Aristida portoricensis (Pelos del Diablo), *Aristida chaseae* (No Common name), *Vernonia proctorii* (No Common name), *Lyonia truncata var. proctorii* (No Common Name)

5-Year Status Review: Summary and Evaluation

Photos (clockwise) of *Vernonia proctorii, Lyonia truncata var. proctorii, Aristida chaseae* and *Aristida portoricensis*. Photos by Omar A. Monsegur-Rivera, U.S. Fish and Wildlife Service

U.S. Fish and Wildlife Service
Southeast Region
Caribbean Ecological Services Field Office
Mayagüez, Puerto Rico

August 2025

5-YEAR STATUS REVIEW
Pelos del Diablo (*Aristida portoricensis*), No Common name (*Aristida chaseae*), No Common name (*Vernonia proctorii*), No Common Name (*Lyonia truncata var. proctorii)*

GENERAL INFORMATION

Current Classification: Endangered (all)

Lead Field Office: Caribbean Ecological Services Field Office, Mayagüez, Puerto Rico, caribbean_es@fws.gov

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Date of original listing:

Aristida chaseae, Lyonia truncata var proctorii and *Vernonia proctorii*- May 27, 1993 (58 FR 25755; April 27, 1993)

Aristida portoricensis- September 1, 1990 (55 FR 32255; August 8, 1990)

Methodology used to complete the review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants (50 CFR 424.11). The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of *Aristida portoricensis, Aristida chaseae, Vernonia proctorii,* and *Lyonia truncata var proctorii* to inform this status review.

A notice of the initiation of this 5-year review was published by the Service in the Federal Register on May 11, 2023 (88 FR 30324), with a 60-day comment period. No public comments were received during this period. The primary sources of information used in this analysis were the recovery plan and amendment, personal communication with species experts, field reports, and other relevant literature. This review was finalized by the U.S. Fish and Wildlife Service, Caribbean Ecological Services Field Office, Mayagüez, Puerto Rico. All literature and documents used for this review are on file at the Field Office.

All recommendations resulting from this review are the result of thoroughly reviewing the best available information related to *Aristida portoricensis, Aristida chaseae, Vernonia proctorii,* and *Lyonia truncata var proctorii*.

FR Notice citation announcing the species is under active review:
May 11, 2023 (88 FR 30324)

Species' Recovery Priority Number at start of 5-year review (48 FR 43098):
8C. *Aristida chaseae* was recognized as a species with a moderate degree of threat and a high recovery potential. The "C" indicates that the species recovery is, or may be, in conflict with construction or other development projects or other forms of economic activity.

11. *Vernonia proctorii* was recognized as a species with a moderate degree of threat and a low recovery potential.

11C. *Aristida portoricensis* was recognized as a species with moderate degree of threat and low recovery potential. The "C" indicates that the species recovery is, or may be, in conflict with construction or other development projects or other forms of economic activity.

9. *Lyonia truncata var proctorii* was recognized as a subspecies (variety) with moderate degree of threat with a high recovery potential.

Review History:
Previous 5-year reviews recommending no change in status for all species were published in 2010 and 2019 (Service 2010 and 2019a).

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature:
We are not aware of any changes to the taxonomic and nomenclature information for *Aristida chaseae*, *Aristida portoricensis, Lyonia truncata var proctorii* and *Vernonia proctorii*, and these are still considered valid species by the Service.

Distinct Population Segment (DPS)
The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listing of a DPS to only vertebrate species. Because the species under review is a not a vertebrate, the DPS policy does not apply.

Recovery Criteria

Recovery Plan or Outline

Recovery plans are not regulatory documents and are intended to provide guidance to the Service, States, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the ESA. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act (84 FR 45020).

Aristida portoricensis Recovery Plan 1994 (Service 1994).
Aristida portoricensis Recovery Plan Amendment 2019 (Service 2019c).

Below are the delisting criteria identified in the 2019 recovery plan amendment (Service 2019c).

1. Existing populations of *A. portoricensis* show a stable or increasing trend, evidenced by natural recruitment and multiple age classes, and populations extending onto private lands are protected via a conservation mechanism (addresses Factors A and E).
2. At least two (2) new populations of *A. portoricensis* are established or discovered within the historical range of the species. New populations show a stable or increasing trend, evidenced by natural recruitment and multiple age classes, and populations extending onto private lands are protected via a conservation mechanism (addresses Factors A and E).
3. Threat reduction and management activities have been implemented to a degree that the species is viable for the foreseeable future (addresses Factors A and E).

The Service believes these criteria are appropriate and relevant; however, no criteria have currently been met.

Aristida chaseae, Lyonia truncata var proctorii and *Vernonia proctorii* Recovery Plan 1995
Aristida chaseae, Lyonia truncata var proctorii and *Vernonia proctorii* Plan Amendment 2019 (Service 2019b)

Below are the delisting criteria identified in the 2019 recovery plan amendment (Service 2019b).

1. Existing populations of *V. proctorii* (3), *L. truncata var proctorii* (1), and *A. chaseae* (5) show a stable or increasing trend, evidenced by natural recruitment and multiple age classes, and populations extending onto private lands are protected via a conservation mechanism (Addresses Factor A and E).
2. At least one (1) new population of *V. proctorii*, two (2) new populations of *L. truncata var proctorii*, and two (2) new populations of *A. chaseae*, are established or discovered within the historical range of the species. New populations show a stable or increasing trend, evidenced by natural recruitment and multiple age classes, and populations extending onto private lands are protected via a conservation mechanism (Addresses Factor A and E).
3. Threat reduction and management activities have been implemented to a degree that the species is viable for the foreseeable future (Addresses Factor A and E).

The Service believes these criteria are appropriate and relevant; however, no criteria have currently been met.

Biology and Habitat Summary

Between 2019 and 2025, the Service in collaboration with the Puerto Rico Department of Natural and Environmental Resources (PRDNER), the University of Puerto Rico at Mayagüez

(University), the Fairchild Tropical Botanic Garden (Fairchild), and Para La Naturaleza (PLN) has worked on the implementation of recovery actions (e.g., surveys, monitoring, propagation protocols) for *A. portoricensis, A. chaseae, V. proctorii,* and *L. truncata var. proctorii*.

