

REPORT ON ALLIUM
COLUMBIA BASIN SCIENTIFIC ASSESSMENT PROJECT

BY

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Allium is a primarily north temperate genus of between 600 and 700 species (Stern, 1991). In North America the genus is represented by 84 species. As a general rule the species in the new world have a base chromosome number of $x = 7$ while those in the old world are $x = 8$ or 9. Only two species in North America, Allium schoenoprasum L. and A. tricoccum D. Solander are of the $x = 8$ group and A. schoenoprasum is the only species in common between the old world and the new.

Allium has been present in North America since at least the Tertiary (Raven & Axelrod, 1978) and has been subject to distributional displacement due to climatic changes several times during this period. At present the centers of distribution of the genus are thought to be the California Floristic **Provence** with about 44 species and Texas with about 14. The Western United States, particularly the states of Washington, Oregon, and California have by far the largest concentration of species, with 60 of the 84 North American species occurring within their boundaries.

All Allium species are cryptophytes, arising from underground bulbs which, in a few cases are attached to rhizomes. In the vast majority of species in the western U.S. vegetative growth occurs in the late winter or early spring, often under the snowpack: Flowering occurs shortly after **snowmelt** and seed set is complete before the soil dries out in the late spring or early summer. These species are dormant for most of **the summer** dry period common to much of the region. A few species (ie. A. brevistylum S. Watson, A. cernuum Roth, and A. validum S. Wats.) occurring in the Columbia Basin Scientific Assessment region are winter dormant, initiating vegetative growth in the spring and flowering in mid to late summer.

There are 31 species and two varieties native to the CRB (Table I). The Allium species in the assessment region can be divided into three groups based on geographic distribution: 1) species endemic to the area (Table I), 2: species with their center of distribution in the assessment region that extend outside the area (Table II), 3: species with their center of distribution outside the assessment region that extend into the area (Table III)

There are 13 species of Allium endemic to the assessment region ranging from the very narrowly distributed A. dictuon and A. tolmiei var. persimile to a number of more broadly distributed species. It is, perhaps notable that, with regard to Allium there are no real "hot spots" of endemism. at least one endemic species can be found within almost any area in the region, with the exception of the southern portion from Malheur Co., Oregon and across southern Idaho. Three species that are endemic to the assessment region occur exclusively or mainly on lands not administered by the Forest Service or the Bureau of Land Management. These are Allium constrictum, which is restricted to Steamboat Rock and the upper portion of Grand Coulee on the Columbia River in Grant, Lincoln and Douglas Counties, Washington. The Steamboat Rock area is administered as a Washington State Park. Allium robinsonii occurs on sand and gravel deposits on old terraces of the Columbia River from Vantage, Washington to the Mouth of the John Day River in Oregon.' As near as I have been able to determine this area is not administered by FS/BLM. The species is also reported from the Thirteenmile Creek area in The Colville National Forest in Ferry co., Washington Finally the majority of the range of Allium aaseae falls outside the purview of the BLM and no populations are known from Forest Service lands.

The following is a list of major species for the Columbia Basin Assessment Region. The species listed were selected either because they are widespread in the region with a large number of known populations and/or because they are species that are being recommended for individual assessment (*).

<u>Allium aaseae</u> *	
<u>Allium acuminatum</u>	
<u>Allium anceps</u> *	
<u>Allium bisceptrum</u> *	
<u>Allium brandesei</u> *	<u>Allium tolmiei</u>
<u>Allium brevistylum</u> *	var. <u>tolmiei</u> *
<u>Allium dictuon</u> *	var. <u>persimile</u> *
<u>Allium cernuum</u> *	<u>Allium validum</u> *
<u>Allium columbianum</u>	
<u>Allium constrictum</u> *	
<u>Allium douglasii</u>	
<u>Allium fibrillum</u> *	
<u>Allium lemmonii</u>	
<u>Allium macrum</u>	
<u>Allium madidum</u> *	
<u>Allium nevia</u> *	
<u>Allium punctum</u> *	
<u>Allium robinsonii</u> *	
<u>Allium schoenoprasum</u>	
<u>Allium scilloides</u>	
<u>Allium simillimum</u>	

Of the species listed on the preceding page I suggest the following be assessed individually. NOTE: Generally it is not possible to assign an ecological role or function to these species. All are primary producers, as all are green plants. I have observed evidence of grazing, particularly on larger species and have, occasionally, seen large masses of bulb material sequestered by rodents or other small mammals. Burrowing mammals also are known to consume bulbs. No data is available to allow me to even estimate how important a food source Allium species may represent.

