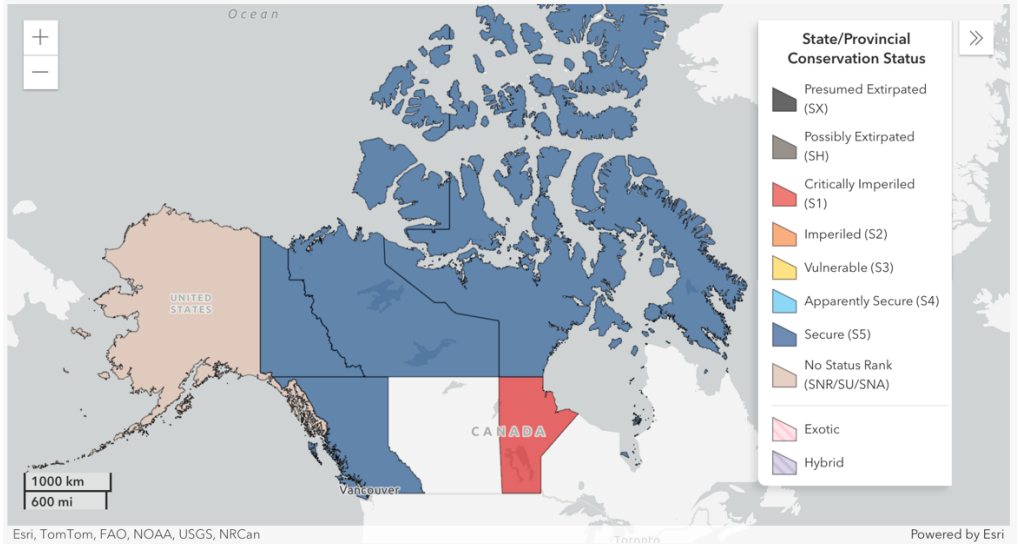




**Plant Propagation Protocol for *Salix richardsonii***  
 ESRM 412 – Native Plant Production  
 URL: <https://courses.washington.edu/esrm412/protocols/2025/SARI.pdf>

<b>TAXONOMY</b>	
Plant Family	Salicaceae
Scientific Name	<i>Salix richardsonii</i>
Common Name	Richardson's Willow
<b>Species Scientific Name</b>	
Scientific Name	<i>Salix richardsonii</i> Hook. <sup>3</sup>
Varieties	None recognized
Sub-species	None recognized
Cultivar	N/A
Common Synonym(s)	<i>Salix lantana</i> ssp. <i>Richardsonii</i> (Hook) Skvort. <sup>2,3,11</sup> <i>Salix richardsonii</i> var. <i>mckeandii</i> Polunin <sup>11</sup>
Common Name(s)	Richardson's Willow, Woolly willow <sup>1</sup>
Species Code (as per USDA Plants database)	SARI(4) <sup>3</sup>
<b>GENERAL INFORMATION</b>	
Geographical range	Spans across Canada (British Columbia, Yukon, Northwest Territories, Nunavut, and Manitoba) and Alaska (US). 
Ecological distribution	Alpine (meadows and barrens/forests), floodplains/stream and riverbeds. <sup>1</sup>