***Aristida portoricensis* (Pelos del diablo)**

A detailed review of the species' biology, habitat, and life history can be found in the 1994 recovery plan, 2019 recovery plan amendment, and the 2010/2019 5-Year reviews (Service 1994, 2019b, 2010, and 2019a, respectively).

In 1994, the species was only known from two locations, Cerro Las Mesas and Sierra Bermenja (Service 1994). Currently there are five extant populations (Table 1).

Cerro Las Mesas. In 2021, several clusters were recorded in the municipality of Mayagüez in Cerro Las Mesas, western Puerto Rico (e.g., Center for Educational Opportunities of Mayagüez (CROEM), Las Antenas, Las Mesas, and an additional cluster at the area known as Pura Brisas; Del Rosario Cosme 2021). Since the clusters of CROEM, Las Antenas, and Las Mesas are located within similar habitat (elevation and vegetation structure) and relatively close to each other (less than one kilometer) we consider these as a single population referenced as Cerro las Mesas. In fact, the localities along Cerro Las Mesas coincide with the type locality (where the species was originally described) and the general locality known at the time of listing.

Aristida portoricensis is not fire-tolerant, and anthropogenic fires may prevent the formation of a seed bank that would replenish populations. In fact, a recent human induced fired occurred on February 17, 2025, at CROEM affecting the known population of this species (Figure 1). At present, the Service considers all the three clusters along Cerro Las Mesas are vulnerable to human induced fires due to the abundance of exotic grasses and ferns (Monsegur, 2025, pers. comm.). Another limiting factor is that seed viability was low (34%) in wild populations Machinski et al. (2018), a factor that renders the species vulnerable to be outcompeted by exotics and unable to recover in the case of frequent fire events or other disturbance events.

Pura Brisas. The Pura Brisas locality may be considered as a new population since it is situated in a lower elevation and moister habitat, and over 1.5 km away from the nearest known cluster located at Cerro Las Mesas area. Nonetheless, these new clusters do not represent an expansion of the species, but rather discovery of locations that have remained unaccounted due to the lack of monitoring and occurring within a fragmented habitat. Del Rosario Cosme (2021) conducted demographic surveys and found that most populations consisted primarily of young adults and adult plants (all 1-60 mm in crown diameter). Plant size and age were not correlated, which made the age of older plants difficult to determine. The absence of seedling stage plants suggests that the populations are stagnating or declining. It is possible that the lack of seedlings is due to disturbed seed banks.

Figure 1. Evidence of direct impacts to *Aristida portoricensis* population due to human induced fires at Cerro Las Mesas (CROEM) in the municipality of Mayagüez.

Three Sierra Bermeja Populations. We have no new information on the other three populations. Sierra Bermeja: La Tinaja Tract/Cerro Mariquita (Laguna Cartagena NWR), Sierra Bermeja: Finca María Luisa, and Sierra Bermeja: Frank H. Wandsworth Natural Protected Area (formerly known as Finca Sollins; El Conuco) & Upper Rancho Hugo.

On August 8, 2020, the Service entered into a Cooperative Agreement (Service 2020) with the Puerto Rico Conservation Trust (PRCT) under the Partners for Fish and Wildlife program to implement recovery actions within the Frank H. Wandsworth Natural Protected Area (NPA) (formerly known as Finca El Conuco, or Finca Sollins) at the Sierra Bermeja mountain range by promoting habitat enhancement efforts and management actions to address major threats to listed species that occur within the area.

In addition, the 2019 review highlighted a new robust population of *A. portoricensis* in the area of Upper Rancho Hugo (private property). Due to its proximity and habitat characteristics, this population is an extension of the population recorded at Frank H. Wandsworth NPA, thus, we are identifying both locations as one distinct population for this and future status review of the species to keep consistency. Similar to the population at Cerro Las Mesas, the Frank H. Wandsworth NPA had been affected by recent human induced fires and based on the last habitat assessments by Service staff, the *A. portoricensis* population has not recovered from the extensive fires that affected the habitat on early 2019. These fires directly impacted a reforested area at Frank H. Wandsworth NPA with approximately 370 trees including native and listed species (Rodríguez, PLN, 2019, pers. comm.).

At the time of listing, *A. portoricensis* was known from only two localities: Cerro Mariquita in Sierra Bermeja and Cerro Las Mesas in Mayagüez, indicating that the species was endemic to Puerto Rico. However, recent examination of *Aristida* material deposited at the herbarium of the Puerto Rico Department of Natural and Environmental Resources (SJ), shows a specimen collected in 1920 by Erick Leonard Ekman at Pinar del Rio, Cuba, which has been identified as *Aristida portoricensis* (Ekman 11244) (Monsegur, 2024, pers. comm.). In addition, after revising

the Catalogue of the Seed Plants of the West Indies (Smithsonian Institution), it mentions *A. portoricensis* as occurring at the island of Tortola, British Virgin Islands (BVI). However, the specimen from Tortola has not been found at the Smithsonian National Herbarium (Monsegur, 2024, pers. comm.). Based on the above information, *A. portoricensis* may not be endemic to Puerto Rico and its range may extend to Cuba and the British Virgin Islands. The identification of *Aristida* spp. herbarium material is challenging and highlights the need for phylogenetic analyses from all locations to address the question on the species range (Monsegur, 2024, pers. comm.).

Table 1. Five known populations and localities of *Aristida portoricensis* across its range in Puerto Rico. Sources of data can be found in (Service 1994, 2010, 2019a, Del Rosario Cosme 2021, and unpublished Service data).

Population: Locality	Municipality	Estimated number of individuals (2010)	Estimated number of individuals (2019)	Estimated number of individuals (2025)	Reference
* Cerro Las Mesas: Center for Educational Opportunities of Mayagüez (CROEM)	Mayagüez	No data available	No data available	45	Del Rosario Cosme 2021
*Cerro Las Mesas: Las Antenas	Mayagüez	No data available	No data available	233	Del Rosario Cosme 2021
*Cerro Las Mesas: Las Mesas	Mayagüez	No data available	No data available	669	Del Rosario Cosme 2021
**Pura Brisas	Mayagüez	No data available	No data available	606	Del Rosario Cosme 2021
Sierra Bermeja Population 1: La Tinaja Tract/Cerro Mariquita (Laguna Cartagena NWR)	Lajas	Recorded but no population estimate provided	Hundreds	No updated data available, presumed similar to 2019.	Service 2019a
Sierra Bermeja Population 2: Finca María Luisa	Lajas	No data available	55	No updated data available, presumed similar to 2019.	Service 2019a; 2019c
Sierra Bermeja Population 3: Frank H. Wandsworth Natural Protected Area (formerly known as Finca Sollins; El Conuco) & Upper Rancho Hugo	Cabo Rojo	No data available	970 (one acre at Rancho Hugo)	No updated data available, presumed declining.	Service 2019a

*New locality, these are considered sub-populations of the Cerro Las Mesas population.
**New population.

