



# What We Know Now: Tracing the Tamarack

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## Introduction

One [Ojibwe](#) legend tells of a lone chickadee who sought shelter under a Tamarack tree in winter. During a fierce storm, the chickadee was cold, trapped, and alone. Chickadee asked the Tamarack tree to lower its branches for warmth, but the tree refused. For this, the Great Spirit, Wenabozho, punished the Tamarack.



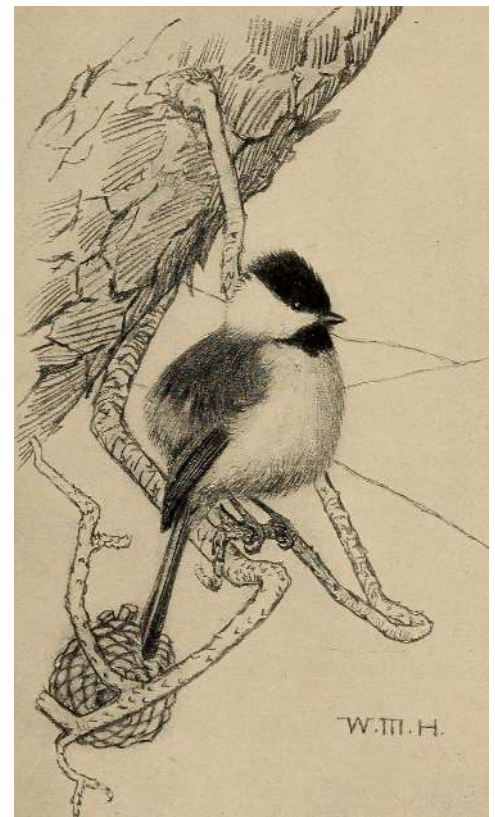
⋮ Tamarack Tree needles turn a golden yellow in autumn.



As Ojibwe author Anne M. Dunn writes in her book, *Fire in the Village: New and Selected Stories*,<sup>1</sup> Wenabozho promises the Tamarack,

“Every autumn, your fine green needles will turn brown and fall off. Then you will stand naked in the forest all winter, as a reminder to others that it is always better to be kind and merciful than it is to be vain and selfish.”

In the telling of the story, the Tamarack becomes a signifier of something larger than itself, the ephemeral nature of life on earth, and the reciprocity that living beings should practice and nurture.



⋮ Ojibwe stories help show the...



The needles of each Tamarack meet the ground every autumn, golden and crisp, marking the passage of time. Its lively expression in October is brief and wondrous. [Vibrant fuchsia cones](#) and [baby-green needles](#) are part of the cycle of new growth in spring. This and the Tamarack’s “wind-swept sweetness” define the character of the landscapes where it grows.<sup>2</sup>



⋮ Cones develop around 25...



⋮ New spring needles on the Golden Larch, *Pseudolarix amabilis*.





These become places we can begin to understand more fully through [Traditional Ecological Knowledge](#) (TEK) and stories in addition to the plant's biology. Plant knowledge held through the oral traditions of Indigenous peoples compels us to view plants as living archives rather than simply specimens, a shift in perspective that is necessary to understand how to use plants for ecological design and restoration. With its rich roots and spiny branches covering most of New England, the tree's seasonal qualities could become a symbol for the conservation of America's wetlands.



⋮ View of a forested Tamarack tree... ⌵

The Tamarack tree species belongs to the genus *Larix* in western botanical nomenclature and is known by many names across different regions. In North America, the common name Tamarack refers to the American Larch (*Larix laricina*), also known as the Eastern Larch and Hackmatack. The other ten widely accepted species in the same genus are generally referred to as Larch trees. This narrative focuses on the characteristics of the Tamarack, while also introducing other Larch species to compare their significances within indigenous cultures across different regions globally.



⋮ In The Larch ⌵

Among the Ojibwe Nation in the Great Lakes Region, the Tamarack is called *mshkiigwaatig* in the Ojibwa language, among other names.<sup>3</sup> Some of these names specifically relate to Indigenous philosophies about the interconnectedness of humans and plants, such as the Siberian Indigenous dialect name *Tuuru* for the Siberian Larch (*Larix sibirica*), while others such as “tamarack” are adopted from misinterpretations of indigenous words in English from colonial times, and as a result carry little to no holistic meaning in English.<sup>4</sup> The Ojibwe word is similar to the word that Potawatomi people use to refer to all plants, *mshkikinek*, or “the growers of the world.”<sup>5</sup> According to 2022 MacArthur Fellow, ecologist, ethnobotanist, and Indigenous scholar Robin Wall Kimmerer, *mshkikinek* directly translates as “medicines,” with the root *mshkiki* meaning “strength of the earth.”<sup>6</sup>



⋮ Tamarack is amazing Indigenous medicine for... ⌵

Humanity's fascination with trees has been expressed in many ways across time, from cosmology to botany to landscape design. Trees are often treated as both living organisms and botanical specimens through Indigenous rituals, traditional ecological knowledge, and Western scientific taxonomies.<sup>7</sup> The legend of the Tamarack and the Chickadee illustrates how Indigenous storytelling can connect people to place through plant species. Tamarack trees and other *Larix* species are featured in many histories, inspiring us to think of how a palimpsest of narratives can inform the future of landscape and plant knowledge, and what role Indigenous knowledge can play in understanding living systems.