Climate and elevation range	The recorded elevation range for SARI is large, mostly found between the elevations of 6m- 1900m in arctic and alpine climates <sup>12</sup> however sources vary on what the minimum and maximum elevation range values are. <sup>11</sup>
Local habitat and abundance	Commonly associated species <sup>1</sup> : <ul style="list-style-type: none"> <li>- Quaking aspen (<i>Populus tremuloides</i>)</li> <li>- White spruce (<i>Picea glauca</i>)</li> <li>- Black spruce (<i>P. mariana</i>)</li> <li>- Alaska paper birch (<i>Betula resinifera</i>)</li> <li>- Feltleaf willow (<i>Salix alaxensis</i>)</li> <li>- Diamondleaf willow (<i>S. pulchra</i>)</li> <li>- Netleaf willow (<i>S. reticulata</i>)</li> <li>- American green alder (<i>Alnus crispa</i>)</li> <li>- Sitka alder (<i>A. 2arexs pp</i>)</li> <li>- Bog birch (<i>Betula glandulosa</i>)</li> <li>- lichens (<i>Ericaceae spp.</i>)</li> <li>- Huckleberry (<i>Vaccinium spp.</i>)</li> <li>- Bluejoint grass (<i>Calamagrostis canadensis</i>)</li> <li>- Bluegrass (<i>Poa spp.</i>)</li> <li>- Sedges (<i>Carex spp.</i>)</li> <li>- Mosses (<i>Polytrichum spp.</i>)</li> </ul>
Plant strategy type / successional stage	This species of willow is adapted to low-severity fires, as the roots sprout rapidly after fire top-killing. SARI is an early successional species, colonizing disturbed soils. <sup>1</sup> Additionally, SARI is tolerant to anaerobic soils. This species is recorded to survive in a wide range of soil pH (2.1-7.3) <sup>3</sup> .
Plant characteristics	SARI is a thicket forming shrub, with a recorded slow growth rate. <sup>3,13</sup> This species rarely lives longer than 60 years, and can be identified by its white catkins. <sup>3</sup> Flowering occurs between May and July (or into August), where fruiting and ripening occurs quickly following flowering. Pods then split open and release the seeds, which are dispersed via wind or water transport. <sup>1</sup>
<b>PROPAGATION DETAILS: FROM SEED</b>	
Ecotype	As there is limited information about SARI propagation, seed collection information is also limited. This information is collected from other propagation data about either the genus <i>Salix</i> or similar species ( <i>Salix alaxensis</i> , <i>Salix arctica</i> , <i>Salix pulchra</i> )
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Plug
Stock Type	Deepots(S) or 1 Gallon pots
Time to Grow	Unclear, due to slow growth rate.
Target Specifications	Grow to suitable sapling size for outplanting at respective site. Aim for saplings between 1-2ft tall.

<p>Propagule Collection Instructions</p>	<p>Seed collection should occur during the summer, soon after catkin flowering to ensure seeds are collected at higher density. Collection methods could include bagging catkins before development and quickly storing them.</p>  <p>© David McCorquodale</p> <p>Image 1. Catkin in bloom.</p>  <p>© David McCorquodale</p> <p>Image 2. Leaf and bark visuals.</p> <p><i>Image credit: David McCorquodale, source iNaturalist.</i></p>
<p>Propagule Processing/Propagule Characteristics</p>	<p>Seeds are likely recalcitrant (viable for short period of time, difficult to store) and germinate quickly with contact to moist media.<sup>1,5</sup></p> <p>Seed Density: 2500000 seed/lbs<sup>3</sup></p>
<p>Pre-Planting Propagule Treatments</p>	<p>Cold stratification required, and hairs/fuzz may be removed for easier flow through machinery.<sup>3,6,9</sup></p>

Growing Area Preparation / Annual Practices for Perennial Crops	Container size may vary depending on target size for plant. For 1-2ft tall x saplings container may range from Deepots(S) to gallon pots to develop firm root balls. SARI benefits from nutrient rich growing media to germinate (though not entirely necessary), and soils with sufficient drainage. <sup>1,4,7</sup>
Establishment Phase Details	Most ideal to sow seeds in early spring. Seeds germinate in 5-25°C temperatures. <sup>1,14</sup> .
Length of Establishment Phase	Germination can occur within the first 24-48 hours.
Active Growth Phase	No information about this phase for slow-growing Willows.
Length of Active Growth Phase	No information about this phase for slow-growing Willows.
Hardening Phase	Likely not necessarily if grown in the lower end of species germination temperature range, 5-25°C.
Length of Hardening Phase	No information about growth rate for slow-growing Willows.
Harvesting, Storage and Shipping	Seedlings must be kept moist and cool in storage and shipment to the outplanting site.
Length of Storage	Minimal storage
Guidelines for Outplanting / Performance on Typical Sites	<p>Site soil recommendations:</p> <ul style="list-style-type: none"> <li>- Silt/clay soil mixture<sup>13</sup></li> <li>- Moist sandy or gravelly places and shores<sup>15</sup></li> </ul> <p>Outplanting establishment success of SARI is higher when plants are smaller.<sup>5</sup> This species is shade intolerant, so it is essential to plant in sites with sufficient direct sunlight.<sup>1,3</sup> May be valuable to outplant in fall to allow root establishment and support spring/summer seed distribution in site while still disturbed.</p>
Other Comments	N/A

