

# U.S. Fish and Wildlife Service

## Five-Year Review: Summary and Evaluation

Fringed Campion

*Silene catesbaei* (Walter)

Formerly (*Silene polypetala*) (Walter) Fernald & Shubert



(Photo by Pete Pattavina)

U.S. Fish and Wildlife Service  
Southeast Region – Region 4

Georgia Ecological Services Field Office  
Athens, Georgia

December 2014



## 5-YEAR REVIEW

**Species reviewed:** Fringed campion (*Silene catesbaei*)

### I. GENERAL INFORMATION

#### A. Methodology used to complete the review

The lead recovery biologist for this plant, stationed at the Ecological Services Field Office in Athens, Georgia, completed this five-year review of *Silene catesbaei*, formerly known as and listed as endangered under the name *Silene polypetala* (see § II.C.1.c Taxonomic Classification). In conducting this review, we relied upon: published, scientific articles; consultation with botanical experts and horticulturalists; and unpublished data and reports. We acknowledge the importance of botanical expertise provided by: James Allison, botanist; Wilson Baker, naturalist; the late Mr. Angus Gholson former botanist for the U.S. Army Corps of Engineers; Tom Patrick, Georgia Department of Natural Resources (GADNR); Michael Jenkins, Florida Forest Service, as well as element occurrence data provided by Amy Jenkins, Florida Natural Areas Inventory (FNAI) and Lisa Kruse, GDNR. Other reports on field observations proved indispensable to this review including: Faust (1981); Leonard and Baker (1982); and Allison (1988, 1991). Additionally, the lead recovery biologist performed field visits to 31 occupied sites from 2004-2006, in concert with 2006 population surveys completed by FNAI (Jenkins and Baker 2006). The lead recovery biologist completed return visits to a few sites in 2010-2014. We published the public notice for this review on June 21, 2005, with a 60-day public comment period. We received no comments during the public comment period nor received any suggested changes to this five-year review from peer reviewers (Appendix A).

#### B. Reviewers

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

**Lead Field Office:** USFWS Georgia Ecological Services Field Office, Pete Pattavina, (706) 613-9493; pete\_pattavina@fws.gov

**Cooperating Field Offices:** Patricia Kelly, Panama City Ecological Services Field Office, Florida

#### C. Background

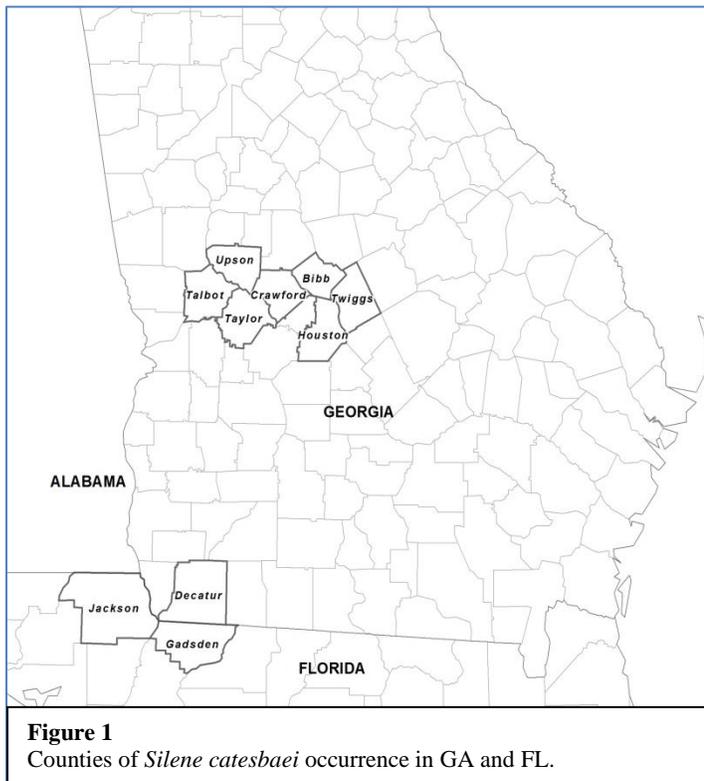
##### 1. FR Notice citation announcing initiation of this review

The U.S. Fish and Wildlife Service (USFWS) initiated a 5-year review of *Silene catesbaei/S. polypetala* on June 21, 2005 (70 FR 35689).

## 2. Species status

The current status of *Silene catesbaei* is uncertain, since the populations across the species' range are not regularly monitored and only a few abundance estimates are known at occupied areas. Additionally, since the species is clonal and patch-forming, achieving a consistent "count" on the number of plants can be problematic with multiple site investigators. Periodic visits by botanists and Pete Pattavina, USFWS verified that plants are currently present at all locations except three sites where it appears to have been extirpated (Rivoli Lakes and Colaparchee Creek, Bibb County, Georgia and Lumpkin Road, Talbot County, Georgia). However, long-term monitoring is required to determine population trends. Credible anecdotal reports suggest that abundance of *Silene catesbaei* stems at certain sites decreased (either through destruction of entire patches or reduction in patch size) or there was curtailment in the amount or quality of available habitat, as outlined in Table 1. Lack of beneficial habitat management, in concert with increasing threats at most sites, continue to threaten this species with extinction throughout its range.

USFWS evaluated the baseline status of *Silene catesbaei* prior to the species' proposal for listing as endangered in 1990 (USFWS 1990) and during the drafting of an unpublished draft of a 1996 Technical Agency Draft Recovery Plan (USFWS 1996b). In 1990, the status of *Silene catesbaei* was restricted to 14 global sites, comprising 12 Georgia sites and two Florida sites (USFWS 1990).



As of 2014, *Silene catesbaei* is known from 40 sites globally (Table 1), occurring in four distinct geographic areas within central Georgia and a narrowly restricted area within northwestern Florida and extreme southwestern Georgia (Alison 1988, 1991) (Echols and Zomlefer 2012) (Amanda Jenkins, Florida Natural Areas Inventory, 2012, pers. comm.) (Faust 1981) (GADNR, unpublished data 2014) (Jenkins and Baker 2006) (Tom Patrick, GADNR, 2014, pers. comm.) (Pete Pattavina, USFWS, 2014, unpublished data) (Figure 1) (see also §II.C.1.d.Spatial Distribution).

