

**REPORT ON THE CONSERVATION STATUS OF  
Claytonia lanceolata var. flava IN IDAHO**

by

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Claytonia lanceolata var. flava IN IDAHO

**Taxon Name:** Claytonia lanceolata Pursh var.  
flava (A. Nels.) C.L. Hitchcock

**Common Name:** Yellow Springbeauty

**Family:** Portulacaceae

**States Where Taxon Occurs:** U.S.A.; Idaho, Montana, Wyoming

**Current Federal Status:** Category 2 Candidate

**Recommended Federal Status:** Category 1 Candidate

**Author of Report:** Robert K. Moseley

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## ABSTRACT

Only one population of Claytonia lanceolata var. flava (yellow springbeauty) is known from Idaho. It occurs near Staley Springs, on the northwest corner of Henry's Lake, Fremont County. The population is the type locality for the taxon, first collected by Aven Nelson in 1899. The population was last seen in 1986 by Duane Atwood, who said there were approximately several hundred individuals. The area was partially searched in May 1988, but no yellow springbeauty was seen.

Ten populations are known for yellow springbeauty in Wyoming, Montana, and Idaho. The Idaho population is the smallest and is probably not viable in the long-term. Much of available habitat for the taxon around Henry's Lake was probably inundated in 1923 when a 22 foot dam was constructed at the outlet to the lake. Cattle grazing has been relatively heavy over the last century, but the effect on yellow spring beauty is unknown. The population occurs on private land and the land owner is planning to subdivide and build houses on the site in the near future. Yellow springbeauty is expected to be extirpated from Idaho's flora within the next few years if no additional populations are found.

The taxonomic status of yellow springbeauty is being examined by the Montana Natural Heritage Program. Morphological and genetic evidence indicates that yellow springbeauty deserves recognition as a full species.

With completion of this report, Status Surveys have been completed for the U.S. Fish and Wildlife Service in the three states where yellow springbeauty is known to occur: Wyoming, Montana, and Idaho. Therefore, it is recommended that yellow springbeauty be moved to category 1 of the candidate species list. It is also recommended that it remain on the U.S. Forest Service and Idaho BLM Sensitive Plant Species List, although after an intensive search none was found on public land. The possibility exists that a population may have been overlooked.

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I. Species Information.

1. Classification and nomenclature.

A. Taxon.

1. Scientific name.

- a. **Binomial:** Claytonia lanceolata Pursh var. flava (A. Nels.)  
C.L. Hitchcock.
- b. **Full bibliographic citation:** Hitchcock, C.L. 1964. Vascular  
Plants of the Pacific Northwest. Seattle: University of  
Washington Press. Part 2:229.
- c. **Type specimen:** U.S.A., IDAHO, Fremont Co.: Henry's Lake; June  
22, 1899; Nelson 5488 (RM).

2. **Pertinent synonym(s):** C. aurea A. Nelson (1900; but not of Kuntze  
in 1891); C. flava A. Nelson (1926).

3. **Common name:** Yellow Springbeauty

4. **Taxon codes:** PDPOR03092 (Idaho, Montana, and Wyoming Natural Heritage  
Programs).

5. **Size of genus:** According to Davis (1966), the genus consists of 19  
or 20 species, 15 of which occur in North America.

B. Family classification.

1. **Family name:** Portulacaceae

2. **Pertinent family synonym(s):** None

3. **Common name(s) for family:** Purslane

C. Major plant group: Dicotyledoneae

D. **History of knowledge of taxon:** This taxon was first collected by Aven  
Nelson (#5488) from Henry's Lake in Fremont County, Idaho, on June 22,  
1899. Ray J. Davis later collected yellow springbeauty on May 24,  
1940, from the "northwest corner of Henry's Lake, T43E, T15N" (#1986),  
and again on May 30, 1962, "near Henry's Lake in an open medium moist  
meadow northeast of Staley Springs" (#6026).

It was described by Nelson (1900) as Claytonia aurea. In 1926, it was  
renamed C. flava, C. aurea having been used by Kuntze in 1891. The  
taxon was reduced to varietal status by Hitchcock (1964). Davis (1966)  
published the same combination as new, perhaps in ignorance of  
Hitchcock's revision, and is occasionally cited as author (C.  
lanceolata var. flava (A. Nels.) R.J. Davis).

Douglas et al. (1978) searched the Island Park - Henry's Lake area in  
1978, but were unable to locate yellow springbeauty. Whitehead (1983)  
searched for the Henry's Lake population in the spring of 1978, but  
found no sign of it around Staley Springs or the mouth of Timber Creek.  
Duane Atwood rediscovered the population on April 3, 1986, in the exact

same areas that Whitehead said he searched in 1978, near the mouth of Timber Creek. Atwood and myself looked for yellow springbeauty around the mouth of Timber Creek in May 1988, and found none, but were kicked off the land by the landowner before the entire area could be searched.