In most cases there are probably other environmental correlates in addition to those **suggested** on the Plant Panel Species Information form, however these are not obvious and most of the species have never been investigated to determine other possible correlates.

There is not enough data available to allow any speculation as to whether any of these species would be good bioindicators or measures of biodiversity. In fact as cryptophytes many of these species are insulated from various forms of disturbance (ie. fire and other surface disturbance) for much of the year owing to their prolonged dormant period.

Allium aseae M. Ownbey

Allium aseae is a rare early spring (mid-March through April) flowering species found on the Glenn's Ferry formation along the Boise Front, Ada County, Idaho. It is currently known from a number of populations extending from the Fort Boise Military Park' to Freezeout Hill southeast of Emmett in Gem County. A single, disjunct population is known from the Rebecca Sand Hill Research Natural Area (BLM) just east of Wieser, Washington County.

Rarity, both of the species and of the substrate on which it grows is the chief reason for assessing this species. This is combined with the fact that much of the habitat is privately held and subject to extreme pressure from housing development in the Boise area and from grazing and sand mining in other parts of the range.

Associated cover species include Purshia tridentata, Artemisia tridentata, Agropyron spicatum, Aristida lonsiseta, Stipa a t a, Bromus tectorum, Balsamorhiza sasittata and Brodiaea douglasii. This cover corresponds to SRM 314 or 317.

Allium aseae is apparently sensitive to any disturbance that disrupts the soil profile. It apparently requires the coarse, sandy substrate, overlying a clay layer that is found along the Boise Front. Disturbance that results in a mixing of the sand/clay layers makes it impossible for the species to

survive.

Long term population trends will likely be down. Habitat is being destroyed along the Boise Front by housing development. Away from urban areas livestock grazing and sand mining are also taking a toll.

Dispersal: Pollen dispersed by insects including Apis mellifera and several species of solitary bees; Seed dispersal in Allium aaseae is likely due to release of seed for the fruit, the seed drops to the ground and is either **washed down** slope or moves by gravity. There is no evidence of animal dispersal.

Data from the Idaho Department of Fish and Game indicates that Allium aaseae is frequently associated with two other rare species in its range: Astragalus mulfordii and Lepidium papilliferum.

Allium anceps S. Watson

The center of distribution of Allium anceps is along the Oregon-Nevada border extending south along the eastern base of the Sierra Nevada and into the Ranges in eastern Nevada. To the north, **it** has been recorded from Twin Falls and Cassia Counties in southern Idaho and in Lake, Harney and Malheur Counties in Oregon. There is a substantial disjunction **in** the known range from western Malheur Co. to Twin Falls County. This disjunction is possibly accounted for by a lack of collections in the area in question or, perhaps, a lack of collections at the right time of the year. Allium anceps is an early blooming species and can be looked for anytime after the end of March.

Individual assessment is recommended due to the limited distribution of A. anceps in the CRB and the disjunct distribution. The only possible threat is due to cattle grazing and this is probably minor because of the early blooming and seed set of the species.

Associated species include Artemisia tridentata, Canbya aurea, Scutellaria nana, Lupinus uncialis, and Juniperus occidentalis. The communities correspond to SAF 238, Juniper and SRM 401, Great Basin Big Sagebrush.

Ecological role or function: unknown

Sensitivity to disturbance: unknown

Trends: **unknown**, populations appear stable

Dispersal mode: Pollination: various insects including bumblebees and honeybees (Apis mellifera). Seeds: wind

dispersed, the **scapes** break off at ground level at about the same time the seeds mature and the capsules dehisce. **Scape** and umbel are blown across the soil surface in a "tumbleweed" fashion, dispersing the seeds.

Allium bisceptrum S. Watson

Known from populations in Twin Falls and Idaho Counties, but there are persistent reports of occurrences in eastern Oregon. All of the Oregon specimens I have seen belong to Allium camnanulatum a distinct, but closely related species. It is also reported to occur in Klamath Co. in southern Oregon. This is a, summer (June-July) blooming species and, give its large disjunction in the CRB and reports of its occurrence in Oregon it **should be** assessed in Central Idaho and eastern Oregon for **occurrence** and distribution.

Associates: unknown. In Twin Falls County A. bisceptrum is known from the Shoshone Falls area which falls within the Wyoming Big Sagebrush community (SRM 403) and the Interior Ponderosa Pine, community (SAF 237) and should be looked for in the Grand Fir (SAF 213) and Interior Douglas Fir (SAF 210) communities. The species will often be found in open meadows within these communities or in aspen groves mixed into them.