⋮ 'Tamarack Swamp,' by Tom Thomson, 1915. Oil on Panel.... 🗉

## Characteristics and Habitat

Larch trees belong to the pine family and are native to the northern hemisphere in North America, Europe, and Asia.<sup>8</sup> Like most pine trees, they prefer colder climates. Unlike any other pine species, however, the Larch is deciduous. It stores nutrients in dormancy during winter, adapting to tough climates easily: without needles, branches are less likely to break from the weight of snow and the force of wind. It is also more fire resilient when new shoots emerge in the spring. Its roots are fibrous, shallow, and wide-reaching. The Larch is monoecious and produce cones at around 25 years of age.<sup>9</sup>

Tamaracks are a pioneer species, meaning after a large disturbance such as erosion, pollution, or fire causing other species to perish, the tree is known for aggressively colonizing those soils, being one of the first species to grow there. It is an extremely resilient plant species. Observing the growth patterns of Tamarack trees can signify unique traits of an ecosystem such as disturbances to a wetland or other historic climatic events.



⋮ Small wetland at the headwaters of Doe Run, a mountain... 🗉



Each tamarack species prefers distinct growing conditions. In the Pacific Northwest, long swaths of gold needles from Western Larch (*Larix occidentalis*) cover the sunny mountainsides, depending on snowmelt to carry nutrients and water to its roots in early summer. The Tamarack, or American Larch (*Larix laricina*), can be found in wet soil along wetlands and bogs across the Northern Hemisphere in Canada and the northeastern United States. Its prominent Asian counterparts are *Larix siberica*, which has inhabited the Northern taiga in Siberia, and *potaninii* and *kaempferi*, found in the temperate forests in China and Japan, respectively.<sup>10</sup>



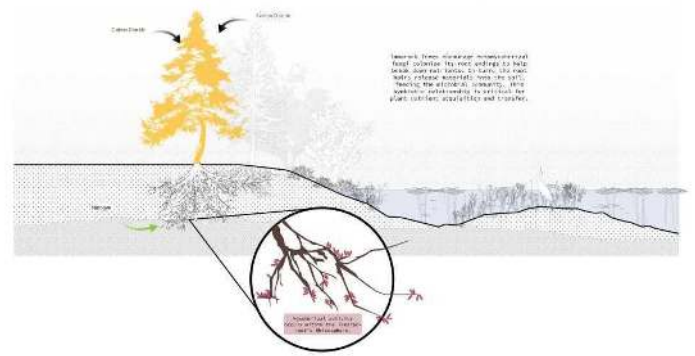
⋮ Larix americana ⌂ ⋮ Larix specimen from the Smithsonian. ⌂ ⋮ Japanese Larch, cone and needles. ⌂

Larches grow old, but not alone. Like most forest trees, the Larch is part of a network of living systems. Even though most live for about 200 years, and the European Larch has been reported to live as long as 2,000 years, almost all grow among other tree species. They often grow in pure stands and occasionally as an understory tree to other conifers. Insects and small mammals consume the tree's bark and needles. Often, ospreys will choose to nest in its crown.



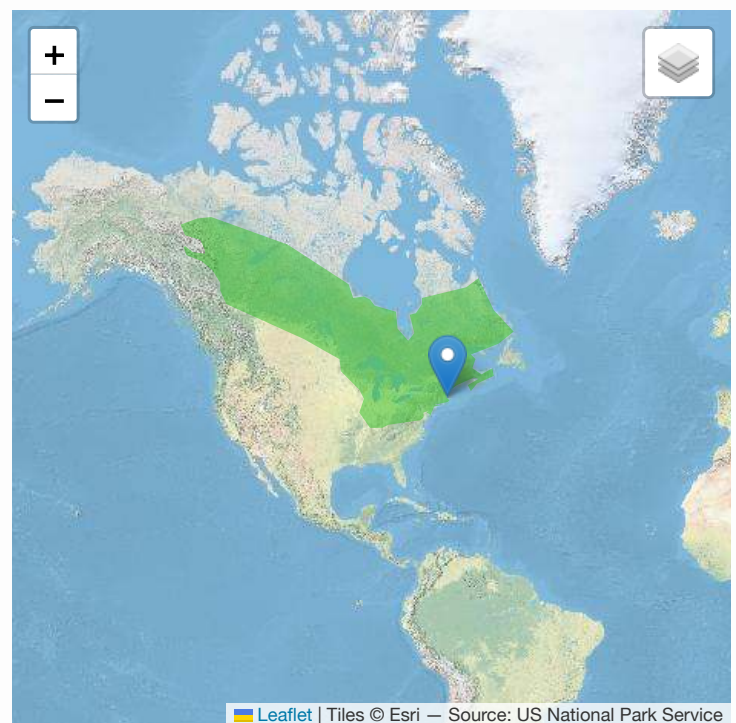
⋮ Swipe across images to view the conditions of the... ⌂

Among the three North American species, [ectomycorrhizal fungi](#) are often found burrowing in their tree roots; these microorganisms are essential for 90 percent of all temperate and boreal forest trees for nutrient cycling, plant health, decomposition, and carbon sequestration.<sup>11</sup>