**E. Comments on current alternative taxonomic treatment(s):** According to the taxonomic treatment of Hitchcock (1964), Claytonia lanceolata is a wide-ranging, variable species consisting of four varieties: chrysantha, flava, multiscapa, and the typical lanceolata. The latter variety has the widest geographic distribution, occurring throughout western North America from British Columbia to southern California, and east to Alberta and New Mexico. The other three varieties are restricted to smaller geographic areas within the range of var. lanceolata.

As part of the assessment of the conservation status of Claytonia lanceolata var. flava in Montana, by the Montana Natural Heritage Program (Shelly 1989a; 1989b), detailed studies of its systematic status were also conducted. These studies included an analysis of the extent of genetic differentiation between vars. flava and lanceolata (using electrophoresis), as well as morphological studies of living plants in the field. The results of the electrophoretic study (conducted by Dr. Douglas Soltis' laboratory, Department of Botany, Washington State University) indicate that the two varieties are well differentiated genetically, apparently at the species level (Wolf 1988). The morphological data also support taxonomic treatment of var. flava as a distinct species (Shelly 1989a; 1989b). The results of these studies will be published in the systematic literature once all analyses are complete (Shelly 1989a).

## **2. Present legal or other formal status.**

### **A. International.**

**1. Present designated or proposed legal protection or regulation:** None.

### **B. National.**

**1. Present designated or proposed legal protection or regulation:** Yellow springbeauty is currently a category 2 candidate (U.S. Fish and Wildlife Service 1985).

**2. Other current formal status recommendation:** A Status Report for Wyoming, submitted to Region 6 of the U.S. Fish and Wildlife Service by the Rocky Mountain Heritage Task Force (Marriott 1986) recommended that yellow springbeauty remain a category 2 candidate until further field work reveals its range-wide status in Montana and Idaho. The Wyoming Status Survey (Marriott 1986) is included as Appendix 7 of this report. In a second Status Survey submitted to Region 6 of the U.S. Fish and Wildlife Service, the Montana Natural Heritage Program also recommended that yellow springbeauty remain a category 2 candidate (Shelly 1989b). The Montana Status Survey (Shelly 1989b) is included as Appendix 8 of this report.

Yellow springbeauty is currently listed as "critically imperiled throughout its range" (global rank = G5T1) by The Nature Conservancy.

**3. Review of past status:** None.

**C. State.**

**1. Idaho.**

**a. Present designated or proposed legal protection or regulation:**

None.

**b. Other current formal status recommendation:** Yellow springbeauty is currently listed as "critically imperiled in Idaho" (state rank = S1) by the Idaho Natural Heritage Program.

**c. Review of past status:** Holte (1981) recommended that yellow springbeauty be listed as endangered.

**2. Montana.**

**a. Present designated or proposed legal protection or regulation:**

None.

**b. Other current formal status recommendation:** Yellow springbeauty is currently listed as "critically imperiled in Montana" (state rank = S1) by the Montana Natural Heritage Program.

**c. Review of past status:** Yellow springbeauty was recommended for listing as threatened by the Montana Rare Plant Project (Lesica et al. 1984).

**3. Wyoming.**

**a. Present designated or proposed legal protection or regulation:**

None.

**b. Other current formal status recommendation:** Yellow springbeauty is currently listed as "critically imperiled in Wyoming" (state rank = S1) by the Wyoming Natural Heritage Program.

**c. Review of past status:** None.

**3. Description**

**A. General nontechnical description:** Yellow springbeauty is a small herb, with stems that arise from deep-seated corms. The aboveground portions of the stems are about 2-6 inches tall. The middle of each stem bears two opposite leaves, which are much longer (ca. 2-4 inches long) than wide (ca. 0.25-0.5 inch wide). The tops of the stems bear from 2 to 12 or more flowers; the results of current systematic studies indicate that the petals may be either yellow or white. The five petals are rounded at the tips, and narrow to a small base. In Montana, the plants are generally in bloom from mid-May to mid-June (Shelly 1989a).

**B. Technical description:** Glabrous perennial from a usually rather deep-seated, semiglobose corm 5-20 (40) mm in diameter; basal leaves (often lacking in flowering plants) 1 or 2, narrowly oblanceolate, 2-10 mm broad, up to about 10 cm long (including the subterranean portion of the slender petiole); flowering stems 1-several, up to about 12 cm tall (not including the subterranean portion of the raceme), bearing (from slightly below to above midlength) 2 opposite, sessile or subsessile,

narrowly lanceolate leaves that are commonly about 3-10 (12) mm wide and 2-6 cm long; racemes loosely (2) 3- to 12- flowered, often secund, reduced-bracteate below; pedicels stout to slender, 1-5 cm long, usually arched-recurved in fruit; sepals 4-7 mm long; corolla deep yellow or white, the petals 7-12 mm long; stamens 5, basally adnate to the petals; styles 3; capsule ovoid, firm-walled, about 4 mm long; seeds (1-2) 3-6, black and shining, 2-2.5 mm long, very indistinctly warty-papillate, with a fairly evident strophiole (Shelly 1989a).

