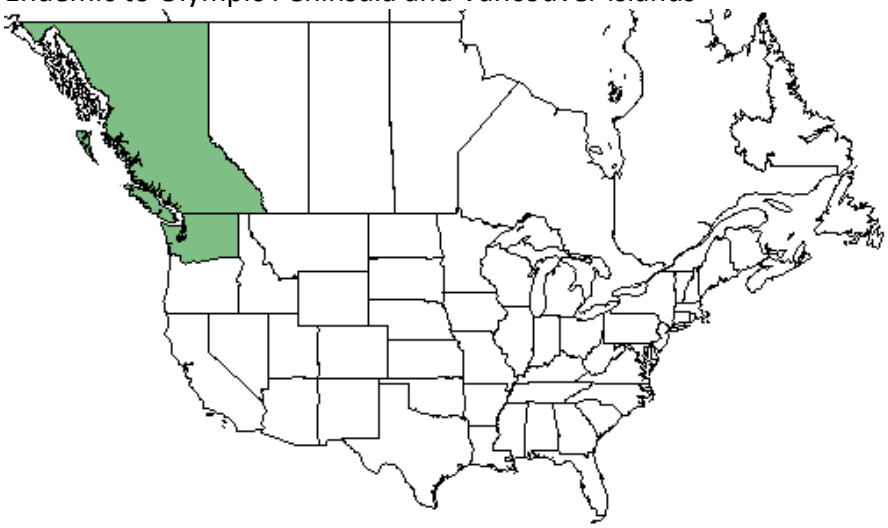
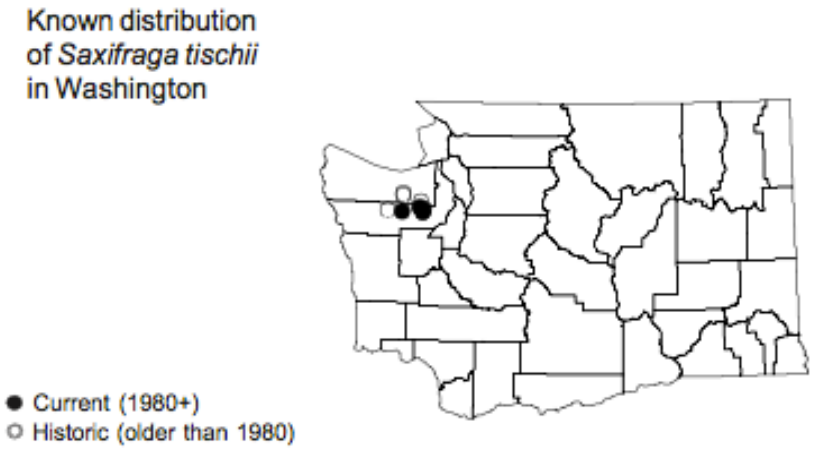
Plant Propagation Protocol for *Micranthes tischii* (formerly *Saxifraga tischii*)

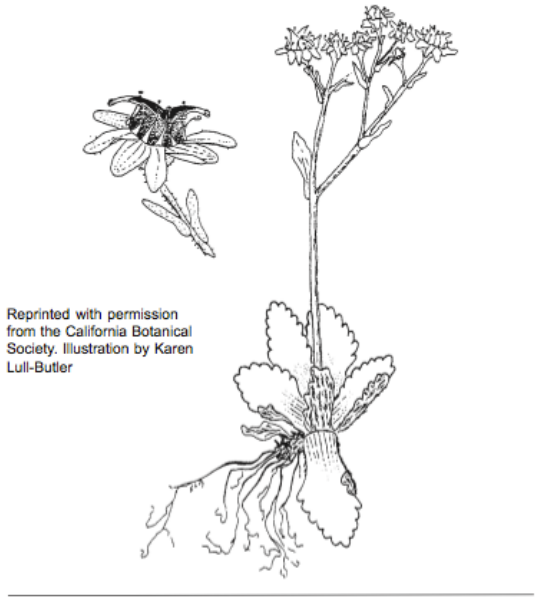
ESRM 412 – Native Plant Production

Source: Burke Herbarium 2016. Credit: Left, Rod Gilbert. Right, Stephan Hart.

