Panicum fauriei var. *carteri*
(no common name)

5-Year Review
Summary and Evaluation

U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii

5-YEAR REVIEW

Species reviewed: *Panicum fauriei* var. *carteri* / no common name

TABLE OF CONTENTS

5-YEAR REVIEW
Panicum fauriei var. *carteri* (no common name)

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:
Region 1, Endangered Species Program, Division of Recovery, Jesse D`Elia, (503) 231-2071

Lead Field Office:
Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (808) 792-9400

Cooperating Field Office(s):
N/A

Cooperating Regional Office(s):
N/A

1.2 Methodology used to complete the review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on March 16, 2009. The review was based on the final rule to list *Panicum carteri* as an endangered species and to designate its critical habitat (USFWS 1983, 2003) as well as a review of current, available information. The National Tropical Botanical Garden provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Tamara Sherrill, biological consultant, was reviewed by the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Lead and the Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 Federal Register (FR) Notice citation announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2009. Endangered and threatened wildlife and plants; initiation of 5-year reviews of 103 species in Hawaii. Federal Register 74(49):11130-11133.

1.3.2 Listing history

Original Listing
FR notice: USFWS. 1983. Endangered and threatened wildlife and plants; rule to list *Panicum carteri* (Carter's Panicgrass) as an endangered species and determine its critical habitat. Federal Register 48(198):46328-46332.

Date listed: October 12, 1983
Entity listed: Species
Classification: Endangered

Revised Listing, if applicable
FR notice: N/A
Date listed: N/A
Entity listed: N/A
Classification: N/A

1.3.3 Associated rulemakings:

USFWS. 1983. Endangered and threatened wildlife and plants; rule to list *Panicum carteri* (Carter's Panicgrass) as an endangered species and determine its critical habitat. Federal Register 48(198):46328-46332.

Critical habitat was designated for *Panicum fauriei* var. *carteri* in a single unit consisting of the entire islet of Mokolii (Chinaman's Hat) on Oahu, totaling about 5 hectares (13 acres). This designation includes habitat on City and County of Honolulu lands (USFWS 2003; Offshore Islet Restoration Committee 2010).

1.3.4 Review History:

Species status review [FY 2010 Recovery Data Call (September 2010)]: Declining

Recovery achieved:
1 (0-25%) (FY 2007 Recovery Data Call – most recent year reported)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:
9

1.3.6 Current Recovery Plan or Outline
Name of plan or outline: Draft recovery plan for *Panicum faurei* var. *carteri* (Hosaka) Davidse (Carter's Panicgrass).
Date issued: May 23, 1994.
Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?
____ ***Yes***
__X_ ***No***

2.1.2 Is the species under review listed as a DPS?
____ ***Yes***
__X_ ***No***

2.1.3 Was the DPS listed prior to 1996?
____ ***Yes***
____ ***No***

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?
____ ***Yes***
____ ***No***

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?
____ ***Yes***
____ ***No***

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?
____ ***Yes***
__X_ ***No***

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

__X_ ***Yes***
____ ***No***

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

__X_ ***Yes***
____ ***No***

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

__X_ ***Yes***
____ ***No***

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

A synthesis of the threats (Listing Factors A, C, D, and E) affecting this species is presented in section 2.3.2 and Table 2. Listing Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is not known to be a threat to this species.

Stabilizing, downlisting, and delisting objectives are provided in the draft recovery plan for *Panicum fauriei* var. *carteri* (Hosaka) Davidse (Carter's Panicgrass (USFWS 1994). To be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats. Measures to address threats for all populations known at that time include removing invasive introduced plants; developing fire prevention, response, and suppression plans; and posting signs and other measures to minimize human disturbance. Further measures to protect the East Maui and Molokai populations include fencing to prevent ungulate damage. At the Mokolii population, classifying the land as a Seabird Sanctuary and addressing rodent and insect threats are additionally required.

This recovery objective has not been met.

For downlisting, all stabilization targets must be met, and a total of two populations of *Panicum fauriei* var. *carteri* should be documented on each island where it occurred (Maui, Oahu, and Molokai). Each of these populations must be stable or increasing in number and secure from threats, with a minimum of 500 reproductive individuals per population. Human assistance may be required to meet these criteria. Each population should persist at this level for a minimum of 10 consecutive years before downlisting is considered.

This recovery objective has not been met.

For delisting, a total of two populations of *Panicum fauriei* var. *carteri* should be documented on each island where it occurred (Maui, Oahu, and Molokai [total of six populations]). Each of these populations must be naturally reproducing without human manipulation or assistance, stable or increasing in number, and secure from threats, with 500 mature individuals per population. Each population should persist at this level for a minimum of 10 consecutive years before delisting is considered.