**C. Local field characters:** The two varieties of Claytonia lanceolata that occur in Idaho (vars. flava and lanceolata) both possess deep-seated, roundish corms. However, recent systematic studies indicate that the two are distinguishable by leaf morphology. Variety flava has leaves which are much longer than wide, being lanceolate (often narrowly so) in shape. Variety lanceolata has leaves that are typically shorter and broader. In addition, var. flava can have either yellow or white flowers, with petals that are most often rounded at the tips. Variety lanceolata possesses white petals that are frequently tinged and/or lined with pink, and that are often notched at the tips (Shelly 1989a).

**D. Identifying characteristics of material which is in interstate or international commerce or trade:** See above section for distinguishing features. No interstate or international commerce or trade is known.

**E. Photographs and/or line drawings:** The only known line drawing of yellow springbeauty is found in Hitchcock (1964). This drawing has been reproduced in Appendix 2. Numerous photographs (35 mm slides) of yellow springbeauty from Montana and its Idaho habitat are in the slide collection of the Idaho Natural Heritage Program. Several of these slides are included in Appendix 3.

#### 4. Significance.

**A. Natural:** Yellow springbeauty is a geographically restricted taxon in the Claytonia lanceolata complex that will continue to be important in studies of the evolutionary relationships within the group.

**B. Human:** The flower of yellow springbeauty is beautiful and has potential for horticultural purposes. It produces prodigious spring floral displays in the moist meadows where it occurs, which are aesthetically pleasing.

#### 5. Geographical distribution.

**A. Geographical range:** Yellow springbeauty is a regional endemic, known from ten populations in eastern Idaho (one population in Fremont County), northwestern Wyoming (four populations in Fremont County), and southwestern Montana (five populations in Beaverhead, Deerlodge, Gallatin, Jefferson, and Silver Bow counties). See Appendix 4 for distribution maps.

##### **B. Precise occurrences in Idaho.**

**1. Populations currently or recently known extant:** Only one population in Idaho is known, last seen in 1986. See Appendix 4 for maps and Appendix 5 for the occurrence record.

###### **a. Staley Springs**

1. U.S.A., Idaho, Fremont County
4. Targhee Peak Quadrangle 7.5'
5. This is probably the type locality collected in 1899, by Aven Nelson. It was later collected by Ray J. Davis from this area in 1940 and again in 1962.
6. Last observed by Duane Atwood, April 3, 1986.
7. Located approximately 0.5 mile northeast of Staley Springs

2. **Populations known or assumed extirpated:** None.

3. **Historically known populations where current status not known:** None.

4. **Locations not yet investigated believed likely to support additional natural populations:** Much of the suitable-appearing habitat in the Island Park - Henry's Lake area, Idaho, was searched during May 1988, but no additional populations were found (see Appendix 6 for maps of areas searched in Idaho during 1988). Douglas et al. (1978) and Whitehead (1983) searched the Island Park area in 1977 and 1978, but no populations of yellow springbeauty were found. The Centennial Mountains, west of Henry's Lake, would be the only likely area that may harbor additional, undiscovered populations of yellow springbeauty.

5. **Reports having ambiguous or incomplete locality information:** None.

6. **Locations known or suspected to be erroneous reports:** None.

**C. Biogeographical and phylogenetic history:** This taxon was first described as a species (*Claytonia aurea*, then *C. flava*) by Aven Nelson (1900, 1926). It was reduced to varietal status by Hitchcock (1964), but no reasons were given. Davis (1966) also recognized it as a variety of *C. lanceolata* in his monograph of the genus. Again, no discussion was presented on the reduction of the taxon to varietal status. He disposed of several of Hitchcock's *C. lanceolata* varieties after greenhouse studies demonstrated that variation was based on age and growing conditions. However, *C. lanceolata* var. *flava* was maintained for its distinctive corolla (golden yellow), its typically prostrate habit and its tendency to maintain green leaves year-round under cultivation (not true of any other segregates of *C. lanceolata*). All material used in the above taxonomic studies and descriptions of *C. lanceolata* var. *flava* have been from the Staley Springs and "Anaconda" historical population in Montana (Montana occurrence 002).

As part of the assessment of the conservation status of *Claytonia lanceolata* var. *flava* in Montana, by the Montana Natural Heritage Program (Shelly 1989a; 1989b), detailed studies of its systematic status was also conducted. These studies included an analysis of the extent of genetic differentiation between vars. *flava* and *lanceolata* (using electrophoresis), as well as morphological studies of living plants in the field. The results of the electrophoretic study (conducted by Dr. Douglas Soltis' laboratory, Department of Botany, Washington State University) indicate that the two varieties are well differentiated genetically, apparently at the species level (Wolf 1988). The morphological data also support taxonomic treatment of var. *flava* as a distinct species (Shelly 1989a; 1989b). The results of these studies will be published in the systematic literature once all analyses are complete (Shelly 1989a).

