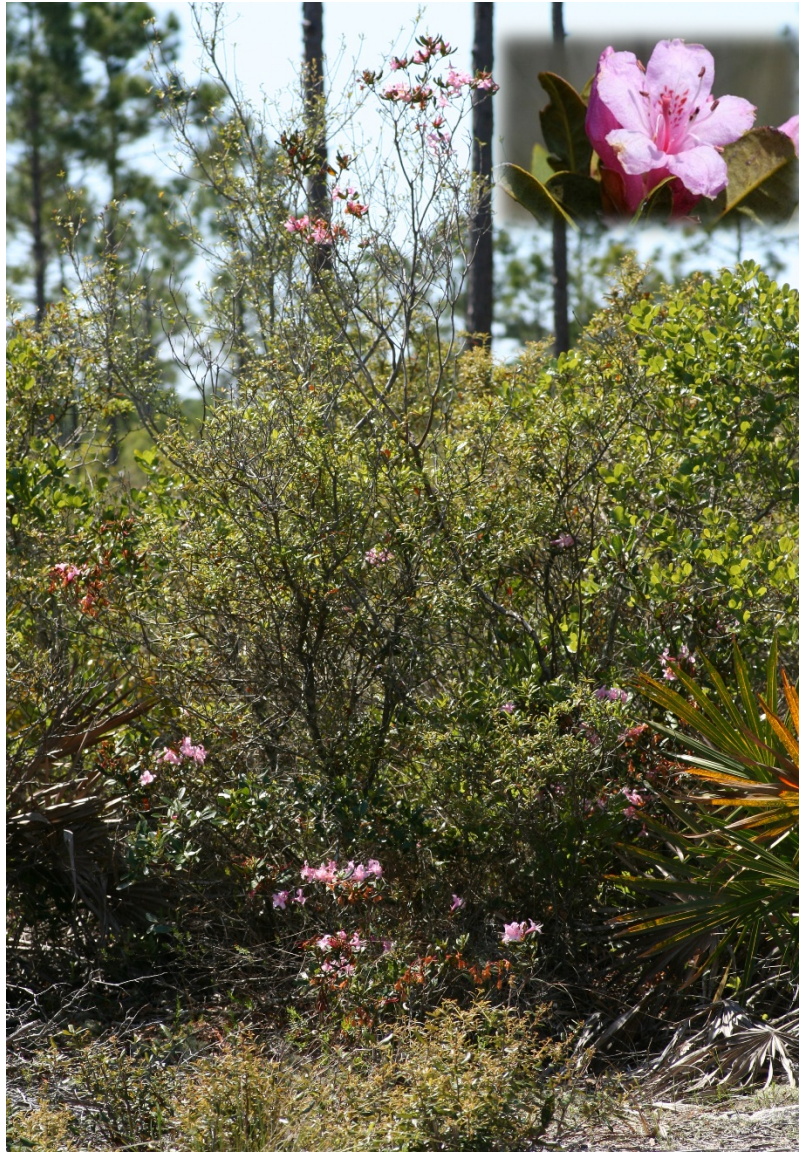


Rhododendron minus var. *chapmanii*
Chapman's Rhododendron

**5-Year Review:
Summary and Evaluation**



St. Joseph State Buffer Preserve, Gulf County, Florida
Photos by Vivian Negrón-Ortiz

**U.S. Fish and Wildlife Service
Southeast Region
Panama City Field Office
Panama City, Florida**



5-YEAR REVIEW
Rhododendron minus* var. *chapmanii
(Chapman's Rhododendron)

I. GENERAL INFORMATION

A. Methodology used to complete the review: In conducting this 5-year review, we relied on the best available information pertaining to historical and contemporary distributions, life histories, genetics, habitats, and threats of this species. We announced initiation of this review in 2018 and requested information in a published *Federal Register* notice with a 60-day comment period (83 FR 38320). We received no public comments during the 60-day open comment period, but a few partners provided information or data during the review process. We used a variety of information resources, including the Recovery Plan of September 1983, unpublished field survey results, reports of current research projects, peer reviewed scientific publications, unpublished field observations by U.S. Fish and Wildlife Service (Service), State and other experienced biologists, and notes and communications from other qualified individuals. Appendix A provides a brief summary of peer-review. This review was completed by the Service's lead Recovery botanist in the Panama City Field Office, Florida.