Although the net number of global sites occupied by *Silene catesbaei* increased since the species was listed as endangered in 1990, some sites are represented by only a few individuals (Steve Bowling, Botanist, Atlanta Botanical Garden, Georgia 2014 pers. comm.) (Echols and Zomlefer 2012)(Jenkins and Baker 2006), other sites clearly showed habitat degradation from a variety of threats or showed a visible reduction in plant abundance (Steve Bowling, Botanist, Atlanta, Georgia, pers. comm 2005, 2014)(Wilbur Duncan, Botanist, University of Georgia, pers. comm. 2004) or reduction in plant density across previously-occupied landscapes (Pete Pattavina, pers. observations 2010, 2012)(Tom Patrick, GDNR, pers. comm. 2014) (Table 1). The term ‘sites’ often refers to element occurrences maintained by Florida Natural Areas Inventory and Georgia Department of Natural Resources but may not necessarily be equivalent to what is considered a “population” in strict terms of genetic exchange per generation between discrete groups of plants.

Element occurrences or “sites” are often created to indicate discrete aggregations of plants grouped by any number of factors such as: land use; land owner; habitat type; observations by different individuals; differing temporal observations; groups or single plants separated by a genetically permeable or impermeable barrier, i.e., roadway, stream, river, unsuitable habitat, etc. Moreover, older element occurrences documented prior to modern global positioning devices and spatial analysis programs may be skewed to point data, rather than polygon data that would describe large blocks of contiguous, occupied habitat.

Without studies to determine pollen and seed dispersal, criteria for how populations or element occurrences should be defined is difficult. In the absence of this data, the strict criterion of one kilometer remains the default standard to discern between independent element occurrences (NatureServe 2004). Many element occurrences/sites for *Silene catesbaei* are in close proximity to one another and may represent observations of plants within single, large populations that occur over a matrix of habitat units. This can misrepresent and perhaps inflate the number of discrete and genetically distinct global populations that exist for the species. For example, of the 14 element occurrences that are recorded for Gadsden and Jackson Counties, Florida and Decatur County, Georgia, many are in such close proximity that if one utilized the 1.0 km rule to generically define a genetic barrier between plant groupings, the 14 element occurrences would constitute only about 5-6 distinct populations. Similar grouping of element occurrences into larger, single populations may also occur among a number of observed sites such as: (1) Winship Woods + Savage Branch, Bibb County, Georgia; (2) Potato Creek Woods North + Potato Creek Woods, Upson County, Georgia; and (3) Pobiddy Bridge Bluff + Big Lazer Creek, Talbot County, Georgia. For the purposes of this document, we refer to occupied sites that may include multiple element occurrence points; where we have information, both the element occurrence number and site names are indicated together (see Table 1). We tried to preserve both the element occurrence structure and the naming of sites that were gathered in preparing a draft recovery plan (USFWS 1996b) for easy comparison.

### **3. Recovery achieved**

1 (0-25% species recovery objectives achieved)

**4. Listing history**

Original Listing

FR notice: 56 FR 1932

Date listed: January 18, 1991

Species: *Silene polypetala*.

Classification: Endangered.

**5. Associated rulemakings**

N/A

**6. Review History**

Recovery Data Call—annually from 1998 through 2014.

This is the first, five-year review of *Silene catesbaei*.

**7. Species' Recovery Priority Number at start of review (48 FR 43098)**

*Silene catesbaei* is currently assigned a recovery priority number of 8. The “8” indicates a moderate degree of threat and a high recovery potential.

**8. Recovery Plan**

Name of plan: No plan finalized.

Date issued: N/A.

**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 species of vertebrate wildlife. This definition limits listing DPS to only vertebrate species of fish and wildlife. Because the species under review is a plant, the DPS policy does not apply.

**B. Recovery Criteria**

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

No. We distributed the 1996 Technical/Agency Draft Recovery Plan for public comment but we never finalized the document. The recovery plan needs to be finalized to include, among other things, current population data and recent genetic information, as a guide to prioritize protection of population throughout the species' range. We will focus on evaluating recovery actions implemented to date.

**C. Updated Information and Current Species Status**

**1. Biology and Habitat**

**a. Abundance, population trends**

*Silene catesbaei* is currently known from 40 sites in Georgia and Florida (Table 1). No comparable, long-term data exists to determine trends for the species, but overall, available habitat appears to be degrading over much of its range (Table 1). Jenkins and Baker (2006) estimated that approximately 1500-2000 plants occurred among 12 element occurrences in Florida. No abundance estimates exist for Georgia but most of the central Georgia sites are more extensive in size, in both the area *Silene catesbaei* occupies and the numbers of plants present (Pete Pattavina, pers. obs. 2006).

Many *Silene catesbaei* populations are composed of only a few patches, can be overlooked when plants are not in flower, and often occur over only a few acres. New populations are periodically discovered during field status surveys, when new areas are explored in the vicinity of known sites. However, without public ownership of sites to remove the primary threat of clear-cutting of forest, in concert with specific management to ensure habitat stability on existing sites, the periodic discovery of new populations will do little to offset the risk of extinction to this species.

Three sites are considered extirpated: (1) Rivoli Lakes, Bibb County, Georgia; (2) Colaparchee Creek, Bibb County, Georgia; and (3) Lumpkin Road, Talbot County, Georgia. None of these sites was very large but each was situated at the fringes of the species' range and could have represented genetically unique populations.

Eleven sites experienced significant habitat degradation or steep reduction in abundance of *Silene catesbaei* plants (1) Pope's Lake, Jackson County, FL; (2) Nature Park Central, Gadsden County, Florida; (3) Nature Park North, Gadsden County, Florida; (4) Satsuma Road, Gadsden County, Florida; (5) River Road Site, Gadsden County, Florida; (6) Selway Site, Gadsden County, Florida; (7) Savage Branch/Winship Woods, Bibb County, Georgia; (8) Musella Woods, Crawford County, Georgia; (9) Woodruff Dam Ravines, Decatur County, Georgia; (10) Torreya Ravines, Decatur County, Georgia; and (11) Pobiddy Bridge Bluff, Talbot County, Georgia.

Six sites are so small in size, occurring over less than two acres or have so few plants they have fair to poor estimated population viability: (1) Selway Site, Gadsden County, Florida; (2) Southern Site, Gadsden County, Florida; (3) Musella Woods, Crawford County, Georgia; (4) Dry Creek, Houston County, Georgia; (5) Oaky Woods, Houston County, Georgia; and (6) Big Lazer Creek, Talbot County, Georgia.

Superior sites, where *Silene catesbaei* is observed in what appears to be stable habitat [with few immediate threats] and seemingly stable qualitative abundance, occur at only 12 sites: (1) Powerline Site, Gadsden County, Florida; (2) Baker Creek, Talbot County, Georgia; (3) Blackman Branch, Talbot County, Georgia; (4) South Fork East, Talbot County, Georgia; (5) South Fork West, Talbot County, Georgia; (6) Barfield Creek, Taylor County, Georgia; (7) Carsonville Powerline Woods, Taylor County, Georgia; (8) Trillium Shoals, Taylor County, Georgia; (9) Potato Creek Woods and Potato Creek Woods North, Upson County, Georgia; (10) Pobiddy Road Ravines, Upson County, Georgia; (11) Shellstone Creek, Twiggs County, Georgia; and (12) Mincey Tract, Taylor County, Georgia.