## 6. General environment and habitat description.

**A. Concise statement of general environment and habitat:** In Idaho, the population at Staley Springs occurs along the northern shore of Henry's Lake, in the transition zone between wet meadows dominated by Carex spp. and uplands dominated by Artemisia tridentata ssp. vaseyana. These transition areas are dominated by Artemisia cana ssp. viscidula. The elevation of the Staley Springs population is 6480' and it is growing on gently sloping, sandy alluvium. The only other associated species recognizable at the time of flowering were Ranunculus glaber-rimus and Claytonia lanceolata var. lanceolata.

### B. Physical characteristics.

#### 1. Climate.

**a. Koppen climate classification:** The Idaho, population of C. lanceolata var. flava occurs at the interface of two of Koppen's classification units: BSk - Cool, steppe or semiarid climate and Dfb - Cold-snowy forest climate with humid winters (Trewartha 1954).

**b. Regional macroclimate:** The climate of the Henry's Lake - Island Park area is influenced by moist air masses from the Pacific Ocean and Gulf of Mexico and dry, often cold continental air from Canada. During winter months, either cyclonic storms from the Aleutian low or dry continental air from Canada dominate. Air masses from the Pacific, however, moving through California, Nevada, and Utah, also bring moisture during winter and at other times of the year. In the summer, air masses from the Gulf of Mexico bring moisture. As a result, the weather of eastern Idaho is transitional between areas to the north and west that are affected primarily by moist Pacific air and to a lesser extent by continental air from Canada and areas to the east and south that are influenced strongly by moist Gulf of Mexico air. The resulting precipitation is relatively uniform throughout the year. At lower elevations, at the outer edges of Island Park, precipitation is as little as 10 inches annually, while the higher elevations may exceed 40 inches. Mean annual precipitation at Island Park Dam, 18 miles south of the Staley Springs population, averages 31 inches annually. The mean annual temperature for the area ranges from 30° to 40° F (U.S. Forest Service 1985).

**c. Local microclimate:** No quantitative data are available. The Staley Spring population occurs in a large, high elevation, intermontane valley that experiences considerable cold-air pooling. Freezing temperatures can occur at any time during the growing season as a result of this cold-air pooling.

**2. Air and water quality requirement:** Unknown.

**3. Physiographic province:** The Idaho population falls within the Northern Rocky Mountain Geomorphic Province (Ross and Savage 1967).

**4. Physiographic and topographic characteristics:** Yellow springbeauty in Idaho, occurs on a nearly level, bottomland site at 6480' in elevation.

5. **Edaphic factors:** Substrate of the Idaho population of yellow springbeauty is sandy, Quaternary alluvium derived from late Tertiary and early Quaternary volcanics. The moisture regime of these soils is mesic.
6. **Dependence of this taxon on natural disturbance:** Unknown.
7. **Other unusual physical features:** None known.

**C. Biological characteristics.**

1. **Vegetation physiognomy and community structure** - The Staley Springs population occurs at the interface of a Carex-dominated wet meadow and shrub-steppe, dominated by Artemisia tridentata ssp. vaseyana and several bunchgrasses on the upland. The narrow transition zone between the two formations, where yellow springbeauty occurs, is dominated by Artemisia cana ssp. viscidula and an unidentifiable rhizomatous grass, probably Poa pratense. Forbs are a common component of the Artemisia cana sites.
2. **Regional vegetation:** Kuchler (1964) places the vegetation surrounding Staley Springs as Sagebrush Steppe (Artemisia - Agropyron). The Staley Springs site probably falls within the Artemisia cana ssp. viscidula/Festuca idahoensis habitat type (Hironaka et al. 1983), however, a rhizomatous grass, probably Poa pratense, appears to have replaced Festuca idahoensis as a result of cattle grazing.
3. **Frequently associated species:** Following is a list of species frequently associated with yellow springbeauty in Idaho:
  - Artemisia cana ssp. viscidula
  - Ranunculus glaberrimus
  - Claytonia lanceolata var. lanceolata
  - Besseya wyomingensis
  - Dodecatheon pulcherrimum
  - Saxifraga rhomboidea
  - Poa pratense
4. **Dominance and frequency:** According to Duane Atwood, yellow springbeauty has a widely scattered, patchy distribution at Staley Springs.
5. **Successional phenomena:** Unknown.
6. **Dependence on dynamic biotic features:** Unknown.
7. **Other endangered species:** Bald eagles, an endangered species, were present in the vicinity of Staley Springs during May 1988. Astragalus gilviflorus, a species rare in the state of Idaho (Heritage Rank - G5S1), occurs near the C. lanceolata var. flava population on more xeric microhabitats.

