

## I. SPECIES INFORMATION

### I.A. CLASSIFICATION AND NOMENCLATURE

#### I.A.1. Species or infraspecific taxon

##### I.A.1.a. Scientific name

- Binomial or trinomial - *Rumex krausei* Yurtsev & Petrovsky
- Full bibliographic citation - Yurtsev B.A. and V.V. Petrovsky in Yurtsev, B.A., A.K. Sytin, and N.A. Sekretareva. 1973. Interesting floristic finds in the easternmost Chukotka Peninsula. II. Bot. Zhurn. 58:1742-1753.
- Type specimens - Yurtsev, Sekretareva, & Sytin s.n. 16 August 1971, Cape Krausei, Lavrentia Bay, Chukotsk Peninsula, Russia, holotype LE, isotypes (3) LE.

##### I.A.1.b. Pertinent synonyms

*Rumex graminifolius* Lamb *pro parte minore* Hulten, 1968

*Rumex graminifolius* Lamb *var. arcticus* A. Love, A. 1942

*Rumex aureostigmaticus sensu* Love *pro parte* Love, A. 1983

*Acetosella krausei* (Yurts. & Petrovsky) A. Love and Love, 1975

*Rumex treleasei* W.F. Wight ined. *pro parte* Standley and Coville, 1915

##### I.A.1.c. Common names – None

##### I.A.1.d. Size of Genus – About 200 species

#### I.A.2. Family classification

- Family name – Polygonaceae
- Pertinent synonyms - None
- Common name for family - Buckwheat

#### I.A.3. Major plant group- Dicotyledoneae

#### I.A.4. History of knowledge of taxon

*Rumex krausei* was described by Yurtsev and Petrovsky (in Yurtsev et al. 1975) from material collected in Lavrentia Bay, Chukotka, 1971. Material fitting this taxon had been collected earlier, both in Chukotka and in Northwest Alaska, but had generally been lumped in with the more widespread *Rumex graminifolius*. In 1915 W. F. Wight described (but never effectively published) *Rumex treleasei* based on material collected in Chukotka and Northwest Alaska (the type being from "Plover Bay, Siberia"- an earlier name for Providenia Bay). From his description it is clear that he distinguished his material from *R. graminifolius* by many of the same criteria that were later used to describe *R. krausei* and *R. beringensis* by Yurtsev and Petrovsky. The specimens he cites include representatives of both *R. krausei* and *R. beringensis*. The first attempt to relocate any of the Alaskan populations was made in 1992 when I visited the Lost River valley of the Seward Peninsula and found two additional populations as well as the original population collected by Lenarz (1972)

**I.A.5. Comments on current alternative taxonomic treatments**

Early workers had lumped *R. krausei* (along with *R. beringensis* Yurtsev & Petrovsky) into an aggregate species *R. graminifolius*. Yurtsev and Petrovsky (1973) clearly separated the three taxa based on morphology, ecology, and cytology, and these taxa are now generally accepted as valid. (Love, 1983, restricts *R. graminifolius* to European octoploids, referring material from eastern Asia and western Alaska to the "perhaps only remotely related diploid and morphologically plastic amphipacific taxon *R. aureostigmaticus* Komarov, races of which have recently been described as distinct species by Yurtsev & Alii (1973)". I have had neither sufficient time nor access to material to evaluate this treatment.) The remaining question concerns the generic concept of workers in Polygonaceae. A conservative treatment (e.g. Nijs 1983, Murray and Lipkin 1987) leaves all three taxa as part of a large and variable genus, *Rumex*. Others (e.g. Love 1983, Tsvelev in Kharkevich 1985) have subdivided the genus, segregating dioecious taxa into the genera *Acetosella* and *Acetosa*. *Acetosella* (including the three above listed species) being distinguished from *Acetosa* on the basis of cytology, leaf morphology, and the size of valves relative to nutlets. All workers, however, clearly recognize the close relationship of these three taxa regardless of which group they are placed in.

**I.B. PRESENT LEGAL AND FORMAL STATUS****I.B.1. International**

- Present designated or proposed protection or regulation - None
- Other current formal status recommendations - None

**I.B.2. National****I.B.2.a. United States**

- Present designated or proposed legal protection or regulation – Listed in category 2 by the U.S. Fish and Wildlife Service (21 Feb. 1990 Federal Register 55:6223).
- Other current formal status recommendations – None

**I.B.2.b. Russia**

- Present designated or proposed legal protection or regulation – Unclear what legal status it currently has, but it has been listed in the Red Book for the Soviet Far East as category 2, Rare (Karkevich and Kachura 1981).