B. Reviewers

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Lead Region: Southeast Region: Kelly Bibb, 404-679-7132

C. Background:

- 1. Federal Register Notice citation announcing initiation of this review:** 83 FR 38320 (August 6, 2018).
- 2. Species status:** Unknown. Of the three known locations, only the Camp Blanding population (Clay County) is stable with current surveys (C. Baldoni, Camp Blanding, 7/11/2019, pers. comm.) and management in place. The status of most Gulf County locations are unknown because we do not have current censuses, and a few locations may have been impacted by Hurricane Michael, a natural catastrophic event that occurred in October 2018. The privately owned population near Hosford is not protected and was sold to a for-profit company; therefore, the safety of this population is uncertain.
- 3. Recovery achieved:** 1 (0–25% species recovery objectives achieved).
- 4. Listing history**

Original Listing

FR notice: 44 FR 24248

Date listed: April 24, 1979

Entity listed: species

Classification: endangered

5. Associated rulemakings: None.

6. Review History:

Recovery Plan: September 8, 1983

Each year, the Service reviews and updates listed species information to eventually benefit the required Recovery Report to Congress Through 2013, we performed a recovery data call that included status recommendations, such as “Stable” for this species. We continue to show those recommendations in our 5-year reviews. The last review conducted for the Recovery report was conducted in 2018.

Five-year reviews:

April 13, 2010: The last review conducted in 2010 showed this species as Stable; no status change was recommended.

November 6, 1991 (56 FR 56882): In the 1991 review, multiple species were simultaneously evaluated with no species-specific, in-depth assessment of the five factors or threats as they pertained to each species’ recovery. In particular, no changes were proposed for the status of *Rhododendron minus* var. *chapmanii* in the review.

7. Species’ Recovery Priority Number at start of review: 8C

Degree of Threat: moderate

Recovery Potential: high

Taxonomy: species

Conflict category (‘C’): in conflict with development and growth

8. Recovery Plan

Name of plan: Chapman’s Rhododendron Recovery Plan

Date issued: September 8, 1983

II. REVIEW ANALYSIS

A. Application of the 1996 Distinct Population Segment (DPS) Policy

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any vertebrate. This definition limits listing DPS

to only vertebrate species of fish and wildlife. Because the species under review is a plant, the DPS policy is not applicable and not addressed further in this review.

B. Recovery Criteria

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

The recovery plan included a recovery objective for downlisting the species. The objective was to reverse the decline in population and increase it to the point that the listing status can be changed from endangered to threatened. The Recovery Plan projected that downlisting could potentially be undertaken by year 2000 if the existing populations are protected and managed by following these criteria: the dense 10-acre population near Hosford is maintained stable or increasing, and the remaining part continues to occupy at least 200 acres with at least 500 plants; the Gulf County population continues to occupy at least 200 acres with at least 500 plants; the Camp Blanding Military Installation (Camp Blanding) population continues to have at least 20 plants, and there is a permanent increase of about 1,000 plants in any combination of sites to increase to a total of at least 2,000 plants.

2. Adequacy of recovery criteria.

- a. **Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?** *No.* The recovery criteria were based on the available data at the time the plan was published 36 years ago.
- b. **Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?** *No.* The recovery plan only addressed factor A – habitat destruction and modification, which is still a threat. See sections II.B.3 and II.C.2 for description of current information and threats.

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:

The recovery criteria address factor A. Factor B is addressed by recovery action 2. Factor C is not relevant to *R.m. chapmanii*. Factor D, although relevant to this species, was not addressed in the Recovery Plan.

Evaluation of Criteria to consider reclassification:

1. The dense 10-acre population near Hosford is maintained stable or increasing.

The population near Hosford was examined in 2010 and some areas were found to be relatively 'well-managed' (some areas were cleared cut or with a dense understory; Negrón-Ortiz 2010). As of March 2014, the site was sold to AgReserves, Inc., and access to the site was no longer permitted. Therefore, we do not have current data to assess this criterion.

2. The remaining part of the Hosford population continues to occupy at least 200 acres with at least 500 plants.
A plant survey conducted in 2010 detected 87 clumps (or plants, hereafter clumps); 14 Florida Natural Areas Inventory (FNAI) documented sites that lacked R.m. chapmanii plants were clear cut, or encroached with a dense understory. Therefore, we do not have current data to assess this criterion.
3. The Gulf County population continues to occupy at least 200 acres with at least 500 plants
An estimated 983+ clumps are potentially present in the Gulf County locations (see IIC1a). This is an estimated number because the majority of the sites have not been censused since 1997, *and several may have been impacted by Hurricane Michael in October 2018.*
4. The Camp Blanding Military Installation (Camp Blanding) population continues to have at least 20 plants.
This population has 31 clumps (USFWS 2010). According to the Camp Blanding Biologist, there has been no change to the population (C. Baldoni, Camp Blanding, 7/11/2019, pers. comm.).
5. There is a permanent increase of about 1,000 plants in any combination of sites 2, 3, and 4 to increase to a total of at least 2,000 plants at these sites.
We do not have a current estimate of clumps. Systematic surveys have not been conducted since the 2010 5-year review. The last count we synthesized was 3,172 based on 1997 surveys.

We summarize our progress under existing recovery actions below. Recovery actions 1-4 address factor A. Recovery action 1 addresses factor B.

Recovery Action 1: Stop population and habitat decline by protection, management and monitoring
This is an ongoing action.

Establish cooperative agreements with landowners

Cooperative agreements have not been established with the AgReserves, Inc. for the Liberty/Gadsden population (Hosford population).