⋮ Ectomycorrhizal Activity within 1-2mm of soil directly... 🗨

One need not look far into New England's temperate forests in the fall before seeing the golden cloak of Tamarack needles. In an urban context, 169 Larches representing six species, including the Tamarack, currently thrive at the [Arnold Arboretum](#) in Boston. The Arboretum has documented each of the trees' provenance, tracing their place of origin as a seed from Siberia, Mongolia, and Russia to Western Sichuan, China, to Central Europe and the Pacific Northwestern United States. Many of the trees arrived as seeds, shipped from other continents in the 1800s to exhibit *Larix's* diversity of species. Botanists were confident these non-native species would thrive alongside the Tamarack in the New England climate due to similar growing conditions in east Asia.<sup>12</sup>



⋮ Natural Growth Dispersal of the Tamarack, *Larix laricina*. 🗨

# Western Botanical Documentations of Tamarack

Early European travelers' accounts sometimes referred to the medicinal properties of the Tamarack in North America before Linnean classification became the standard in the eighteenth century. John Josselyn, an English traveler and physician, recorded medicinal uses of the tree while recording species of plants in America. "The Turpentine that issueth from the Cones of the Larch-tree ... is singularly good to heal wounds, and to draw out the malice of any Ach," recalls Josselyn in his travel record, *An Account of two Voyages to New England*, in 1674.<sup>13</sup> "Groundsels made of Larch-tree will never rot ... Oh, that my Countreymen might obtain that blessing with their buildings," he writes of the benefits of using the tree for timber.<sup>14</sup> Josselyn's account also preserves some Indigenous knowledge of North American trees recorded at the time by white settlers.



Wikimedia Commons

Cones on larix decidua 'Little Bogle'

## WHAT'S IN A NAME?

An etymology of the Larch tree



LARIGNUM: THE  
VILLAGE THAT  
WOULDN'T BURN

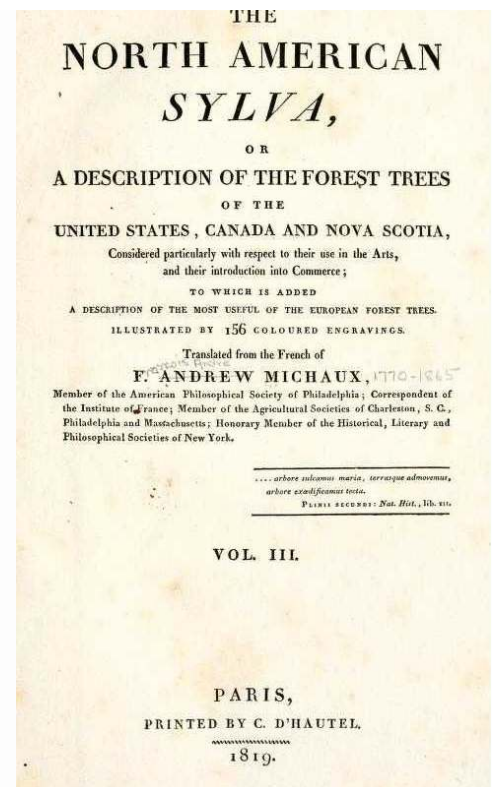


Larignum:  
The Village  
that...

TimelineJS

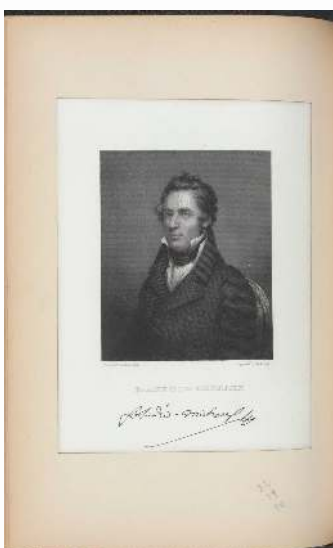


Several Western botanists who traveled the globe attempted to document and classify all species of Larch trees, including the Tamarack. North America was of particular interest, and between 1768 and 1900, several scientists published taxonomies of the trees native to the continent. Such publications, however, seldom included information about traditional ecological knowledge or Indigenous knowledge about plants.<sup>15</sup>



⋮ The North American sylva, or A... ⌂

The first classification of North American Larch trees in botanical science dates to when French botanist André Michaux traveled to the newly formed United States in 1785, with a mission of bringing trees home constructing ships for the French Navy.<sup>16</sup> Following in his father's footsteps, Francois André Michaux became a successful botanist and traveler, who continued to document American plant life.<sup>17</sup> He published *The North American Sylva; or, A Description of the Forest Trees of the United States, Canada, and Nova Scotia*, in three volumes.<sup>18</sup> Francois André later managed farmland in France, pursuing his interest in the cultivation of trees grown from the seeds he collected in North America. The work of both father and son provided a strong base upon which American botanists were to build scientific knowledge of *Larix* species for the next century.



⋮ Francois-Andre...



⋮ Illustration of *Larix*...



Enter Charles Sprague Sargent, a leading American botanist, conservationist, and educator, whose work in taxonomizing North American plants became essential to introducing the North American public to the trees that were not native to New England. In 1873, Sargent became the [first director of the Arnold Arboretum](#). He sought to protect American forests from lumber harvesting and worked alongside landscape architects and city planners to ensure the future of the trees at the Arboretum. Sargent followed his predecessors in the field of western botany to categorize and document plants for the larger purpose of expanding plant knowledge in the United States, as reflected in his landmark publication, *The Silva of North America: a description of the trees which grow naturally in North*

*America exclusive of Mexico*.<sup>19</sup> As the work's scope was scientific, it included minimal cultural references, although Sargent was familiar with John Josselyn's travelogue, as a footnote in *Silva* indicates. With "untiring zeal and energy," Sargent worked to introduce to the United States tree species from China, Siberia, Mongolia, Japan, Korea, Tibet, and Nepal through a series of expeditions led by experienced plant collectors to whom he outsourced his work.<sup>20</sup> What survives of these expeditions are the species that make up the [living collection at the Arboretum](#).