**I.B.3. State****I.B.3.a. Alaska**

- Present designation or proposed legal protection or regulation – The State of Alaska does not give formal protection to threatened, endangered, or sensitive plants.

I.C. DESCRIPTION

I.C.1 **General nontechnical description**

An erect, perennial herb, 4 - 12 inches tall, arising from a taproot and stout base and with purplish tinged leaves and inflorescence. The stems are mostly unbranched. The leaves are mostly basal (1-3 stem leaves), approximately 1/16 - 3/16 inches wide and 1 - 2 inches long, lacking any projections at the base and with large light brown to chestnut-brown colored stipules. The inflorescence is a densely flowered, leafless and usually unbranched panicle, compact or ball-like when young and elongating in fruit. Fruit a small nutlet. Male and female flowers are on different plants (dioecious).

I.C.2. **Technical description**

Dioecious, glabrous, erect perennial from stout caudex and taproot, the stems 8-20 (25) cm tall, mostly unbranched; leaves primarily basal 2-5 mm wide, 2-5 cm long, entire, never hastate, linear to narrowly oblanceolate, with large membranaceous castaneus stipules, hyaline only along the distal margins; flowers numerous, imperfect, usually purplish tinged, in leafless panicles, perianth spreading, not reflexed, inner perigonial leaves less than twice as broad as mature nutlets; inflorescence capitate when young, elongating in fruit, becoming interrupted but essentially unbranched;  $2n=21$ .

I.C.3. **Local Field characters**

*Rumex krausei* and *R. beringensis* are similar in general appearance to the more widespread *R. graminifolius*. They differ from the latter in their lack of tattered, white, persistent leaf bases. *R. beringensis* is distinguished from *R. krausei* by its branched inflorescence (Murray and Lipkin 1987).

I.C.4. **Identifying characteristics of material which is in inter-state or international trade or commerce - N/A**

I.C.5. **Photographs and/or line drawings**

- Illustrations:  
Kharkevich, S.S., and N.N. Kachura, 1981, p. 191.  
Murray, D.F. and R. Lipkin, 1987, p. 41.
- Photographs:  
Alaska Natural Heritage Program, manual files.

I.D. SIGNIFICANCE OF THE TAXON

I.D.1. **Natural**

I.D.2. **Human**

## I.E. GEOGRAPHIC DISTRIBUTION

## I.E.1. Geographical range

*Rumex krausei* is apparently restricted to northwestern Alaska (western Seward Peninsula and Capes Dyer and Thompson) and the eastern and southern most margins of Chukotsk Peninsula in Russia (Cape Krause, Lorino, Yanrakinnot, Bennet Island, and possibly Providenia Bay).

## I.E.2. Precise occurrences

I.E.2.a. Populations currently or recently known extant:

- **001 LOST RIVER CAMP SITE**  
(USA: Alaska: Unorganized Borough: U.S.G.S. TELLER B-5 1:63,360 Topographic map quadrangle; approximate location, lat. 65 27 46N, long. 167 10 10W.) Lost River is approximately 130 km northwest of Nome, Alaska. The site is in wet sedge rock stripes east of the runway and camp buildings, below the juncture of Camp Creek. *R.krausei* was first collected here by Mark Lenarz in 1972; I revisited the site in 1992. Elevation range: 70m. Date last observed: 1992-07-23
- **002 IBRULIKORAK CREEK SITE**  
(USA: Alaska: North Slope Borough: U.S.G.S. POINT HOPE A-2 1:63,360 Topographic map quadrangle; approximate location, lat. 68 08 45N, long. 165 57 52W.) Cape Thompson area, northwest Alaska. Left fork of Ibrulikorak Creek, according to collection label (Belson 1960, ALA). Elevation range: 30-150m. Date last observed: 1960-07-10
- **003 OGOTORUK CREEK SITE**  
(USA: Alaska: North Slope Borough: U.S.G.S. POINT HOPE A-2 1:63,360 Topographic map quadrangle; approximate location, lat. 68 08 -- N, long. 165 39 --W.) Collection label (Johnson, Viereck, Melchior 300, ALA, DAO) only says "Ogotoruk Creek drainage"; there is no additional information about the location of this site. Elevation range: unknown; less than 300m. Date last observed: 1959-07-05
- **004 CAPE DYER SITE**  
(USA: Alaska: North Slope Borough: U.S.G.S. POINT HOPE C-2 1:63,360 Topographic map quadrangle; approximate location, lat. 68 38 09N, long. 166 11 46W.) Vicinity of Cape Dyer, northwest Alaska. Kipalog [Kapaloak?] Creek and Angowlik Creek drainage, according to collection label (Viereck and Bucknell 4269, ALA). No additional information about the location of this site is known. Elevation range: unknown; less than 300m. Date last observed: 1960-07-24
- **006 CAPE KRAUSE SITE**