Aristida chaseae

A detailed review of the species' biology, habitat, and life history can be found in the 1995 recovery plan, 2019 recovery plan amendment, and the 2010/2019 5-Year reviews (Service 1995, 2019b, 2010, and 2019a, respectively).

In 1995, *A. chaseae* was known from two localities, in Cabo Rojo National Wildlife Refuge and the other in the upper slopes of Sierra Bermeja east of the Refuge (Service 1995). Currently there are five extant populations (Table 2). The original location where this species was found (type locality) has been extirpated, which has been attributed to competition from invasive grasses (Service 2019a). We have updated information about the populations at Cabo Rojo National Wildlife Refuge and Sierra Bermeja: Frank H. Wandsworth NPA.

Cabo Rojo National Wildlife Refuge. During July 25 and September 26, 2024, Service personnel and American Conservation Experience/Youth Conservation Corps interns conducted a habitat maintenance at the natural population of *Aristida chaseae* at the Cabo Rojo National Wildlife Refuge (Refuge) by manually removing the exotic and invasive grass *Megathyrsus maximus* (Guinea grass) (Figure 2). Parallel to this effort, a population assessment was completed documenting an estimate of 693 individuals, mostly adults (Service 2024). Overall, the population seemed healthy, despite the absence of seedlings (Figure 3) (Arocho, 2025, pers. comms). However, the population remains limited to a narrow strip approximately 328 ft long on both sides and down the center of a two-track dirt road (Turpial Trail), a total area of approximately 0.07 acres (Service 2024). At present the population is encroached by a dense stand of Guinea grass that precludes the natural expansion of this population and that may result in its extirpation.

Sierra Bermeja: Frank H. Wandsworth NPA. As mentioned above, since 2020, Para La Naturaleza has been implementing habitat management actions at the Frank H. Wandsworth NPA to conserve the existing populations of *Aristida* spp. as well as other federally listed species that occur within the property aiming to reduce the threats to these species. Main threats to the populations of target species on this property include soil erosion along the main access road. Erosion results in landslides during heavy rain events that are directly impacting the populations (e.g., *Aristida* spp., *Vernonia proctorii* and *Eugenia woodburyana*) located on the main and a secondary road and down slope (PRCT 2021). An Environmental Assessment for the secondary road was conducted to determine the best course of action to prevent negative impacts to the population of *A. chaseae* and *A. portoricensis* colonizing the area (PRCT 2021). Improvements on the main road including culvert repairs and road stabilization were completed in 2022, and Para La Naturaleza personnel ensured the protection of the natural populations near the area during these activities (PRCT 2022). However, a heavy rain event following Hurricane Fiona resulted in damages to a road segment near Cajul Creek that will require additional stabilization actions (PRCT 2022).

Figure 2. Manual removal of invasive vegetation and population assessment along the two-track dirt of *Aristida chaseae* natural population at Cabo Rojo National Wildlife Refuge. Photo by USFWS.

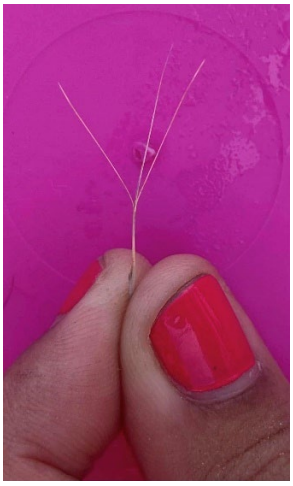

Figure 3. Detail of the seeds of *Aristida chaseae*. Photo by Nahíra Arocho (Biologist, Refuge).

Also, during 2021, Para La Naturaleza personnel identified an area in the northern border of the property where cattle are trespassing and has been in contact with the neighbor that owns the cattle to address the situation resulting in a decrease of trespassing activity (PRCT 2021). Thus, a fence was constructed and reinforced in 2023 (PRCT 2023). However, another problematic area of trespassing was evaluated in 2024, and an exclusion fence is planned for construction during 2025 (PRCT 2024).

In 2021, Para La Naturaleza personnel developed a fire hazard assessment for the property, identified the status of current fire breaks, and proposed a new one in coordination with the Puerto Rico Fire Department (PRCT 2021). After evaluating the area for the proposed firebreak, individuals of *Aristida* spp. were identified, the construction of the new firebreak was not recommended (PRCT 2022).

A series of surveys have been conducted by Para La Naturaleza personnel between 2021-2023 to document the status of the existing natural populations of *Aristida* spp. at of Frank H. Wandsworth NPA. The surveys documented a total of 303 individuals of *A. chaseae* distributed in 14 clusters within the property (PRCT 2023; Table 2). According to Arocho (2023), the *A. chaseae* population surveyed was associated to invasive grasses such as *Melinis repens* and *Megathryrsus maximus* which renders the populations vulnerable to fire events.

Table 2. Known localities and the five population estimates of *Aristida chaseae* across its range in Puerto Rico. Sources of data can be found in (Service 1995, 2010, 2019a, and unpublished Service data).

Populations	**Municipality**	**Estimated number of individuals (2010)**	**Estimated number of individuals (2019)**	**Estimated number of individuals (2025)**	**Reference**
Sierra Bermeja: Cerro Marquita' (Laguna Cartagena NWR)	Lajas	Recorded but no population estimate provided	Hundreds	No data available, presumed similar to 2019.	Service 2019a
Sierra Bermeja: Finca María Luisa	Lajas	No data available	180	No data available, presumed similar to 2019.	Service 2019a; 2019c
Sierra Bermeja: Frank H. Wandsworth Natural Protected Area (formerly known as Finca Sollins; El Conuco)	Cabo Rojo	No data available	Recorded but no population estimate provided.	303	Service 2019a; PRCT 2023
Cabo Rojo National Wildlife Refuge	Cabo Rojo	474	Recorded but no population estimate provided.	693	Service 2019a; 2024
Peñones de Melones	Cabo Rojo	578	512	No data available, presumed similar to 2019.	Service 2019a

Vernonia proctorii

A detailed review of the species' biology, habitat, and life history can be found in the 1995 recovery plan, 2019 recovery plan amendment, and the 2010/2019 5-Year reviews (Service 1995, 2019b, 2010, and 2019a, respectively).