Sargent's interest in Asian species was primarily scientific, though he also counted on the endeavors of botanists seeking to introduce new plants to nurseries for commercial purposes. This is how he met E. H. Wilson, who had been collecting seeds for a large nursery in England called Veitch & Sons. Wilson provided much of the text for *Plantae Wilsonianae*, an account of the species native to Western Sichuan, the seeds of which Wilson sent to Sargent for the Arboretum. Many of the species that grow in Boston's soil today originated from expeditions such as Wilson's.



⋮ Charles Sprague Sargent examining plant specimens.



⋮ E. H. Wilson and his collecting team on a houseboat,...



Wilson referred to Chinese Larch (*Larix potaninii*), noting its “decidedly handsome and striking” qualities.<sup>21</sup> He writes of the tree’s practical use for construction as a valuable timber in the western Sichuan region.<sup>22</sup> As Sylvia Barry Sutton, the author of Sargent’s biography, writes: “One is thankful, finally, that it was Wilson and not Sargent who explored China, because it is unlikely that Sargent would have written about anything but the flora.”<sup>23</sup> Indeed, Wilson was interested in much more than the species itself, although he did not mention any of the traditional uses of the Chinese Larch.



⋮ Chinese Larch, *Pseudolarix kaempferi*.



## Traditional Uses of the Tamarack

“Narratives of all kinds—stories, tales, and rumors—are the stuff of ideas—concepts and hypotheses—and the stuffing of history,” write the authors of *Dirt*.<sup>24</sup> But how do we cite, record, and archive oral histories, especially when such stories have been nearly eradicated through colonial and extractive forces? The Tamarack tree, as a living archive, could be one answer. Indigenous groups and shamans have harnessed its bark, sap, and needles for medicinal purposes for over 3,000 years. The long, spindly form of *Larix siberica* has ties to spiritual worlds of nomadic groups in northern Asia, and local water management organizations have recognized the Tamarack for its role in stabilizing wetlands across the midwestern United States.<sup>25</sup>




⋮ Needles growing from the branch of a Western Larch,...






In addition to its medicinal uses known to both First Nations and traditional Chinese Medicine practitioners, *Larix* is a subject of living legends that reflect traditional lifestyles and plant knowledge.<sup>26</sup> Across the Pacific, the world's largest taiga stretches across Siberia from the Ural Mountains to the Pacific Ocean. Historians have postulated that the Siberian Larch holds great spiritual power to groups of people living in the region, and is the connection between their spiritual and physical worlds through studying illustrations that were drawn on drum heads.<sup>27</sup> Since as early as 600 CE, the Evenki people, nomadic groups of three to ten immediate families indigenous to northern Siberia, Mongolia, and eastern China, revered the Larch tree for its practical uses and spiritual meaning. In the winter, they use its needles for insulation inside shelters as protection from the frozen ground. They use the timber for crafting ceremonial sculptures, such as carvings of birds that sit atop a "spirit pole" at the residence of a shaman to signify the connection between the human and spirit worlds.<sup>28</sup>



⋮ Siberian Larch, *Larix sibirica* in autumn colour with a... 

*Tuuru* translates to "world tree" in the Indigenous Siberian Evenki Tungus language.<sup>29</sup> The Evenki people believe that *Tuuru* connected their three worlds: the upper world, where deities and spirits of nature resided, the middle world, inhabited by humans, and the lower world, home to spirits of the dead. Siberian Shamans believe that the tree is the bridge that connects them to the three worlds.<sup>30</sup> Perhaps the Siberian Larch is chosen for its grittiness, its strength to survive the harsh taiga, or for its fire-resistant bark. While it is not clear why Evenki Shamans chose the Larch tree, the practice of selecting a tree as symbolic of worldviews is common among many shamanic religions.



⋮ The Buryats and Yakut People of Siberia place hitching... 

Shamanic traditions that center on the Larch tree continue today, including securing ribbons to the tree trunk to symbolize a myriad of offerings for the spirits.<sup>31</sup> Thousands of Siberian Larches dot the shores of Lake Baikal, where the Buryat people live, another nomadic clan in the Siberian region. Their offerings are tied to the ancient tree's branches, reaching toward the sun in search of nutrients, and passing down knowledge from the spirits above.



⋮ Spiritual poles on lake Baikal in Khuzhir, Russia.



The North Asian Reindeer-Evenki are a small nomadic group of 200 people whose culture is in danger of extinction. They continue to practice traditional ways of life including having their shaman as a “mediator between human society and the world of spirits.”<sup>32</sup> Under shamans’ leadership, the clan, or *kala* in Tungus northern dialect, developed a system of beliefs whereby the spirits of the upper world cause all events in nature, including births and deaths.<sup>33</sup> *Tuuru* is the physical symbol of how the spirits travel between worlds and is, therefore, one of the cornerstones of Evenki cosmology.



⋮ Pictured is Valentin Hagdaev - the head shaman of Olkh...





