FIELD INVESTIGATION OF *ALLIUM VALIDUM* (TALL SWAMP ONION), A REGION 4 SENSITIVE SPECIES, ON THE BOISE NATIONAL FOREST.

by

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ABSTRACT

A field investigation of Allium validum (tall swamp onion) was carried out in the mountains of the southern Boise National Forest by the Idaho Department of Fish and Game's Natural Heritage Program. The investigation was a cooperative Challenge Cost-share project between the Department and the Boise National Forest.

Tall swamp onion, a Region 4 Sensitive Species, occurs sporadically at subalpine elevations in the mountains of west-central Idaho, where it is on the eastern edge of its range. It is more common in the Cascade Range, Sierra Nevada, and portions of the Coast Ranges.

Data gathered during this investigation reveal that tall swamp onion is rare on the Boise NF, found only in the Trinity Mountain area of the Mountain Home Ranger District (three small populations) and around Pilot Peak (two extensive populations) on the Idaho City Ranger District. Known populations occur between 6800 and 8100 feet in elevation, occupy approximately 20 acres in meadows or along small- to moderate-sized creeks, and consist of over 1000 genets. Extensive searches in other areas were unsuccessful.

Three populations appear vigorous while two populations appear to be impacted by sheep grazing and recreational disturbance.

Several recommendations are made relative to the long-term conservation of tall swamp onion on the Boise NF, including further areas to survey, a monitoring program, and ways to mitigate ongoing disturbance.

TABLE OF CONTENTS

LIST OF APPENDICES

INTRODUCTION

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service sensitive species list.

Allium validum (tall swamp onion) is on the Region 4 Sensitive Plant Species List for the Boise NF (USDA Forest Service 1988). A field investigation of tall swamp onion was conducted in July and August 1989, on the southern half of the Boise NF by the Idaho Department of Fish and Game's Natural Heritage Program through the Cooperative Challenge Cost-share Program. A similar project was also completed in 1989 on the Nez Perce NF.

The primary objectives of this investigation were as follows:

1) Survey the two known populations of Allium validum in the Trinity Mountain area and search potential habitats on the Boise NF for new populations.

2) Characterize habitat conditions for known populations.

3) Assess population trends and threats to existing populations and make management recommendations to the forests based on these assessments.

Allium validum Wats.

CURRENT STATUS USFS Region 1 Sensitive Species (Nez Perce NF)
USFS Region 4 Sensitive Species (Boise NF)
USFWS - None
Idaho Native Plant Society - Sensitive
Heriteg Rank - G4 S2

TAXONOMY

Family: Liliaceae (Lily)

Common Name(s): Tall swamp onion, Pacific onion, swamp onion

Citation: Watson, S. 1871. In: King, U.S. Geological Exploration of the 40th Parallel 5:350

Technical Description: Bulb elongate, 1 to 1.5 cm thick, terminating a thick Iris-like rhizome, inner coats reddish purple or whitish, outer coats brownish, membranaceous, minutely striate with elongate cells in regular vertical rows, not fibrous-reticulate, but with coarse, persistent, parallel fibers; leaves several, plane, obtuse, entire, 4 to 15 mm broad, shorter than the scape, green at anthesis, persistent at maturity; scape 3 to 7 dm tall, flattened and narrowly winged toward the apex; bracts of the spathe 2, united at base, membranaceous, broadly ovate, acute, 5- to 7-nerved; umbel several- (15- to 30-) flowered, pedicels slender, about equalling the perianth at anthesis, elongating and becoming stout in fruit; perianth segments 8 to 10 mm long, narrowly lanceolate, acuminate, entire, pink, withering in fruit, the midribs scarcely thickened; stamens much exceeding the perianth in length, filaments broadly dilated below and united into a cup at the base, anthers oblong, obtuse, purplish or yellowish; ovary crestless, style subulate, exerted, stigma capitate, entire, capsules mostly longer than broad, valves oblong, barely emarginate, seeds correspondingly long and slender, dull black, alveoli not pustuliferous (Ownbey 1950).

