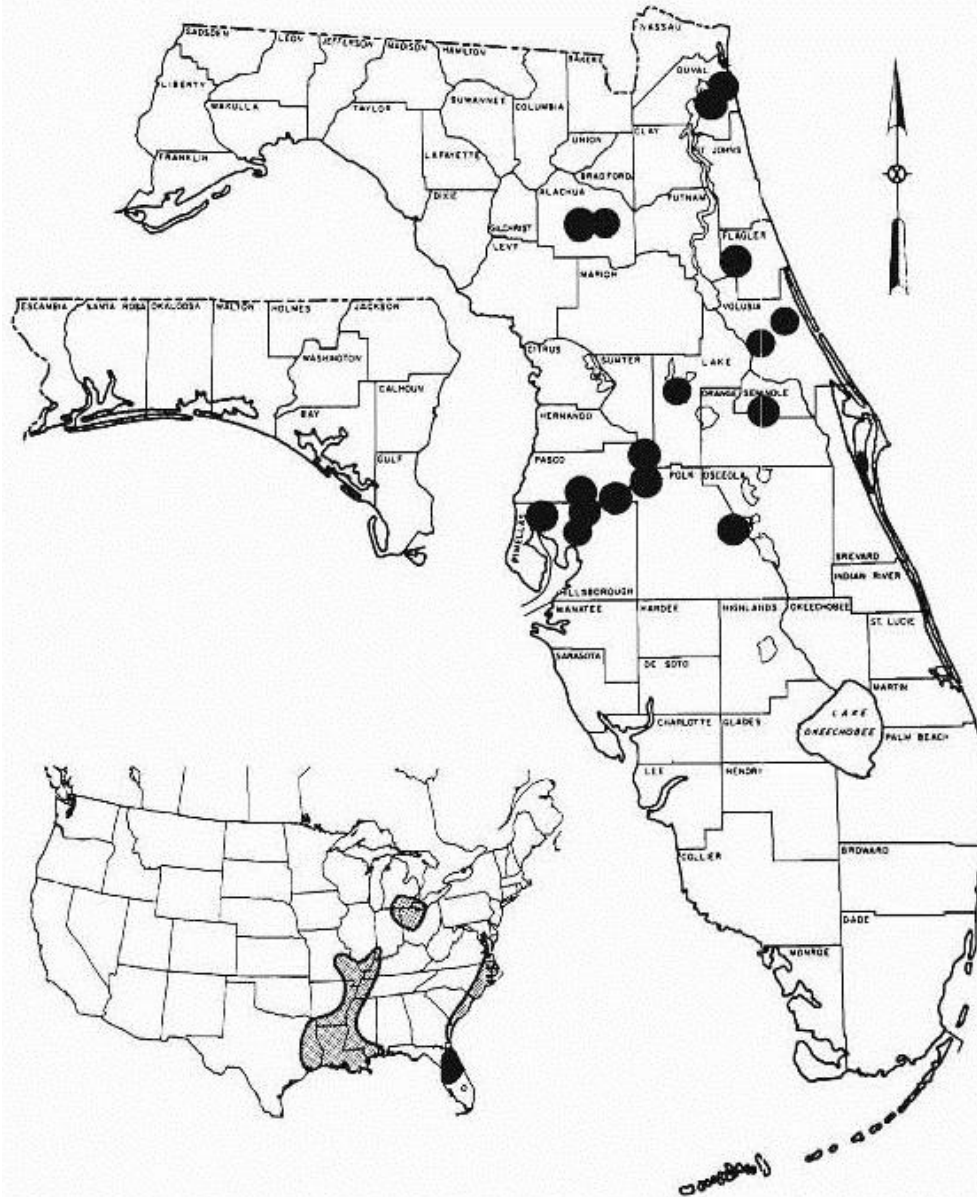
1731 San Mateo Drive, Dunedin, Florida 34698, USA

ABSTRACT. A distinctive endemic phenotype of *Euphyes dukesi* (Lindsey) was first discovered in Florida in 1971. The endemic nature of Floridian populations was only recently recognized, and the populations currently remain undescribed. Pleistocene glacial events probably contributed to the isolation of these populations from populations on the North American mainland. The species has been found in at least five types of forested wetlands in Florida. The primary hostplant is *Rhynchospora inundata* (Oakes) Fern (Cyperaceae), but *Rhynchospora miltacea* (Lam.) A. Gray (Cyperaceae) and a species of *Carex* (Cyperaceae) also are utilized. *Euphyes dukesi* is bivoltine in Florida, with adults active primarily during May-June and September-October. Adults frequent sunlit patches of hostplants within swamps and visit a variety of nectar sources. The alteration and destruction of forested wetlands threaten populations of this species. *Euphyes dukesi* has a limited distribution and is considered rare in Florida.

Additional key words: endemic, swamps, hostplants, energy resources, behavior.