Habitat protection

To date, two protected sites have been secured: one site of about 400+ clumps¹ on the St. Joseph Bay State Buffer Preserve (SJBSBP) in Gulf County, and one population at Camp Blanding in Clay County composed of 31 clumps.

The Hosford population has not been secured. The land was proposed for state acquisition in 2002 as a Florida Forever project (Hosford Chapman's Rhododendron Protection Zone) but it was not ranked in the top two categories for acquisition, i.e. "top 21" or category A. It was and continue to

¹ Clump: genet; one or a cluster of rooted stems representing a plant.

be ranked in Category B by the Acquisition and Restoration Council.

Individual plant protection

We have been closely working with the managers of the SJBSBP, and the Camp Blanding to ensure protection of the plants.

Proper management

Management with prescribed fire has been implemented for the population at SJBSBP. Burns are conducted on a 3 to 5 year return interval. The Camp Blanding staff cleared the encroaching vegetation at the *Rhododendron* site in 2005 (Hall 2005) and in subsequent 2008, 2009, 2010 survey periods.

The Hosford population was burned in 2001 by The Nature Conservancy under a grant with FNAI; only 10 acres were burned (M. Jenkins, 2010, pers. comm.). The site appeared to have been burned once every 6-8 years. The Camp Blanding site was burned in 2010. Presently, the Hosford site is in need of prescribed fire.

Monitoring

Forty plants at the SJBSBP population were monitored from 2008-2010 (V. Negrón-Ortiz, USFWS, botanist, unpub data). An average of eight stems per plant was observed during the study period, with an average length of the longest stem of 123 centimeters (48 inches); suggesting growth is similar across these years. On average, flowering stems were higher in 2009, but higher flower bud production was observed in 2008. The Camp Blanding population has been monitored since 2005 (see section II.C.1.a). Monitoring has not been implemented for the Hosford population.

Recovery Action 2: Strengthening existing populations

Strengthening existing populations (augmentation) involves the addition of individuals to a geographic area that is currently known to contain the taxon. The goals are to increase the number of individuals and the genetic variability in a population. However, a major concern is that it may negatively alter the genetic composition of the pre-existing population. The risk of outbreeding depression is not trivial, so in order to reduce the risk, the source stock for augmentation should be chosen from the same or a geographically adjacent population (i.e., within a 1,000 meter radius of wild individuals without barriers to gene flow), and preferably after an assessment of the genetic variability within and among populations of *R. minus* var. *chapmanii* (hereafter *R.m. chapmanii*). Augmentation could be initiated if the following changes occur (modified from Maschinski and Albrecht 2017, and http://manoa.hawaii.edu/hpicesu/DPW/2003_MIP/Sec_1/2003_MIP_edited.pdf):

1. If the numbers of mature individuals show declines of 10% for two subsequent years and there is no significant seedling recruitment, and

2. If the numbers of mature individuals decline >20% in a single year (i.e., due to catastrophic events).

According to the Recovery Plan, 100-200 plants were taken from the Hosford population by growers and planted in Tallahassee, Florida for ornamental purposes. The Plan suggested reintroducing cuttings from the collected plants to the wild in the areas where they were taken. Augmentation is not plausible at the moment because we do not 1) know the locations where these plants are currently growing; 2) have an agreement with the private landowner to conduct this action; and 3) have an assessment of the genetic variability within and among populations.

Augmentation was also recommended for the Camp Blanding population if the number of clumps decreases below 20 per acre, and if the site shows a decline of more than 30 percent (%) of rhododendrons after the initiation of monitoring. At present the population is composed of 31 clumps and seems to have been stable since 2005 (see section II.C.1.a. for details), thus augmentation is not currently necessary.

This recovery action (e.g., fragmented areas due to due to development and hurricane damage) has not been undertaken. This action should not be revoked as suggested by the 2010 review.

Recovery Action 3: Establish new populations
This recovery action has been partially met.

Establishing new populations could be accomplished via reintroduction or translocation. The goal is the establishment of a viable reproducing population where cross-pollination can occur, genetic variation is maintained, and minimal long-term management is required. Reintroduction should be restricted to the historic geographical range of the species. Translocation, the introduction of a species to a site outside the known historical range, could offer a best management option if the recipient site provides the only place safe from the threats that brought the species to endangerment, or if the historical range no longer contains the most appropriate habitat including suitable moisture and soil composition.

Determine historical range

Historic geographical range represents the entire geographical distribution of the species known to date. *Rhododendron m. chapmanii* is currently endemic to Florida, and occurs in Gulf, Liberty, Gadsden, and Clay counties.

Locate suitable habitat

This action can include the use of aerial photographs and species distribution modeling methods to initially determine potential sites, with subsequent validation or inspection of the sites for plants and suitability of habitat.

Obtain permission and cooperation for establishing planting

No projects have been identified at this time.