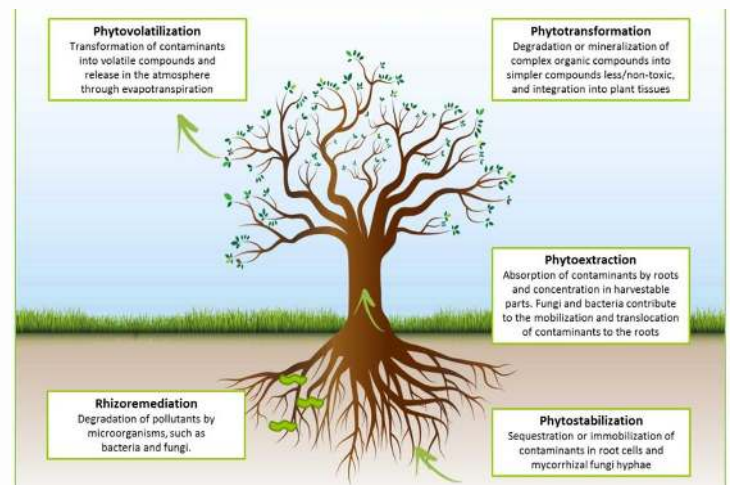
## Design Considerations

Traditional practices ultimately protect ecosystems by forging a strong connection of people with place through an understanding of plant relationships.<sup>34</sup> Consider how the spiritual practice of Ojibwe storytelling may impact the daily practice of protecting the value of wetlands, lakes, and the species that thrive there. The [Tribal Council of the Leech Lake Band of Ojibwe](#)'s Division of Resource Management and Environmental Lands Department lists resources and information about wetland health and protection on its website for local landowners to reference and to encourage wetland restoration on the Leech Lake Reservation in northern Minnesota.<sup>35</sup> While there are no direct mentions of the Tamarack, their website lists the importance of healthy wetlands, including how vegetation along agricultural areas has aided in containing excess phosphorus and nitrogen from runoff water.<sup>36</sup>

If we consider the Tamarack as a wetland stabilizer that aids in phytoremediation, associating the tree with values of reciprocity can further generate values and respect for our wetland ecologies, which can catalyze efforts to restore and preserve this important landscape typology. When considered alongside Western botanical studies, the two sources of knowledge have very different perspectives to offer. In using texts such as Charles Sargent's *Silva of North America* to identify the Tamarack, and in considering the spiritual meaning of the species for shaman rituals, a sense of place can be understood more meaningfully as a complex network of individuals coexisting in places that are unique to the climate, species, and rituals of that area.



Wetland areas in northern Minnesota with developed...



Phytoremediation, the practice of utilizing plant material ...



Traditional knowledge practices teach us more about plants than just their medicinal and other practical uses. They teach us about our **relationship with larger ecological systems**. They relate us to place. Through oral traditions like the Ojibwe legend about the tamarack, we begin to understand the spiritual meaning of the species, and the place that it occupies in the worldview of Indigenous communities. Through a single species, we begin to understand the symbiotic patterns of the relationship between humans and plants. This deeper understanding can also shift our perspective on the meaning and purpose of designed spaces.

Design can represent the relationships between plants and by grouping certain species or making connections by storytelling through plants. The key to using plants as the catalyst in the design process is that it must acknowledge the role of the people whose stories are being told. The design may be the agent, but the people are the protagonists. If one were to tell the story of the Tamarack through design, it should be built around the living stories, past and present, about this tree.

The beautiful colors of Tamarack that are catalyzed by the seasonal cycle of decay and renewal make it an atypical choice for design projects. Yet, there are potential opportunities to consider the tree as a symbol to encourage wetland habitats across New England. Tamarack tree forests usually have a dense herbaceous layer and a somewhat full shrub layer, contributing to a rich ecosystem along riparian zones.



⋮ 3000-year-old solutions to modern problems | Lyla June |...



⋮ Larch trees in fall at Mar Bleue Bog, Southern Ontario.



⋮ A planting design that benefits the ecosystem and creat...





Additionally, wetland habitats in the United States have been historically filled in to transform marshes into fields to sustain crops. At the time of European settlement, the United States had 221 million acres of wetlands. Generally viewed as wastelands in the 1700s, wetlands were drained by early colonizers by constructing ditches and rerouting waterways into canals to navigate to western regions.<sup>37</sup> This manipulation of American watersheds continued through the Industrial Revolution and increased sharply in the 1900s through government-supported rebate programs for farmers for building levees, water-diversion projects, and dams. By the 1980s, 50 percent of these wetlands had disappeared.

Wetlands are incredibly biodiverse ecosystems that sustain the ecological health of each region. They enhance water quality, control erosion, sequester carbon, and provide crucial habitat for threatened species.<sup>38</sup> The protection of American wetland regions began in the 1950s, slowly gaining pace; in the 1980s, federal agencies aided in restoring 90,000 acres in just three years. Tamaracks create a unique sense of place with their seasonal changes of color and dynamic dropping of needles in dense, marshy groves. A Tamarack growing at the water's edge can also signify abundant moisture in the soil. Observing the conditions of a Tamarack and the distinct manners in which it grows can tell us a great deal about its larger environment and its role in the wetland ecosystem.