**7. Population biology.**

- A. **General summary:** One population, consisting of an unknown number of individuals, is known from Idaho. The population was last seen in

1986, and could not be relocated in 1988.

## B. Demography.

1. **Known populations:** There are ten known populations of yellow springbeauty occurring in three widely scattered areas along the Continental Divide in Wyoming, Montana, and Idaho (see Map 1, Appendix 4). One center of distribution occurs in the Anaconda - Deer Lodge area of Montana, with four large populations, each containing tens of thousands of individuals (Shelly 1989a; 1989b).

Approximately 130 miles to the southeast, a second center occurs in the Hebgen Lake - Henry's Lake area of Idaho and Montana. Two populations occur here, with the Hebgen Lake population being extensive and containing 15,000 to 20,000 individuals, while the Idaho population at Staley Springs on Henry's Lake is small and probably contains only several hundred individuals.

The third center of distribution occurs in the Waynes Creek area near Dubois, Wyoming, approximately 120 miles southeast of the Hebgen Lake - Henry's Lake area. Four populations occur here, with one containing more than 10,000 individuals and the other three each containing several hundred.

## 2. Demographic details.

### a. Staley Springs

1. **Area:** 10 acres.
2. **Number and size of plants:** Duane Atwood estimated the size of the population to be several hundred individuals.
3. **Density:** Unknown.
4. **Presence of dispersed seeds:** Unknown.
5. **Evidence of reproduction:** Unknown.
6. **Evidence of expansion/contraction:** Details unknown, but considerable habitat was probably inundated when the level of Henry's Lake was artificially raised in 1923.

## C. Phenology

1. **Patterns:** The four collections made at Staley Springs, presumably all in flower, occurred at the following dates: April 3, May 24, May 30, June 22.

In Montana, yellow springbeauty begins blooming by early May at the lowest-elevation sites; peak flowering occurs in mid- to late May. At higher elevations, flowering can persist into mid-June, and a few individuals have been observed in bloom as late as the first week of July. Yearly climatic differences were thought to influence these events, especially in the higher elevations where dramatic weather shifts often occur. Fruiting begins by late May; it is unknown how long the fruits persist, but it is likely that seed dispersal takes place rapidly after fruit maturation (Shelly 1989a; 1989b).

The flowers of yellow springbeauty are open only during the day; they close completely one to two hours before sunset, and open in the morning as the temperature rises (Shelly 1989b).

2. **Relation to climate and microclimate:** Depth of winter snowpack and spring weather probably affect phenology. The beginning of flowering may vary as much as a month or more from year to year, depending on the rate of snowmelt.

**D. Reproductive ecology.**

1. **Type of reproduction:** Details are unknown, but yellow springbeauty in Montana appears to reproduce by sexual production of seeds; these give rise to plants with deep-seated corms. Vegetative dispersal by growth or splitting of corms was not observed in Montana specimens collected during field surveys in 1988 (Shelly 1989a; 1989b).

2. **Pollination.**

- a. **Mechanisms:** Details are unknown, but studies in Montana indicate that it is possible that yellow springbeauty is predominantly self-pollinating; the flowers close in the late afternoon, and open again with warming during the morning. This corolla closure is tight enough that self-pollination may occur as a result of the anthers being pressed toward the stigma. However, insects (small bees) were observed visiting the flowers at the French Creek (002) site on May 18, 1988; it is possible that some pollination results from this activity (Shelly 1989a; 1989b).
- b. **Specific known pollinators:** Details unknown, but possibly small bees (Shelly 1989a; 1989b).
- c. **Other suspected pollinators:** None.
- d. **Vulnerability of pollinators:** Details are unknown, but studies of pollinators of a rare California species (Sugden 1985) indicate that pollinators are adversely affected by heavy domestic livestock grazing. The Staley Springs sites is heavily grazed season long, presumably by cattle.

3. **Seed dispersal.**

- a. **General mechanisms:** Details are unknown, but the seeds of perennial Claytonia taxa are relatively large, and it is likely that dispersal does not extend far from the parent plants. The large seed size is possibly and adaption allowing for efficient germination and corm establishment in dense associated vegetation of the meadow habitats (Shelly 1989a; 1989b).
- b. **Specific agents:** Unknown.
- c. **Vulnerability of dispersal agents and mechanisms:** Unknown.
- d. **Dispersal patterns:** Unknown.

4. **Seed.**

- a. **Amount of seed production:** Unknown.