(Russia: Chukotka; approximate location, lat. 65 48 --N. long. 171 25 --W.) Cape Krause is located near the head of Lavrentia Bay, on the extreme northeastern Chukotsk Peninsula. This site is the locus classicus for *R. krausei*. Elevation range: unknown, presumably near sea-level. Date last observed: 1971-07-26

- **008 TIN CREEK SITE**

(USA: Alaska: Unorganized Borough: U.S.G.S. 1:63,360 Topographic map quadrangle; approximate location, lat. 65 27 11N, long. 167 11 10W.) Tin Creek is a tributary of Lost River, in the York Mountains, approximately 130 km northwest of Nome, Alaska. The site is above the river terrace on the west side of Lost River, across from the mouth of Tin Creek, approximately 6.5 km from the coast. I discovered this site in 1992 during field work on Lost River. Elevation range: 60-80m. Date last observed: 1992-07-21

- **009 CURVE CREEK SITE**

(USA: Alaska: Unorganized Borough U.S.G.S. 1:63,360 Topographic map quadrangle; approximate location, lat. 65 25 25N. long. 167 10 40W.) Curve Creek is a tributary of Lost River, in the York Mountains, approximately 130 km northwest of Nome, Alaska. The site is above the river terrace on the west side of Lost River, downstream from the mouth of Curve Creek, approximately 4 km from the coast. It is located at a slope break-point just south of the northernmost set of carbonate outcrops. I discovered this site in 1992 during field work on Lost River. Elevation range: 40-60m. Date last observed: 1992-07-22

I.E.2.b. Populations known or assumed extirpated:

None

I.E.2.c. Historically known populations where current status not known:

- **005 PORT CLARENCE SITE**

(USA: Alaska: Unorganized Borough: U.S.G.S. POINT HOPE C-3 1:63,360 Topographic map quadrangle; approximate location, lat. 65 10 --N, long. 166 29 --W.) Port Clarence is located on the Seward Peninsula approximately 90 km NW of Nome. The site is known only from collections made in the late 19th and early 20<sup>th</sup> centuries, whose labels say only "Port Clarence." Accounts of the Harriman Expedition (Burroughs et al. 1910) suggest the collection locale may be near the mouth of one of the streams entering from the south shore of the bay, possibly Fox Creek. Since the name "Port Clarence" was apparently used in a broad sense by early travelers, the site could also be near Teller or Brevig Mission. Elevation range: unknown. Date last observed: 1879-07

- **007 PLOVER BAY SITE**

(Russia: Chukotka; approximate location, lat. 64 22 --N, long. 173 20 --W.)  
Plover Bay is an earlier name for Providenia Bay, on the southeast Chukotsk Peninsula, Russia. It is not clear precisely where this site is, but it is possible that it is near the old eskimo village site behind the sand spit near the head of the bay, on the east shore. The related species *R. beringensis* is known from this area, but an early collection of Macoun (1891) may be *R. krausei*.  
Elevation range: unknown, presumably near sea level. Date last observed: 1891-08-16

- I.E.2.d. Locations not yet investigated believed likely to support other possible extant natural occurrences  
Appropriate habitat (wet or seasonally saturated calcareous gravels and argillaceous soils in frost disturbed or solifluction areas with dryas-step or terrace communities) within the known geographic range of *R. krausei* should be surveyed. Other drainages in the York Mountains (outside the Lost River valley) should receive particular attention, as should drainages near Ogotoruk Creek and Cape Dyer.
- I.E.2.e. Reports having ambiguous or incomplete locality information:  
See sites 005 and 007, above.
- I.E.2.f. Locations known or suspected to be erroneous reports:  
See site 007, above.
- I.E.2.g. Locations of potential habitat checked but plants not found:  
Despite fairly intensive collecting around Ogotoruk Creek and Cape Thompson, only two collections are known. In 1992 I made a brief investigation of dryas solifluction stripes near Cassiterite Peak (east of Lost River) but did not see any *R. krausei*.