One increased threat to the species is the burgeoning population of white-tailed deer (*Odocoileus virginianus*) that, on some sites, excessively browse the plants, preventing fruit development and seed set (Steve Bowling, pers. comm. 2004)(Wilbur Duncan, pers. comm. 2004)(Pete Pattavina, pers. obs. 2004). Steve Bowling observed an increase in deer pressure on *Silene catesbaei* populations, beginning in the early-to-mid 1980s. This observation is supported by data that shows rapid expansion of Georgia's white-tailed deer population since 1972, when the State deer herd expanded from 253,000 to approximately 990,000 in 2013, peaking in 1997 at 1,460,000 individuals (GDNR 2014). Although no data is available to prove that the increase in deer population has a negative effect on *Silene catesbaei* populations, deer modified population structure and plant robustness in other forest herbs (Anderson 1994)(Leege et al. 2010), caused declines in species richness in forests, evenness and species diversity (Rawinski 2008)(Webster et al. 2005).

There is a continual invasion and degradation of natural habitats by exotic plant species at sites adjacent to urban areas (Jackson and Gadsden Counties, Florida; Decatur and Bibb Counties Georgia). The most damaging invasive species are often evergreen Asian species (*Ardisia crenata*, *Nandina domestica*, *Ligustrum spp.*, *Hedera helix*, and *Elaeagnus spp.*) that quickly create excessive shade for *Silene catesbaei* plants and other native species(Moser et al. 2009). Even with regular invasive species management by professional biologists, such as has occurred at Angus Gholson Nature Park, Gadsden County, Florida, eradication is nearly impossible and continual management is necessary (Michael Jenkins, Florida Forest Service, pers. comm. 2014).

**Table 1: Known locations, population status, and population-specific threats for *Silene catesbaei*.**

Site Name	State	County	First Observed	Population Vigor/Size	Specific Threats
Apalachicola River West/Pope's Lake; FNAI EO#7	FL	Jackson	1937	Good estimated viability ranking by FNAI. One of the largest Florida populations observed in 2006 by Jenkins and Baker (2006) but exotics problematic. Few flowering individuals among several patches, due to mid-story shading. No acreage estimate by FNAI (Jenkins and Baker 2006). Pete Pattavina (2006) observed a minimum of 17 patches on site—considered a small population globally.	Habitat degradation from exotics ( <i>Ardisia crenata</i> , <i>Nandina domestica</i> ) public disturbance (trash dumping)(Jenkins and Baker 2006). Low genetic diversity observed throughout Apalachicola watershed (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
State Hospital Pond/Medical Pond;FNAI EO#6	FL	Gadsden	1982	Fair estimated viability. Jenkins and Baker (2006) observed only 5 vegetative plants observed over approximately 3 acres, Jenkins and Baker could not relocate plants observed in 1998 and 1999. Small population but within good quality habitat. Pete Pattavina (2006) observed about 17 patches over small area of good habitat—considered globally a small population.	Lowest genetic diversity of any populations studied in 2006 (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
Angus K Gholson Nature Park/Nature Park Central; FNAI EO#4	FL	Gadsden	1970s	Small population with good or fair estimated viability, but under stress from competition with exotic species. Probably less than 100 plants among a few, scattered aggregations (Jenkins and Baker 2006). Pete Pattavina (2006) observed approximately 15 patches over small area with poor habitat quality due to exotics—considered globally a small population.	Public ownership but population severely threatened and habitat degraded by exotic, invasive plant species such as <i>Ardisia crenata</i> , <i>Lygodium japonium</i> , <i>Nandina domestica</i> , <i>Ligustrum lucidum</i> (Jenkins and Baker 2006)(Pete Pattavina, pers. obs. 2006) Low genetic diversity observed throughout Apalachicola watershed (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006)
Satsuma Road/Satsuma Road West; FNAI EO#3	FL	Gadsden	1956	Small populations and perhaps only fair viability. Probably less than 50 plants among several, scattered clumps within area approximately 30 acres, few blooming and proximity to development over approximately 20 acres but not all habitat occupied (Jenkins and Baker, 2006). Pete Pattavina (2006) observed approximately 13 patches throughout woods, could not relocate historic patches near	Public and private ownership. Highly threatened by exotics ( <i>Ardisia crenata</i> , <i>Lonicera japonica</i> , <i>Nandina domestica</i> , <i>Phylostachys aurea</i> ), portion of population within private ownership (Jenkins and Baker 2006). Small site but plants scattered throughout, if lumped with contiguous forested property owned by City of Chattahoochee (Angus Gholson Nature Park, FNAI EO#4) as

				residential yard—poor habitat quality, considered globally a small population	one population, it would form a fairly large population over large acreage, with various microhabitats, although exotic species infestation prevalent throughout forest. Low genetic diversity observed throughout Apalachicola watershed (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006)
G Hill Bluff/River Road Site; FNAI EO#8	FL	Gadsden	2001	Fair estimated viability. Multiple aggregations of plants on edge of clear-cut. Small in acreage, approximately 2 acres (Jenkins and Baker 2006). Very small site, considered globally very small.	Plants within clear-cut will likely succumb to increased competition and excessive shading as canopy closes. Reduction in plant abundance anticipated. No genetic samples collected from this population by Pete Pattavina in 2006 but low genetic diversity anticipated based on samples from other Apalachicola area.
Powerline Site; FNAI EO#1	FL	Gadsden	1982	Excellent or good estimated viability. Plants occurring with powerline and adjacent forested slopes. Approximately 122-640 plants in at least three aggregations over approx. 25 acres (Jenkins and Baker 2006). Pete Pattavina (2006) noted this was the largest and most dense population of any visited in 2006; observed in excess of 48 patches over steep slope above powerline. Globally, this is considered a moderate-to-large population.	Private ownership and within industrial forest management regime. Powerline management could affect species but woody herbicide treatment in 2000 did not appear to negatively affect <i>Silene catesbaei</i> (Jenkins and Baker 2006). No imminent threats noted by Pete Pattavina (2006). Low genetic diversity observed throughout Apalachicola watershed (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006)
Dolan Road Site; FNAI EO#5	FL	Gadsden	1982	Fair estimated viability. Very small number of plants (3-4) observed over large area of available habitat (160 acres) (Jenkins and Baker 2006). Pete Pattavina did not visit this site for genetic studies in 2006.	Private ownership and within industrial forest management regime. Small size and low abundance of plants suggest that population is not thriving or genetically diverse.
Apalachicola River South/203 Bluff Site; FNAI EO#2	FL	Gadsden	1982	Healthy but small population of plants over maximum of 25 acres. Probably less than 100 plants among multiple patches (Jenkins and Baker 2006)	Private ownership and within industrial forest management regime (Jenkins and Baker 2006). Small size and low abundance of plants suggest that population is not thriving or genetically diverse.
Nature Park North, FNAI EO#9	FL	Gadsden	2000	Good or fair estimated viability. Small site of scattered patches along trail over less than one acre (Jenkins and Baker 2006).	Public ownership but population severely threatened and habitat degraded by exotic, invasive plant species such as <i>Ardisia</i>