- b. **Seed viability and longevity:** Unknown.
  - c. **Dormancy requirements:** Unknown.
  - d. **Germination requirement:** Unknown.
  - e. **Percent germination:** Unknown.
5. **Seedling ecology:** Unknown.
6. **Survival and mortality:** Unknown.
7. **Overall assessment of reproductive success:** According to Duane Atwood, who has seen four populations of this taxon in Idaho, Wyoming and Montana, the Staley Springs site is the sparsest of all. No plants were observed in 1988, but limited searching took place because the property was inaccessible to us. Given these observations, it appears that the Idaho population may be having reproductive difficulties in its habitat under past and/or present land management practices.
8. **Population ecology.**
- A. **General summary:** Yellow spring beauty begins growth soon after snow melt and flowers relatively early, before many other associated species. Therefore, interspecific competition for resources may be minimal. The effect of domestic livestock herbivory on yellow springbeauty is unknown. Only one intermediate between yellow spring beauty and C. lanceolata var. lanceolata was observed in Montana and genetic evidence indicates that little to no gene flow takes place between the two, even though they are sympatric at several sites.
  - B. **Positive and neutral interactions:** Unknown.
  - C. **Negative interactions.**
    - 1. **Herbivores, predators, pests, parasites and diseases:** The meadow containing yellow springbeauty at Staley Springs, is grazed by domestic livestock, probably cattle. The grazing regime is unknown, as is the effect of grazing on the yellow springbeauty, if any.
    - 2. **Competition.**
      - a. **Intraspecific:** Details are unknown, but yellow springbeauty generally occurs as widely scattered individuals.
      - b. **Interspecific:** Details are unknown, but yellow springbeauty occurs in the dense grassland/forb vegetation of meadow habitats. However, annual growth and flowering occur early in the growing season, prior to vigorous growth by many of the associated species, which are generally taller in stature. This phenological pattern may allow for efficient germination and photosynthesis, especially considering the short stature of mature individuals.
    - 3. **Toxic and allelopathic interactions:** Unknown.
  - D. **Hybridization.**

1. **Naturally occurring:** Yellow springbeauty occurs with C. lanceolata var. lanceolata at the Staley Springs site. As noted in section I.E., genetic and morphological studies indicate that yellow springbeauty is a distinct taxon from var. lanceolata, and should be recognized as a full species. The genetic evidence indicates that there is little to no gene flow between var. flava and var. lanceolata (Wolf 1988). Yellow springbeauty was found to have both yellow- and white-flowered forms. In only one case in Montana, was an individual found with intermediate, cream-colored corollas; this suggests the possibility of limited gene flow between the two color forms. The color morphs may be genetic forms that differ with respect to only a few genes (Shelly 1989b).
  2. **Artificially induced:** Unknown.
  3. **Potential in cultivation:** Unknown.
- E. Other factors of population ecology:** Unknown.
9. **Current land ownership and management responsibility.**
    - A. **General nature of ownership:** The Idaho population at Staley Spring is privately owned by a single landowner.
    - B. **Specific landowners.**
      - a. Mr. Rich Lewis, Island Park, Idaho.
    - C. **Management responsibility:** Probably the same as above.
    - D. **Easements, conservation restrictions, etc.:** None.
  10. **Management practices and experiences.**
    - A. **Habitat management.**
      1. **Review of past management and land-use experiences.**
        - a. **This taxon:** The Staley Springs site is has been grazed heavily in the past few years, at least. Soil has been compacted in this moist meadow and the composition of understory grasses and forbs has probably been altered. For instance, Festuca idahoensis has probably been replaced by the rhizomatous grass Poa pratense. However, the direct affect of grazing on yellow springbeauty is unknown. The population at Staley Springs appears to have been bisected by construction of the loop road around Henry's Lake (Map 3, Appendix 4).

Direct impacts or destruction of habitat by road construction, mining, and recreational activity have been noted in Montana (Shelly 1989a).
        - b. **Related taxa:** The effect of grazing at Staley Springs on C. lanceolata var. lanceolata is unknown.
        - c. **Other ecologically similar taxa:** Unknown.

**2. Performance under changed conditions:** As noted elsewhere, yellow springbeauty has persisted at Staley Springs since at least 1899, when it was first collected here. Also noted elsewhere, however, is the fact that this population appears to be the least viable of the ten that are known.

**3. Current management policies and actions:** As of May 1988, grazing was the predominant land-use.

**4. Future land use** - The two areas in and around subpopulations A and B (Map 3, Appendix 4) were covered with newly placed survey stakes. According to Mrs. Rich Lewis on May 18, 1988, these two areas "will be under houses in six months."

**B. Cultivation.**

**1. Controlled propagation techniques:** Unknown.

**2. Ease of transplanting:** Unknown.

**3. Pertinent horticultural knowledge:** Unknown.

**4. Status and location of presently cultivated material:** Unknown.

**11. Evidence of threats to survival.**

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

**1. Past threats:** The Staley Springs population occurs on the edge of Henry's Lake. In 1923, an earthen dam was built at the outlet of Henry's Lake, raising the height of the lake 22 feet. Since Henry's Lake occurs in a broad, relatively gentle basin, considerable shoreline habitat was flooded around the lake in general and near the mouth of Timber Creek in particular. Undoubtedly, some of the population at Staley Springs was flooded, possibly a large portion. Other populations around Henry's Lake could have been extirpated.