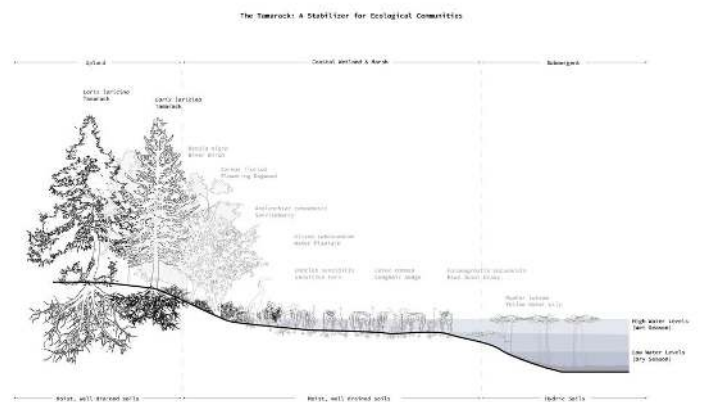
⋮ Larch from The Park and the Forest, 1841 lithograph.



⋮ Columbus Bog (also Sulphur Spring Bog), a part of the...



Due to these characteristics, the Tamarack could be the poster child of wetland restoration within the design disciplines. The associations it builds with soil, water, climate, and people are at the core of creating a functional and thriving wetland ecosystem. Drawing from Ojibwe stories about the Tamarack can incite a level of reciprocity and acknowledging the tree's role in a larger living network of beings, one which designers should protect and curate for the health of future wetland landscapes. To conserve marshes along the eastern coast and Great Lakes regions of the United States, the Tamarack could help highlight the significance and history of these landscapes.



⋮ The Tamarack as a stabilizer for ecological communities.... 📐



## References

1. Anne M. Dunn is a storyteller and descendant of the Ojibwe people. Her book, *Fire in the Village*, includes many short stories that are a mixture of traditional Ojibwe tales and modern storytelling, preserving an Indigenous perspective on the reciprocal understanding among living systems that predates Western botany. Anne M. Dunn and A. Humphrey, *Fire in the Village: New and Selected Stories* (Duluth, Minnesota: Holy Cow! Press, 2016), 14–15. The story is also recorded online by KKWE Nijii Radio, a community-based radio station located in White Earth, Minnesota, aimed to revitalize Native American cultures and traditions. “Chickadee Story,” *Dibaajimowin: Stories from the Anishinaabe Akiing*, PRX, <https://beta.prx.org/stories/110294>. ↪
2. Gertrude Jekyll, *Wood and Garden: Notes and Thoughts, Practical and Critical, of a Working Amateur* (London: Longmans, Green, and Co., 1899). ↪
3. Nora Livesay, ed. *The Ojibwe People's Dictionary*, <https://ojibwe.lib.umn.edu/search?utf8=%E2%9C%93&q=tamarack&commit=Search&type=english>. In Potawatomi, Tamarack is called *manbemesh* and in the Algonquin language, *menahekwa*. *Proto-Algonquian Dictionary*, <https://protoalgonquian.atlas-ling.ca/#!/results>. These two nations have lived regionally close to the Ojibwe people, in the Great Lakes region and Quebec, Canada, respectively, though the United States Army forcibly removed each nation from their homelands in the 18th and 19th centuries, causing families to relocate. ↪
4. Technically speaking, tamarack is the common name for only the Eastern/American larch, not any other species. The name tamarack is said to be derived from a mispronounced Algonquian word, *akemantak*, then *hackmatack*, meant to have been translated as “wood used for snowshoes,” though when and where this conflation occurred is unclear. Looking for the original word from one of the Algonquian languages is difficult. *The Ojibwe People's Dictionary* translates a similar word, *aagimaak*, as “white ash,” though it gives *mshkiigwaatig* for tamarack. In Ojibwe, the word for tree, plant, and wooden frame, among other meanings related to human uses of lumber, is *aatigw*. “Aagimaak,” *The Ojibwe People's Dictionary*, <https://ojibwe.lib.umn.edu/main-entry/aagimaak-na>; *Nishnaabemwin: Odawa & Eastern Ojibwe Online Dictionary*, <https://dictionary.nishnaabemwin.atlas-ling.ca/#!/results>. See also *hackmatack*. “Hackmatack,” *Merriam-Webster Dictionary*, <https://www.merriam-webster.com/dictionary/hackmatack>. ↪
5. Like the Ojibwe, the Potawatomi are an Anishinaabe tribe native to the Great Lakes Region. Originally one people, the Ojibwe, Ottawa, and Potawatomi split after the Anishinaabe reached Mackinac Island on their migration west from the Atlantic coast. ↪
6. Robin Wall Kimmerer, “Roundtable on Plant Humanities,” a lecture series with Felix Driver, William Friedman, Jessica B. Harris, and Londa Schiebinger, moderated by Yota Batsaki. Plant Humanities Conference at Dumbarton Oaks Research Institute, Washington, D.C., September 15, 2022. <https://www.doaks.org/events/plant-humanities/2022-plant-humanities-conference>. ↪
7. In *Sacred Ecology*, Fikret Berkes suggests that “the study of traditional ecological knowledge begins with the study of species identifications and classification (ethnobiology) and proceeds to considerations of peoples’ understandings of ecological processes and their relationships with the environment (human ecology).” To Berkes, traditional ecological knowledge implies three main components: local-based knowledge of the environment, practices such as agriculture, and beliefs defining people’s interactions with nature. Fikret Berkes, *Sacred Ecology: Traditional Ecological Knowledge and Resource Management* (Philadelphia, PA: Taylor & Francis, 1999), 6. ↪
8. Scientists recognize ten to fifteen species, with some debate on the interrelated details within the genus: *Larix griffithii*, *Siberica*, *Potaninii*, *Kaempferi*, *Himalaica*, *Mastersiana*, *Gmelinii*, *Laricina*, *Decidua*, *Occidentalis*, *Lyalli*. ↪
9. Pine trees on average have a crop of pinecones every three to seven years. U of M Extension Master Gardeners in St. Louis County, “Ask a Master Gardener: Weather influences pine cone production,” *Duluth News Tribune*, April 16, 2021, <https://www.duluthnewstribune.com/lifestyle/ask-a-master-gardener-weather-influences-pine-cone-production#:~:text=a%20hot%20fire-Pine%20trees%20don't%20produce%20the%20same%20number%20of%20cones,reproduction%20and%20produce%20more%20cones>. ↪
10. The Dahurian Larch (*Larix dahurica*) can thrive above permafrost, the European Larch (*Larix decidua*) is more resistant to pollutants in urban environments, and the advantageous Subalpine Larch (*Larix lyallii*) prefers rock outcrops at an elevation of 7,500 feet in the alpine tundra, higher than any other North American tree species. “Southern Research Station,” *Forest Service: U.S. Department of Agriculture*, [https://www.srs.fs.usda.gov/pubs/misc/ag\\_654/volume\\_1/Larix/lyallii.html](https://www.srs.fs.usda.gov/pubs/misc/ag_654/volume_1/Larix/lyallii.html). ↪
11. “Ectomycorrhizal symbiosis,” *Microbe Wiki*, [https://microbewiki.kenyon.edu/index.php/Ectomycorrhizal\\_symbiosis#cite\\_note-deeper-1](https://microbewiki.kenyon.edu/index.php/Ectomycorrhizal_symbiosis#cite_note-deeper-1). ↪
12. In 1859, Asa Gray, Professor of Botany at Harvard and a correspondent of Charles Darwin, put forward his idea of “biographical disjuncts” to explain why plant species that were native to North America were so morphologically similar to those of Japan. This is an example of the earliest applications of Darwin’s evolutionary theory before his publication of *The Origin of Species*. Kuang-Chi Hung, “‘The Place That Offers the Greatest Interest’: Northeast Asia and the Making of Asa Gray’s Disjunction Thesis,” *Harvard Papers in Botany* 15, no 2 (2010): 231–50. <https://doi.org/10.3100/025.015.0206>. ↪
13. John Josselyn, *An Account of Two Voyages to New England* (London: Printed for Giles Widdows, 1674), 67. ↪