Ecological function or role: unknown, possible food source for grazing animals.

Sensitivity to disturbance: unknown

Trends: unknown

Dispersal mode: Pollination, insects.. Seeds unknown.

Allium brandesei S. Watson: Allium fibrillum M. E. Jones:
Allium tolmiei J. G. Baker var. tolmiei

I suggest these three species for treatment only in the area where their ranges overlap. This area includes the Seven Devils Mountains in Adams and Washington Counties in western Idaho and the **Wallowa** Mountains in eastern **Wallowa** and northern Baker Counties, Oregon. Ownbey (1950) suggested that there was possible hybridization between A. brandesei and A. tolmiei var tolmiei in the Seven Devils Mountains and stated that for this reason some individual specimens from the area were impossible to assign to a species. Similar difficulties exist in eastern Oregon distinguishing specimens of A. fibrillum from A. brandesei. Hybridization is rare in North American species of Allium so these possibilities should be investigated. In other

parts of the extensive ranges of these three species, there is no problem in distinguishing any of these species. As a result I suggest limiting treatment of the three to the area of distributional overlap.

The area where putative hybrids occur is characterized by association with Pseudotsusa menziesii and Pinus ponderosa. This corresponds to the SAF Interior Douglas Fir cover type. The plants themselves apparently occur mostly on open scab areas on slopes or ridgetops.

Ecological function or role: unknown

Sensitivity to disturbance: unknown

Trends: stable

Dispersal mode: Pollination, unknown, probably solitary and social bees (Apis mellifera) and other insects. Seeds, unknown, probably wind dispersal of the "tumbleweed" type previously discussed.

Allium brevistylum S. Watson: Allium validum S. Watson

These species do not occupy the same range, however both are basically riparian species, found mainly in swampy meadows at mid- to subalpine elevations. Allium brevistylum is a Rocky Mountain species occurring from western Montana to northeastern Idaho. Allium validum is a Sierrian-Cascade species found in similar habitats in the mountains of Southwestern Idaho, eastern Oregon and in the Cascades of Western Oregon and Washington. In their ranges, both species are uncommon. Both are more widespread and common outside the CRB.

Riparian communities tend to be subject to strong pressures from grazing, both by native herbivores and by cattle and horses. Both species are summer growing and hence would likely be affected by grazing. Allium validum, in particular, tends to grow in large clumps and could be quickly extirpated from an area by overgrazing (It should be noted that there are several records in the veterinary literature of a fatal form of anemia developing in horses and cattle from heavy consumption of this species).

Both species are found almost exclusively on either Forest Service or BLM administered lands in the CRB.

Associated cover species include Picea enselmanii, Pinus contorta, Abies lasiocarpa, Salix spp, Populus tremuloides, and Carex spp. corresponding to SAF 206, 217 & 218. However both species will normally be found in openings in the forest canopy, frequently in swampy areas dominated by willows (Salix spp.)

Other associated species for A. brevistylum include Moneses uniflora, Pyrola asarifolia and Habenaria obtusata.

Ecological function: unknown except as a forage plant for grazing animals.

Sensitivity to disturbance: Unknown, probably sensitive to overgrazing.

Trends: Unknown

Dispersal Modes: Pollination unknown, probably solitary and social bees (Apis mellifera) and other insects. Seeds: unknown possibly by down slope water movement.

Allium dictuon H. St. John

Allium dictuon is the rarest Allium species in the CRB. It is currently known from only six small populations in a 1-2 square mile area to the north and west of Weller Butte, Umatilla National Forest, Blue Mountains, Columbia Co., Washington, at T.6, R41E, Section 5, and T7N, R41E, Sections 32 & 33. Again individual assessment is warranted because of the extreme rarity and very limited distribution.

Allium dictuon is associated with relatively shallow soils along the lower margins of basalt outcrops in the area stated. Its plant associates have not been recorded but it seems to be associated with Pinus nonderosa in mixed stands with Pseudotsusa menzesii. The SAF classification could be either 210 or 237.

Ecological role: unknown

Sensitivity to disturbance: Unknown

Trends in populations: unknown, but apparently stable.

Dispersal mode and requirements: Pollination, unknown, probably solitary and social bees (Apis mellifera) and other insects. Seeds, unknown possibly down slope movement due to gravity or water.