This recovery objective has not been met.

2.3 Updated Information and Current Species Status

Panicum fauriei var. *carteri* was originally listed as endangered in 1983 under the name *Panicum carteri*. Since then it went through a taxonomic revision, which is discussed in the draft recovery plan (USFWS 1994). *Panicum carteri* Hosaka, *Panicum annuale* St. John, *Panicum kukaiwaaense* St.John, and *Panicum malikoense* St. John were placed in synonomy under *Panicum fauriei* var. *carteri* (Hosaka) Davidse. The range for the species was expanded due to this taxonomic revision, but only the Mokolii Islet population on Oahu is protected under the Endangered Species Act.

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

No new information.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at

mortality, mortality rate, etc.), or demographic trends:

As of 1992, four populations of *Panicum fauriei* var. *carteri* were known to exist in the wild. These populations are located on Mokolii Islet off the coast of Oahu (one population), one population on Molokai at Kukaiwaa Peninsula, and two populations on Maui at Makamakaole Gulch and Watercress Point, east of Maliko Gulch (USFWS 1994). A few individuals of *Panicum fauriei* var. *carteri* were observed in 1998 in West Maui in Wailena Gulch, west of Hakuhee Point, on sea cliffs at 15 meters (50 feet) elevation (Wood 2010). Since *P. fauriei* var. *carteri* is classified as an annual species, the number of individuals in each population often fluctuates with variable rainfall, triggering the emergence of new individuals after the onset of the winter rains (USFWS 1994).

Panicum fauriei var. *carteri* is known from the northern end of Mokolii Islet, (also known as Chinaman's Hat) located off of the island of Oahu. A single clump about 1 square meter (12 square feet) in size was seen in 1990, and another group of 20 to 30 individuals was seen there in 1992 (Perlman 2010). On Mokolii in 2002, the population had about 25 individuals, but from 2002 to 2007 an invasive introduced grass, *Sporobolus pyramidatus* had spread into that area and no *P. fauriei* var. *carteri* was found. In June 2008, four individuals were found in the same area, indicating the presence of a viable seedbank. No individuals were found in a survey conducted in 2009 (Tangalin 2009); however, the survey was conducted in the autumn, which is a period when this species normally dies back.

On Molokai, just to the southeast of Huelo Islet on the Kukaiwaa Peninsula off of the mainland coast of Molokai, 457 individuals of *Panicum fauriei* var. *carteri* were observed during a survey in 2002. The greatest concentrations of individuals were on the western side of the peninsula, with only a single population of *P. fauriei* var. *carteri* located on the east side, on the west facing side of a gulch (LeGrande 2002). Since that time, additional surveys have shown that the population on Molokai is relatively stable (G. Hughes, Kalaupapa National Historical Park, pers. comm. 2010).

On Maui, no populations of *Panicum fauriei* var. *carteri* have been recently observed (H. Oppenheimer, Plant Extinction Prevention Program, pers. comm. 2010).

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

No new information.

2.3.1.4 Taxonomic classification or changes in nomenclature:

No new information.

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g., corrections to the historical range, change in distribution of the species within its historic range, etc.):

See above section 2.3.1.2.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

On Maui at Wailena Gulch, west of Hakuhee Point, *Panicum fauriei* var. *carteri* was known to grow on sea cliffs with associated native species such as *Artemisia australis* (ahinahina), *Centaurium sebaeoides* (awiwi), *Chamaesyce degeneri* (akoko), *Lipochaeta integrifolia* (nehe), *Lycium sandwicense* (ohelo kai), *Lysimachia mauritiana* (no common name [NCN]), *Cyperus javanicus* (ahu awa), *Panicum torridum* (kakonakona), *Portulaca lutea* (ihi), *Plumbago zeylanica* (iliee), *Psydrax odorata* (alahee), *Scaevola taccada* (naupaka), *Schiedea globosa* (NCN), *Sesuvium portulacastrum* (akulikuli), and *Sida fallax* (ilima) (Wood 2010).

On Mokolii Islet (off Oahu), the habitat is coastal cliffs with associated native species including *Boerhavia repens* (alena), *Cyperus javanicus*, *Capparis sandwichiana* (maiapilo), *Fimbristylis cymosa* subsp. *umbellato-capitata* (mauu aki aki), *Heliotropium curassavicum* (kipukai), *Heteropogon contortus* (pili), *Ipomoea pes-caprae* subsp. *brasiliensis* (pohuehue),

Jacquemontia ovalifolia subsp. *sandwicensis* (pau-o-Hiiaka), *Lycium sandwicense*, *Scaevola taccada*, *Sida fallax*, *Solanum americanum* (popolo), *Tephrosia purpurea* var. *purpurea* (auhuhu), and *Waltheria indica* (uhaloa) (Eijzenga and Preston 2008; Perlman 2010).