At the time of the recovery plan (Service 1995), the species was only known to occur on the summit area of Cerro Mariquita in Sierra Bermeja. Surveys in 2014 and 2016 identified two new locations (Service 2019a) and an additional group of individuals was discovered since 2019, bringing the total to three current, extant natural populations of *V. proctorii* still confined to Sierra Bermeja (Table 3).

Since the latest species status review (2019) only the population located at the Frank H. Wandsworth NPA has been assessed. This population, formerly known as Finca Sollins; El Conuco, is located in the southwest corner of the mountain range of Sierra Bermeja in the municipality of Cabo Rojo. These individuals are an extension of the same population originally recorded at the area known as Upper Rancho Hugo, thus, we are identifying both locations as one distinct population for this and future status review of the species to keep consistency. The potential presence of *V. proctorii* in private properties neighboring to the Frank H. Wandsworth and María Luisa NPAs was anticipated by Lange et al. 2017, since the seeds are dispersed by wind. As stated in the previous species status review (Service 2019), because of the existence of additional suitable habitat for the species along the range of Sierra Bermeja, additional populations or individuals could be present.

As part of an on-going cooperative agreement between the Service and Para La Naturaleza, a series of surveys have been conducted (2021-2023) documenting *V. proctorii* within Frank H. Wandsworth NPA. The surveys recorded a total of 185 individuals, 6 saplings, and 8 seedlings including the individual in Figure 4 (PRCT 2023). The presence of seedling and saplings suggest some evidence of natural recruitment.

An environmental assessment was completed for the secondary dirt road within Frank H. Wandsworth NPA to implement the best management actions without affecting the natural population of *V. proctorii* and other listed species that occur in the area. The heavy rain events following Hurricane Fiona caused significant landslides to the road, however, the species has been recolonizing the area. Para La Naturaleza personnel analyzed photographs for the past 5 years and noticed that the area of the landslide has been stable for years even during heavy rain events. Therefore, the road will not be restored, allowing the species to continue its natural succession and recruitment process. In addition, individuals of *V. proctorii* were also identified during the monitoring activity conducted by Octavio Rivera Hernández (Botanist) within the main access road. A total of 3 individuals were documented and 2 of them in reproductive state. Service biologists provided recommendations to minimize potential impacts to the species due to road and fire break maintenance.

Figure 4. Individual of *V. proctorii* with flowers during 2023 surveys. Photo by Nahíra Arocho (Biologist, Refuge).

Table 3. Known localities and population estimates of *Vernonia proctorii* across its range in Puerto Rico. Sources of data can be found in (Service 1995, 2010, 2019a, and unpublished Service data).

Population	Municipality	Estimated number of individuals (2010)	Estimated number of individuals (2019)	Estimated number of individuals (2025)	Reference
Sierra Bermeja: Cerro Mariquita	Lajas	150	618	No data available, presumed similar to 2019.	Service 2019a
Sierra Bermeja: Finca María Luisa	Lajas	No data available	79	No data available, presumed similar to 2019.	Service 2019a; 2019c
Sierra Bermeja: Frank H. Wandsworth Natural Protected Area (formerly known as Finca Sollins; El Conuco) & Upper Rancho Hugo	Cabo Rojo	No data available	3	199	Service 2019a; PRCT 2023

Lyonia truncata var. proctorii

A detailed review of the species' biology, habitat, and life history can be found in the 1995 recovery plan, 2019 recovery plan amendment, and the 2010/2019 5-Year reviews (Service 1995, 2019b, 2010, and 2019a, respectively).

Currently there is one population with two extant sub-populations. As of 2019, approximately 329 individuals were documented in those subpopulations (Table 4). At present, the Service has no updated information on the population structure and the number of individuals. Since *L. truncata var. proctorii* grows in very steep slopes, it is challenging to access certain areas where the species might be located due to safety hazard. In addition, the potential impacts of Hurricanes Irma/María (2017), Hurricane Fiona (2022) and heavy rain events impacted the populations, but those impacts have not been quantified. In May 2023, Service biologists and Fairchild personnel attempted to visit the wild population, but unfortunately it was inaccessible due to road damage associated with the hurricanes (Wintergerst et al. 2023).

Table 4. Known localities and population estimates of *Lyonia truncata var. proctorii* across its range in Puerto Rico. Sources of data can be found in (Service 1995, 2010, 2019a, and unpublished Service data).

Subpopulation	Municipality	Estimated number of individuals (2010)	Estimated number of individuals (2019)	Estimated number of individuals (2025)	Reference
Sierra Bermeja: Cerro Marquita/La Tinaja Tract (Laguna Cartagena NWR)	Lajas	25	280	No data available, presumed stable.	Service 2019a
Sierra Bermeja: Finca Lozada (Cerro Mariquita northwest section of the farm)	Lajas	12	49	No data available, presumed stable.	Service 2019a

Other relevant information on these species

Propagation and reproductive biology. As a continuation of conservation work started in 2019, Fairchild received external funding from the Association for Zoological Horticulture to further safeguard the Sierra Bermeja endemic species. During May 2023, personnel from Fairchild traveled to Puerto Rico and collected fresh seeds of all the species except *L. truncata var. proctorii* due to inaccessibility of the natural population. The seed material collected in 2023 comprised approximately 23,707 seeds that were processed at Fairchild laboratory and stored at Fairchild and at the National Laboratory for Genetic Research Preservation in Ft. Collins, CO. The most recent testing by Fairchild showed that seeds of all four species remain viable in storage (freezing conditions) for up to a decade. However, this study suggests the need to replenish seed banked material every 5-10 years (10 years for *V. proctorii* and 5 years for *A. chaseae*, *A. portoricensis*, *L. truncata var proctorii*) (Possley, 2023, pers. comm.). A summary of the final germination percentage of the viability tests conducted in 2023 for each species is provided in Table 5.