Allium constrictum (Ownbey & Mingrone) Peterson, Annable & Reiseberg Synonym: Allium douglasii Hooker var. constrictum Ownbey & Mingrone

This is the second rarest Allium species in the CRB. It is known from the top of Steamboat Rock in the Upper Grand Coulee, Grant Co. and along the margins of Grand Coulee to the northwest

and south in Douglas and Lincoln counties, Washington. It occurs on shallow, sandy, rocky soils

Commonly associated species include Artemisia tridentata and Poa secunda. I cannot determine which category in the SRM classification this species association fits. It falls into the northern portion of the Intermountain Semi-desert Province and the Lava Plateau (3421) section.

Steamboat Rock is a Washington State Park and hence protected, other sites of occurrence are, apparently, privately held. It seems likely that the chief threats to Allium constrictum are foot traffic trampling the plants, grazing and botanists collecting specimens. It seems certain that there are sufficient specimens in herbaria for study and further collecting should be limited and justified in terms of research proposals.

Ecological role or function: unknown

Sensitivity to disturbance: unknown

Trends: unknown, as recently as 1985, Allium constrictum was reported only from the top of Steamboat Rock. New populations have been reported in Grant, Lincoln and Douglas counties within the past few years. These new reports probably represent newly discovered populations rather than any extension of the formerly known range.

Dispersal mode and requirements: Pollination, unknown, probably solitary and social bees (Apis mellifera) and other insects. Seeds, unknown possibly down slope movement due to gravity or water.

Allium madidum S. Watson

Allium madidum is tends to be found associated with seeps, streambanks and vernal moist depressions in Grant, Wheeler and Umatilla Counties, Oregon, it is then disjunct to Adams and Valley Counties, Idaho. The disjunction is also associated with different chromosome numbers.' All known Oregon populations are tetraploid ($n = 14$), all Idaho populations are hexaploid ($n = 21$). Based on morphology I believe that A. madidum is a polyploid derivative of A. fibrillum ($n = 7$) but, this has not yet been confirmed with biochemical tests.

Individual assessment is recommended because of the fragile nature of the habitat and because of the very limited distribution of the Idaho populations. All or most of the known populations occur on the Malheur, Ochocho and Umatilla National forests in Oregon. In Idaho populations are known from the, Payette National Forest as well as from private lands around New Meadows and McCall.

Allium madidum is found in moist clay soil in openings in Interior Ponderosa Pine (SAF 237) forests. Associated species include Pinus nonderosa, Pinus contorta, Abies grandis, Pseudotsusa menziesii, Camassia cuamash, Claytonia lanceolata, Allium brandesei, and Carex sdd.

Vernal pools and vernal moist areas are fragile because they tend to occur in open grassland or in openings in the forest canopy. In forest areas these openings may be fenced for livestock holding. Clearings of this type are often used for temporary log storage..

Ecological role or function: unknown

Sensitivity to disturbance: unknown. Sensitivity to disturbance will be much higher during the growing season than when dormant. In other words temporary log storage during the dormant season will probably have little effect. During the actively growing season it would probably result in the death of the directly affected plants. Any disturbance that changes drainage patterns or seasonal water relations will be detrimental to the effected population.

Trends: apparently stable, a recent survey of Idaho populations showed that most historical populations to be intact and discovered several that were previously unknown.

Dispersal modes: Pollination, unknown, probably solitary and social bees (Apis mellifera) and other insects. Seeds: unknown, possibly water.

Allium nevii S. Watson Synonym: Allium douglasii Hooker var. nevii (S. Watson) Ownbey & Mingrone

Allium nevii is found in vernal wet depressions in the eastern foothills and along the eastern plains adjacent to the Cascade Range from Jefferson Co. Oregon to the Wenatchee Mountains in Kittitas Co., Washington.

'Individual assessment is recommended because of the fragile nature of the habitat and the fact that all or most of the habitat isprivately held or in state control. The recent collections from Jefferson Co., Oregon are in the Deschutes National Forest. A few populations are known from the Snoqualmie National Forest, Washington. Other collection sites are on the Warm Springs Indian Reservation, Oregon and the Yakima Reservation, Washington

Vernal pools and **vernally moist** areas are fragile because they tend to occur in open grassland or in openings in the forest canopy. These sites are often plowed on agricultural lands. In

forest areas they may be fenced for livestock holding. On the Jefferson County, Oregon site the area was being used as a parking lot for fire **control** vehicles, causing soil compaction and possibly petroleum contamination. Clearings of this type are often used for temporary log storage. Any disturbance that changes drainage patterns or seasonal water relations will be detrimental to the effected population.

