PROPERTY PLANNING COMMON ELEMENTS

COMPONENTS OF MASTER PLANS

HABITATS AND THEIR MANAGEMENT

Tamarack

Description

This page describes management of tamarack, a forest type that occurs statewide, with southern and northern types. It is comprised of >50% swamp conifers with tamarack predominating. Tamarack is Wisconsin's only native deciduous conifer. It is a short-lived species, shallow-rooted, and reproduces from seed on favorable substrates which historically were created by wildfire. Tamarack is a pioneering species, fast-growing and shade-intolerant, and may form relatively pure stands after natural disturbances such as flooding, severe windthrow, drought, or severe insect infestations, especially when these are followed by fire. The southern and northern types are described below.

Southern Tamarack

Tamarack stands in the south are uncommon and increasingly rare, found mostly in southeastern and south-central Wisconsin due to their southern range limit. Their rarity makes them very valuable for many species. Tamarack swamps in the south occur in poorly drained parts of formerly glaciated regions, often on ground moraine, lake plain or outwash landforms but sometimes in kettles. They are similar to tamarack swamps in the north but less acidic, supporting understory associates that are more nutrient-demanding and tolerant of higher pH levels. These stands are basically remnant northern forests that have persisted in the fire-prone southern Wisconsin landscape since the early post-glacial period when northern forests dominated the landscape. Tamarack is the dominant tree, with red maple, white birch, black ash, green ash, and American elm present as associates, sub-canopy trees, or saplings. The tall shrub layer can be diverse and well developed. Poison sumac is the most common and abundant species, but speckled alder, mountain holly, common winterberry, dogwoods, and willows also occur. Grasses and sedges such as lake sedge, fringed brome, and bluejoint grass occur in the ground layer along with a moss layer that is variable, often patchy, discontinuous, and composed of many genera other than *Sphagnum*. Stands fed by spring seepage sometimes support species such as marsh-marigold, cinnamon fern, royal fern, and skunk-cabbage. Many tamarack swamps in the south were drained, cleared, and converted to muck farms during the first half of the 20th century, and existing stands have been degraded by altered hydrology, pollution and sedimentation, excessive groundwater withdrawals, and infestations of invasive plants.

Northern Tamarack

Tamarack in northern Wisconsin is widespread and moderately common. It is weakly to moderately minerotrophic and occurs in depressions on poorly drained outwash plains, glacial lakebeds, and ground moraine, or, in smaller stands, in glacial kettles. Larger stands can cover hundreds of acres and sometimes occur in peatland complexes of several communities that are much larger in extent. Tamarack is the dominant tree, growing in stands that often are even-aged, with a broken to closed canopy. Coniferous associates include black spruce, northern white-cedar, balsam fir, and, less commonly, white spruce or white pine. Deciduous species such as black ash, yellow birch, white birch, or red maple are sometimes present and can be important in some stands.

The tall shrub layer is variable in density and composition and includes members of the heath family as well as speckled alder, common winterberry, mountain holly, alder-leaved buckthorn, bog birch, swamp fly honeysuckle, cranberry viburnum, and several gooseberries and currants. Ericaceous shrubs such as Labrador tea and blueberries are sometimes present. A variety of sedges, grasses, and mosses are present in the ground layer. Stands with spring seepage can have species like marsh-marigold, skunk-cabbage, and swamp saxifrage in the understory. Tamarack has declined in the north due to hydrologic disruption, logging of mature trees, fire, outbreaks of native and non-native insects, and succession to other cover types in the absence of fire.

Ecological Landscape Opportunities

Ecological Landscape	Opportunity*	
	Southern Type	Northern Type
Central Lake Michigan Coastal		P
Central Sand Hills	I	M
Central Sand Plains	P	M
Forest Transition	P	M
North Central Forest		M
Northeast Sands		I
Northern Highland		M
Northern Lake Michigan Coastal		P
Northwest Lowlands		M
Northwest Sands		M
Southeast Glacial Plains	M	
Southern Lake Michigan Coastal	I	
Superior Coastal Plain		I
Western Coulee and Ridges	I	P
Western Prairie		P

M = Major; major opportunity exists in this Landscape; many significant occurrences are recorded, or restorations likely to be successful.

I = Important; several occurrences important to maintaining the community in the state occur in this Landscape.

P = Present; community is present in the Landscape but better opportunity exists elsewhere.