Since its description, Duke's skipper, *Euphyes dukesi* (Lindsey), has remained an enigmatic and poorly understood North American member of the genus *Euphyes*. This species generally is considered rare and known from only a few widely separated localities (e.g., MacNeill 1975, Pyle 1981, Opler & Krizek 1984). In Michigan, *E. dukesi* is a state-listed threatened species (Haack 1992). Owing to this perceived rarity, a number of distributional and ecological discoveries have been documented in detail (Pliske 1957, Mather 1963, 1966, Price & Shull 1969, Irwin 1969, 1972, Covell et al. 1979). The known range of *E. dukesi* extends from Virginia, southward along the Atlantic coast to Florida, west to southeastern Texas and northward in the Mississippi drainage to Indiana, Ohio, Michigan, and southern Ontario (Opler & Krizek 1984, Holmes et al. 1991, Stanford & Opler 1993) (Fig. 1). The species is represented in Florida by a recently recognized, but undescribed endemic subspecies (Shuey 1993). Throughout its range, this species is associated primarily with the interiors of swamps, habitats that characteristically support few butterfly species. Because of this extraordinary habitat affinity, *E. dukesi* remained undiscovered until 1922 (Lindsey 1923).

In common with most other North American members of the genus, *E. dukesi* has been recorded in association only with *Carex* (Cyperaceae) sedge hostplants (Shuey 1986). In the Great Lakes region, the only reported host is *Carex lacustris* Willd., a broad-leaved species fre-

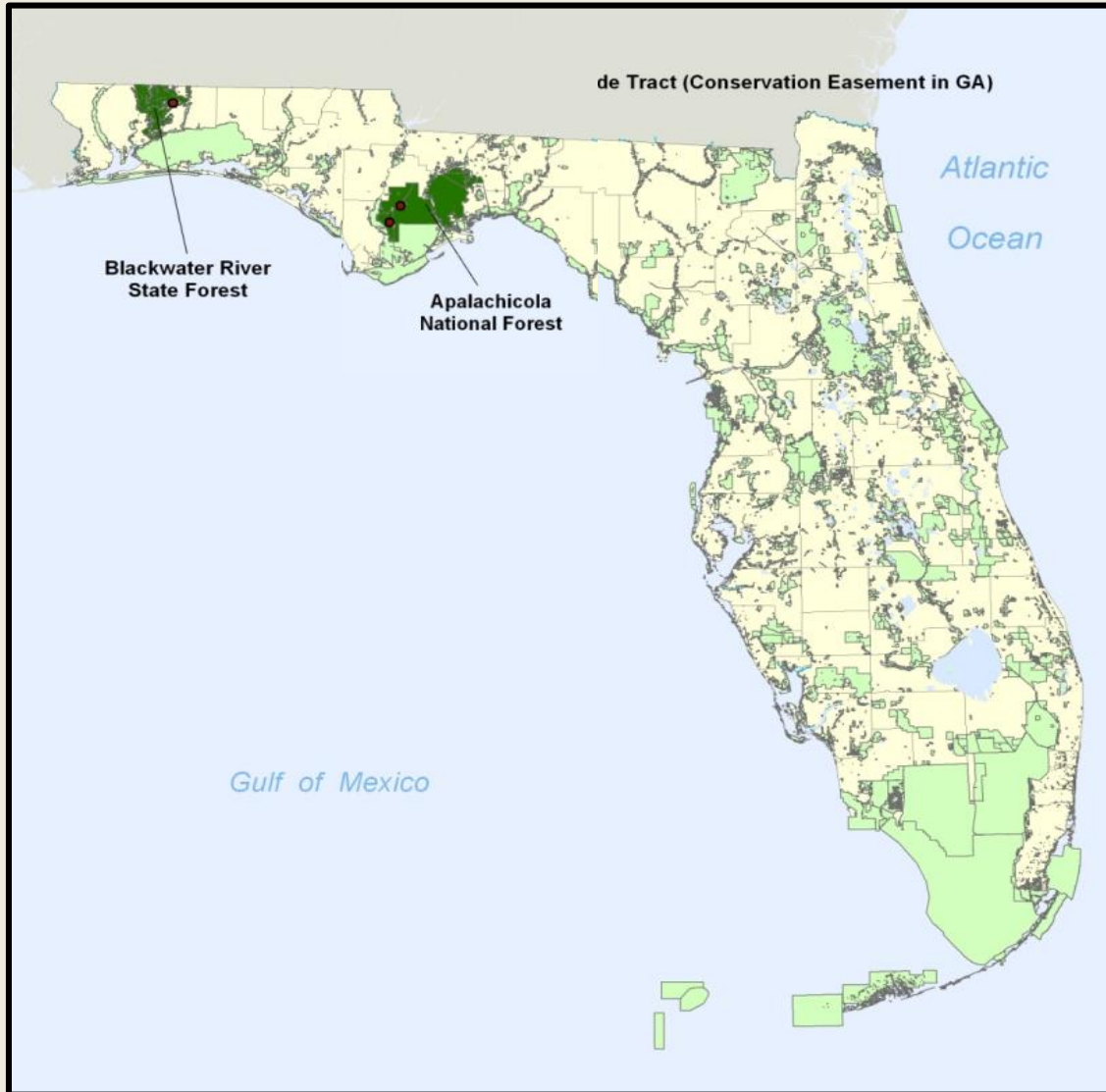


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Shifts in Distribution



Taxa New to Florida



Mottled Duskywing (*Erynnis martialis*)