The species is most often associated with grasslands of the Valley grassland type (SRM 215) or similar type. Some of these have largely been converted to agricultural use, eliminating historical populations.

Associated species: unknown, these have generally not been noted on herbarium records. These types of vernal moist areas often harbor rare plants, insects and amphibians, hence there may be a suite of species that associated with these habitats that will need to be assessed.

Ecological function or role: unknown, possibly a food source for grazing animals.

Sensitivity to disturbance:- unknown, this will undoubtedly depend on the timing and type of disturbance. Grazing, log storage or even vehicle parking are unlikely to have a severe impact if the activities occur during the dormant period. However, any of these activities will have a deleterious impact if they occur during the season when active growth is occurring. Any cultivation that results in soil disturbance to a depth of 4-6 inches will probably extirpate the population and in any event competition from any agricultural crop, including forage grasses will likewise extirpate the population. Cultivation usually changes drainage patterns associated with vernal pools and thus eliminates the pool and its associated species.

Trends: unknown

Dispersal modes: Pollination, unknown, probably solitary and social bees (Apis mellifera) and other insects. Seeds, unknown, possibly water movement.

Allium punctum L. H. Henderson

Allium punctum is found from southwestern Malheur Co. to southeastern Lake Co. Oregon. It is suggested for assessment because of its rarity and limited distribution. It is known from only about a dozen localities in the southern CRB. It also is known from a single record in northern Humboldt Co., Nevada and a single collection from the Modoc National Forest in northwestern Modoc Co., California. This species, though more closely related to A. anceps and A. lemmonii, is often confused with A. parvum

and its rarity may be due to the lack of a thorough survey of the range of the species during the blooming period which extends from late April to early June. This species is primarily found on lands administered by the BLM and on the Hart Mountain National Antelope Refuge.

Allium punctum is generally found in more or less bare scab areas in the Basin Big Sagebrush Community (SRM 401). Its associates include Artemisia tridentata, Chrysothamnus vicidiflorus, Eriogonum ovalifolium, Poa sandbersii, Bromus tectorum, Stipa thurberiana, Agoseris glauca, Microsteris gracilis, Phlox hoodii, Phlox aculeata, and Canbya aurea.

Ecological role: unknown

Sensitivity to disturbance: unknown, one population at the North end of Alkali Lake, Lake Co., Oregon occurs in an area that was apparently disturbed years ago by the running of power/telephone lines. To date the onion is about the only plant that has successfully reinvaded or survived this disturbance. This suggests that this species may actually flourish in a circumstance where disturbance reduces competition from other plant species.

Trends: 'unknown

Dispersal mode: Pollination: unknown probably solitary and social bees (Apis mellifera) and other insects. Seeds: wind dispersed, the **scapes** break off at ground level at about the same time the seeds mature and the capsules dehisce. **Scape** and umbel are blown across the soil surface in a "tumbleweed" fashion, dispersing the seeds.

Allium robinsonii L. H. Henderson

Allium robinsonii is apparently restricted to the bottom lands and lower terraces along the Columbia River from the vicinity of Vantage, Kittitas Co., Washington to near the mouth of the John Day River, Sherman Co., Oregon. Above Vantage this **species is** reported from bald-ridges and knobs above Thirteenmile Creek, Ferry Co., Washington. The type locality of Allium robinsonii is, as near as I can determine, now a parking-lot below Interstate 30 at the mouth of the John Day River. All of **the specimens** I have seen from Oregon were collected prior to 1942, it is possible that the species has been extirpated in the state. It seems clear, in view of the substantial disjunction in known distribution, that it would be worthwhile surveying the Columbia River area between Vantage and the Ferry Co. populations during the blooming season (April to mid June) for additional populations.

Assessment is recommended for Allium robinsonii because of its rarity, its restricted and possibly threatened habitat and because of the large distributional disjunction noted above. Occurring-as it does on terraces and bottoms along the Columbia River, the species seems susceptible to habitat loss by agriculture, both cultivation and grazing, road building and possibly flood control and other water management activities.

The Ferry Co. populations are on the Colville National Forest. As near as I can determine none of the other historic populations **are** on Forest Service or BLM administered lands.

Because of the different habitat and large distributional disjunction, it would be worthwhile investigating the taxonomy of this species to insure that the Ferry County material is correctly identified (I have not seen these specimens nor visited the site to confirm the identification).

Ecological function or role: unknown

Sensitivity to disturbance: unknown except for parking lots.

Trends: possibly extirpated in Oregon and declining due to habitat loss in Washington.