In addition, Fairchild is growing plants from seeds for increasing the availability of seed material for banking of these species from cultivated individuals. Moreover, in March 2024, Fairchild

notified the Service that seeds sowed for *L. truncata var. proctorii* had a germination rate of 25% and produced 50 seedlings (Figure 5), a significant contribution for a species with no evidence of natural recruitment in the wild (Possley 2024). More recently, Fairchild provided an update of the current material growing in pots in the nursery including 2 plants of *A. portoricensis*, 1 plant of A. *chaseae*, 3 plants of *V. proctorii*, and 7 plants of *L. truncata var. proctorii* (Possley, 2025, pers. comm).

Table 5. Final germination percentages for each species after viability tests with old accessions stored at Fairchild Tropical Botanic Garden's seed bank in 2014, 2016 or 2020 (Wintergerst et al. 2023).

***Species**	**Year material stored at seed bank**	**Final germination percentage**
Aristida chaseae	2016/2020	4 to 36%
Aristida portoricensis	2016/2017/2020	1-54%
Vernonia proctorii	2014/2016	8-54%
Lyonia truncata var. proctorii	2016	14%

*In general, trial results showed that all seed accessions contained viable seeds.

Figure 4. Seedlings of *Lyonia truncata var. proctorii* at Fairchild Tropical Botanic Garden's nursery. Photo by Fairchild Tropical Botanic Garden.

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act. A detailed review of the species' threats can be found in the previous 5-year status reviews (Service 2010, Service 2019a) and in the recovery plans (Service 1994, Service 1995, Service 2019b) of the species. A summary of current threats is detailed below.

A. Present or threatened destruction, modification or curtailment of its habitat or range.

As detailed in the previous species status reviews (Service 2010, 2019a), habitat destruction and modification continue to be a primary threat affecting the continued existence of all four species, *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii.* These species' distribution extends into privately owned lands within the Sierra Bermeja region in southwest Puerto Rico and have limited protections from modifications to their habitat. During this current review additional localities of these species were found within private lands.

These species are particularly vulnerable to human induces fires and land-use changes (e.g., agriculture, bulldozing, development). Although natural fire is relatively common in the drier portions of the island, the majority (95%) of fires are human caused (Monmany et al. 2017). As discussed in past reviews, fire encourages invasion of non-native species which out compete native species and also promotes conditions that these species may not be adapted to survive (Service 2019a).

At present, all the individuals of *Aristida portoricensis* within the municipality of Mayaguez are vulnerable to habitat modification. The *A. portoricensis* clusters at Las Antenas and Las Mesas are located within an area that is advertised for real state and subject to urban development. Similarly, the Pura Brisas site lies within an area that was cleared for development in the past, with the potential of the area to be developed in the future, highlighting the need to seedbank material from this locality (Wintergerst et al. 2023). Moreover, the Pura Brisas sites remain deforested and shows extensive soil erosion which affects the *A. portoricensis* individuals. In the case of the *A. portoricensis* at CROEM site, despite the area was donated to the University of Puerto Rico and is currently managed for conservation, the population remains threatened by the maintenance of the access road to the power lines and the associated maintenance (Wintergerst et al. 2023). In addition, as stated above the CROEM site was directly impacted by a human induced fire event.

In the case of the *Aristida chaseae* population at Peñones de Melones in Cabo Rojo, the area is threatened by a proposed tourist and residential development in the southern portion of Boquerón Bay. On July 2025, Service personnel conducted a site visit to the area and evaluated gentle slope hills with exposed serpentine soils in the proximity of a known location of *A. chaseae* and confirmed the presence of the species (Monsegur, 2025a, pers. comm.). A comprehensive assessment is needed to better determine the size of this population (including the areas where the species was originally recorded). Because of the reduced range of this species, the species' reproductive ecology, and the lack of connectivity of the Peñones de Melones population with other natural populations, the *A. chaseae* population may harbor unique genetic variability important for its long-term survival. These potential development projects pose significant risk to that population.

In addition, the habitat of *A. chaseae, A. portoricensis* and *Vernonia proctorii* within the Frank H. Wadsworth NPA is extensively degraded due to former deforestation for cattle ranching, and associated habitat intrusion by nonnative invasive plant species (e.g., *Megathyrsus maximus*). At present some of these localities occur within or adjacent to access roads and dirt trails, making the individuals vulnerable to maintenance activities (e.g., vegetation pruning and bulldozing) or to soil erosion along the roads/trails.

Although some of the natural populations that occur within private lands are protected under Conservation Easements and Cooperative Agreements, the threat of habitat destruction and modification persists for *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii*.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Based on the available information, we have no evidence indicating that overutilization for commercial, recreational, scientific, or educational purposes represents a threat to *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii*.

C. Disease or predation.

During population assessments, Envirosurvey, Inc. (2020) observed that cattle grazing threatening the northern section of Finca María Luisa, and even observed that cows, goats, and horses in the property had impacted the habitat by making trails and foraging on the vegetation. For example, goats were observed grazing on the endangered *A. chaseae* (Envirosurvey, Inc. 2020). The observations by Envirosurvey, Inc. (2020) were consistent with previous status review (Service 2019a) that indicated that recorded grazing activity at Finca Lozada. Therefore, impacts from cattle predation likely affects *A. chaseae, A. portoricensis* and *V. proctorii* across these species' habitat. Despite Para La Naturaleza personnel have contacted adjacent landowners to address the cattle trespassing issue at Frank H. Wadsworth NPA, this threat continues to affect these species and its habitat.

Del Rosario Cosme and Puente Rolón (2023) found that a fungal endophyte, *Balansia aristida*, has varying presence in *A. portoricensis* populations at the Mayaguez sites, suggesting it may cause damage to its host. Based on Del Rosario Cosme and Puente Rolón (2023) it does not seem to be a significant threat to the persistence of this species, but more research is needed to determine its impacts in the presence of other stressors.

Based on this information, currently disease and predation are not considered a significant threat to *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii*.

D. Inadequacy of existing regulatory mechanisms.

At present, Puerto Rico's Law No. 241-1999 (12 L.P.R.A. Sec.107), known as the New Wildlife Law of Puerto Rico includes provisions to protect habitat for all wildlife species, including plants. In addition, *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii* are protected by the Puerto Rico Department of Natural and Environmental Resources Regulation 6766, which under Article 2.06 prohibit collecting, cutting, and removing, among other activities, listed plant individuals within the jurisdiction of Puerto Rico (Departamento de Recursos Naturales y Ambientales 2004). However, the protection of listed species on private lands is challenging as landowners may damage those species (e.g., by cutting, pruning, or mowing) unaware they are protected species. These measures will provide some protections for the species on protected lands; however, they will be inadequate to protect the species on private lands or from invasive species and impacts from fire.