**PROPAGATION DETAILS: VEGETATIVE**

Ecotype	As there is limited information about SARI propagation, seed collection information is also limited. This information is collected from other propagation data about either the genus <i>Salix</i> or similar species ( <i>Salix alaxensis</i> , <i>Salix arctica</i> , <i>Salix pulchra</i> )
Propagation Goal	Cuttings /plants
Propagation Method	Vegetative
Product Type	Plug
Stock Type	1-4 gallon containers

Time to Grow	Limited to no information available about total length of vegetative growth.
Target Specifications	Firm (but not root-bound) root occupation of container. <sup>7</sup>
Propagule Collection Instructions	Collect from a variety of locations to ensure genetic diversity, from “old-rooted” individuals primarily but a variety of age groups (that reproduce)  Stake collection should occur from branches 13mm in diameter or larger (buds can be present) <sup>4</sup>
Propagule Processing/Propagule Characteristics	Cutting longevity is reasonable. After collection, cuttings should be sealed in a plastic bag and refrigerated immediately at 1°C to retain moisture in cuttings. <sup>4</sup>
Pre-Planting Propagule Treatments	3 days before starting, cuttings should be soaked in a tub of running water (in a shaded area). <sup>4</sup>
Growing Area Preparation / Annual Practices for Perennial Crops	Growing media: <ul style="list-style-type: none"> <li>- Coarse sand and peat initially for stability and aeration<sup>13</sup></li> <li>- Once roots develop-transfer to organic growing media nutrients, moisture retaining and good drainage.</li> <li>- Deep containers are better for root development<sup>13</sup></li> </ul>
Establishment Phase Details	2 weeks to 2 months depending on species (may not be accurate to slow growing species of willow). <sup>4,7,16</sup>
Length of Establishment Phase	Unclear for species with slow growth rates.
Active Growth Phase	Unclear for species with slow growth rates.
Length of Active Growth Phase	Salix generally, says 4 weeks. However, this species is regarded as a having a slow growth rate, so it is unclear for species with slow growth rates.
Hardening Phase	Because this plant is present primarily in arctic climates, hardening may not be necessary. If hardening is done, gradual exposed to colder temperatures while maintaining moist soils. Sources for Salix generally say 3 months of hardening <sup>4</sup> .
Length of Hardening Phase	Unclear for species with slow growth rates.
Harvesting, Storage and Shipping	For SARI specifically, it is unclear if it can be stored for extended periods of time
Length of Storage	3-5 months <sup>4,7</sup>

Guidelines for Outplanting / Performance on Typical Sites	No information available for this species on performance when outplanting. This species will likely do best in alpine floodplains and riparian thickets.
Other Comments	Much of this information is based on the general Genus Salix, however most Salix species have a fast growth rate- which may make most timeline or root development information inaccurate.