Dispersal mode: Pollen: various insects including Apis mellifera and a number of solitary bees. Seeds: wind 'dispersed, the **scapes** break off at ground level at about the same time the seeds mature and the capsules dehisce. **Scape** and umbel are blown across the soil surface in a "tumbleweed" fashion, dispersing the seeds.

Allium tolmiei J. G. Baker var. persimile F. Ownbey

Allium tolmiei var. persimile is the hexaploid ($2n = 42$) variety of the Allium tolmiei complex. It is known from about, 22 populations and is restricted to the area at the south end of the Seven Devils Mountains around **Cuprum** and the Hornet Creek Ranger Station, Payette National Forest, Adams County, Idaho. Generally the species occurs in seasonally wet soils on hillsides. Only occasionally it is found on dryer slopes. A number of populations are on private lands within the Payette National Forest boundaries in the vicinity of the communities of **Cuprum** and Bear. Rarity and limited distribution lead to the suggestion that this variety be included for individual assessment.

At lower elevations Allium tolmiei var. persimile is found associated with Artemisia risida and Artemisia tridentata. At higher elevations it occurs in Openings in Pinus ponderosa/Pseudotsuga menziesii/Abies srandis forest. Close associates in moister habitats include Sisyrinchium inflatum, Trifolium

macrocephalum, Lomatium macrocarum, Camassia cuamash, Ranunculus oresterus, Antennaria luzuloides, and Sedum stenopetalum. In dryer situations the Associates are Purshia tridentata, Phvsaria oresana, Chaenactis douglasii and the rare species Crvotantha prooria.

Populations are not currently threatened, however threats from **grazing and** logging are possible. Logging in some instances might open up more habitat but road building associated with logging could damage or possibly extirpate some existing populations;

Ecological function or role:, unknown, subject to grazing by deer and other grazing mammals.

Sensitivity to disturbance: unknown, portions of several populations have been extirpated by road building activities. Concentration of cattle around hillside springs and streams could constitute a threat to some populations.

Trends: Most populations are apparently stable

Dispersal mode: Pollen: various insects including Apis mellifera and a number of solitary bees. Seeds: wind dispersed, the **scapes** break off at ground level at about the same time the seeds mature and the capsules dehisce. Capsules may dehisce earlier and some seeds fall to the ground surface where they may move by **water or** gravity. **Scape** and umbel are blown across the soil surface in a "tumbleweed" fashion, dispersing the seeds.

LITERATURE REVIEW

The first attempt to write an enumeration of the Allium species of the Pacific Northwest including the Columbia River Basin was Hooker's *Flora Boreali-Americana* (1840). This work describes two new species from the area, ~~Allium acuminatum~~ and A. douglasii. Allium douglasii is described as consisting of two varieties, alpha beta. Variety beta was later elevated to species status by J. G. Baker as Allium tolmiei (1876). In 1879 Sereno Watson published the last successful attempt at monographing the genus for all of North America. In this work a number of new species from the Columbia Basin are described. In all Watson recognized 20 of the species currently listed as occurring in the Columbia Basin. Marcus E. Jones (1902) attempted a monograph in which provisionally described ~~Allium fibrillum~~ though its valid description was left to Leroy Abrams (1923). 'Jones was an astute field botanist, however he had little time for the rules of nomenclature and his work is often confused. He did recognize the same 20 of the species listed by Watson and currently recognized for the Columbia Basin.

Beginning in the 1940's Marion Ownbey of Washington State University and a number of his students began publishing a series of papers encompassing Allium in the Columbia Basin. In 1948 Ownbey published a paper announcing the discovery of the three chromosomal races of Allium tolmiei. In 1950 he published a monograph of Allium for Idaho in which he describes the tetraploid race of A. tolmiei as var. platyphyllum and the hexaploid race as var. persimile. In all Ownbey lists 18 species of Allium in Idaho. In recent years one additional species, A. anceps has been added to that list (Moseley & Groves, 1992). The Ownbey and Aase monograph of the ~~Allium canadense~~ alliance (1955) discussed and mapped the distribution of two species from the CRB, A. oeveri with two varieties and A. textile.

In 1968 L. V. Mingrone, one of Ownbey's students completed a PhD thesis on the Allium falcifolium alliance. This work recognizes 17 species with several varieties from the alliance within the boundaries of the CRB

Ownbey published an enumeration of Allium in volume 1 of the *Vascular Plants of the Pacific Northwest* (Hitchcock et al., 1969) This listed 26 native species for the area of the flora encompassed by the CRB. This work includes keys to and descriptions of each species Only about the northern 2/3 of the CRB is covered in the treatment.