In addition, as stated in the previous species status reviews (Service 2010, 2019a), the individuals and habitat of *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii* within Refuge Lands (La Tinaja Tract/Laguna Cartagena National Wildlife

Refuge/Cabo Rojo National Wildlife Refuge) are protected by the National Wildlife Refuges Act of 2000. All plants existing on the National Wildlife Refuge System are protected from collecting (50 CFR 27.51). Moreover, the Comprehensive Conservation Plans include measures for the protection and recovery of threatened and endangered species within these Refuges.

Although inadequacy of existing regulatory mechanisms may be providing some protections to these species, regulations do not provide sufficient protections on private lands and areas utilized for agricultural practices, and urban development and funding for monitoring and enforcement on federal lands may also be limited.

E. Other natural or manmade factors affecting its continued existence.

Other natural or manmade factors continue to impact *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii*, including human-induced fires, changes in temperature, extreme precipitation evens, and hurricanes (Service 2010, 2019a).

Fire. As discussed above, fires are likely to be a continued threat to these species. Wildfires in the Caribbean, including Puerto Rico, are mainly human-caused and the dry forest habitats and their species are nut adapted to such fire disturbance (Robbins et al. 2008). Wildfire in these sensitive ecosystems can increase the presence of invasive, non-native fire-tolerant species that can out-compete native, fire-sensitive species (Robbins et al. 2008). While grasses typically need some type of disturbance to reduce canopy cover to increase sunlight (gaps), traditionally hurricanes and tropical storms have provided such disturbance regime in Puerto Rico. The recurrent human induced fires have allowed fire-resistant exotic species to outcompete endemic species impacting native seed bank and reducing the natural recruitment (Service 2019a). With future projections increased drought events, the extent of fire on Puerto Rico is likely to increase and reduce the resiliency of these species (Van Beusekom et al. 2018). For example, one of the main threats to the species at Frank H. Wandsworth NPA is human-induced fires, which in addition to directly killing the vegetation and modifying the habitat, modify the landscape by promoting the establishment of exotic invasive vegetation (e.g. guinea grass (*Megathyrsus maximus*)) (Arocho 2023). In addition, it diminishes the seed bank of native species (Arocho 2023). Furthermore, the presence of guinea grass and other grass species increases the amount of fuel, hence the intensity of future fire events (Arocho 2023).

As described above, the population of *A. portoricensis* recorded at Cerro Las Mesas (CROEM) was directly affected by a human-induced fire on February 17, 2025. In addition, in early 2019, the *A. chaseae* population located within the Cabo Rojo NWR was nearly impacted by a human induced fire that was extinguished about 100 meters from the population of this endangered grass (Pacheco, 2019, pers. comm). The same year, an extensive fire event affected the southern hills of Sierra Bermeja, affecting the populations of *A. chaseae, A. portoricensis* and *V. proctorii* within at Frank H. Wandsworth NPA (Rodríguez, 2019, pers. comm.). The expected future severe droughts may contribute to an increase in the quantity and frequency of fires on the southern coast of Puerto Rico. In addition, the increase in severe or extreme weather may also increase landslides and other impacts that will damage habitat and individuals. For example, since 2021 as part of the on-going Cooperative Agreement with the Service, Para La Naturaleza has been implementing management actions within Frank H. Wadsworth NPA to ameliorate impacts to natural populations of *Aristida portoricensis, A. chaseae* and *V. proctorii* that occur

on the sides and along the dirt roads since they have been affected by increased soil erosion, and landslides associated to Hurricanes María and Fiona (PRCT 2021, 2022, 2023, 2024). Moreover, the remaining population of *L. truncata var. proctorii* was exposed to landslides after the impacts of these hurricanes and heavy rains. At this time, we don't know the status of the *L. truncata var. proctorii* population and access roads were damaged making it challenging to monitor this locality.

Drought, Extreme Precipitation, Hurricanes. Modeling predicts an increased frequency of drought events and catastrophic hurricanes (Category 3, 4, and 5), as well as increases in temperature in the future (Factor E; Runkle et al. 2022; Intergovernmental Panel on Climate Change 2023). Temperatures in Puerto Rico have already risen almost 2˚F since 1950 and under a higher emissions pathway, historically unprecedented warming is projected during this century, including increases in extreme heat events (Runkle et al. 2022). Rising temperatures are contributing to the expansion of dry-climate species, which could alter the environmental suitability for *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii*. The capacity to colonize other habitats by the species will depend on factors such as life history traits, adaptability, dispersal mechanisms, species introductions, and ecological interactions (Khalyani et al. 2019). Under this scenario, *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii* may be displaced or outcompeted by native or exotic species with wider environmental plasticity. Furthermore, increased temperatures may negatively impact natural recruitment by affecting seed germination and seedling survival (Service 2014). Increases in temperature and decreases in precipitation may favor increased impacts and extent of human-started fires and non-native species. These factors are further exacerbated by the isolated habitats (serpentine soils), and likely a minimal seed bank in areas that have experienced fire.

Based in the information provided above, we believe that natural or manmade factors continue to be a main threat to *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii.*

Synthesis

Four plants primarily occurring in Puerto Rico are the focus of this status review, two grasses, pelos del diablo (*Aristida portoricensis*) and *A. chaseae,* and two other plants *Lyonia truncata* var *proctorii* and *Vernonia proctorii*. These four species occur in west-southwest Puerto Rico. There are currently five extant populations of *A. portoricensis* in Puerto Rico, which was an increase from the two localities known at the time of the species' listing. Recent analysis of species data indicates the species may also occur in Cuba and the British Virgin Islands. There are also five extant populations of *A. chaseae*, which has increased from the two localities known in 1995. *Vernonia proctorii* has three extant populations, which is also an increase from the populations known at the time of listing. Lastly, *L. truncata* var. *proctorii* only has a single extant population made up of two subpopulations. Although some of these plants have had an increase in the number of populations, these increases are most likely due to increases in survey efforts rather than dispersal or range increases. The number of individuals recorded has fluctuated through time, but we have insufficient data to determine if any trends in population sizes are significant at this time. Current threats to the species that include competition with invasive/exotic plant species, human-induces fires, animal grazing/trampling, non-compatible land use such as agricultural practices and urban development, vegetation clearing, dirt road maintenance within private lands. Also, drought, temperature changes, and extreme weather

events have resulted in landslides and soil erosion. These threats disturb the habitat and some impact the seed bank of native plants which reduce their natural recruitment. Based on the information gathered during this review and ongoing threats, *A. chaseae, A. portoricensis, V. proctorii*, and *L. truncata var. proctorii* continue to meet the definition of an endangered species.