Collect seeds

There are 2,900 seed in refrigerated storage at the Bok Tower Garden (BTG), Lake Wales, FL from collections made in 2007 at the SJBSBP (C. Peterson, BTG, 06/27/2019, pers. comm.).

Grow plants

Bok Tower Garden had no success with root or stem cuttings despite quite successful and widely used commercial protocols (Gensel and Blazich 1985). According to BTG, germination rates were 54 %, but seedlings died around three months of age from unknown causes. Mycorrhizal association has been reported for other rhododendron species (Usuki et al. 2003), therefore it is plausible that fungal colonization is important in the establishment and survival of *R.m. chapmanii*' seedlings.

Recovery Action 4: Research

This recovery action is ongoing.

Reproduction

The pollination and mating system was investigated (V. Negron-Ortiz, 2010, unpubl. report). *In-situ* seed germination and seedling establishment have not been observed in the wild, consequently, if the established individuals are eliminated, they cannot re-establish themselves. The lack of *in-situ* germination appears to be a limiting factor for seedling recruitment in the wild; therefore, germination studies are needed.

Trial planting

Experimental planting has not and should not been initiated until all potentially suitable habitats for *R. m. chapmanii* are searched.

Forest management practices

For details see Recovery action 1-Proper management.

C. Updated Information and Current Species Status

1. Biology and Habitat

Rhododendron m. chapmanii is restricted to the Florida panhandle with only three known populations occurring in coastal Gulf County, Liberty and Gadsden counties in the vicinity of Hosford, and Clay County on the Camp Blanding Military Reservation. The population near Hosford is the largest and is privately owned by AgReserve Inc., which **may** maintain timber production and agricultural uses of the lands. The smallest and most geographically isolated of these populations is within the Florida National Guard post at Camp Blanding, about 165 miles east of the Hosford population. *Throughout Florida, surveys and censuses collectively recorded*

about 55 occurrences or sites. Although we have limited information regarding trends, current data assessment suggest the presence of only 35 sites (about 36 % decline).

*In May 2019 FNAI performed a comprehensive review of all *R.m. chapmanii* element occurrences (EO²). The 55 areas where the species was observed are currently mapped as 23 EOs. This is based on NatureServe 2004 guidance (EO separation distance of 1 km) with the addition of separation based on differences in management practices, threats, and habitat conditions. If considering only the parameter of 1 km separation distance, the 23 EOs technically represent 15 EOs (J. Annis, FNAI, 07/02/2019, pers. comm.).*

Clay County

The Clay County population was first reported by Totten in 1944, who observed over 60 clumps of *R.m. chapmanii* at Camp Blanding. The majority of the Camp Blanding area was destroyed in the early 1940's by engineering work along Black Creek; therefore, this population likely covered a much larger area. It was also reduced by collectors for the purpose of the nursery trade (Simmons 1983, Hall 2005). The Recovery Plan mentioned that this site “seems unlikely” to be “planted by man”; therefore it raised the possibility of being artificial.

Hardin and Redmond (1985) comprehensively censused the population reporting 32 clumps with a total of 94 stems. Thirty-one clumps were located in 2005 by the Camp Blanding staff, and censused consistently for four years. The clumps occur at two sites (Camp Blanding north and Camp Blanding south) separated by 130 meters; the isolated clump, recorded along the road, was not located during the surveys. These sites represent one EO. *According to the Camp Blanding Biologist, there has been no change to the *R.m. chapmanii* population (C. Baldoni, Camp Blanding, 7/11/2019, pers. comm.).* The censuses include revisiting the clumps and recording whether the clumps had flowers, fruits, buds or neither (presence and absence). Based on these censuses, the population seems to be stable since 2005. *However, if we compare these results to Totten's 1944 observations, it appears that the number of clumps declined over time by 52%.*

Gulf County

The Gulf Co. population is broadly distributed north from Mexico Beach south to St. Joseph Bay State Buffer Preserve (SJBSBP). Surveys indicate the presence of 24 locations or sites within 6,511 acres, totaling about 811 clumps (Schultz and Johnson 1997, FNAI 2019). *Technically, we are considering 8 EOs (A. Jenkins & F. Price, FNAI, 07/18/2019, pers. comm.).* Excellent estimated viability was reported to the SJBSBP; *about 490 plants have been documented from 2003 to 2019.*

Three sites near Mexico Beach, scattered between 0.12 to 0.18 miles from each other, were documented to have Chapman's rhododendron in 2008. The sites were revisited

² EO: an area of land and/or water in which a species or natural community is, or was, present. For species, it corresponds with the local population (portion of a population or a group of nearby populations). It is also referred to as occurrence, location, or site

in 2010 and 2011- at one site 40+ Chapman's rhododendron were observed (Negrón-Ortiz 2011, pers. observ.). Portions of the other two sites were found cleared and thinned, and only two of seven individuals were found. Mexico Beach suffered a direct impact from Hurricane Michael; therefore, the status of the habitat and plants are currently uncertain. Similarly, Windmark Beach suffered massive tree fall and understory damage, and the 175 to 225 Chapman's rhododendron plants documented in 2016 have not been found since the storm; the most recent, unsuccessful survey was in April 2019 (K. Mandello, Icarus ES, 5/24/2019, pers. comm.).