14. To trace the name *Larix* even further, during the first century BC, Roman architect Vitruvius provided an account of Caesar assaulting a town whose towers were made of larch wood. The stronghold's name was *Larignum*, which explains how the larch tree genus received its name *Larix*. Marcus Vitruvius Pollio, *The Ten Books of Architecture, Book II* (Torino: Giulio Einaudi, 1997). ↩
15. For the exclusion of Indigenous knowledge by western science, and more recent advocacy of its inclusion, see the National Park Service Database on Traditional Ecological Knowledge, which cites many Indigenous voices. "Indigenous Knowledge and Traditional Ecological Knowledge," *National Park Service*, <https://www.nps.gov/subjects/tek/tek-vs-western-science.htm>. Kerstin Knopf, "The Turn Toward the Indigenous: Knowledge Systems and Practices in the Academy," *Amerikastudien/American Studies* 60, no 2/3 (2015): 179–200, <http://www.jstor.org/stable/44071904>. ↩
16. André Michaux became a prominent botanist in the United States. He built a relationship with Thomas Jefferson, which enabled him to travel west to botanize, or "herboriser," as he frequently described his work in his travel journals. According to historian Elizabeth Hyde, Michaux was spending time in the field to "know" the plants, not only to identify them, but also to classify and collect, sharing his findings with the larger scientific community. He was one of the first botanists in the United States to do this, and his work would influence the development of French gardens and forests into the nineteenth century. Elizabeth Hyde, "'The Neighborhood Would Be Very Interesting for a Botanist to Visit,' or André Michaux, French Botanist in the American Field," *Journal of the Western Society for French History* 46 (2018), <http://hdl.handle.net/2027/spo.0642292.0046.003>. ↩
17. Francois André Michaux, *The North American sylva; or A description of the forest trees of the United States, Canada, and Nova Scotia: considered particularly in respect to their use in the arts, and their introduction into commerce; to which is added a description of the most useful of the European forest trees* (Philadelphia: Robert P. Smith, Philadelphia, 1853), [https://www.biodiversitylibrary.org/bibliography/118984?utm\\_medium=social%20media&utm\\_source=blogger&utm\\_campaign=Book%20of%20the%20Month&utm\\_content=Smithsonian%20Libraries](https://www.biodiversitylibrary.org/bibliography/118984?utm_medium=social%20media&utm_source=blogger&utm_campaign=Book%20of%20the%20Month&utm_content=Smithsonian%20Libraries). Predating Michaux, the larch tree had been identified in Europe by English botanist Philip Miller, who published its descriptions in *The Gardeners Dictionary* in 1768, and German-Estonian botanist Carl Frederich Ledebour, who authored *Flora Altaica* in 1833. ↩
18. Originally published in French in 1810, and later in English in 1817, this publication was enhanced with the work of botanist Thomas Nuttall in the 1850s. The text was one of the first references to American trees west of the Mississippi River. Michaux, *The North American sylva*, [https://www.biodiversitylibrary.org/bibliography/118984?utm\\_medium=social%20media&utm\\_source=blogger&utm\\_campaign=Book%20of%20the%20Month&utm\\_content=Smithsonian%20Libraries](https://www.biodiversitylibrary.org/bibliography/118984?utm_medium=social%20media&utm_source=blogger&utm_campaign=Book%20of%20the%20Month&utm_content=Smithsonian%20Libraries). ↩
19. Charles Sargent and C.E. Faxon, *The Silva of North America: a description of the trees which grow naturally in North America exclusive of Mexico, Volume XII* (Boston: Houghton, Mifflin and Company, 1891). ↩
20. Alfred Rehder, *Manual of cultivated trees and shrubs hardy in North America: exclusive of the subtropical and warmer temperate regions* (New York: Macmillan, 1927). ↩
21. *Plantae Wilsonianae*, 19. ↩
22. *Plantae Wilsonianae*. ↩
23. Sylvia Sutton, *Charles Sprague Sargent and the Arnold Arboretum* (Cambridge: Harvard University Press, 1970), 220. ↩
24. Megan Born, *Dirt, Vol. 2* (Cambridge, MA: MIT Press, 2012). ↩
25. "Faces of Wetlands: Tamarack," Vadnais Lake Area Water Management Organization, [www.vlawmo.org/news/blog/faces-wetlands-tamarack/](http://www.vlawmo.org/news/blog/faces-wetlands-tamarack/). ↩
26. Resin from the Tamarack's bark has been used in Traditional Chinese Medicine to help heal wounds, cuts, and brewed into a tea to help with sore throats. The Golden Larch, or *Pseudolarix amabilis*, is one of fifty fundamental herbs in Traditional Chinese Medicine recognized by specialists who incorporate 3-000-year-old remedies from Eastern Medicine into their modern practice. *Pseudolarix amabilis* - "jīn qián sōng (金钱松)" - is used as a dermatologic antifungal remedy. Dr. Wang Skincare Education Team, "The 50 Fundamental Herbs of Traditional Chinese Medicine," Dr. Wang Herbal Skincare, <https://www.drwangskincare.com/blogs/news/the-50-fundamental-herbs-of-traditional-chinese-medicine>; "Traditional Chinese Medicine: What You Need to Know," National Center for Complementary and Integrative Health, <https://www.nccih.nih.gov/health/traditional-chinese-medicine-what-you-need-to-know>. ↩
27. "Parts of a Story of a World Picture," Center for the Philosophy of Nature and Science Studies (CPNSS) at the Faculty of Science, University of Copenhagen, <https://www.nbi.dk/~natphil/Siberian.html> ↩
28. "Evenki Shamanism," Museum of Archaeology and Ethnology, Simon Fraser University, <https://www.sfu.ca/archaeology/museum/exhibits/virtual-exhibits/russian-traditional-village-life/evenki-shamanism.html>. ↩
29. Kevin Schuster, "A traditionally shamanistic culture: Investigation the cosmological belief-systems of Evenki hunter-gatherers in Siberia," *Hexenkunde*, February 14, 2023, [hexenkunde.com/a-traditionally-shamanistic-culture-investigating-the-cosmological-belief-systems-of-evenki-hunter-gatherers-in-siberia/](https://hexenkunde.com/a-traditionally-shamanistic-culture-investigating-the-cosmological-belief-systems-of-evenki-hunter-gatherers-in-siberia/). ↩
30. F. Georg Heyne, "The Social Significance of the Shaman among the Chinese Reindeer-Evenki," in *Shamans in Asia*, ed. Clark Chilson and P. Knecht (Abingdon, UK: Routledge, 2003), 31, <https://doi.org/10.2307/1179101>. ↩