Nontechnical Description: As its common name indicates, tall swamp onion is relatively tall for a native onion, with the scape being from 3 to 7 dm tall, and it grows in subalpine wet meadows and seeps. Tall swamp onion has a thick Iris-like rhizome, in addition to the starchy bulb found in most Allium species. It forms dense clumps in sedge-dominated wet meadows and is easy to distinguish from surrounding vegetation, even in a vegetative state, by its flat, succulent, relatively wide, light green leaves. A capitate cluster with many bright pink flowers usually stands above the surrounding, mostly graminoid vegetation. Tall swamp onion flowers between mid-July and September.

Distinguishing Features and Similar Species: In Idaho, tall swamp onion is likely to be confused only with Allium brevistylum, which is smaller in stature and has stamens only half as long as the perianth segments. Allium brevistylum also differs by having a short style with a trifid stigma, and its capsules are broader than long with cordate valves, and shorter, thicker seeds, the alveoli on which are usually pustuliferous (Ownbey 1950).

DISTRIBUTION

Range: Tall swamp onion occurs at medium and high elevations in the mountains of west-central Idaho, eastern Oregon and northeastern Nevada; in the Cascade Range from southern British Columbia, southward to northern California; in the Sierra Nevada as far south as Sequoia National Park; and in the Coast Ranges of southwestern Oregon and northwestern California.

In his monograph of Allium in Idaho, Ownbey (1950) listed two collections of tall swamp onion from the Trinity Mountain area of the Boise NF and one from the upper Hornet Creek drainage in the Cuddy Mountains of the Payette NF. Steele (1981) mentioned the Trinity Mountain area and the Selway River drainage of the Nez Perce NF as being known sites of tall swamp onion in his treatment of the species for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council. Recent herbarium searches found another specimen from the Hornet Creek drainage (see Map 1 in Appendix 2 for an overview of the distribution of tall swamp onion in Idaho).

As a result of this Challenge Cost-share project, I found tall swamp onion to be distributed on the Boise NF in the Trinity Mountain area of the Mountain Home Ranger District (three small populations) and around Pilot Peak (two extensive populations) on the Idaho City Ranger District (see Appendix 2 for maps of known populations of tall swamp onion on the Boise NF; see Appendix 3 for demographic data for the Boise NF populations). I found no other population in suitable-appearing habitat in mountains immediately west of the Trinity Mountain area or to the north and northwest, in mountains between the Trinities and the Middle Fork of the Boise River (see Appendix 4 for maps of areas unsuccessfully searched for tall swamp onion on the Boise NF).

Habitat and Associated Species: I found tall swamp onion to occur in three distinct habitats in the subalpine zone of the southern Boise NF:

1. Around small forested seeps in the Abies lasiocarpa/ Caltha biflora habitat type (Steele et al. 1981). It occurred in low density and did not form large clumps as it does in open-canopy habitats. Associated species in this habitat include Senecio triangularis, Saxifraga arguta, Polygonum bistortoides, Pedicularis bracteosa, Cardamine cordifolia, and Mimulus lewisii. The Upper Smith Creek population occurs in this habitat, as does several outlying individuals of the Summit Flat population.

2. Carex scopulorum-dominated wet meadows in glaciated basins. The Abies lasiocarpa/Calamagrostis canadensis habitat type, Ledum glandulosum phase (Steele et al. 1981), occurs adjacent to these meadows, with an overstory of A. lasiocarpa, Picea engelmannii, and Pinus contorta. Associated species in the meadows include Caltha biflora, Dodecatheon jefferyi, Polygonum bistortoides, Salix commutata, Pedicularis groenlandicum, Polemonium occidentale, Senecio triangularis, Ribes hudsonianum, Aconitum columbianum, Ranunculus alismaefolius, Corydalis caseana var. cusickii, Cardamine cordifolia, Saxifraga arguta, Veratrum californicum, Potentilla flabellifolia, and Erythronium grandiflorum. The Upper Mores Creek, Big Trinity Lake, Big

Rainbow Lake, and most of the Summit Flat populations occur in this habitat.