TAXONOMY AND STATUS	
Plant Family	
Scientific name	Saxifragaceae
Common name	Saxifrage
Plant species	
Scientific name	*Micranthes tischii* Skelly, formerly *Saxifraga tischii*
Common Name	Olympic Saxifrage
Varieties	None listed
Sub-species	None listed
Cultivar	None Listed
Common Synonym(s)	Saxifraga tischii
Common Name(s)	Olympic Saxifrage, Tisch's Saxifrage
Species Code (USDA Plants)	SATI3
State Status (WA)	R1--Review group 1: of potential concern but needs more field work to assign another rank (Copass 2016)
Provincial Status (BC)	S2--Imperiled (Eflora 2017)
Global Status	G1--Critically imperiled (Eflora 2017)
Conservation Status	Rare (Burke Herbarium 2017)
Note on propagating in regards to listed status	This species is endemic to the Olympic Peninsula and Vancouver Island. Given its distribution, it may be at risk to climate change driven habitat loss (Wershow 2016). Because of this risk, steps must

	be taken with the agencies that manage the land where this species grow before any collection or propagation could occur.
GENERAL INFORMATION	
Geographical range	Endemic to Olympic Peninsula and Vancouver Islands  Source: USDA Plants Database 2017.  Source: Washington Natural Heritage Program 2006
Ecological distribution	*Micranthes tischii* is endemic to the Olympic Mountains and the interior of Vancouver Island, British Columbia. It has been observed in Clallam and Jefferson counties in Washington. (Washington Natural Heritage Program 2006)
Climate and elevation range	Wet, cold, alpine climate. 1300-2400 meter elevation range. (Natureserve Explorer 2017)
Local habitat, abundance and associated species	Grows in subalpine and alpine habitats in shallow, well-drained soil pockets on rock ledges and in rock crevices. Slopes are north to northeasterly, and the plants are often in cirques or near persistent

	snow patches. (Natureserve Explorer 2017) Associated species include Drummond's thimbleweed (*Anemone drummondii* var. *drummondii),* nard sedge *(Carex nardina),* brittle bladder fern *(Cystopteris fragilis),* cliff dwarf primrose *(Douglasia laevigata* var. *ciliolata),* lance-leaved draba *(Draba lonchocarpa* var. *lonchocarpa),* spiked wood-rush *(Luzula spicata),* tufted alpine saxifrage *(Saxifraga caespitosa* var. *emarginata),* and Olympic violet *(Viola flettii).* (Washington Natural Heritage Program 2006)
Plant strategy type / successional stage	No information found for *Micranthes tischii*, but one study found that *Micranthes nivalis* (which is similar in habit to *M. tischii*) is a late colonizer of glaciated terrain. (Wietrzyk 2016)
Plant characteristics	*Saxifraga tischii* is a small, perennial herb 1-3/8 to 5 in. (3.5-12.5 cm) tall arising from a short rhizome with a rosette-shaped base. (Washington Natural Heritage Program 2006) **Plants:** solitary or in groups, with bulbils on caudices. **Leaves:** basal; petiole flattened, 0.4-2 cm; blade ovate to elliptic, 0.5-2.5 cm, fleshy, base attenuate, margins serrate (7-16-toothed), ciliate, surfaces reddish brown-tomentose abaxially, glabrous or rarely glabrate adaxially. **Inflorescences**: (3-)5-15(-18)-flowered, open, flat-topped thyrses or cymes, 2-7 cm, purple-tipped stipitate-glandular. **Flowers:** sepals spreading to reflexed, ovate; petals greenish, often purple-margined, not spotted, lanceolate to obovate, not clawed, 1.2-2(-2.5) mm, equaling to longer than sepals; filaments linear, flattened; pistils distinct almost to base; ovary superior, (to 1/3 adnate to hypanthium). **Fruit:** purplish capsules, follicle like. (EFlora 2017) **Identification Tips:** There are many other species of *Saxifraga* that occur in the Olympic Mountains, but most of the other species have white flowers, although some are greenish or tinged with purple. The petals of the white-flowered species are often notched at the tip and they have no marginal cillia; those of *S. tischii* are not apically notched and usually have 1-7 asymmetrically distributed marginal cillia. It looks as if *S. tischii* has no petals. However, the petals are always there but semi-microscopic; a 10- power hand lens is extremely helpful in identifying this species. No others have purple leaves or flowers that persist. (Washington Natural Heritage Program 2006)