31. Aleksandra Wierucka, "Modern Forms of Buryat Shaman Activity on the Olkhon Island," *Anthropological Notebooks* 19, no 3 (2013): 101-119. [↩](#)
32. Clark Chilson, *Shamans in Asia*, 32. [↩](#)
33. Aado Lintrop, "The Great Oak and Brother-Sister," *Folklore* 16 (2001): 35-58, doi:10.7592/FEJF2001.16.oak2. [↩](#)
34. One example is a collective that aims to restore the declining harvests of wild rice in the Midwest, named "Kawe Gidaa-naanaagadawendaamin," which translates from Ojibwe to "We must first consider wild rice." "State of Water: Protecting and Understanding Wild Rice, Sacred to Ojibwe People," *CBS News*, accessed September 4, 2024, <https://www.cbsnews.com/minnesota/news/state-of-water-addressing-the-environmental-impacts-on-wild-rice-sacred-to-ojibwe-people/>. [↩](#)
35. "Wetlands, Lakes & Streams," Division of Resource Management, Leech Lake Band of Ojibwe, accessed September 4, 2024, <https://www.llojibwe.org/drm/environmental/wetlands.html>. [↩](#)
36. "Wetlands, Lakes & Streams." [↩](#)
37. Vittoria Di Palma offers a critical stance on how emotions of disgust and contempt were assigned to landscapes such as bogs, swamps, and forests in eighteenth-century England. Vittoria Di Palma, *Wasteland: a History* (New Haven: Yale University Press, 2014). [↩](#)
38. "Why are Wetlands Important?," National Park Service, <https://www.nps.gov/subjects/wetlands/why.htm#:~:text=Wetlands%20are%20highly%20productive%20and,all%20threatened%20and%20endangered%20species>. [↩](#)

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