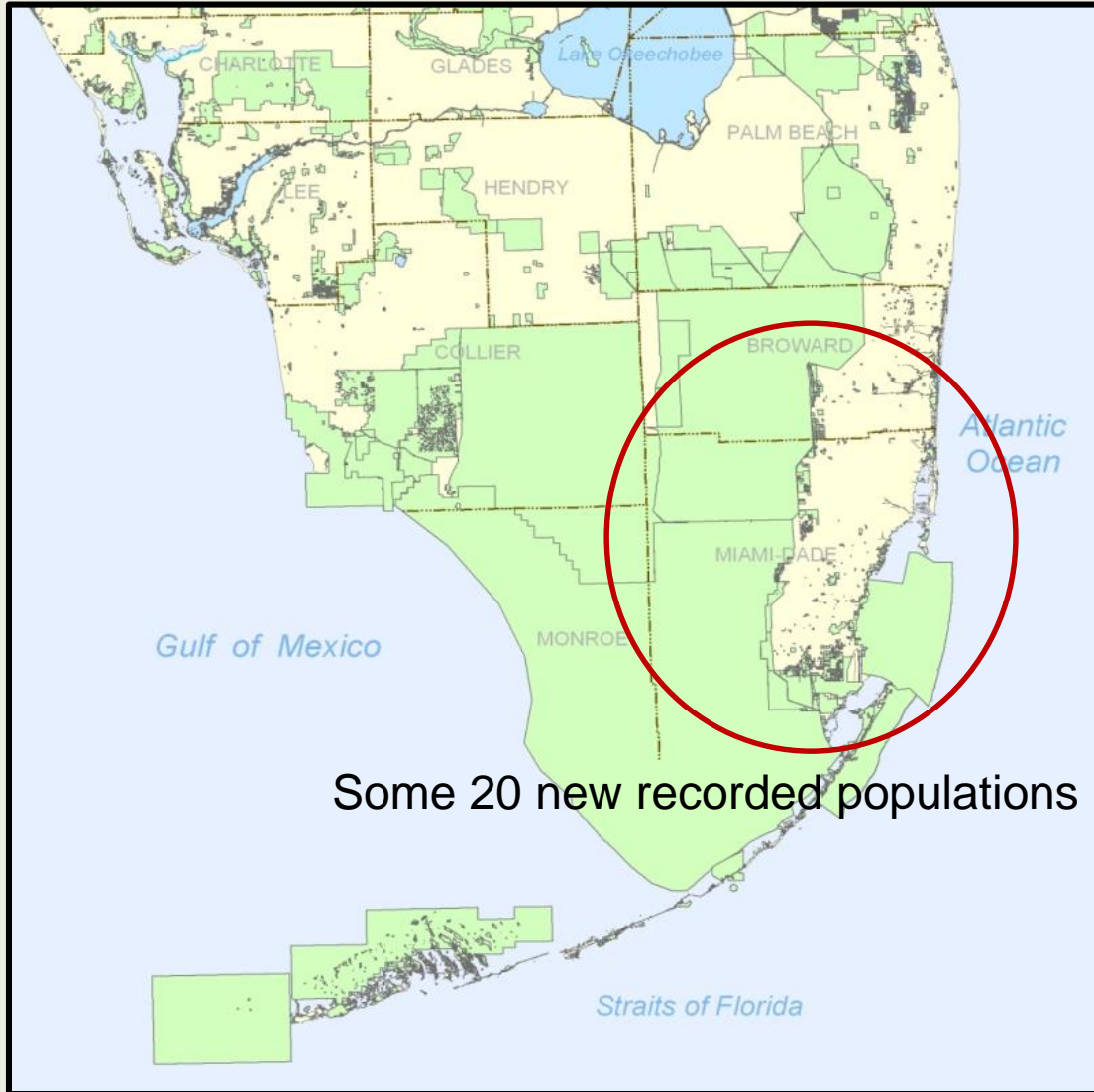


Brown Elfin (*Callophrys augustinius*)



Verification of Breeding Resident

Pink-spot Sulphur (*Aphrissa neleis*)

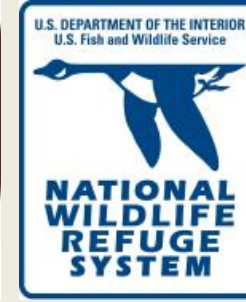


Frosted Elfin (*Callophrys irus arsace*)





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