Fourteen sites that were last observed in 1982, 1985, 1995, 1997, 2002, and 2005 showed a 9% decline in numbers of clumps; four sites were found either partially or completely destroyed. We do not have current observations for these sites.

Liberty/Gadsden counties (Hosford population)

Surveys conducted in Liberty and Gadsden counties' locations between 1982 and 2001 indicated the presence of 30 locations or sites (17 sites in Gadsden County; three in Liberty/Gadsden counties, and 10 in Liberty County; FNAI 2019), with about 2,942 clumps (Schultz and Johnson 1997). *Technically, we are considering 6 EOs (A. Jenkins & F. Price, FNAI, 07/18/2019, pers. comm.).*

*Seventeen sites were surveyed in 2010 (Negrón-Ortiz 2010 surveys). Excellent (A) estimated viability (size of the EO, general condition of the EO at the site, and the conditions of the landscape surrounding the EO, <https://www.fnai.org/ranks.cfm>) was observed for three sites, with a total of 81 *R.m. chapmanii* clumps. The other 14 sites lacked *R.m. chapmanii*: 10 sites had been clear cut (extirpated); and four sites were found encroached with a dense understory, specifically overgrown with *Cyrilla racemiflora* (swamp titi). This information possibly indicates a 47% decline of the Hosford population's documented sites.*

c. Genetics, genetic variation, or trends in genetic variation:

A population and systematic study was funded in 2019 by the USFWS Coastal Program will be completed in 2022 by the Atlanta Botanical Garden (ABG).

d. Taxonomic classification or changes in nomenclature:

Kingdom:	Plantae
Division:	Magnoliophyta
Order:	Ericales
Family:	Ericaceae
Genus:	<i>Rhododendron</i>
Species:	<i>minus</i>
Variety:	<i>chapmanii</i>
Common name:	Chapman's Rhododendron

Rhododendron is a widely distributed genus found in North America, Europe, Asia, and Australia. The species, which are either shrubs or small to (rarely) large trees, are divided into several subgenera (<http://www.efloras.org>). In North

America, the subgenus *Rhododendron* is represented by about 25 species. One of the species, *R. minus*, is located in the southeastern United States and is represented by two varieties: *R. minus* var. *chapmanii* and *R. minus* var. *minus* (Duncan and Pullen's 1962). These two varieties were considered two species by Kartesz (1994). Luteyn et al. (1996) accepted Duncan and Pullen's (1962) treatment, recognizing two varieties of one species. The Flora of North America circumscribed *R. minus* broadly considering *R. m. chapmanii* to be a distinct variety (www.efloras.org). The name *R. minus* Michaux var. *chapmanii* (Alph. Wood) Gandhi & Zarucchi was recently validated by Gandhi and Zarucchi (2009). The two varieties are distinguished by the shape of leaf apices, depressed leaf veins, petiole length, and branches held erect and rigid.

Note: The two varieties were morphologically assessed by Jones and Negrón-Ortiz (2014, unpublished report). Seven vegetative and six floral characters, two of which were categorical characters, were examined for analysis. No overlap between the varieties occurred for any of the analyzed characters, suggesting that the two varieties should be reclassified as distinct species of Rhododendron: R. chapmanii and R. minus. In addition, the ABG will perform a systematic study to reconstruct evolutionary relationships between these two species using phylogenetic reconstruction methods to determine if these two varieties are genetically isolated. Expected completion date is 2022.

e. Spatial distribution, trends in spatial distribution, or historical range:

Rhododendron m. chapmanii is endemic to Florida and restricted to Gulf, Liberty/Gadsden and Clay counties. The present patches are separated by clear cuts, pine plantations or residential/commercial development.

In 1983, when the Recovery Plan was written, it was estimated there were about 3,020 clumps in the four counties. To date, the species is still constrained to the same counties. The last review conducted in 2010 suggested that the number of clumps slightly increased to about 3,168 (USFWS 2010). To date, we don't have a current estimate of clumps. Development, timbering, and the effect of Hurricane Michael have resulted in (or potentially resulted in) extirpation of several EOs, and have left other sites highly fragmented.

f. Habitat:

Rhododendron m. chapmanii usually occurs in a transitional area between upland mesic or scrubby flatwoods and floodplain swamps or baygalls. This species is also found within mesic pine flatwoods or on the lower elevations of the sandhills. Consequently, it appears to require acidic sandy soil, good to moderately well-drained to somewhat poorly drained sandy soils of 0-5% slope, and no flooding. The Camp Blanding population grows on the edge of xeric hammock next to a stream bank. The plants tolerate full sun to moderate shade (Negrón-Ortiz, 2010, pers. observ.), and heavy shade once they are mature as at Camp Blanding (Hall 2005).