	 Source: Washington Natural Heritage Program 2006
PROPAGATION DETAILS: SEEDS No information was found for *Micranthes tichii*, but some information was available for *Micranthes nivalis*, *Micranthes hieracifolia ssp. hieracifolia*, and *Micranthes foliolosa* in "Germinating seeds or bulbils in 87 of 114 tested Arctic species indicate potential for ex situ seed bank storage" by Alsos and Müller, 2012.	
Ecotype	Arctic Tundra in Isfjorden area of Svalbard. Insect-pollinated herbs are dominant vegetation type in Svalbard Achipelago. (p. 820) Habitat: Appendix 1 (p. 3) Moist tundra--*Micranthes nivalis* Heavily grazed moist tundra--*Micranthes hieracifolia ssp. hieracifolia* Moist tundra--*Micranthes foliolosa*
Propagation Goal	Germinants
Propagation Method	Seed
Product Type	Germinated seed on a 9 cm diameter petri dish with 10% agar solution. 3 to 50 seeds of each species were placed in each petri dish (p. 821)
Stock Type	Native seed from Isfjorden area of Svalbard .
Time to Grow	No detailed information was given for the germination time periods for the seeds this study. "Stratification and germination conditions selected for each species were based on an extensive review of seed germination trials of the same species or genera (not shown), or after recommendations from Lindsay Robb at Millennium Seed Vault

	(personal communication)" (p. 821)
Target Specifications	Successful germination of seeds. No specific criteria outlined.
Propagule Collection Instructions	Seeds were collected between August 27th and September 19th, 2008 in the Isfjorden area of Svalbard. When possible, seeds were shaken out of the plants to ensure only mature seeds were collected. (p. 820)
Propagule: Processing/ Propagule Characteristics	If the plants were wet, seed capsules were collected and left in paper bags at 5–8 °C in 35 % relative humidity (RH) to dry. (p. 820)
Pre-Planting Propagule Treatments	Seeds were counted and placed in sealed aluminum bags. The aluminum bags were placed at -2 °C on September 15th or 24th, 2008 and stored outside at about -6 °C on October 1st. A temperature logger (Tinytag Plus 2 TGP-4020) was placed in one of the boxes on October 2nd. The temperature dropped to 10 °C during the night of October 2nd. On October 3rd, the seed boxes were placed in the Svalbard Global Seed Vault where the temperature was about -14 °C. The box with the seeds for germination trials was taken out of the Svalbard Global Seed Vault on 27 April 2009. Thus, this first year of storage resembled what seeds of Arctic species experience under natural conditions as they ripen in autumn and normally do not germinate within the season they are produced. (p. 820- 821). Appendix 2: overview of applied stratification and germination methods (p. 2) Species — No. of days for cold stratification — Temperature (degrees Celsius) *Micranthes nivalis* — *37* — *20* *Micranthes hieracifolia ssp. hieracifolia* — *37* — *20/10* *Micranthes foliolosa* — 0 — 20
Growing Area Preparation	3 to 50 seeds of each species were placed on a 9 cm diameter petri dish with 10% agar solution (p. 821)
Establishment Phase Details	The light temperature was 4,000 K (Osram 35 W, 840 HE) and the brightness was 3,300 lm (manufacturer's information). The proton flux was approximately 40 umol per square meter per second measured with a quantum flux sensor at the level of the seeds. If the germination percentage obtained was low, but the seeds still seemed viable, a new germination test was attempted following an additional

