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To:
Public Comments Processing
Division of Policy and Directives Management
US Fish and Wildlife Service
4401 N. Fairfax Drive
MS 2042-PDM
Arlington, VA 22203

Attn: Peer Review for Docket No.
FWS-R4-ES-2013-0084

I submit these comments as an invited peer reviewer. The same comments are provided for each proposed action under the separate docket numbers since they are really two sides of the same issue.

In general, I completely agree with and support the proposal for listing both *Anaea troglodyte floralis*, the Florida leafwing (FLW) and *Strymon acis bartrami*, Bartram's hairstreak (BH) for protection as endangered under the Federal Endangered Species Act. The data presented in support of these proposals appears to be well researched, sound, and sufficient for listing and should be employed as part of a comprehensive management plan.

During surveys from 1993-1996, led by Dr. Tom Emmel and conducted by Kerri Schwarz and myself, the two proposed butterflies were already found in very limited distributions and strictly limited to healthy pine rockland habitat. By healthy, I mean large enough tracts of land, actively managed so fire can return excess biomass to the thin nutrient base, fire-adapted plants have light and reduced competition to grow and thrive, and where plants and butterflies have refugia from natural or managed events (fire, hurricanes, etc.)

Since formal surveys began in the 1980s, remaining habitat for the two butterflies has become even more fragmented from human activities. Additionally, recent effects from ongoing, mostly human-induced climate change have likely had further negative impacts (see recent statements from the IPCC: <http://www.bbc.co.uk/news/science-environment-24292615> (accessed 10/14/2013)). Even very slight sea level rise in a place like the South Florida coastal landscape can potentially have very huge impacts on natural habitats. Butterflies have been considered bio-indicators of ecosystem health. If this is true the multiple ecosystems that make up the Florida Keys have been in steady decline. A summary of the critical nature of South Florida butterflies in general and the potential impact

of sea-level rise can be found here:

<http://www.frrp.org/SLR%20documents/Minno.pdf> (accessed 10/14/2013).

In reading the data presented it appears that the FLW and BH, while sharing the same unique host plant and general habitat, may require slightly different micro habitats. Surveys over the last 25+ years seem to show that BH apparently survives better on Big Pine Key, having relatively consistently low numbers at Long Pine Key (ENP), while the opposite is apparently true for the FLW, it having been extirpated from Big Pine Key regardless of its ability to fly farther distances to seek suitable larval or resting sites. Both Big Pine Key and Long Pine Key have been clearly shown to be the last large, intact remnants of the pine rockland habitat. It was mentioned that fire management is behind in periodic burning on BPK which is reducing suitable habitat for both species.

One important feature of the listings is to include habitat outside the extant range of the butterflies and within the historic range but not currently occupied. Depending on how climate change effects coastal south Florida, new pineland habitat at the edge of the historic range might be considered for possible management to maximize stands of croton. The pine rockland habitat is restricted and relictual by nature. Across the northern hemisphere climate change has pushed some insect and plant populations north, surviving in places they haven't before. The pine rockland habitat, and, ultimately, the butterfly species will either perish in the current location or will adapt to survive in a slightly different habitat, possibly north of where they currently exist.

Based on data cited in the proposed listings and found on herbarium specimen records for *Croton linearis*, the plant can be found as far north as Martin Co. or the Tampa region. A link to Florida plant atlas: <http://florida.plantatlas.usf.edu/SpecimenDetails.aspx?PlantID=3919> (accessed 10/14/2013) suggests that the area around Indiantown (and inside the JW Corbett NWR), in Martin and Palm Beach counties, was a historic site for this plant and images found linked on Google Earth show some stands of slash pine and saw palmetto still exist. What will or could happen is speculation but might be worth factoring into a survival plan if possible.

Regarding the hostplant, *Croton linearis*, it has been occasionally referred to as Woolly croton. A possible synonymy may also exist: *Croton cascarilla* <http://plants.usda.gov/core/profile?symbol=CRCA29> (accessed 10/14/2013).

In summary, while I support these listings, my suspicion is that the two species in question will ultimately cease to exist in the near future. If nothing else we can at least document the decline of these species to show, once again, what we have lost, how we lost them, and tell future generations why.