Cattle grazing has taken place around Henry's Lake for many years. The effect of heavy cattle grazing in the past is unknown.

**2. Existing threats:** Cattle grazing is continuing.

**3. Potential threats:** Subdivision of a majority of the site for housing is planned (Mrs. Rich Lewis, 1988, personal communication). This development will eliminate or severely impact subpopulations A and B.

**B. Overutilization for commercial, sporting, scientific, or educational use:** Not expected to be a problem in Idaho.

**C. Disease, predation, or grazing:** The direct and indirect impacts of livestock grazing on yellow springbeauty at the Staley Springs site is unknown, but it has altered composition of understory grasses, at least.

**D. Inadequacy of existing regulatory mechanisms.**

1. **Past threats:** Obviously, no regulatory mechanisms were in place in 1923, to prevent inundation of a portion of the yellow springbeauty population on the edge of Henry's Lake at Staley Springs.
2. **Existing threats:** None.
3. **Potential threats:** The entire Idaho population of this taxon is on private land and has no protection under state or federal law from a housing subdivision. A portion of the site, however, may be classified as a wetland under the Clean Water Act. Under Section 404 of this act, a permit must be granted by the Corps of Engineers to fill any wetlands at the site for a housing subdivision.

**E. Other natural or manmade factors.**

1. **Past threats:** None known.
2. **Existing threats:** None known.
3. **Potential threats:** The Staley Springs population of yellow springbeauty is small and isolated from other populations. The closest known population is at Hebgen Lake, Montana, ten miles to the east. This isolation could be detrimental to the taxon's ability to adapt to environmental change.

**II. Assessment and Recommendations.**

12. **General assessment of vigor, trends and status:** Given past, present and known potential threats to habitat at Staley Springs, the continued existence of yellow springbeauty in Idaho, appears bleak. Factors contributing to this assessment include flooding of considerable shoreline habitat by dam construction in 1923, prolonged domestic livestock grazing in the past, continued heavy livestock grazing at present, and the planned housing subdivision covering much of the known distribution of this taxon in Idaho. The Staley Springs population, however, is the smallest known.

**13. Priority of listing or status change.**

- A. **Recommendation to U.S. Fish and Wildlife Service:** Yellow springbeauty is currently a category 2 candidate (U.S. Fish and Wildlife Service 1985). Status Surveys for Regions 1 and 6 of the U.S. Fish and Wildlife Service have been completed in the three states that constitute the known range of yellow springbeauty: Idaho (this report), Montana (Shelly 1989b; Appendix 8), and Wyoming (Marriott 1986; Appendix 7). In other words, with submission of this report the Service now has sufficient data to support listing yellow springbeauty as threatened or endangered; yellow springbeauty should be changed from a category 2 to category 1 candidate. Although the Idaho population is on the verge of being lost, the taxon as a whole is not currently in jeopardy in Montana or Wyoming. The listing priority should be 12, that is, the possible threats to the continued existence of yellow springbeauty is of low to moderate magnitude and of non-imminent immediacy. When taxonomic studies are complete and yellow springbeauty is given full species status, the listing priority should be upgraded

to 11.

The Service should contact the Corps of Engineers to make them aware that a candidate species occurs on a wetland that may be filled for a housing development.

**B. Recommendations to other U.S. Federal Agencies:** Yellow springbeauty is currently on the U.S. Forest Service, Intermountain Region Sensitive Plant Species List for the Targhee National Forest (U.S. Forest Service 1989). No status change is recommended. Although an extensive search was conducted in the Island Park - Henry's Lake area, including a large portion of the Targhee National Forest, and no yellow springbeauty was found, the possibility still exists that populations may occur on the Forest (see Appendix 6). As mentioned in section I.5.B.4., the Centennial Mountains are a likely area for further searches in Idaho.

Yellow springbeauty is currently on the Idaho BLM Sensitive Plant Species List as an Endangered Species. No status change is recommended. Although no yellow springbeauty was found on any of the tracts that it manages around Henry's Lake, the BLM should be aware of the possibility that yellow springbeauty may occur on them (see Appendix 6 for maps of areas searched in 1988).

**C. Other status recommendations.**

1. **Counties and local areas.** No recommendation.

2. **State:** Yellow springbeauty is currently listed as "critically imperiled in Idaho" (state rank = S1) by the Idaho Natural Heritage Program. No status change is recommended.

The State of Idaho, Departments of Land and Parks and Recreation, manage considerable land in the Island Park - Henry's Lake area. Although considerable state land was searched and no yellow springbeauty was found, the possibility remains that it could have been overlooked (see Appendix 6 for areas searched). These agencies should take yellow springbeauty into account when planning land-use changes in the Island Park - Henry's Lake area.

3. **Other Nations:** No recommendation.

4. **International:** No recommendation.

14. **Recommended critical habitat:** No critical habitat is recommended in Idaho.