The sixth volume of the *Inter-mountain Flora* (Cronquist et al. 1977) provides keys and descriptions to 19 species within the CRB. These two floras cover all but a small portion of the CRB in south central Oregon.

It is important to note here that although the two floras listed above do not cover the entire CRB they do cover all of the species of Allium occurring within its boundaries.

Beginning in the late 1980's a number of species of Allium have been surveyed because of their-status or proposed status as rare or endangered in various parts of the CRB. In general these reports have not been published and I have had access only to those on projects where I have worked.

Several investigations in Idaho, mostly **cooperative** investigations. between the Department -of Fish and Game and the U. S. Forest Service have generated reports on the status of Allium aaseae (Moseley and Ciacco, 1989; **Moseley** and Groves 1990; Moseley & Mancuso, 1990; Mancuso & Moseley, 1991; **McNeal**, 1993; Prentice, 1988), A. madidum (Atwood, 1987; Kaltenecker, 1993) and A. tolmiei var. persimile (Moseley & Mancuso, 1990).

In Oregon two reports have been done on the status and taxonomy of the Allium tolmiei complex, including the **taxa** referred to as A. tolmiei var. platyphyllum and A. pleianthum (**McNeal**, 1991, 1992). The second of these investigations recommended reducing both of the later two **taxa** to synonyms of var tolmiei and a manuscript with these results is in preparation.

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TABLE I - Allium species native in the Columbia Basin Scientific Assessment Region

Allium aaseae M. Ownbey'
Allium acuminatum Hooker
Allium amplectens Torrey
Allium anceps A. Kellogg
Allium bisceptrum S. Watson
Allium brandegei S. Watson
Allium brevistylum S. Watson
Allium campanulatum S. Watson
Allium cernuum A. Roth
Allium columbianum Peterson, Annable & Rieseberg
Allium constrictum Peterson, Annable & Rieseberg
Allium crenulatum K. Wiegand
Allium dictyon H. St. John
Allium douglasii Hooker
Allium fibrillum M. E. Jones ex L. Abrams
Allium geveri S. Watson
 var. geveri
 var. tenerum M. E. Jones
Allium lemmonii S. Watson
Allium macrum S. Watson
Allium madidum S. Watson
Allium nevadense S. Watson
Allium nevii S. Watson
Allium parvum A. Kellogg
Allium platycaule S. Watson
Allium punctum L. Henderson
Allium robinsonii L. Henderson
Allium schoenoprasum Linnaeus
Allium scilloides D. Douglas ex S. Watson
Allium simillimum L. Henderson
Allium textile Nuttall
Allium tolmiei J. G. Baker
 var. tolmiei
 var. persimile M. Ownbey
Allium validum S. Watson

TABLE II - Allium species and varieties endemic to the Columbia Basin Assessment Region

<u>Allium</u>	<u>aaseae</u>	F. Ownbey
<u>Allium</u>	<u>dictuon</u>	St. John
<u>Allium</u>	<u>columbianum</u>	Peterson, Annable & Rieseberg
<u>Allium</u>	<u>constrictum</u>	Peterson, Annable & Rieseberg
<u>Allium</u>	<u>douglasii</u>	Hooker
<u>Allium</u>	<u>fibrillum</u>	M. E. Jones
<u>Allium</u>	<u>macrum</u>	S. Watson
<u>Allium</u>	<u>madidum</u>	S. Watson
<u>Allium</u>	<u>nevii</u>	Peterson, Annable & Rieseberg
<u>Allium</u>	<u>robinsonii</u>	L. Henderson
<u>Allium</u>	<u>scilloides</u>	D. Douglas ex S. Watson
<u>Allium</u>	<u>simillimum</u>	L. Henderson
<u>Allium</u>	<u>tolmiei</u>	J. G. Baker
	var. <u>persimile</u>	M. Ownbey

TABLE III - Allium species with their center of distribution in the Columbia Basin Scientific Assessment Region, but extending beyond its boundaries

Allium acuminatum Hooker
Allium anceps A. Kellogg
Allium brandeaei S. Watson
Allium parvum A. Kellogg
Allium platycaule S. Watson
Allium punctum L. Henderson
Allium tolmiei J. G. Baker
var. tolmiei

TABLE IV - Allium species with centers of distribution outside the-Columbia Basin Scientific Assessment Region which extend into the area.