**I.E.3. Status and location of presently cultivated material**

None known

**I.E.4. Biogeographical and phylogenetic history**

**I.F. GENERAL HABITAT DESCRIPTION**

**I.F.1. Concise statement of general environment and habitat**

Moist to wet gravels and solifluction soil in tundra areas, especially on colluvium or alluvium at the toe of slopes or at slope break points. Generally on calcareous gravels and argillaceous soils in frost disturbed or solifluction areas with dryas stripe and step or terrace communities.

**I.F.2. Physical characteristics**

**I.F.2.a. Climate**

- Koppen climate classification  
Type ET, tundra climate; average temperature of the warmest month

below 10°C but above 0°C.

- **Regional macroclimate**  
A summary of climatological data for Ogotoruk Cree, Cape Thompson Point Hope, Teller, Wales, Tin City and Port Clarence are provided in Appendix B. These stations should provide a reasonably accurate overview of the climate at the known *R. krausei* sites in Alaska.
- **Local microclimate**  
No climatic data are available for Lost River. My brief field visit (1992) and the available data for Teller, Tin City, Wales, and Port Clarence suggest a frost free season of less than 90 days with a mean summer temperature between 45° and 50° F. Mean annual precipitation is about 12 inches, with maximum rainfall in late summer. Lost River has a cold maritime climate, and all three sites are in areas with considerable fog, cloud cover, and mist. Strong winds are common, especially in the winter, and probably frequently exceed 60 miles per hour. Lost River valley is oriented north-south, affording little or no protection to the predominantly south winds. These strong winds have a pronounced influence on the existing plant cover.

I.F.2.b. Physiographic province - (Wahrhaftig, 1965)

- Arctic foothills
- Seward Peninsula

I.F.2.c. Physiographic and topographic characteristics and edaphic factors

Based on the Lost River sites and descriptions from herbarium labels, *R. krausei* favors or tolerates a distinct landscape unit. The key elements are frost sorted colluvium or alluvium in protected areas at the toe of slopes or at inflection points. These areas typically have considerable accumulation of fines, sometimes overlain with coarser material, creating soils that are very moist to wet (at least seasonally). Soils are typically calcareous or argillaceous pergelic cryorthents (Van Patten 1990). Frost scars are common, and well developed rock stripes are typical.

I.F.2.d. Biological Characteristics

- **001 LOST RIVER CAMP**

The site is on wet, saturated gravels below the toe of an outwash fan. The site consists of solifluction stripes of open, disturbed gravels interfingering with the drier turf of dryas stripes. Common species on the disturbed, wet gravels include *Eriophorum angustifolium*, *Senecio atropurpureus*, *Juncus sp.*, *Claytonia acutifolia*, *Lagotis glauca*, *Rumex krausei*, *R. arcticus*, *Salix rotundifolia*, and *Primula anvilensis*. Dryas stripes contained *Dryas integrifolia*, *Carex membranacea*, *Papaver macounii*, *Silene acaulis*, *Minuartia arctica*, and *Equisetum arvense*.