The habitat where this species occurs is defined as a fire-dependent community. The sites at the Gulf and Liberty/Gadsden populations are dominated by wiregrass (*Aristida beyrichiana*), longleaf pine (*Pinus palustris*) and/or slash pine (*P. elliotti*). The Camp Blanding plants are found on a slope growing under a canopy dominated by sand live oak (*Quercus geminata*), laurel oak (*Q. hemisphaerica*) and water oak (*Q. nigra*), rather than in open flatwoods (Hardin and Redmond 1985). According to the natural communities' classification, this community would be classified as xeric hammock (FNAI/FDONR 1990). *Rhododendron m. chapmanii* resprouts and flowers prolifically following a burn (Negron-Ortiz, 2009, pers. observ.).

g. Other

Effects of Hurricane Michael

On October 10, 2018, Hurricane Michael made landfall along the Florida Panhandle as a massive Category 5 hurricane with maximum sustained winds of 161 mph and a pressure of 919 millibars

(<https://www.weather.gov/tae/HurricaneMichael2018>). This storm continued inland all the way to interior southern Georgia as a high Category 3 hurricane. Residents including wildlife and plants in discrete portions of northern Gulf of Mexico's coast experienced a storm surge of 9 to 14 feet. This storm resulted in excessive wind damage and destruction to an area from Panama City Beach to Mexico Beach to Cape San Blas

*(<https://www.weather.gov/tae/HurricaneMichael2018>). We have documented four sites with *R.m. chapmanii* plants near Mexico Beach and Windmark Beach that suffered direct damage by this catastrophic event.*

*To assess the effects of this hurricane on this species and affected habitat: 1) K. Mandello (Icarus ES) will continue monitoring Windmark Beach, and 2) FNAI will revisit all known occurrences of the species and evaluate any negative effects to the habitat (FNAI will help the ABG's genetic research of Chapman's *Rhododendron*).*

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

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

Habitat loss and modification remain the main threats to date for this species as a result of urban development, logging, and conversion of *R.m. chapmanii*'s habitat for silviculture practices. Timbering, urban development, and fire management and suppression in this region have changed the ecosystems; the threats are discussed in more detail below.

Forestry practices and residential/commercial development

The timber industry in North Florida became well established in the 1850s. Privately owned companies grow trees for their byproducts by mechanically

preparing the site for planting, planting seedlings, and mechanically harvesting the trees. Harvesting typically involves thinning, and later clear cutting the site; the process is then repeated. The St. Joe Company had close to a million acres in timber in the eastern region of the panhandle and they plan to continue to harvest and replant indefinitely. Tree farming, i.e., privately owned forest managed (clearcutting, mechanical site preparation, and pine plantations) for timber production, is a primary threat since there are many thousands of acres of tree farms. *In 2013, the St Joe Company sold more than 380,000 acres of its land to AgReserves, Inc., a for-profit company that has primarily focused on cattle grazing. The land sold included timberlands in Bay, Calhoun, Franklin, Gadsden, Gulf, Jefferson, Leon, Liberty and Wakulla counties. The safety of the Hosford population, sold to AgReserves, Inc., is undetermined because it is not protected.* Also, the Gulf County population is primarily on tree farm land; therefore, tree farming is a threat to this species.

In addition to being one of the largest private landowners in northwest Florida, the St Joe Company is also one of the largest real estate operating companies in the Southeast. This Company develops both residential and commercial properties along roadways and near or within business districts in the region. Urbanized land in Florida, statewide, is projected to double by 2070 along with a growth of about 33.7 million residents—almost 15 million more people than in 2010 (University of Florida GeoPlan Center 2017). Since the species occurs on Company-owned property in Gulf, Liberty, and Gadsden counties, Florida, there is no guarantee that these properties will not be utilized for residential or commercial development in the near future. Therefore, residential or commercial development is a threat.

Fire suppression

Suppression of fire continues to threaten pineland and savanna flora as fire is an important element in the maintenance of flatwoods (Abrahamson and Hartnett 1990). Fire influences community structure and composition (Abrahamson and Hartnett 1990), and with insufficient frequency in longleaf pine communities, a woody midstory quickly develops (Glitzenstein et al. 1995), negatively affecting the understory diversity. Several studies have shown that frequent prescribed fire regimes are important for maintenance of flatwoods diversity (Hiers et al. 2007). Prescribed burnings are needed to maintain optimal habitat for *R.m. chapmanii* populations; specifically to avoid the encroachment of *Cyrilla racemiflora* L. (swamp titi).