RECOMMENDED FUTURE ACTIVITIES

A detailed discussion of recovery actions is presented in the original Recovery Plans (Service 1994, 1995), Recovery Plan Amendments (Service 2019) and past 5-year reviews (Service 2010, 2019a). In the course of this status review new and/or targeted potential recovery activities were identified and are included below.

Recovery Activities

- Identify possible reintroduction sites and evaluate its suitability.
- Continue close coordination and collaboration with Para La Naturaleza for the protection of the natural populations of *A. chaseae, A. portoricensis,* and *V. proctorii* that occur within Frank H. Wadsworth NPA by implementing management actions (e.g., maintain firebreaks, exclusion fences, erosion control, removal of invasive plant species).
- Continue close collaboration with Refuge staff to coordinate annual maintenance activities for the population of *A. chaseae* within the Cabo Rojo NWR to allow more open space for dispersion, natural recruitment and avoid encroachment and competition with exotics.
- Assess the difference between natural dispersal, recruitment, and planting for recovery planning.
- Establishing new self-sustainable populations in private and protected lands within Sierra Bermeja mountain range.
- Prioritize the assessment of the only known wild population of *L. truncata var. proctorii* and coordinate with private landowners to safely access the area.
- Develop protection mechanisms (e.g., Landowner Agreements) for *Aristida portoricensis* within private lands in the municipality of Mayagüez.
- Continue outreach efforts with private landowners, NGOs, and communities to inform them about the presence of these plants and discuss options to protect the species' known locations.
- Continue collaborating with botanical gardens (e.g., Fairchild Tropical Botanic Garden, Atlanta Botanical Garden, Dessert Botanical Garden) on the long-term seed bank for these species and re-collect seed material from all known wild populations, prioritizing the most imperiled ones.

Monitoring and Research Activities

- Continue surveying suitable habitat within the species' range to identify new localities or populations, and to identify potential reintroduction sites.
- Population monitoring should be conducted to assess the response of the species to known threats (i.e., after hurricanes, fires, or other major disturbances).
- Conduct research on average age at reproductive maturity and frequency of reproduction.

- Conduct research on the effects of the endophytic fungus *Balansia aristida* on the fitness of *Aristida portoricensis.*
- Studies should be conducted to determine the patterns of genetic variation within and among populations to develop a plan to preserve the species genetic variability and to manage populations effectively.

REFERENCES

Arocho, N. 2023. Final Report to Para La Naturaleza: Inventory of endangered and threatened species at Protected Natural Area Frank Wadsworth (El Conuco). 7 pp.

Arocho, N. 2025. Personal communication. Conversation between N. Arocho and Alexandra M. Galindo, U.S. Fish and Wildlife Service about the current health status of the *Aristida chaseae* population at Cabo Rojo National Wildlife Refuge. May 15, 2025.

Del Rosario Cosme, S. 2021. Population structure and distribution of a new population of the endangered *Aristida portoricensis* (Poaceae) in Mayagüez, Puerto Rico. Master's Thesis, University of Puerto Rico, Mayagüez Campus. 119 pp.

Del Rosario Cosme, S. and A.R. Puente Rolón. 2023. Spatial Distribution and Demography of the Endangered *Aristida portoricensis* (Poaceae) in a New Population in Western Puerto Rico. 62 pp.

Envirosurvey, Inc. 2020. Final Report: Cooperative Recovery Initiative (CRI), Implementation of priority recovery actions for Puerto Rico's southwest endangered plant species that lead to the down listing of *Eugenia woodburyana*, delisting of *Sthalia monosperma* and simultaneously, in the same type of habitat, prevent the extinction of four listed plants of Puerto Rico 2014-2019. Inventory & Monitoring and Coastal Programs, Cooperative Agreement No. F140C00847. 77 pp.

Hernández, O. 2024. Assessment Report: Identification of listed species and their occurrence within trails at Frank H. Wandsworth NPA. 4 pp.

Lange, J., J. Possley, and J. Maschinski. 2017. Final Report: Developing propagation protocols and seed bank for Sierra Bermeja plants: *Aristida chaseae, Aristida portoricensis, Lyonia truncata* var. *proctorii* and *Vernonia proctorii*. U.S. Fish and Wildlife Service Cooperative Agreement No. F14AC01201. 51 pp.

Maschinski, J., J. Possley, J. Lange, O. Monsegur Rivera, and K. Heineman. 2018. Evaluating Seed-banking Capacity and Propagation Potential of Endangered Sierra Bermeja Grasses: *Aristida chaseae* and *Aristida portoricensis*. Caribbean Naturalist 2:76–89.

Monmany, A.C., W.A. Gould, M. J. Andrade-Núñez, G. González, and M. Quiñones. 2017. Chapter 4. Characterizing Predictability of Fire Occurrence in Tropical Forests and Grasslands: The Case of Puerto Rico. *In* Forest Ecology and Conservation, S. Chakravarty, and G. Shukla, eds. Pp. 77-95.

Monsegur, O. 2024. Personal communication. Email correspondence between O. Monsegur, U.S. Fish and Wildlife Service and personnel from the Royal Botanical Gardens Kew and National Park Trust BVI regarding *Aristida portoricensis* question about the species range

and possible collaboration on its phylogenetic placement. Correspondence from May 8, 2024, May 9, 2024, and May 10, 2024.

Monsegur, O. 2025. Personal communication. Email from O. Monsegur to Alexandra M. Galindo, U.S. Fish and Wildlife Service, regarding evidence on the threat by human induced fires to *Aristida portoricensis* at Cerro Las Mesas in Mayaguez, Puerto Rico. Received on February 18, 2025.

Monsegur, O. 2025a. Personal communication. Conversation between O. Monsegur and Alexandra M. Galindo, U.S. Fish and Wildlife Service, regarding a site visit conducted to a known location of *Aristida chaseae* at Peñones de Melones in Cabo Rojo, Puerto Rico. August 11, 2025.