				Considered globally a very small site.	<i>crenata</i> , <i>Nandina domestica</i> , (Jenkins and Baker 2006) Small size and low abundance of plants suggest that population is not thriving nor genetically diverse.
Georgia Line Site, FNAI EO#10	FL	Gadsden	2006	Excellent or good estimated viability. Small population comprising multiple patches over small area of good habitat, although some exotic species. Prolific flowering of patches due to canopy gap (Jenkins and Baker 2006).	Ownership uncertain. Few immediate threats indicated but some exotic species on site. Small size and low abundance of plants suggest that population is not thriving or genetically diverse.
Selway Site, FNAI EO#11	FL	Gadsden	2006	Possibly fair estimated viability. Very small population (10 flowering stems) on private property recently clear-cut (Jenkins and Baker 2006). Plants occupy less than 0.10 acre.	Private property recently clear-cut prior to 2006 (Jenkins and Baker 2006). Plants may likely be shaded out during early successional stage of forest. Small size and low abundance of plants suggest that population is not thriving or genetically diverse.
Southern Site, FNAI EO#12	FL	Gadsden	2006	Good or fair estimated viability. Small population comprising approx. 3 patches over less than one acre (Jenkins and Baker 2006).	Private property and within industrial forest management regime. Active logging occurring in area and lower slopes appearing to be within cut boundary in 2006 (Jenkins and Baker 2006). Small size and low abundance of plants suggest that population is not thriving or genetically diverse.
Beaverdam Creek, GDNR EO#10	GA	Bibb	1988	GDNR database lists element occurrence with fair estimated viability. No other information available.	No information. Ocmulgee drainage shown to have low genetic diversity (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
Savage Branch and Winship Woods, GADNR EO#13,1	GA	Bibb	1987	Good to fair estimated viability. Large, sprawling population over approximately 40 acres with multiple microhabitats along several ravines, but becoming increasingly smaller from invasive exotics destroying habitat (Pete Pattavina pers. obs. 2012). Pete Pattavina (2006) observed over 50 patches over multiple aggregations. A large population with multiple microhabitats but serious threats emerging from exotics.	Severe habitat destruction from primarily English ivy ( <i>Hedera helix</i> ) take-over of understory but <i>Ligustrum</i> and <i>Elaeagnus</i> species also present. Observed a number of patches destroyed from ivy. Genetic diversity very low (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
Musella Woods, GADNR EO#2	GA	Crawford	1970	Poor estimated viability. Formerly moderately sized	Habitat of good quality but significant waning of <i>Silene</i>

				population along entire length of slope. Over 36 patches observed in 2006 (Pete Pattavina, pers. obs) but only 2-3 patches remaining in 2012 near top of slope (Pete Pattavina pers. obs.)(Tom Patrick, GADNR pers. obs. 2014)	abundance, perhaps due to extended drought (Pete Pattavina pers. obs. 2012).
Woodruff Dam Ravine 5, GADNR EO#11	GA	Decatur	1988	No information on abundance but site probably not larger than 2 acres.	Public ownership (U.S. Army) but population likely threatened and habitat degraded by exotic, invasive plant species such as <i>Ardisia crenata</i> , <i>Nandina domestica</i> . Low genetic diversity throughout Apalachicola River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
Woodruff Dam Ravine 1&2/Torreya Ravines, GADNR EO#3, 12	GA	Decatur	1938	Good estimated viability. Moderately sized site with at least 35 patches over approximately 5 acres.	Public ownership (U.S. Army) but population threatened and habitat degraded by exotic, invasive plant species such as <i>Ardisia crenata</i> , <i>Nandina domestica</i> , (Pete Pattavina, pers. obs. 2006) Low genetic diversity throughout Apalachicola River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
Dry Creek, GADNR EO#32	GA	Houston	2003	Fair estimated viability. Very small site with no more than 4-6 large patches over less than 2 acres (Pete Pattavina pers. comm 2014P). Plants growing low in floodplain but not along slopes, despite extensive searches downstream by Steve Bowling and Pete Pattavina (Pete Pattavina pers. comm 2006).	Owned by Houston County as part of landfill, periodic forestry activity within past 20 years. Patches remain unchanged in 10+ years since initial discovery but very small population and low genetic diversity measured throughout Ocmulgee River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006). Habitat quality fair, with many saplings and periodic flooding.
Baker Creek, GADNR EO#26,28	GA	Talbot	1998	Excellent estimated viability. Multiple locations of plants over approx. 15 acres. Don't have official estimate of plant abundance but visited site and observed plants present in 2010 (Pete Pattavina, pers. obs. 2010).	No immediate threats. Area within private ownership and managed as industrial forest but manager diligent about avoided areas of occupancy and USFWS inspects site before and after timber operations (Pete Pattavina, pers. comm. 2014).
Blackman Branch, GADNR EO#5	GA	Talbot	1979/1998	Excellent estimated viability. Large number of plants, at least 25 patches spread over multiple areas within approx.. 70 acres	No immediate threats. Area within private ownership and managed as industrial forest but manager diligent about avoided