**INFORMATION SOURCES**

References	<ol style="list-style-type: none"> <li>1. USDA Index of Species Information, Salix richardsonii. <a href="https://www.fs.usda.gov/database/feis/plants/shrub/salric/all.html">https://www.fs.usda.gov/database/feis/plants/shrub/salric/all.html</a></li>   <li>2. S.G. Aiken, Et.al. 2007. Flora of the Canadian Arctic Archipelago: Descriptions, Illustrations, Identification, and Information Retrieval. NRC Research Press, National Research Council of Canada, Ottawa. <a href="https://nature.ca/aaflora/data/www/wlsari.htm">https://nature.ca/aaflora/data/www/wlsari.htm</a> , accessed on 05/06/2025.</li>   <li>3. Natural Resources Conservation Service, USDA Richardson’s Willow Plant Profile. <a href="https://plants.sc.egov.usda.gov/plant-profile/SARI4">https://plants.sc.egov.usda.gov/plant-profile/SARI4</a></li>   <li>4. K. Dumroese, NPN Propagation Protocol Database, Salix spp. Protocol information. <a href="https://rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-3519">https://rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-3519</a></li>   <li>5. Useful Temperate Plants Database, Salix richardsonii <a href="https://temperate.theferns.info/plant/Salix+richardsonii">https://temperate.theferns.info/plant/Salix+richardsonii</a></li>   <li>6. USDA Index of Species Information, Salix alaxensis. <a href="https://www.fs.usda.gov/database/feis/plants/tree/salala/all.html">https://www.fs.usda.gov/database/feis/plants/tree/salala/all.html</a></li>   <li>7. R. Watson, NPN Propagation Protocol Database, Salix. Protocol information. <a href="https://rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-2366">https://rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-2366</a></li>   <li>8. USDA Index of Species Information, Salix pulchra. <a href="https://www.fs.usda.gov/database/feis/plants/shrub/salpul/all.html">https://www.fs.usda.gov/database/feis/plants/shrub/salpul/all.html</a></li>   <li>9. R. Swaii, Plant Propagation Protocol for Salix alaxensis, ESRM 412. 2023. <a href="https://courses.washington.edu/esrm412/protocols/2023/SAAL.pdf">https://courses.washington.edu/esrm412/protocols/2023/SAAL.pdf</a></li>   <li>10. Nature Serve Explorer, Richardson’s Willow Species Status ( <a href="https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.134892/Salix_richardsonii">https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.134892/Salix_richardsonii</a> )</li> </ol>
------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<p>11. In Klinkenberg, Brian. 2020. <i>E-Flora BC: Electronic Atlas of the Plants of British Columbia</i>. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. (<a href="https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Salix%20richardsonii&amp;noTransfer=0">https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Salix%20richardsonii&amp;noTransfer=0</a> )</p> <p>12. Consortium of Pacific Northwest Herbaria, <i>Salix richardsonii</i> data. (<a href="https://www.pnwherbaria.org/data/results.php?SourcePage=search.php&amp;submit=+Search+&amp;TaxonomicGroup=&amp;Family=&amp;Genus=Salix&amp;Species=richardsonii">https://www.pnwherbaria.org/data/results.php?SourcePage=search.php&amp;submit=+Search+&amp;TaxonomicGroup=&amp;Family=&amp;Genus=Salix&amp;Species=richardsonii</a> )</p> <p>13. C. Newsholme, 2003. Willows the genus <i>Salix</i>. Pg. 35-41.</p> <p>14. NPN Propagation Protocol Database, <i>Salix alaxensis</i>. Protocol information <a href="https://rng.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-2631">https://rng.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-2631</a></p> <p>15. H.J. Scoggan. The Flora of Canada (Book 3, pg 577</p> <p>16. T. Luna NPN Propagation Protocol Database <i>Salix Arctica</i> <a href="https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-169">https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-169</a></p>
Other Sources Consulted	<p>16. C. Baskin &amp; J. Baskin, NPN Propagation Protocol Database, <i>Salix lanata</i>. Protocol information <a href="https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-1455&amp;referer=wildflower">https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=salicaceae-salix-1455&amp;referer=wildflower</a></p> <p>17. P.S. Holloway, Propagation of Alaska Native Plants. 1985.</p>
Protocol Author	Matilda W. Webster
Date Protocol Created or Updated	05/06/2025