3. Along moderate-size creeks in the Abies lasiocarpa/ Streptopus amplexicaulis habitat type, Streptopus amplexicaulis phase (Steele et al. 1981). This rather narrow, linear habitat is restricted to stream margins. Associated species include Dodecatheon jefferyi, Ligusticum canbyi, Polygonum bistortoides, Salix commutata, Pedicularis groenlandicum, Polemonium occidentale, Senecio triangularis, Ribes hudsonianum, Aconitum columbianum, Corydalis caseana var. cusickii, and Cardamine cordifolia. The lower portion of the Summit Flat population occurs in this habitat.

CONSERVATION STATUS

Conservation History - Idaho: Bob Steele (1975) first recognized that tall swamp onion had a limited distribution in Idaho, in his catalogue of disjunct and endemic plants in central and southern Idaho. In his treatment of the species as part of the rare plant project of the Idaho Natural Areas Council (Steele 1981), he recommended that it be placed on the State Watch List for Idaho, remarking that it has a limited distribution in the state but does not appear to be threatened. He does note, however, that substantial increases in road construction and recreational impacts may eventually jeopardize at least two of the known populations.

Tall swamp onion was placed on the Region 1 and 4 Sensitive Species Lists based on this recommendation. It is currently considered a Sensitive species for Idaho by the Idaho Native Plant Society (Idaho Native Plant Society 1989). The Sensitive category of the Idaho Native Plant Society list refers to taxa with "small populations or localized distributions within Idaho that presently do not meet the criteria for classification as Priority 1 or 2, but whose populations and habitats may be jeopardized if current land use practices continue".

The Idaho Natural Heritage Program currently ranks tall swamp onion as G4 S2 (G4 = apparently secure globally, S2 = imperiled in Idaho because of rarity or because of other factors demonstrably making it very vulnerable to extirpation from the state).

Conservation History - Elsewhere:

OREGON - Tall swamp onion was listed as rare in Oregon by the Oregon Rare and Endangered Plant Species Taskforce in the mid-1970's (Meinke 1978). It is no longer considered rare in Oregon (Oregon Natural Heritage Data Base 1989).

BRITISH COLUMBIA - Tall swamp onion is considered rare in British Columbia by the British Columbia Rare Plant Program (Straley et el. 1985). It is classed as an R1 rare species in British Columbia, which is defined as "plant taxa that are represented by a single or few known populations, usually with only a few individuals in the populations."

Ownership: All tall swamp onion populations observed during the course of this cooperative project occur on land administered by the Boise NF.

Although it has not been relocated, the Selway River population probably occurs on the Nez Perce NF. The two historical collections from the Cuddy Mountains are both on the Payette NF.

Threats: All known tall swamp onion populations on the Boise NF occur in areas that have been extensively grazed by sheep in the past. Tall swamp onion, being large and relatively succulent, is probably highly palatable to sheep; most Allium species are. Only the two populations in the Trinity Mountain recreation area, Big Rainbow Lake and Big Trinity Lake, are not currently grazed.
The Big Trinity Lake population, consisting of about 20 genets (genetically identical groups of stems produced by the rhizome), occurs immediately adjacent to a pullout for camping on the west shore of Big Trinity Lake. Much of the area encompassed by the population has been impacted by recreational activity associated with camping and fishing. Several trails traverse the population, and in July 1989, several genets had been partially trampled. Some of the population may have been destroyed during road and/or camp pullout construction.