Within the ocean spray zone of Kukaiwaa, Molokai, *Panicum fauriei* var. *carteri* occurs with other native salt-loving plant species such as *Artemisia australis*, *Bidens hillebrandiana* subsp. *polycephala* (kookoolau), *Bacopa monnieri* (ae ae), *Fimbristylis cymosa* subsp. *umbellato-capitata*, *Pittosporum halophilum* (hoawa), and *Tetramolopium sylvae* (NCN) (Wood 2008).

2.3.1.7 Other:

No new information.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

Threats to *Panicum fauriei* var. *carteri* on West Maui include feral goats (*Capra hircus*), which degrade habitat by causing erosion and landslides, and invasive introduced plant species including *Casuarina equisetifolia* (ironwood), *Lantana camara* (lantana), *Pluchea carolinensis* (sourbush), and *Schinus terebinthifolius* (Christmasberry) (Wood 2010).

Invasive introduced plants which degrade the habitat and compete with *Panicum fauriei* var. *carteri* on Kukaiwaa peninsula, Molokai include *Bidens pilosa* (beggartick), *Conyza bonariensis* (hairy horseweed), *Cynodon dactylon* (Bermuda grass), *Lantana camara*, *Paspalum urvillei* (vasey grass), *Pluchea carolinensis*, *Portulaca oleracea* (pigweed), *Schinus terebinthifolius*, and *Stenotaphrum secundatum* (buffalo grass) (LeGrande 2002; Wood 2008).

On Mokolii Islet, off of Oahu, introduced invasive plants which threaten the habitat of *Panicum fauriei* var. *carteri* include *Bidens alba* var. *radiata* (beggartick), *Boerhavia coccinea* (NCN), *Chloris barbata* (swollen fingergrass), *Dactyloctenium*

aegyptium (beach wiregrass), *Desmodium* sp. (tick trefoil), *Digitaria ascendens* (NCN), *Digitaria insularis* (sourgrass), *Emilia* sp. (Flora's paintbrush), *Indigofera suffruticosa* (indigo), *Lantana camara*, *Leucaena leucocephala* (haole koa), *Melinis repens* (Natal redtop), *Nicotiana tabacum* (tobacco), *Opuntia ficus-indica* (prickly pear cactus), *Passiflora foetida* (love-in-a-mist), *P. suberosa* (corkystem passionflower), *Pluchea carolinensis*, *P. indica* (marsh fleabane), *Schinus terebinthifolius*, *Sporobolus pyramidatus* (NCN), *Stachytarpheta jamaicense* (Jamaica vervain), and *Terminalia catappa* (false kamani) (Tangalin 2009).

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

Not a threat.

2.3.2.3 Disease or predation:

Rats (*Rattus* spp.) and ants (unidentified species) are believed to consume the seeds and plant parts of *Panicum fauriei* var. *carteri* (USFWS 1994; Wood 2008).

2.3.2.4 Inadequacy of existing regulatory mechanisms:

No new information.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

Threats from introduced invasive plant species described in Section 2.3.2.1, in addition to degrading habitat, directly compete with *Panicum fauriei* var. *carteri* for water, light, and nutrients.

Climate change may also pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

Attempts to germinate seeds from this grass species for

reintroduction purposes have been unsuccessful (Tangalin 2009; USFWS 1994). No seed is being stored toward future restoration efforts.

In 2002, the Hawaii Division of Forestry and Wildlife and a group of community volunteers eradicated rats from Mokolii Islet to protect nesting wedge-tailed shearwaters (*Puffinus pacificus*). The islet is still owned by the City and County of Honolulu and is open to the public (Offshore Islet Restoration Committee 2010).

Kukaiwaa Peninsula is a part of Kalaupapa National Historical Park. The area where *Panicum fauriei* var. *carteri* occurs is regularly weeded, fenced from ungulates, and at a relatively low level of threat from fire due to its inaccessibility to people, humid climate, and low-growing vegetation. A draft Environmental Assessment for the Park includes a fire plan (G. Hughes, pers. comm. 2010).