Drainage

Drainage of adjacent bogs to increase areas of pine plantings affects seasonal hydrology. Drained sites become more desiccated, and this affect processes such as seed germination and seedling establishment. Therefore, drainage of adjacent bogs is still a threat due to tree farming activities.

b. Overutilization for commercial, recreational, scientific, or educational purposes:

The Recovery Plan identified this as a threat to *R.m. chapmanii*. Specifically, the Plan suggested that this species was taken from the wild for ornamental purposes (Tatum and Lake 1979). According to Simmons (1983), numerous plants were removed in the late 1940's from the Camp Blanding for the nursery trade. Similarly, 100-200 plants were removed from the Hosford population (USFWS 1983). Therefore, this species was a 'commercially exploited plant'³ and is still sold by several nurseries (e.g., <https://shop.shadygardensnursery.com/>). This activity does not currently seem to be a major problem because most cuttings and seeds come from plants collected in the past. However, we cannot discount the possibility of sporadic plant removal.

c. Disease or predation:

There is no evidence to suggest that this factor is a threat.

d. Inadequacy of existing regulatory mechanisms:

The Endangered Species Act (Act) of 1973, as amended prohibits the removal of federally listed threatened and endangered plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in knowing violation of state law or regulations or in the course of any violation of a state criminal trespass law. However, the Act does not provide protection for plants on private lands or unless it's in violation of state law. Several populations of *R.m. chapmanii* occur on private timberland. While the Act requires federal agencies to carry out programs for the conservation of endangered and threatened species, no such programs are stipulated for private landowners. Neither section of the Act provides protection for plants on private lands as long as the activity is permissible under state/local laws.

Seeds of both threatened and endangered species found on federal lands are regulated under the Act. In addition, the seeds of an endangered species are regulated if they are going to be purchased/traded/bartered in interstate commerce. Since *R.m. chapmanii* is an endangered species, the seeds are regulated under the specified conditions. However, the seeds are not regulated if they are provided freely (no exchange of money, goods, or services; 7 CFR 319.37.2, USDA 2008).

The State requires permission of private landowners for collecting of state-listed plants from their property. *Rhododendron m. chapmanii* is protected under Florida State Law, chapter 581.185: Preservation of native flora of Florida (<https://www.flsenate.gov/Laws/Statutes/2013/581.185>), which includes preventions of take, transport, and the sale of the plants listed under the State Law. The rule Chap. 5B-40, Florida Administrative Code, contains the "Regulated Plant Index" (5B-40.0055) and lists endangered, threatened, and commercially exploited plant species for Florida; defines the categories; lists

³ Commercially exploited plant: species native to the state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale

instances where permits may be issued; and describes penalties for violations (Coile and Garland 2003). This law does not protect habitat.

Based on the information summarized above, the existing regulatory mechanisms are deemed inadequate for plants.

e. Other natural or manmade factors affecting its continued existence:

Catastrophic events: The effects of climate change are worsening the impacts of natural disasters, including hurricanes, algal outbreaks, fire, droughts, and floods (Carter et. al 2014). Over the past 50 years, several U.S. regions have seen increases in extended periods of high temperatures, heavy downpours, and severe floods and droughts.

*Hurricanes, a primary disaster type for Florida, have impacted the Florida's East Coast, Gulf Coast, Panhandle, and Keys. As the warming of the ocean surface temperature continue to increase in the future, hurricane intensity and rainfall are projected to rise, increasing threats to rare plants and wildlife. As previously mentioned, the Florida Panhandle was impacted by Hurricane Michael in 2018. The distribution and abundance of *R.m. chapmanii* have already been affected by habitat destruction and alteration, and Hurricane Michael potentially impacted several sites in Gulf County by increasing plant loss, decreasing the number of occupied sites, and thus, exacerbating fragmentation. Although the effect of this disturbance on *R.m. chapmanii* is currently unknown, this species is a rare shrub and likely more vulnerable to extinction as a result of warmer climate.*

D. Synthesis

Rhododendron m. chapmanii is mainly threatened by habitat destruction/modification. Urban development, timbering, and inadequate fire management, i.e., fire suppression, are the main pressures reducing or eliminating the number of sites and clumps. Development pressures in the Florida panhandle are extreme; urbanized land is projected to increase two-fold in the near future. Conversion of much of the forest land to pulpwood plantations (clearcutting, mechanical site preparation, and pine plantations) and catastrophic events have extirpated some sites. Overharvesting was a threat of high importance in the past, but the present magnitude has been reduced. No problems have been detected with disease and predation.

The species occurs on both private and public lands. The populations at Camp Blanding and the site at the SJSBP are protected and adequately managed. The privately owned population at Liberty/Gadsden counties is not protected and conservation measures are needed for the recovery of the species.

Current survey information indicates a decline in the number of sites and, hence, the clump numbers (although we don't have current information on clumps). Fifty-five sites distributed throughout this species range were documented between 1944 and 2019, but based on current surveys, about 20 sites (36%) appear to have been extirpated. A

comprehensive census is needed in order to update this information and accurately evaluate the status and current classification of this species.