- **002 IBRULIKORAK CREEK**  
No site information available.
- **003 OGOTORUK CREEK**  
"Dryas step community: With mats of *Dryas octopetala* on slopes of less than 10°. On the surface of a wet step" (collection label, Johnson, Viereck, Melchior 300).
- **004 CAPE DYER**  
"Drainage of Kipaloq and Angowlik Creeks, Elev.- Sea level to 1000 ft. Common on extremely hard frost scars - fine materials" (collection label, Viereck, Bucknell 4269).
- **008 TIN CREEK**  
The site is at the slope break-point above the river terrace. It consists of wet, silty, frost scars and solifluction stipes within a wet sedge meadow dominated by *Eriophorum angustifolium*, *E. vaginatum*, *Carex aquatilis*, *C. atrofusca*, and *Dryas integrifolia*. Other common species included *Equisetum arvense*, *Salix rotundifolia*, *Claytonia acutifolia*, *Pedicularis sudetica*, *Saussurea angustifolia*, *Bistorta vivipara*, *Lagotis glauca*, *Oxytropis mertensiana*, *Rumex arcticus*, and *Minuartia arctica*. *Rumex krausei* was restricted to the silty frost scars and soil stripes. These frost scars and disturbed solifluction stripes were sparsely vegetated with a wet graminoid herbaceous community of *Juncus spp.*, *Rumex krausei*, *R. arcticus*, *Carex misandra*, *Bistorta vivipara*, *Gastrolychnis apetala*, *Deschampsia caespitosa*, *Colpodium wrightii*, and *Primula anvilensis*. Soils were fine, silty and saturated.
- **009 CURVE CREEK**  
The site is in a swale between two carbonate outcrops, below a series of dryas-stripe tundra barrens. It consists of wet, silty, solifluction stipes within a wet sedge meadow dominated by *Eriophorum angustifolium*, *E. callitrix*, *Salix reticulata*, *Pedicularis penellii*, *Senecio fuscatus*, and *Gastrolychnis apetala*. *Rumex krausei* was restricted to the silty soil stripes. These disturbed solifluction stripes were sparsely vegetated with a wet graminoid herbaceous community of *Carex misandra*, *C. glacialis*, *C. rupestris*, *Colpodium wrightii*, and *Juncus spp.* Other common species included *Claytonia acutifolia*, *Rumex krausei*, *R. arcticus*, *Senecio resedifolius*, *Primula anvilensis*, *Minuartia arctica*, *Bistorta vivipara*, *Oxytropis mertensiana* and *Oxgraphis glacialis*. Soils were fine, silty and saturated.

I.G. POPULATION BIOLOGY OF TAXON

I.G.1. **General Summary**

The true abundance of *R. krausei* at most sites is still unknown. Several locations at Lost River had more than 1000 individuals.

I.G.2. **Demography**

- 001 LOST RIVER CAMP  
*Rumex krausei* was common at this site. A rough population estimate would be 750 - 2,000 individuals, mostly in flower.
- 002 IBRULIKORAK CREEK  
Unknown.
- 003 OGOTORUK CREEK  
Unknown.
- 004 CAPE DYER  
Reported as "common."
- 005 PORT CLARENCE  
Unknown.
- 006 CAPE KRAUSE  
"Frequent" according to Yurtsev (1973).
- 007 PLOVER BAY  
Unknown.
- 008 TIN CREEK  
*Rumex krausei* was common at this site. A rough population estimate would be 1000 - 3,000 individuals, mostly in flower or early fruit.
- 009 CURVE CREEK  
*Rumex krausei* was common at this site. A rough population estimate would be 750 - 3000 individuals, mostly in flower or early fruit.

I.G.3. **Phenology**

The detailed phenology of this species is not yet known. The Lost River populations were mostly in late flower and fruit when visited 20-23 July 1992. Some plants still had fairly compact inflorescences, indicating a somewhat earlier flowering stage. Lenarz's 1972 collections from the same site were in fruit 15 July. Collections from Ogotoruk Creek were in fruit 5 July, as were those from Plover Bay collected 8 August. Collections made in mid to late July from Cape Dyer, Cape Krause, and

Ibrulikorak Creek were in flower.

#### I.G.4. Reproductive biology

- Types of reproduction and discussion  
*Rumex krausei* is dioecious and hence obligately outcrossed. No signs of vegetative reproduction or apomixis were evident. Of the three Lost River populations, all were predominantly female. This agrees with findings in the related taxon *R. acetosella*, and may be related to differences in pollen tube competition (Love 1940) or in drought tolerance (Zimmerman and Lechowicz 1982).
- Pollination  
Anemophilous
- Seed dispersal  
Unknown
- Survival and mortality of plants  
Unknown

#### I.H. POPULATION ECOLOGY

##### I.H.1. General summary

Unknown

#### I.I. CURRENT LAND OWNERSHIP AND MANAGEMENT RESPONSIBILITY

Both the Ibrulikorak and Ogotoruk Creek sites are within the Alaska Maritime National Wildlife Refuge. The U.S. Fish and Wildlife Service controls the surface and subsurface rights to these lands.