2.4 Synthesis

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for *Panicum fauriei* var. *carteri* (Hosaka) Davidse (Carter's Panicgrass) (USFWS 1994). To be considered stabilized, which is the first step in recovering the species, *Panicum fauriei* var. *carteri* must be managed to control threats. Measures to address threats for all known populations include removing alien plants; developing fire prevention, response, and suppression plans; and posting signs and other measures to minimize human disturbance. Further measures to protect the East Maui and Molokai populations include fencing to prevent ungulate damage. At the Mokolii population, classifying the land as a Seabird Sanctuary and addressing rodent and insect threats are additionally required.

The interim stabilization goals for this species have not been met. Although the Molokai population is protected from most threats, the Mokolii population is still threatened by human disturbance, invasive introduced plants, and insects, and the Maui populations appear to be extirpated (Tables 1 and 2). Therefore, *Panicum fauriei* var. *carteri* meets the definition of endangered as it remains in danger of extinction throughout its range.

Table 1. Status of *Panicum fauriei* var. *carteri* from listing through 5-year review.

Date	No. wild indivs	No. outplanted	Stability Criteria identified in Recovery Plan	Stability Criteria Completed?
1983 (listing and critical habitat)	0-200	0	All populations: invasive plants controlled, fire prevention plans, human disturbance minimized	No
			East Maui and Molokai populations: fencing to prevent ungulate damage	N/A – not included in listing rule
			Mokolii population: classifying the land as a Seabird Sanctuary, addressing rodent and insect threats	No
1994 (recovery plan)	400+	0	All populations: invasive plants controlled, fire prevention plans, human disturbance minimized	No
			East Maui and Molokai populations: fencing to prevent ungulate damage	No
			Mokolii population: classifying the land as a Seabird Sanctuary, addressing rodent and insect threats	No
2010 (5-year review)	457+		All populations: invasive plants controlled, fire prevention plans, human disturbance minimized	Partially (Table 2)
			East Maui and Molokai populations:	Partially (Table 2)

			fencing to prevent ungulate damage	
			Mokolii population: classifying the land as a Seabird Sanctuary, addressing rodent and insect threats	Partially (Table 2)

Table 2. Threats to *Panicum fauriei var. carteri*.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – habitat modification and herbivory	A, C, D	Ongoing	Partially: Molokai populations are fenced
Rats – herbivory	C	Ongoing	Partially: rats controlled at Mokolii, Oahu
Ants – herbivory	C	Ongoing	No
Fire	E	Ongoing	Partially: Kalaupapa National Park has a draft wildfire plan
Invasive introduced plants	A, E	Ongoing	Partially: weed control on Molokai
Climate change	A, E	Increasing	No

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
__X_ No change is needed

3.2 New Recovery Priority Number:

Brief Rationale:

3.3 Listing and Reclassification Priority Number:

Reclassification (from Threatened to Endangered) Priority Number: ____

Reclassification (from Endangered to Threatened) Priority Number: ____
Delisting (regardless of current classification) Priority Number: ____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Regular monitoring needs to be maintained.
- Collect material for genetic storage and propagation for reintroduction.
- Research factors that hamper or assist germination in cultivation.
- Reclassify Mokolii Islet as a Seabird Sanctuary.
- Control rats in the vicinity of these populations.
- Develop and implement methods to control ants.
- Work with Hawaii Division of Forestry and Wildlife and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Update the listed entity on 50 CFR 17 to match the currently recognized taxonomy.
- Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

5.0 REFERENCES

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Personal Communications:

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Oppenheimer, Hank L. 2010. Maui nui Coordinator, Plant Extinction Prevention Program, Lahaina, Hawaii. E-mail to Tamara Sherrill, dated January 10, 2010. Subject: *Panicum fauriei* var. *carteri* on Maui.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Panicum fauriei* var. *carteri* (no common name)

Pre-1996 DPS listing still considered a listable entity? N/A

Recommendation resulting from the 5-year review:

_____ Delisting
_____ Reclassify from Endangered to Threatened status
_____ Reclassify from Threatened to Endangered status
__X__ No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:
Chelsie Javar, Fish and Wildlife Biologist
Marie Bruegmann, Plant Recovery Coordinator
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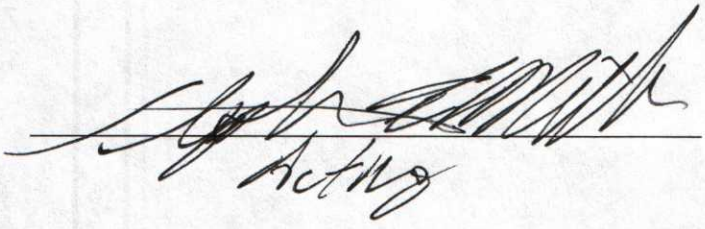

Date 8/29/11