Rare Species

Many Species of Greatest Conservation Need (SGCN) are associated with tamarack swamps throughout Wisconsin based on the findings in Wisconsin's 2015 Wildlife Action Plan. To learn more, visit the Southern Forest communities page and click on 'Southern Tamarack Swamp" and on the Northern Forest communities page and click on "Northern Tamarack Swamp".

Threats

- Altered hydrology is a primary threat to tamarack. Ditching, diking, draining, diversion of polluted water, and excessive groundwater withdrawals have disrupted natural hydrology in tamarack swamps throughout the state, resulting in loss of tamarack and, where swamps have been drained and cleared, the drying, erosion, or oxidation of exposed muck soils. Pollution and sedimentation degrade water quality.

- Tamarack is very fire-sensitive, and fire can lead to loss of tamarack. However, fire historically has been a key part of the disturbance regime for tamarack, producing the mineral seedbed tamarack needs to regenerate, and fire suppression has been detrimental to tamarack persistence. In the absence of fire, senescing stands may succeed to tall deciduous shrubs or trees like white birch and red maple. Even stands that have been disturbed by other forces such as wind, ice, hail, beaver activity, or insect infestation may not regenerate to tamarack without fire (or another disturbance) to provide a suitable seedbed with minimal competition.
- Non-native invasive plants such as glossy buckthorn, common buckthorn, purple loosestrife, narrow-leaved cattail, giant reed, and reed canary grass are a threat to tamarack.
- Tamarack is vulnerable to several insect pests, particularly larch sawfly, a species that may or may not be native to North America, which can cause the death of mature trees. Another exotic insect, larch casebearer, does not seem to result in death of trees although growth rates may be affected.
- Many tamarack stands in southern Wisconsin are now isolated from other natural communities by large expanses of agricultural or developed land and may lose species with poor dispersal capabilities. This landscape position also renders them more vulnerable to detrimental impacts from these surrounding land uses (sediment or nutrient inputs, invasion by exotic species, etc.).
- Management of tamarack on a given site can be challenging due to its sensitivity to environmental changes (e.g., water level fluctuations) and changes in fire regime and it vulnerability to insect pest outbreaks. Reasons for the failure of management to result in regeneration are not always clear.
- While tamarack is projected to undergo only low to moderate decreases in habitat suitability as a result of climate change, it is considered to have low adaptability due to its requirements for a cold climate and its vulnerability to drought, fire, and insect outbreaks.

Management Techniques

- Clearcut (progressive strip)
- Overstory removal
- Patch selection
- Passive management
- Seed tree
- Shelterwood
- Direct seeding and planting
- Site preparation
- Pesticide treatments
- Prescribed fire

Management Considerations

- Wherever possible, manage tamarack as part of a complex of related and interconnected forest and wetland habitats.

- Protect and maintain large and/or high-quality examples of tamarack swamp, particularly when adjacent to other intact habitats. Where possible, manage for larger stands, larger blocks, to increase connectivity with surrounding native habitats, and to soften sharp transitions between habitat types.
- Where possible, use buffers to protect tamarack from negative impacts of surrounding land uses (e.g., sedimentation, pollution).
- Carefully consider both landscape (watershed; surrounding land uses and vegetation; patch size, etc.) and site (hydrology; species composition; soils and topography; stand age, etc.) features and develop a management approach based on this assessment. Use an adaptive management approach, and monitor results.
- Apply silvicultural techniques that consider effects on surrounding forests. For example, strip cutting can create high-contrast edge and minimize or eliminate larger patches of forest-interior habitat.
- Passive management may be employed for tamarack, particularly where trees are small, slow-growing, non-merchantable, or where site conditions preclude active management without damage to hydrology, soils, or wildlife habitat.
- Maintain or restore site hydrology whenever feasible.
- Use management practices that limit soil damage, erosion, sedimentation, and hydrologic changes to the stand and to adjacent areas.
- Consider using prescribed fire as a tool to aid regeneration where feasible and safe.
- Marginal stands of tamarack, particularly in southern Wisconsin, may be managed to allow conversion to another plant community if the stands are small, low-quality, and/or on sites where maintaining the stand conflicts with the objectives of a larger associated wetland community.
- Conduct timber harvests only under frozen-ground or very dry conditions to prevent rutting and soil damage and to protect site hydrology.
- Consider leaving tops and branches for further seeding opportunities from remaining cones.