				(Pete Pattavina, pers. obs. 2006, 2010). Considered globally a large population with high conservation priority. Very high genetic diversity (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	areas of occupancy and USFWS inspects site before and after timber operations (Pete Pattavina, pers. comm. 2014).
Big Lazer Creek, GADNR EO#22	GA	Talbot	1980's	No information. Apparently, this was or is a small population of a few patches over less than one acre.	No information.
Pobiddy Bridge Bluff, GADNR EO#1, 9	GA	Talbot	1946	Fair to poor estimated viability. Multiple patches scattered along Flint River but some destroyed from clear-cuts and road construction (Pete Pattavina, pers. obs. 2014) as well as flooding and deer browse (Wilbur Duncan, pers. comm. 2004)(Steve Bowling, pers. comm. 2004)	Plants always appear drought-stressed and of poor fitness. Appears as if population vigor is extremely low, even when plants brought into cultivation (Steve Bowling, pers. comm. 2004)(Pete Pattavina, pers. obs. 2013). Large, sprawling patches disappeared along roadway between 1984-2003 (Steve Bowling, pers. comm. 2004)(Pete Pattavina pers. obs. 2006). Severe erosion, continual forestry practices continue to reduce abundance. Deer browse observed to be a problem here (Steve Bowling, pers. comm. 2014)
South Fork East, GADNR EO#24	GA	Talbot	1998	Excellent estimated viability. At least 17 patches located in multiple ravines in superb habitat. Plants over approximately 5 acres (Pete Pattavina, pers. obs. 2006). Globally, this is considered a moderately-sized population. Very high genetic diversity (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	No immediate threats observed. No immediate threats. Area within private ownership and managed as industrial forest but manager diligent about avoided areas of occupancy and USFWS inspects site before and after timber operations (Pete Pattavina, pers. comm. 2014).
South Fork West, GADNR EO#25.	GA	Talbot	1998	Excellent estimated viability. At least 24 patches located in multiple ravines in superb habitat. Plants over approximately 10 acres (Pete Pattavina, pers. obs. 2006). Globally, this is considered a large population with high conservation value. Very high genetic diversity (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	No immediate threats observed. No immediate threats. Area within private ownership and managed as industrial forest but manager diligent about avoided areas of occupancy and USFWS inspects site before and after timber operations (Pete Pattavina, pers. comm. 2014).
Tributary of Little Patsiliga Creek/Prattsburg	GA	Taylor	1979	Fair to poor estimated viability. Could not relocate plants during 2014 survey of proposed timber	Private ownership, under timber management for pulp production. Area carefully

Flatwoods, GADNR EO#6				cut (Pete Pattavina, pers. 2014). Area needs more intensive survey.	thinned of hardwoods across all size classes, but not clear-cut in 2014. Habitat in good shape, no invasive species threatening habitat but did not observe any <i>Silene</i> plants remaining on site (Pete Pattavina, pers. comm. 2014)
Barfield Creek, GADNR EO#14	GA	Taylor	1989	Excellent estimated viability. Very large, extensive population among multiple ravines and bluffs. At least 70 patches observed over an excess of 20-30 acres (Pete Pattavina, pers. obs. 2006)	Private ownership but no immediate threats observed (Pete Pattavina, pers. obs. 2006). Good genetic diversity observed throughout the Flint River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006)
Tributary of Richland Creek	GA	Taylor	1989	No information	No information
Beaverpond Bluff, GADNR EO#16	GA	Taylor	1989	Very good estimated viability. High density of plants over slope of a few acres over multiple moisture regimes. <i>Lonicera japonica</i> in understory but seemingly not affecting plants much (Pete Pattavina, pers. obs. 2005).	Private ownership but no immediate threats observed (Pete Pattavina, pers. obs. 2005)
Carsonville Powerline Woods, GADNR EO#15, 18	GA	Taylor	1989	Excellent estimated viability. Large site with many patches, at least 48 patches observed by Pete Pattavina in 2006. Habitat quality good, although high abundance of <i>Lonicera japonica</i> in understory, seems not to be affecting plants much. Plants occupy area likely in excess of five acres.	Private ownership but no immediate threats observed.
Damascus Church Ravines, GADNR EO#4	GA	Taylor	1987	Good estimated viability. Smaller population with at least 10 patches of plants observed by Pete Pattavina (2006). Habitat quality good. Plants likely occupy less than 5 acres. Good observed genetic diversity observed throughout Flint River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	Few threats observed, some cattle grazing on opposite side of creek from plants but no immediate threats observed.
Fickling Mill/Flint Ravine/Trillium Shoals, GADNR EO#8	GA	Taylor	1979	Excellent estimated viability. Multiple ravines, slopes, bluffs with at least 51 patches observed (Pete Pattavina, pers. obs. 2006). Plants occupy a minimum of 10-20 acres. Many microhabitats and multiple aggregations of plants	No immediate threats observed.

				over areas of steep terrain offer population resilience to potential threats to fire and other forest disturbance. Good observed genetic diversity observed throughout Flint River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	
US 19/US 80 Woods, GADNR EO#20	GA	Upton	1993	No information since 1995. Plants extant at that time (Jim Allison, pers. comm. 2005).	No information. Area within private ownership and was being developed as a private hunting reserve.
Potato Creek Woods North, GADNR EO# 30	GA	Upton	2003	Excellent estimated viability. Moderately sized population with at least 41 patches over approx. 20 acres (Pete Pattavina, pers. obs. 2006). Globally, this is considered a large site in both area and number of plants. Good observed genetic diversity observed throughout Flint River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	Site in State ownership and managed as a Wildlife Management Area. Deer browse a continual problem at this site, preventing seed set in many cases. Small fire at Adam's Ferry Road destroyed some patches circa 2012 (Pete Pattavina, pers. comm. 2014).
Potato Creek Woods, GADNR EO #21	GA	Upton	1996	Excellent estimated viability. At least 10-15 patches occur along floodplain and bluffs, within approx. 10 acres. Globally this would be considered a moderately-sized population (Pattavina pers. obs. 2006). Good observed genetic diversity observed throughout Flint River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	Site in State ownership and managed as a Wildlife Management Area. Deer browse a continual problem at this site, preventing seed set in many cases (Pattavina pers. obs 2005-2014).
Pobiddy—Upton Ravines, GADNR EO#31	GA	Upton	2003	Excellent estimated viability. Globally considered a small to moderately-sized population. Pete Pattavina (pers. obs. 2006) observed at least 22 patches in two distinct areas. Good observed genetic diversity observed throughout Flint River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).	Timber operations circa 2002 led to the demise of a few patches on clear-cut edge. Patches persisted for approx. 2 years before dying, apparently from drought. Existing plants appear to be secure, with little threat from deer browse (Pete Pattavina, pers. obs. 2010). Site in State ownership and managed as a Wildlife Management Area.
Shellstone Creek, GADNR EO#33	GA	Twiggs	2005	Excellent estimated viability. At least 27 patches at numerous locations, observed over approx. 110 acres (Pattavina pers. obs. 2006). Habitat quality	Site in private ownership but no apparent threats observed. Steep terrain and mesic conditions may buffer plants from forestry activities. Low observed genetic