15. **Conservation/recovery recommendations.**

**A. General conservation recommendations.**

1. **Recommendations regarding present or anticipated activities:** I expect the Henry's Lake population to be extirpated in the near future due to planned housing development. Because at least part of the site is a wetland, the Corps of Engineers may be able to deny a permit to fill the wetlands because a candidate species occurs on the area.

2. **Areas recommended for protection:** None in Idaho.

3. **Habitat management recommendations:** None for Idaho.

4. **Publicity sensitivity:** None in Idaho.

5. **Other recommendations:** None.

**B. Monitoring activities and further studies recommended:** No monitoring studies are recommended in Idaho.

**16. Interested parties:**

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### III. Information Sources.

#### 17. Sources of information.

##### A. Publications.

1. **References cited in report:** See Appendix 1.

2. **Other pertinent publications.**

a. **Technical:** None.

b. **Popular:** None.

**B. Herbaria consulted:** Specimens of yellow springbeauty from Idaho are known to be deposited in the Idaho State University (IDS), Rocky Mountain Herbarium (RM), United States National Herbarium (US), and Brigham Young University (BYU). Following is a list of known herbarium specimens from the Staley Spring population:

Atwood 12186 (BYU)  
Davis 1986 (IDS)  
6026 (IDS, BYU)  
Nelson 5488 (RM, US)

**C. Fieldwork:** During May 17 through 24, 1988, I unsuccessfully searched for yellow springbeauty in numerous wetlands in the Island Park - Henry's Lake area. See Appendix 6 for maps of areas unsuccessfully searched during this time.

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**E. Other information sources:** None known.

- 18. Summary of materials on file:** Color slides, field forms, maps and all published and unpublished references pertaining to yellow springbeauty in Idaho are on file at the Idaho Natural Heritage Program office.

**IV. Authorship.**

**19. Initial authorship:**

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- 20. Maintenance of status report:** The Idaho Natural Heritage Program will maintain current information and update the status report as needed. Should yellow springbeauty be listed as an endangered or threatened species by the U.S. Fish and Wildlife Service, the Service, through its Boise Field Office, should maintain the primary file on information for the Idaho population, encourage others to provide new information, and distribute new findings, as received, to the interested parties (section II.16.).

**V. New Information.**

- 21. Record of revisions:** This report covers the conservation status for yellow springbeauty in Idaho. Section 6 Status Survey Reports have been prepared for Region 6 of the U.S. Fish and Wildlife Service by the Rocky Mountain Heritage Task Force (Marriott 1986; Appendix 7) and the Montana Natural Heritage Program (Shelly 1989b; Appendix 8). These three reports together cover the known range of the taxon.

APPENDIX 1.

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APPENDIX 2.

Line drawing of Claytonia lanceolata var. flava.  
(Reproduced from Hitchcock 1964)

APPENDIX 3.

Slides of Claytonia lanceolata var. flava from Montana and its Idaho habitat.

- Slide 1. Claytonia lanceolata var. flava. Note the golden yellow corolla.
- Slide 2. Claytonia lanceolata var. flava. Note the long, narrow leaves.
- Slide 3. Claytonia lanceolata var. lanceolata. Note the wide leaves and white corolla. This plant was growing with the yellow springbeauty photographed in Slides 1 and 2.
- Slide 4. Overview of Claytonia lanceolata var. flava habitat at Henry's Lake. The Staley Springs population occurs at the edge of the lake in the center of the photograph. The Henry's Lake Mountains rise in the background.
- Slide 5. Overview of the Staley Springs Claytonia lanceolata var. flava habitat at the mouth of Timber Creek. The population occurs at the edge of the Carex meadow along the edge of Henry's Lake. The Centennial Mountains rise in the background.
- Slide 6. Claytonia lanceolata var. flava habitat at Staley Springs. The population occurs in the Artemisia cana ssp. viscidula stand in the center of the photograph. The Henry's Lake Mountains rise in the background.

APPENDIX 4.

Maps of Claytonia lanceolata var. flava distribution.

- Map 1. Overview of the distribution of known populations in Idaho, Montana, and Wyoming.
- Map 2. Overview of the distribution of the Idaho population.
- Map 3. Map of the Staley Springs population. Portion of the 1964 USGS Targhee Peak 7.5' topographic quadrangle.

APPENDIX 5.

Occurrence record for Claytonia lanceolata var. flava population in Idaho.

APPENDIX 6.

Maps of areas searched unsuccessfully for Claytonia lanceolata var. flava in the Henry's Lake - Island Park area, Idaho, during May 1988.

Map 1. Portion of the Targhee National Forest 1984 map.

Map 2. Portion of the Targhee National Forest 1984 map.

Map 3. Portion of the Targhee National Forest 1984 map.

APPENDIX 7.

Status Survey for Claytonia lanceolata var. flava in Wyoming (Marriott 1986).

APPENDIX 8.

Status Survey for Claytonia lanceolata var. flava in Montana (Shelly 1989b).