Management Implications: Tall swamp onion propagates both sexually and vegetatively. The contribution made to population recruitment by sexually reproduced propagules is unknown, but is probably low in the closed communities inhabited by tall swamp onion. The short, stout rhizomes form dense clumps that may be relatively resistant to repeated defoliation by herbivores and trampling by herbivores and/or recreationists.

A population of tall swamp onion was first observed at Big Trinity Lake in 1910, when J.F. Macbride collected a specimen. It is assumed that the Big Trinity Lake population located in this study is the same. Therefore, it has persisted there for over 80 years. The population is currently being highly impacted by recreationists, an impact that has probably increased significantly in the last 20 years and is projected to increase further in the next decade. Although tall swamp onion appears to have a certain degree of resistance to trampling, the prognosis is that it will have a negative, long-term impact on population viability at Big Trinity Lake. The Big Rainbow Lake population is somewhat removed from foot traffic around the lake, being about 30 feet back from the lakeshore.

Sheep grazing may be significantly impacting the Upper Smith Creek population, as only two to three genets were observed in a very localized area of the drainage. Although the area is grazed each summer, the Summit Flat and Upper Mores Creek populations are relatively extensive and appear viable.

ASSESSMENT AND RECOMMENDATIONS

Summary: Tall swamp onion remains a relatively rare species on the Boise NF. Two historical collection sites were relocated during the coarse of this investigation and three new populations were discovered. Tall swamp onion occurs in meadows and along small- to moderate-sized creeks in the subalpine zone in two areas of the southern Boise NF: the Pilot Peak and Trinity Mountain areas. Searches in similar-appearing habitats of adjacent areas were unsuccessful. Known populations occur between 6800 and 8100 feet in elevation, occupy approximately 20 acres

and consist of over 1000 genets.

The Big Rainbow Lake population appears little disturbed by human-impacts. The Big Trinity Lake population has been and is continuing to be impacted by recreational activities. The Upper Smith Creek population is very small and may be affected by sheep grazing. Both the Summit Flat and Upper Mores Creek populations are grazed by sheep, but appear stable.

Recommendations to Boise National Forest: In light of data gathered during this investigation, I have the following recommendations for the Boise NF relative to the long-term conservation of tall swamp onion:

1. Similar habitats on the southern Boise NF as those described in this report should be checked by knowledgeable field personnel for additional populations. Most of my survey concentrated in the Trinity Mountain area, where the known populations were. Minimal time was spent on the Idaho City Ranger District. Further searches on this District around Pilot Peak, Thorn Butte and Sunset Mountain would be useful. Other areas to search include the Swanholm Peak area, the Sawtooth Wilderness, and possibly the Scott Mountain - Deadwood Reservoir area.

Newly located populations should be documented and the location information should be submitted to the Regional Botanist and to the Idaho Natural Heritage Program for entry into their permanent data base on sensitive species.

2. Because it is probably palatable to livestock, managers should assess the effect of allotment management activity on tall swamp onion populations in suitable habitat on the Boise NF. Surveys should be performed in likely habitats and monitoring programs should be integrated into Allotment Management Plans.

3. The Big Rainbow Lake population is little disturbed and appears stable. This population should be visually monitored periodically for evidence of a downward trend.

4. Establish a quantitative, long-term monitoring program at the Upper Sheep Creek, Big Trinity Lake, Summit Flat, and Upper Mores Creek populations to determine the effects of ongoing, locally intense grazing and/or trampling on population viability.

5. Because the trampling effects are locally intense at the Big Trinity Lake population and may be affecting the long-term viability, the Mountain Home Ranger District should consider closing the camp pullout adjacent to the population.

Recommendations to the Regional Forester: Recent herbarium searches reveal the presence of populations of tall swamp onion on the Payette NF. Tall swamp onion should be added to the Sensitive Plant Species List for the Payette and a status survey should be conducted there as soon as practicable.

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Appendix I

Line drawing of *Allium validum*
(from Ownbey 1969).