Consequently, *R. m. chapmanii* continues to meet the definition of an endangered species as a result of habitat destruction or modification due to development, timbering, and catastrophic events. The species presently occupies a narrow distribution, and almost all populations continue to face threats. In addition, in-situ seed germination and seedling establishment have not been observed in the wild; therefore, if the established individuals are eliminated, populations cannot re-establish themselves. Consequently, germination studies are needed to evaluate recruitment and survival. Also, criteria 1, 2, and 5 (see section II.B.3) for delisting the species have not been met. The existing recovery plan contains objective, measurable criteria that need to be updated when the recovery plan is revised.

III. RESULTS

A. Recommended Classification:

 X No change needed

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

- Acquisition of the following private lands will benefit the status of this species:
 - Several land parcels adjacent to the SJSBP, Gulf County that has Chapman's Rhododendron and a suite of other rare species
 - *A Proposal to acquire a parcel in Gulf Co. occupied with Chapman's Rhododendron plants (and two other listed plant species) was submitted by the State of Florida in 2010 to the USFWS Recovery Lands Acquisition Grant. Funding was awarded, but the private landowner retracted its offer.*
 - The Hosford population located in Liberty and Gadsden counties.
 - *Acquisition and Restoration Council should upgrade its ranking of this Florida Forever project to the "top 21."*
- Complete a comprehensive census (e.g., the total number of individuals, number of flowering vs. non-flowering plants, and whether seedling recruitment is occurring) throughout the present distribution. Follow a standardized method for accurate population counts to ensure consistency in collected data (see Appendix B).
 - *FNAI will conduct work to support ABG's genetic research of Chapman's Rhododendron. This survey will revisit all known occurrences of the species. Expected completion date: 2022 (2019 Coastal Program funding to ABG).*
- Conduct surveys for new populations where similar habitat exists. This action can include the use of aerial photographs and species distribution modeling methods to initially determine potential sites, with subsequent validation or inspection of the sites for

plants. Follow a standardized method for accurate population counts to ensure consistency in collected data (see Appendix B).

- *FNAI surveys search for new populations/individuals in priority areas as determined by species distribution modeling (e.g., MaxEnt or Generalized Linear Models). Expected completion date: 2022 (2019 Coastal Program funding to ABG).*
- Garden propagation and reintroduction. An *ex-situ* seed collection should be actively pursued and implemented to help avert the risk of extinction from stochastic events, environmental catastrophes, or development. The living collection should emphasize the privately owned Hosford population and coastal areas, and maintained at botanical gardens and other Service approved facilities for research, recovery, and public outreach.
 - *Following the germination and seedling survival testing, the ABG proposes to develop and maintain an ex-situ collection of Chapman's rhododendron at the ABG-Gainesville Conservation Nursery. Expected completion date: 2022 (2019 Coastal Program funding to ABG).*
- Complete a population genetic study to determine the levels and distribution of genetic diversity within and among populations of *R. m. chapmanii*. The study should test whether the Camp Blanding population is an artificial (planted) population. The Recovery Plan deemed it "unlikely" that this population was planted, but this would provide a further test.
 - *ABG will use the RAD-seq data to determine the levels of genetic diversity in Chapman's rhododendron populations. They will also test whether the population at Camp Blanding was planted by comparing the level of genetic diversity in the Camp Blanding site to genetic variation across the rest of the populations. Expected completion date: 2022 (2019 Coastal Program funding to ABG).*
- The contribution of sexual reproduction to population maintenance is assessed via research related to in-situ soil seed bank, seed viability, and seedling recruitment (in-situ seed germination, seedling survival and growth).
 - *ABG will collect fruits in conjunction with the population surveys to test for seed viability, germination rates under various conditions, as well as seedling survival (this information will inform ex-situ safeguarding and in situ reintroductions or augmentations). Expected completion date: 2022 (2019 Coastal Program funding to ABG).*
- Assess the *R. m. chapmanii* demographic responses (e.g., recruitment, reproduction, and mortality) to hurricane disturbance.
- The recovery plan should be updated to define objective measurable criteria and better address the five factors.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of
Rhododendron minus var. *chapmanii* (Chapman Rhododendron)

Current Classification: Endangered

Recommendation resulting from the 5-Year Review

No change is needed

Reclassification Priority Number: n/a

The review was completed by botanist Dr. Vivian Negrón-Ortiz, Panama City Field Office.

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 9/3/2019

APPENDIX A

Summary of peer review for the 5-year review of *Rhododendron minus* var. *chapmanii* (Chapman Rhododendron)

Peer Review Method:

The document was peer-reviewed internally by Drs. Adam Kaeser and Sean Blomquist in the Panama City Field Office. Minimal new information was obtained since our last 2010 review (e.g., one new site, basic survey data, and FNAI EO revisited). A new threat was described but we don't have current information of *R.m. chapmanii* response to this disturbance. Two proposals funded in 2019 by the Coastal Program will generate critical information in the upcoming years. Since we didn't perform a complete rewrite of the 2010 document, peer review was not essential. Updated information was *italicized*.