Allium amolectens J. Torrey
Allium bisceotrum S. Watson
Allium brevistylum S. Watson
Allium 'camoanulatum S. Watson
Allium cernuum A. Roth
Allium geveri S. Watson
 var. geveri
 var. tenerum M. E. Jones
Allium lemmonii S. Watson
Allium nevadense S. Watson
Allium schoenoprasum Linnaeus
Allium textile Nuttall
Allium validum S. Watson

ADDITIONAL COMMENTS ON CRB ALLIUM

Included is a table dated Wednesday, September 07, 1994 from the Forest Service of species identified for tracking. I was never given any reasons for the choice of species in this table and have not recommended tracking for some of the species listed. Possibly some species are listed here because they are rare in specific areas. This is to be expected for any species that reaches the limits of its distribution within the CRB. I have not recommended some of these species because they are common and widespread either within the CRB or outside of the area. The following list compares my list of recommended species with the table and is followed by an enumeration of my reasons for not recommending those species that are not on both lists. I have explained in my narrative the reasons for recommending individual tracking for species I have added to the Forest Service list.

McNeal's list of species
recommended for tracking

Allium aaseae
Allium anceos
Allium bisceotrum
Allium brandegei
Allium brevistvlum
Allium constricturn
Allium dictuon
Allium fibrillum
Allium madidum
Allium neyii
Allium punctum
Allium robinsonii
Allium tolmiei
 var. tolmiei
 var. persimile
Allium validum

Forest Service list of species
identified for tracking

Allium aaseae
Allium acuminatum
Allium anceos
Allium brandegei
Allium camoanulatum
Allium constricturn
Allium dictuon
Allium douglasii
Allium fibrillum
Allium geyeri
 var. geyeri
Allium macrum
Allium madidum
Allium parvum
Allium robinsonii
Allium simillimum
Allium tolmiei
 var. tolmiei
 var. persimile
 var. platyphyllum
Allium validum

Reasons for not listing some of the species on the Forest Service list are as follows.

Allium acuminatum

This species is common and widespread, it is found in almost all regions and in several plant assemblages. However as a cryptophyte with a spring flowering-summer dormant life cycle I don't think it is a good candidate for individual assessment, its range is well known and it does not appear to be a bioindicator

either of any particular environmental condition or of biodiversity. It is possible that it could serve as an indicator of increased competition from competing plant species but other species indicated above would serve as well in this capacity and have more restricted distribution and habitats.

Allium cam-oanulatum

In Oregon this species has commonly been mistaken for Allium bisceotrum. It is much more common than previously suspected, in fact A. bisceotrum is the rarer species and I have recommended individual tracking for that taxon.

Allium douglasii

Again this is a common species within its range and is not associated with any specific environmental correlate that would warrant individual tracking. Actually two species, A. constrictum and A. nevii that are derived from or at least closely related to A. douglasii are recommended for individual tracking. It may be possible that A. douglasii may have been suggested for tracking because it becomes uncommon at the extremes of its range, however, because it is generally common within the range and for this reason I do not recommend individual assessment.

Allium geveri var. geveri

Allium geveri var. geveri is widespread, but uncommon in the CRB, particularly in Idaho and Washington. It is known from only a single collection in the northeast corner of Oregon. Outside the CRB this taxon is common and widespread reaching western South Dakota, Colorado, west Texas, New Mexico, Arizona and northern Mexico. Its asexual race, var. tenerum, is fairly common in eastern Oregon. Once again it is not restricted to any specialized niche or soil type and is not as far as I can tell an indicator of biodiversity. It may be that individual forests (ie. the Wallowa-Whitman) may want to monitor this species, however I do not recommend it for individual treatment in the context of the CRB assessment.

Allium macrum

This is yet another species that is widespread within the CRB. It is relatively common on rocky, barren soils from central Washington to northcentral Oregon with disjunct populations in southern Klamath county and in eastern Harney County. Again the species is rare at the extremes of its range, but relatively common in the main portion. There are some interesting possibilities for research on the reasons for the fairly widely disjunct populations of the species. However I don't feel that this alone warrants individual assessment as part of the CRB assessment.

Allium parvum

This species is common and widespread, reaching central California in the Sierra Nevada and eastcentral Nevada. It is widespread in Oregon and does not seem to be associated with any particular plant assemblage or any special ecological niche.

Allium pleianthum/tolmiei var. platyphyllum

Careful study by one of my graduate students and I indicate the these two **taxa** are conspecific with Allium tolmiei var. tolmiei. They are both tetraploids while var. tolmiei is' diploid, however no reliable morphological characters have been found to separate the two chromosomal races. A publication on these findings is currently in preparation.