				excellent.	diversity observed throughout Ocmulgee River drainage (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
Oaky Woods WMA, GADNR EO#29	GA	Houston	2005	Poor estimated viability. Only a few plants observed in less than one acre, despite extensive surveys during botanical inventory (Echols and Zomlefer 2010)(Lee Echols, pers. comm. 2014).	So few plants that population probably not sustainable. Hog damage a problem in nearby prairie and could extend into ravine with <i>Silene</i> (J. Mincy Moffett, State Botanist, GADNR, pers. comm. 2013).
Actinolite Bluff, GADNR EO#34	GA	Bibb	2006	Good estimated viability with multiple patches of plants spread over about 5 acres. At least 19 patches observed (Pete Pattavina pers. obs. 2006, 2010). Habitat in good shape with few or no aggressive exotics.	No apparent threats, but low genetic diversity in population (Jim Hamrick, Ph.D. University of Georgia, unpublished data 2006).
Mincey Tract	GA	Taylor	2010	Excellent estimated viability with many plants occurring over the bluff of the Flint River over many acres (Tom Patrick, pers. comm. 2014). Large site with many plants.	Private ownership but steep terrain may insulate population from disturbance. Threats from deer browse observed by Tom Patrick, GDNR.
Tanyard Creek, GADNR EO#35	GA	Crawford	2013	Good estimated viability, small site over a few acres but high density of plants along top of bluff (Tom Patrick, pers. comm. 2014).	Private ownership. Small site in terms of acreage and plants localized along knoll, much like Musella Woods site. No apparent threats but small area of site may make it more prone to extirpation.
Colaparchee Creek, GADNR EO#19	GA	Bibb	1980s	Site considered extirpated, looks like it could be the same site as Rivoli Lakes but unsure (Pete Pattavina pers. obs. 2014). Site was always small, with just a few plants along small creek bank (Julie Duncan, Botanist, pers. comm. 2014).	Extirpated.
Lumpkin Road/Patsiliga Creek, GADNR EO#7	GA	Talbot	1981	Seemingly extirpated. Apparently a very dense site in the 1980's-1990's (Jim Allison pers. comm. 2005) but Pete Pattavina (2006) observed only 3-4 small plants on the site. Pattavina could not find any plants on the site in 2013. Extremely small site (less than one acre occupied) and may be extirpated.	Localized population appears to have died out, although no apparent threats to habitat observed. <i>Silene</i> may be extirpated on the site (Pete Pattavina pers. obs. 2013).
Rivoli Lakes. Colaparchee Creek	GA	Bibb	1990s	1990s	Considered Extirpated

## **b. Genetics, genetic variation, or trends in genetic variation**

*Silene catesbaei* is a true habitat specialist and does not occur in the same habitats as other *Silene* species. In phylogenetic trees, *Silene catesbaei* is related to—but not closely—to other North American species such as *Silene caroliniana*, *Silene virginica*, and *Silene stellata* (Popp and Oxelman 2007). Other *Silene* species that occur in Georgia (*Silene caroliniana*, *Silene ovata*, *Silene virginica*, *Silene regia*, *Silene stellata*) either do not overlap in range with *Silene catesbaei* or occur within different habitat types.

In 2006, Dr. Jim Hamrick, University of Georgia and Pete Pattavina, USFWS completed genetic analyses of *Silene catesbaei* allozymes from 31 sites across the global range of the species. Observed heterozygosity was higher than expected, likely because the species is a tetraploid (Jim Hamrick unpublished data, 2008)(Popp and Oxelman 2007). Despite the restricted range and small population sizes of *Silene catesbaei*, pooled populations still retain a relatively high level of genetic diversity (Jim Hamrick unpublished data, 2008). The Flint and Chattahoochee watersheds (Talbot, Upson, Taylor, Crawford Counties (GA) had the highest expected genetic diversity, placing higher conservation value on these populations. The Ocmulgee (Bibb, Twiggs, and Houston Counties(GA)) and Apalachicola drainages (Decatur County (GA), Jackson County (FL), and Gadsden County (FL) Georgia showed the lowest levels of genetic diversity, somewhat surprising since these populations are located at the very fringes of the species' global range.

In 2007, GADNR funded a University of Georgia study to assess the reproductive strategy and potential for inbreeding depression for *Silene catesbaei*, since observations from the field suggested that the species exhibited male sterility (USFWS 1996b). Studies observed male sterility very rarely under greenhouse conditions but autonomous pollination and seed germination (1.1%-3.1%) was extremely low for the species (Shu-Mei Chang, University of Georgia, unpublished data 2011). This is consistent with field observations, as seedlings are observed very rarely at natural sites (Pete Pattavina, pers. obs. 2006)(Tom Patrick, pers. comm. 2006). *Silene catesbaei* does show high potential to be negatively affected by inbreeding depression (Shu-Mei Chang, University of Georgia, unpublished data 2011). Selfed progeny, grouped by watershed, consistently produced the lowest biomass, when compared to wild plants under identical greenhouse conditions (Shu-Mei Chang, University of Georgia, unpublished data 2011).

## **c. Taxonomic classification or changes in nomenclature:**

Research by Ward (2006) proposed an official change in nomenclature for the species, from *Silene polypetala* to *Silene catesbaei*. Ward's (2006) historical research found that the name *Silene polypetala*, formed in 1948 by Fernald and Schubert, based on their assessment of Thomas Walter's 1788 *Flora Caroliniana*, was erroneously applied to a fragmentary herbarium specimen they believed to be labeled by Walter as *Cucubalus polypetalus*. Ward (2006) proposes that the species and fragmentary herbarium specimen Thomas Walter referred to as

*Cucubalus polypetalus* was either of two introduced species, *Silene cucubalaus* or *Lychnis alba*-- these two exotic species having been established in mountains of North Carolina by the eighteenth century. When Ward (2006) cross-referenced Thomas Walter's Latin prescriptions to specimen labels, he found a prescription for a new species termed by Walter as *Silene catesbaei*, a plant for which no herbarium specimen could be located in the *Flora Caroliniana*. Walter's Latin prescription appeared to Ward (2006) to be a better match to the species named by Fernald and Schubert and considered today as *Silene polypetala*. Since no type specimen matched Walter's prescription of *Silene catesbaei*, the International Code of Botanical Nomenclature guidelines allows for an author [Ward] to select a new type specimen, a neotype, to match the accepted name and prescription of *Silene catesbaei*, for which Ward (2006) did, selecting a specimen formerly and widely known as *Silene polypetala*. The neotype is a specimen of *Silene catesbaei/Silene polypetala* collected along Pobiddy Road in Talbot County, Georgia.

USFWS accepts the name of *Silene catesbaei* for future documentation. However, to formally make this change in 50 CFR 17.12, it will require notice in the *Federal Register*.