Appendix II

Distribution of *Allium validum* in Idaho.

Map 1. Overview of the distribution of *Allium validum* in Idaho.

Map 2. Portion of Boise National Forest map (1987) showing the distribution of *Allium validum* on the Boise National Forest.

Map 3. Portion of 1964 Trinity Mtn 7.5' quadrangle showing location of Upper Smith Creek, Big Trinity Lake, and Big Rainbow Lake populations.

Map 4. Portion of 1972 Sunset Mtn 7.5' quadrangle showing location Summit Flat and Upper Mores Creek populations.

APPENDIX III

Demographic data for the five Boise National Forest
Allium validum populations.

1. Big Trinity Lake

   a. Location:
   b. Area: 0.25 ac.
   c. Number of plants: Approximately 20 genets in 1989.
   d. Density: Scattered.
   e. Evidence of expansion/contraction: Road and camp pullout construction may have eliminated some of the population; ongoing trampling by recreationists impacting population.

2. Big Rainbow Lake

   a. Location:
   b. Area: O.5 ac.
   c. Number of plants: Approximately 200 genets in 1989.
   d. Density: Locally high with a few scattered on periphery.
   e. Evidence of expansion/contraction: No evidence; appeares stable.

3. Upper Smith Creek

   a. Location:
   b. Area: Approximately 4 square yards.
   c. Number of plants: 3 genets in 1989.
   d. Density: High; all three genets occur together.
   e. Evidence of expansion/contraction: No evidence.

4. Summit Flat

   a. Location:
   b. Area: Approximately 10 ac.
   c. Number of plants: Several hundred genets in 1989.
   d. Density: High
   e. Evidence of expansion/contraction: No evidence; appears stable.

5. Upper Mores Creek

   a. Location:
   b. Area: Approximately 10 ac.
   c. Number of plants: Several hundred genets in 1989.
   d. Density: High.
   e. Evidence of expansion/contraction: No evidence; appears stable.

APPENDIX IV

Maps of areas unsuccessfully searched for
Allium validum on the Boise National Forest in 1989.

Map 1. Portion of 1964 Cayuse Point 7.5' quadrangle - upper Yuba River area.

Map 2. Portion of 1972 Phifer Creek 7.5' quadrangle - basins north of Steel Mountain.

Map 3. Portion of 1964 Rocky Bar 7.5' quadrangle - Dismal Swamp.

Map 4. Portion of 1964 Little Trinity Lake 7.5' quadrangle - Trinity Lakes area.

Map 5. Portion of 1964 Trinity Mt 7.5' quadrangle - Trinity Lakes area.

Map 6. Portion of 1964 Trinity Mt 7.5' quadrangle - upper Smith Creek area.

Map 7. Portion of 1964 Prairie 7.5' quadrangle - North Star Lake area.

Map 8. Portion of 1972 Sunset Mtn 7.5' quadrangle - Upper Mores Creek area.

APPENDIX V

Slides of *Allium validum* and habitat.

1. *Allium validum* close-up. Note exerted stamens.

2. *Allium validum* close-up.

3. *Allium validum* excavated plants. Note rhizome and succulent green leaves. Pen is approximately six inches long.

4. Big Rainbow Lake population - The pink inflorescences of *Allium validum* can be seen in *Carex scopulorum* stand at edge of lake.

5. Big Trinity Lake population - *Allium validum* occurs beyond boulders. Trails can be seen traversing population; several trampled individuals occur in right-center of photo. Boulders delimit the edge of the camp pullout.

6. Summit Flat population - *Allium validum* occurs in dense vegetation bordering Grimes Creek in *Abies lasiocarpa*/*Streptopus amplexicaulis* habitat type.

7. Summit Flat population - *Allium validum* (non-flowering) is visible in center of photo as a patch of green clumps. *Ranunculus alsimaefolius* is yellow-flowered plant surrounding *Allium* patch.