Pacheco, C. 2019. Personal communication. Email from C. Pacheco to U.S. Fish and Wildlife Service personnel, regarding a human induced fire at the municipality of Cabo Rojo, Puerto Rico. Early 2019.

Possley, J. 2023. Personal communication. Email from J. Possley, Fairchild Tropical Botanic Garden to U.S. Fish and Wildlife Service and Puerto Rico Department of Natural and Environmental Resources personnel and other partners, sharing the final report of the Sierra Bermeja species seed bank study. November 20, 2023.

Possley, J. 2024. Personal communication. Email from J. Possley, Fairchild Tropical Botanic Garden, to Omar Monsegur, U.S. Fish and Wildlife, providing an update of the seed bank of *Lyonia truncata var. proctorii* at Fairchild Tropical Botanic Garden. March 4, 2024.

Possley, J. 2025. Personal communication. Email from J. Possley, Fairchild Tropical Botanic Garden, to Alexandra Galindo, U.S. Fish and Wildlife Service, regarding the current status of Sierra Bermeja species plant material at Fairchild Tropical Botanic Garden. July 17, 2025.

Puerto Rico Conservation Trust (PRCT). 2021. Progress Report: Conservation and Management Initiative of the Natural Populations of Endangered Plant Species in Sierra Bermeja, Southwest Region of Puerto Rico. Partners for Fish and Wildlife Program, Cooperative Agreement No. F20AC10293. 3 pp.

Puerto Rico Conservation Trust (PRCT). 2022. Progress Report: Conservation and Management Initiative of the Natural Populations of Endangered Plant Species in Sierra Bermeja, Southwest Region of Puerto Rico. Partners for Fish and Wildlife Program, Cooperative Agreement No. F20AC10293. 4 pp.

Puerto Rico Conservation Trust (PRCT). 2023. Progress Report: Conservation and Management Initiative of the Natural Populations of Endangered Plant Species in Sierra Bermeja, Southwest Region of Puerto Rico. Partners for Fish and Wildlife Program, Cooperative Agreement No. F20AC10293. 4 pp.

Puerto Rico Conservation Trust (PRCT). 2024. Progress Report: Conservation and Management Initiative of the Natural Populations of Endangered Plant Species in Sierra Bermeja, Southwest Region of Puerto Rico. Partners for Fish and Wildlife Program, Cooperative Agreement No. F20AC10293. 5 pp.

Robbins, A.M.J., C.M. Eckelmann, and M. Quiñones. 2008. Forest fires in the insular Caribbean. AMBIO: A Journal of the Human Environment 37(7):528-534.

Rodríguez, R. 2019. Personal communication. Email from R. Rodríguez to Para La Naturaleza personnel, regarding the fires that affected the planting sites at Frank H. Wandsworth Natural Protected Area in the municipality of Cabo Rojo, Puerto Rico. May 2, 2019.

U.S. Fish and Wildlife Service (Service). 1994. Recovery Plan *Aristida portoricensis* (Pelos del diablo). Atlanta, Georgia, 19 pp.

U.S. Fish and Wildlife Service (Service). 1995. Recovery Plan *Aristida chaseae*, *Lyonia truncata* var. *proctorii*, and *Vernonia proctorii*. Atlanta, Georgia, 21 pp.

U.S. Fish and Wildlife Service (Service). 2010. *Aristida chaseae, Aristida portoricensis, Lyonia truncata var. proctorii,* and *Vernonia proctorii* Five-Year Review: Summary and Evaluation. Southeast Region, Caribbean Ecological Services Field Office, Boquerón, Puerto Rico. 22 pp.

U.S. Fish and Wildlife Service (Service). 2019a. *Aristida chaseae* (no common name), *Aristida portoricensis* (pelos del diablo), *Lyonia truncata* var. *proctorii* (no common name), *Vernonia proctorii* (no common name) 5-Year Review: Summary and Evaluation. Atlanta, Georgia. 35 pp.

U.S. Fish and Wildlife Service (Service). 2019b. *Aristida chaseae* (no common name), *Lyonia truncata* var. *proctorii* (no common name), and *Vernonia proctorii* (no common name). Recovery Plan Amendment. Atlanta, Georgia. 9 pp.

U.S. Fish and Wildlife Service (Service). 2019c. *Aristida portoricensis* Recovery Plan Amendment. Atlanta, Georgia. 7 pp.

U.S. Fish and Wildlife Service (Service). 2019d. Final Report: Implementation of Priority Recovery Actions for Southwest Puerto Rico Endangered Plant Species. Cooperative Recovery Initiative. Southeast Region, Caribbean Ecological Services Field Office and Caribbean Islands National Wildlife Refuge Complex, Puerto Rico 42 pp.

U.S. Fish and Wildlife Service (Service). 2024. Field Visit Notes: Cabo Rojo National Wildlife Refuge. Caribbean Islands National Wildlife Refuge Complex. 4 pp.

Van Beusekom, A.E., W.A. Gould, A.C. Monmany, A.H. Khalyani, M. Quiñones, S.J. Fain, M.J. Andrade-Núñez, and G. González. 2018. Fire weather and likelihood: characterizing climate space for fire occurrence and extent in Puerto Rico. Climatic Change 146:117-131.

Wintergerst, S., J. Possley, and N. Matsumoto. 2023. Final Report to the Association of Zoological Horticulture: Safeguarding four endangered species endemic to the Sierra Bermeja region of Puerto Rico. Fairchild Tropical Botanic Garden. 21 pp.

RESULTS / SIGNATURES

U.S. Fish and Wildlife Service
Status Review of Pelos del Diablo (*Aristida portoricensis*), *Aristida chaseae*, *Vernonia proctorii*, and *Lyonia truncata var. proctorii*

Status Recommendation:

On the basis of this review, we recommend the following status for this species. A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist:
____ *The species is extinct*
____ *The species does not meet the definition of an endangered or threatened species*
____ *The listed entity does not meet the statutory definition of a species*
__X__ No change needed

FIELD OFFICE APPROVAL:

Field Supervisor, Caribbean Ecological Services Field Office, Fish and Wildlife Service

Approve LOURDES MENA Digitally signed by LOURDES MENA Date: 2025.08.13 15:24:35 -04'00' _____