Current, accepted nomenclature: *Silene catesbaei* Walter  
Synonym: *Silene polypetala* (Walt.) Fernald and Schubert

#### **d. Spatial distribution, trends in spatial distribution**

In Bibb, Crawford, Talbot, Taylor, and Upson Counties, Georgia all populations occur within the Southern Outer Piedmont (Griffith et al. 2001), circumscribed within a northeast-northwest trending formation of underlying biotite gneiss geology (Lawton et al. 1976). Within this area, steep ravines dissect the landscape where the Ocmulgee, Chattahoochee and Flint Rivers meet the Fall Line, forming a complex array of cool, shaded slopes along streams that select for mesic forest types preferred by *Silene catesbaei*. The cool, moist hardwood slopes probably resisted or escaped the frequent fires that would have been common in Georgia prior to European settlement. Community associates such as beech (*Fagus grandifolia*), spruce pine (*Pinus glabra*), basswood (*Tilia americana*) and southern magnolia (*Magnolia grandiflora*), all fire-intolerant species, suggest that *Silene catesbaei* sites do not have a floral community that was historically shaped by fires. The underlying geology of biotite gneiss, hornblende gneiss, and amphibolite contributes high levels of magnesium that seem to be preferred by the species (USFWS 1996b), and its community associates are typically found at higher latitudes (*Panax quinquefolium*, *Trillium vaseyi*, *Asarum canadense*, *Pedicularis canadensis*, *Sanguinaria canadensis*, *Kalmia latifolia*, *Iris cristata*, and *Adiantum pedatum*). A large block of largely unexplored habitat exists east of the Crawford County sites of Musella Woods and Tanyard Creek, extending to the Bibb County, Georgia sites. The potential exists for additional, new populations to be discovered in this area, within the western Ocmulgee River watershed. Other notable, rare species that occur with *Silene catesbaei* in this area include: *Scutellaria ocmulgee*; endangered *Trillium reliquum*; *Trillium lancifolium*; *Croomia pauciflora*; *Waldsteinia lobata*; *Pachysandra procumbens*; and *Baptisia megacarpa*.

In Decatur County (GA), Jackson County (FL) and Gadsden County (FL), all *Silene catesbaei* sites occur within close proximity to the Apalachicola River, within the Tifton Upland physiographic area (Griffith et al. 2001). This is a unique region of extreme topography of high bluffs, steepheads and deep ravines (Edwards et al. 2013). A number of sites occur where limestone is shallow and numerous geologic formations such as the Hawthorne Formation, Suwannee Limestone, Miccosukee Formation intersect (Lawton et al. 1976). The cool, moist slopes also contain species intolerant of frequent fire, such as *Pinus glabra*, *Fagus grandiflora*, *Magnolia grandiflora*, and *Dirca palustris*. As with other *Silene catesbaei* sites, numerous plants typically found at higher latitudes persist here, including *Cynoglossum virginianum*, *Euonymus purpurea*, *Dirca palustris*, *Kalmia latifolia*, *Sanguinaria canadensis*, *Schisandra glabra*, and *Stellaria pubera*. Other notable rare and/or endangered plants known to occur with *Silene catesbaei* in this region are: endangered *Croomia pauciflora*; *Magnolia ashei*; *Schisandra glabra*; endangered *Torreya taxifolia*; *Taxus floridana*; *Trillium lancifolium*; and *Uvularia floridana* (Leonard and Baker 1982).

In Twiggs and Houston Counties, *Silene catesbaei* occurs in the Coastal Plain Red Uplands physiographic area (Griffith et al. 2001), on slopes where there is shallow limestone such as Suwannee or Ocala type, or where carbonate-rich rock such as Cooper Marl lies over Twiggs Clay (Lawton et al. 1976). Unlike areas in the Piedmont, areas of complex topography such as high bluffs or steep, narrow ravines are uncommon. These uncommon landforms support a mesic forest community intolerant of fire, evident from species such as *Pinus glabra*, *Fagus grandiflora*, and *Magnolia grandiflora*). Other notable species of interest in this region, occurring with *Silene catesbaei* include *Trillium lancifolium* and *Waldsteinia lobata*. Areas with steep slopes, bluffs, and narrow ravines over limestone are uncommon in the Coastal Plain and often harbor unique botanical communities if they have remained in forest and never placed in agriculture. Further investigation of these habitats has merit and if one-meter Lidar data becomes widely available at low cost, digital elevation models may help resolve the location of these narrow ravines and steep bluffs. Currently, most digital elevation models use 30-meter data from the National Elevation Dataset (U.S. Geological Survey) that is too coarse to resolve small landscape features

#### **e. Habitat**

Habitat quality appears to be gradually degrading for this species in many parts of its range, especially within the Apalachicola drainage (Decatur County (GA), Jackson County (FL) and Gadsden County (FL) and Bibb County (GA) populations in the Piedmont portion of the Ocmulgee River drainage (Table 1). The main threat in these is competition with exotic, evergreen species. Deer herbivory also appears to be a problem at certain sites.

Since *Silene catesbaei* persists in moist, cool hardwood forests with specific edaphic conditions, it may be susceptible to minor changes in temperature and precipitation. Musella Woods, Crawford County, Georgia was a vigorous site in 2006, with many plants situated near the top of a small knoll. The near extirpation of all *Silene catesbaei* plants at this location, without any other apparent change in habitat parameters, suggests that extended drought

conditions for back-to-back years could cause extirpation at sites where the species persists in marginal conditions. Regional changes in temperature from global warming could affect this species in the future.

## **2. Five-Factor Analysis**

### **a. Habitat loss and/or degradation**

Habitat loss continues for *Silene catesbaei* as areas are clear-cut and other forested parcels suffer from infestation by exotic, invasive plant species that out-compete *Silene catesbaei* (Table 1). Sites on the edge of urban areas are particularly prone to habitat degradation from invasive species, and often these areas are already fragmented from historic, urban development. The largest known site (40 acres) in the Ocmulgee River drainage (Piedmont area) is at risk of losing *Silene catesbaei*, if English ivy continues to spread up the small stream courses where the species grows. Hundreds of acres of habitat in the Apalachicola River drainage are being impacted by invasive plants, many sites where other endangered plants occur, such as *Torreya taxifolia*.

### **b. Overutilization for commercial, recreational, scientific or educational purposes**

There is no indication that the species has ever been over-collected at any site for horticultural or scientific purposes. The species is easy to propagate through cuttings and is maintained by various commercial sources. Despite its showy nature, *Silene catesbaei* generally does not generate a lot of interest by the horticultural community since it is hard to maintain in cultivation and has a short flowering period. (Pete Pattavina, pers. obs. 2007)(Steve Bowling, pers. comm. 2005). Considering the *Silene catesbaei* is not closely related to other *Silene* in North America and exhibits tetraploidy (Popp and Oxelman 2007), crosses with other *Silene* or horticultural plants is unlikely under natural setting and all crosses with tetraploid *Silene* species (*Silene caroliniana*, *Silene virginica*, and *Silene rotundifolia*) are sterile (Kruckeberg 1963). We do not believe over utilization is a threat.