I have been unable to satisfactorily determine the ownership and management of the remaining North American sites. The surface or subsurface estate of all of them has apparently been claimed or conveyed to one of several regional or village Native corporations. Several sites also have a mosaic of sometimes overlapping mining claims, grazing permits, etc. It is beyond the scope of this report to fully research and clarify these lands issues.

The Cape Dyer site is apparently owned by the Arctic Slope Regional Corporation or the Tigara Corporation (Point Hope). Ownership of the Port Clarence site is further confused because we know only that it is somewhere within the general vicinity of Port Clarence, and could be anywhere from Brevig Mission to the south side of the bay. Within this large area are lands conveyed to or selected by: the Bering Straits Native Corporation (Nome); Teller Native Corporation; Brevig Mission Native Corporation; and likely others. In addition there appear to be oil and gas leases pending (Chevron USA) as well

as reindeer grazing permits. It is likely that there are also individual native allotments selected or conveyed and possibly mining claims.

The Lost River Sites are located on lands that have numerous patented and unpatented mining claims and lands that have been selected or conveyed to Bering Straits Native Corporation, and Inalik Corporation (Diomedea). Subsurface rights on Bering Straits Corp. lands are held by a consortium of village corporations (the Tin Pool - headquartered in Unalakleet). Lost River is the site of a large, inactive, open pit and underground tin mine. More recently (1972), the Lost River Mining Co. did a feasibility study and looked at again mining the tin deposits. Although they have yet to act on this, they do have a large number of patented and unpatented claims in the valley. There are also other private individuals who have mining claims in the valley. The Bureau of Land Management retains at least nominal jurisdiction over unpatented mining claims and interim conveyed lands.

Ownership and management of the Russian sites is even more difficult to ascertain, especially given the rapidly changing political situation there. All known sites appear to be within the administrative unit of Chukotka. Management of these areas is unknown, although it is likely that one or more of these sites would be included in the proposed international Beringian Park.

#### I.J. MANAGEMENT PRACTICES AND EXPERIENCE

Regional staff of the U.S. Fish and Wildlife Service are aware of the two occurrences known from Refuge land near Cape Thompson. I am not aware of any special management actions that have been taken.

#### I.K. EVIDENCE OF THREATS TO SURVIVAL

##### I.K.1. **Present or threatened destruction, modification, or curtailment of habitat or range**

Of the seven reported Alaskan sites, two are within a U.S. Fish and Wildlife Refuge and unlikely to suffer any significant habitat modification in the near future. The remaining populations are on privately owned or managed lands. There is no information available on plans to modify or disturb habitat around Cape Dyer. Little can be said about the Port Clarence population as its location is essentially unknown. If still extant, this population could be affected by mining, grazing, or construction activities in the general area.

Lost River has been the site of large scale open pit and underground mining in the past and used to contain a small community, Lost River City. The three Lost River *R. krausei* populations are located on privately held mining claims and could be threatened by any large scale resumption of activity. The Tin Creek and Lost River Camp populations are both immediately adjacent to recent mine related disturbances. While no such resumption of large scale mining seems likely in the immediate future, this should be a long term concern. Even small scale mining and

assessment work could disturb or destroy the limited habitat for these populations.

**I.K.2. Overutilization for commercial, recreational, scientific, or educational purposes**

None known or likely

**I.K.3. Disease or predation**

The Lost River Valley is used by introduced muskoxen and reindeer for summer range, although it is not clear how extensive this use is. During my brief stay in 1992, I observed a herd of approximately 2-300 reindeer grazing near or in *R. krausei* sites on two out of the four days. The Lost River valley is windswept and barren in appearance, with sparse plant cover. Moist, protected sites with comparatively lush plant cover (such as the *R. krausei* sites) are relatively rare and tend to concentrate grazing use. Although no muskoxen were seen, there was abundant sign of relatively recent use. The Port Clarence population of *R. krausei*, if extant, could be subject to grazing pressure.

**I.K.4. The inadequacy of existing regulatory mechanisms**

Most Alaskan populations are on privately owned or managed land, often with mining claims located on them. It is not clear what protection existing regulations could provide.

**I.K.5. Other natural or manmade factors**

*Rumex krausei* is found in areas subject to frequent natural disturbance (solifluction, frost scars, wind scour, etc.). Although apparently adapted to this habitat, it is possible that any additional anthropogenic disturbance, combined with the small population size of this obligately outcrossed species could be critical.