	period of stratification (See Appendix 2 table above). (p. 821)
Length of Establishment Phase	Not completed for this study.
Active Growth Phase	Not completed for this study.
Length of Active Growth Phase	Not completed for this study.
Hardening Phase	Not completed for this study.
Length of Hardening Phase	Not completed for this study.
Harvesting, Storage and Shipping	Not completed for this study.
Length of Storage	Not completed for this study.
Guidelines for Outplanting / Performance on Typical Sites	Not completed for this study.
Other Comments	*Micranthes tischii* is rare and seeds should not be collected. To research this species, contact Olympic National Park at (360) 565-3130.

PROPAGATION DETAILS: VEGETATIVE

No complete information was found for *Micranthes tichii*, but given that the root system is a short rhizome (Skelly 1988), it is theoretically possible to propagate it vegetatively. Below is some basic information about propagation of alpine Saxifrages taken from various sources.

Ecotype	Grows in subalpine and alpine habitats in shallow, well-drained soil pockets on rock ledges and in rock crevices. Slopes are north to northeasterly, and the plants are often in cirques or near persistent snow patches. (Natureserve Explorer 2017)
Propagation Goal	Cuttings
Propagation Method	Vegetative
Product Type	Propagules: cuttings with eventual goal of transplantable plants.
Stock Type	Cuttings from plants occurring in the alpine environment of the Olympic Peninsula or Vancouver Island.
Time to Grow	No information found. One rock gardening source mentioned that cuttings of alpine plants in the genus Saxifraga (sister group to Micranthes) can take 12 months to flower (Heuser 1997, p.85).
Target Specifications	Small basal rosettes that can eventually be transplanted.
Propagule Collection Instructions	Take rosette cuttings 4-10 weeks after flowering (Heuser 1997, p.85) Take new rosettes at plant edges, cut 1/4 –1/2in (5-10mm) below the leaves, trim lower third of stem (Toogood 1999, p.166)

	According to one source, many alpines can be propagated with 1 inch long cuttings of soft young growth in the spring (Elliott 1987).
Propagule Processing/Propagule Characteristics	Here are a few steps to follow when propagating with rosette cuttings: 1. Select a healthy rosette from the edge of the plant. Steady the plant with tweezers and cut the stem ¼-1/2 inch (5-10mm) below the shoot tip. 2. Carefully trim off the lower leaves from the lower third of each rosette. Dip the base of each cutting in hormone rooting compound. 3. Fill a 2 inch (5 cm) clay pot with ground pumice to within ½ inch (1cm) of the rim. Water from below and allow it to drain. Insert cuttings 1/2inch (1cm) apart. (Toogood 1999, p.167)
Pre-Planting Propagule Treatments	Handle cuttings with care as they can bruise easily. (Toogood 1999, p.167)
Growing Area Preparation / Annual Practices for Perennial Crops	Fill a 2 inch (5 cm) clay pot with ground pumice to within ½ inch (1cm) of the rim. Water from below and allow to drain. Insert cuttings 1/2inch (1cm) apart. (Toogood 1999, p.167) One source mentions to root cuttings of Saxifraga in sand between 50-59 degrees Fahrenheit (Heuser 1997, p.85)
Establishment Phase Details	No information found.
Length of Establishment Phase	No information found.
Active Growth Phase	No information found.
Length of Active Growth Phase	No information found.
Hardening Phase	No information found.
Length of Hardening Phase	No information found.
Harvesting, Storage and Shipping	No information found.
Length of Storage	No information found.
Other Comments	*Micranthes tischii* is rare and cuttings should not be collected. To research this species, contact Olympic National Park at (360) 565-3130.
INFORMATION SOURCES	
References	See below
Other Sources Consulted	See below
Protocol Author	Sage Stowell
Date Protocol Created	April 26th, 2017

or Updated	

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