### **c. Disease or Predation**

Plants in the wild appear to exhibit no apparent symptoms of disease. Gibson et al. (2010) evaluated herbaria specimens to determine if threatened or endangered species had lower incidence of pest hosts, notably the fungus *Microbotryum violaceum*, the pathogen that causes anther smut disease, common among plant species in the family Caryophyllacea. Gibson et al. (2010) observed no evidence of anther smut disease from 40 herbaria specimens of *Silene catesbaei* assessed in the study. The study suggests that, because of their limited representation on the landscape, many rare, threatened, and endangered species may have fewer natural pests and pathogens.

Jenkins and Baker (2006) observed that *Silene catesbaei* plants growing in the open sun of a power-line right-of-way appeared to have more incidence of insect damage, when compared to

individuals growing in adjacent, forested habitat. We do not have information that indicates disease is a threat at this time.

Numerous researchers (Wilbur Duncan, pers. comm. 2004)(Steve Bowling, pers. comm. 2014) observed incidence of deer herbivory that appeared to be affecting flowering and fruit set (Pete Pattavina, pers. obs. 2004). The effect deer have on long-term population trends is unknown.

#### **d. Inadequacy of existing regulation**

State laws do not restrict private landowners from any lawful activity that would modify or destroy threatened or endangered plants. Therefore neither the Preservation of Native Plants of Florida Act nor the Georgia Wildflower Preservation Act has had a significant effect in minimizing habitat degradation or fragmentation on private lands, the primary threat to the listed species. Georgia's Wildflower Preservation Act of 1973 provides protection for this species, especially on state-owned land. Sites owned by the U.S. Army Corps of Engineers should be considered protected, although close communication with land managers is necessary to ensure *Silene catesbaei*'s needs are included in approved management protocols. The Endangered Species Act prohibits deliberate removal of endangered plants from these areas, and all Federal agencies have a responsibility to conserve endangered plants.

#### **e. Other natural or manmade factors**

None identified.

### **D. Synthesis**

*Silene catesbaei* continues to be threatened with extinction throughout its range. Few publically-owned properties harbor this species, and serious threats from invasive plant species threaten its continued existence on most Apalachicola River drainage sites, as well as the largest population known from Bibb County, Georgia. Privately-owned sites face continual threats from forestry operations, and some natural sites receive pressure from excessive deer browse.

The near extirpation of *Silene catesbaei* at Musella Woods, Crawford County, Georgia and complete extirpation at Lumpkin Road, Talbot County, Georgia, where the species vanished from the plant community, underscores the need to provide at minimum semi-annual monitoring of the species. Since the species is easily propagated from cuttings, augmentation could occur within populations to ensure that small-scale disturbances will not extirpate *Silene catesbaei* from natural sites. Population augmentation may also help offset low seed set due to excessive deer browse.

Along with partners, we should work to put *Silene catesbaei* populations in long-term conservation, under public ownership. We should also foster partnerships with timber companies to ensure habitat for the species is conserved. Currently, few incentives are available to private landowners to encourage conservation of threatened and endangered plants.

USFWS is working in Georgia with private foresters to preserve *Silene catesbaei* habitat, where clear-cuts do not occur in occupied habitat. USFWS monitors the timber operations on *Silene catesbaei* sites in the Chattahoochee River drainage and drafts letters of support for the timber company's sustainable forest certification through the Sustainable Forestry Initiative (SFI). Maintaining certification through SFI ensures that paper produced by industrial mills remains competitive in the global marketplace.

### III. RESULTS

#### III.A. Recommended Classification:

- Downlist to Threatened
- Uplist to Endangered
- Delist (Indicate reasons for delisting per 50 CFR 424.11):
  - Extinction
  - Recovery
  - Original data for classification in error
- No change is needed

### IV. RECOMMENDATIONS FOR FUTURE ACTIONS (listed in order of priority)

- a. Update the most recent, draft recovery plan (USFWS 1996b), to incorporate genetic information and new populations.
- b. Revisit and assess all known sites for viability and other population variables at least every two years.
- c. Promote and/or fund long-term population and/or demographic monitoring projects through partnerships.
- d. Acquire private forestry tracts and bring into public ownership for proper management of the species and its habitat. Land tracts in the Chattahoochee River basin should be given top priority for purchase because of the genetic and habitat diversity found there. Since the species generally occurs over small areas, purchasing large portions of the global range would be relatively inexpensive, since only several thousand acres may require purchase to ensure long-term protection and survival of the species. Formal conservation agreements and conservation easements may also be effective at protecting *Silene catesbaei* habitat.
- e. Perform new searches for the species in the Ocmulgee River basin and Chattahoochee River drainage. Habitat modeling using one-meter Lidar data may be useful for this exercise.
- f. Continue to fund long-term invasive species control at sites in the Apalachicola and Ocmulgee sites.
- g. Monitoring needs to be standardized for the species to ensure that data collected from different parties is comparable. *Silene catesbaei* is clonal and patch-forming, posing difficulties for estimating the number of plants at occupied sites.
- h. Identify sites within the species range for establishment of new sites and/or population augmentation.

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**U.S. FISH AND WILDLIFE SERVICE  
5-YEAR REVIEW of *Silene catesbaei***

Current Classification Endangered  
Recommendation resulting from the 5-Year Review

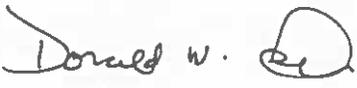
- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change is needed

Appropriate Listing/Reclassification Priority Number, if applicable \_\_\_\_\_

Review Conducted By Pete Pattavina, Fish and Wildlife Biologist, Georgia Ecological Services

**FIELD OFFICE APPROVAL:**

Lead Field Supervisor, Fish and Wildlife Service

Approve  Date 12 January 2015

*The lead Field Office must ensure that other offices within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. The lead field office should document this coordination in the agency record.*

**REGIONAL OFFICE APPROVAL:**

*The Regional Director or the Assistant Regional Director, if authority has been delegated to the Assistant Regional Director, must sign all 5-year reviews.*

<sup>for</sup>  
Lead Regional Director, Fish and Wildlife Service

Approve  Date 3-15-15

*The Lead Region must ensure that other regions within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. If a change in classification is recommended, written concurrence from other regions is required.*

**Cooperating Regional Director, Fish and Wildlife Service**

Concur  Do Not Concur

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Appendix A**  
**Summary of peer review for the 5-Year Review of Fringed Campion (*Silene catesbaei*)**

USFWS provided hard copies of this 5-year review to: (1) Tom Patrick, State Botanist, Georgia Department of Natural Resources; and (2) Wilson Baker, Naturalist, Tallahassee, Florida. Both gentlemen have over 30 years of experience in Florida and Georgia with *Silene catesbaei*. USFWS asked for comments regarding the scientific integrity of the document, as well as validity of the data presented for each site. USFWS received no comments or objections to the information presented in this 5-year review.