## **II. ASSESSMENT AND RECOMMENDATIONS**

### **II.A. GENERAL ASSESSMENT OF VIGOR**

Without additional field work, nothing can be said about the status of the populations at Ogoruk Creek, Ibrulikorak Creek, Cape Dyer, and Port Clarence. Their exact locations are unknown (especially so for the Port Clarence site), and we cannot even be sure that they are still extant. The three Lost River sites were visited by the author in 1992. All three populations were limited in area (less than 1 ha each), and appropriate habitat is probably a limiting factor, at least within this drainage. Within each site, *R. krausei* was scattered but common, with populations ranging from approximately 750 - 3000 individuals. While the populations appeared to be healthy and maintaining themselves, few if any seedlings were seen. No information is available on population trends at any *R. krausei* site. No information was available on the status of any of the Russian populations, although Yurtsev (pers. comm.) reported similar patterns of abundance and habitat specificity for at least the Cape Krause site.

## II.B. RECOMMENDATIONS FOR LISTING OR STATUS CHANGE

Category 2. Information about the status of the populations at Capes Thompson and Dyer and Port Clarence are needed in order to adequately assess the status of this species overall. The Lost River populations, although apparently healthy, are limited in size and area and subject to a variety of actual and potential disturbances. *Rumex krausei* is a narrow endemic known from twelve sites, of which seven are in Alaska. Three of these seven are within 2 miles of each other and a fourth, if it still exists, is within 25 miles. These four populations are on or adjacent to areas that have had large scale mining in the past and which could well be the scene of mining in the future. Even at present some small scale work is ongoing. These populations are also subject to some degree of grazing pressure from introduced ungulates. In the absence of additional, secure, populations elsewhere I would recommend listing as Threatened.

## III.C. RECOMMENDED CRITICAL HABITAT

Designation of Critical Habitat is not likely to add any real protection to this species and could be detrimental.

## III.D. CONSERVATION/RECOVERY RECOMMENDATIONS

### III.D.1. **General conservation recommendations**

The U.S. Fish and Wildlife Service should locate and monitor the two populations known to be on Refuge lands. These are the only populations known to be on protected lands. Adjacent areas should be searched to determine the distribution and size of populations on Refuge lands.

Efforts should be made to work with private landowners (particularly native corporations) to minimize disturbance to existing populations. With proper notice and planning it may be possible that mining or other activities could take place without necessarily disturbing existing populations.

Accurate information on the status of Russian populations would add valuable perspective in evaluating U.S. populations and the status of the species overall.

### III.D.2. **Monitoring activities and further studies recommended**

Appropriate habitat (see above) should be inventoried in order to locate additional populations and determine the distribution of *R. krausei*. The York Mountains should receive particular attention, along with drainages in the area between Cape Lisburne and Cape Thompson.

It would be useful to determine the degree and extent of grazing in the Lost River valley. In particular, how much use is made of *R. krausei* habitat, and how much disturbance is caused either directly by grazing or indirectly by trampling.

## I.E. INTERESTED PARTIES

Office of Endangered Species, U.S. Fish and Wildlife Service

### III. INFORMATION SOURCES

#### III.A. SOURCES OF INFORMATION

##### III.A.1. Publications cited in report

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**III.A.3. Fieldwork**

During July 1992 I spent four days in the Lost River Valley attempting to determine the distribution of *R. krausei*. I was able to locate Lenarz's 1972 collection site and added two additional sites.

**III.A.4. Knowledgeable individuals**

R. Lipkin, Alaska Natural Heritage Program, Anchorage, AK.

D.F. Murray, Herbarium, Univ. Ak. Fairbanks, AK.

L.A. Viereck, Inst. Northern Forestry, Fairbanks, AK.

B.A. Yurtsev, Komarov Botanical Inst., St. Petersburg, Russia

**III.B. SUMMARY OF MATERIALS ON FILE**

All materials used to prepare this report are on file at the Alaska Natural Heritage Program. Files are periodically updated to reflect current knowledge.

**IV. AUTHORSHIP**

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**V. NEW INFORMATION**  
RECORD OF REVISION -

**VI. APPENDIX**  
VI.A. Maps  
VI.B. Climate summaries