

FISH STICKS

Improving lake habitat with woody structure

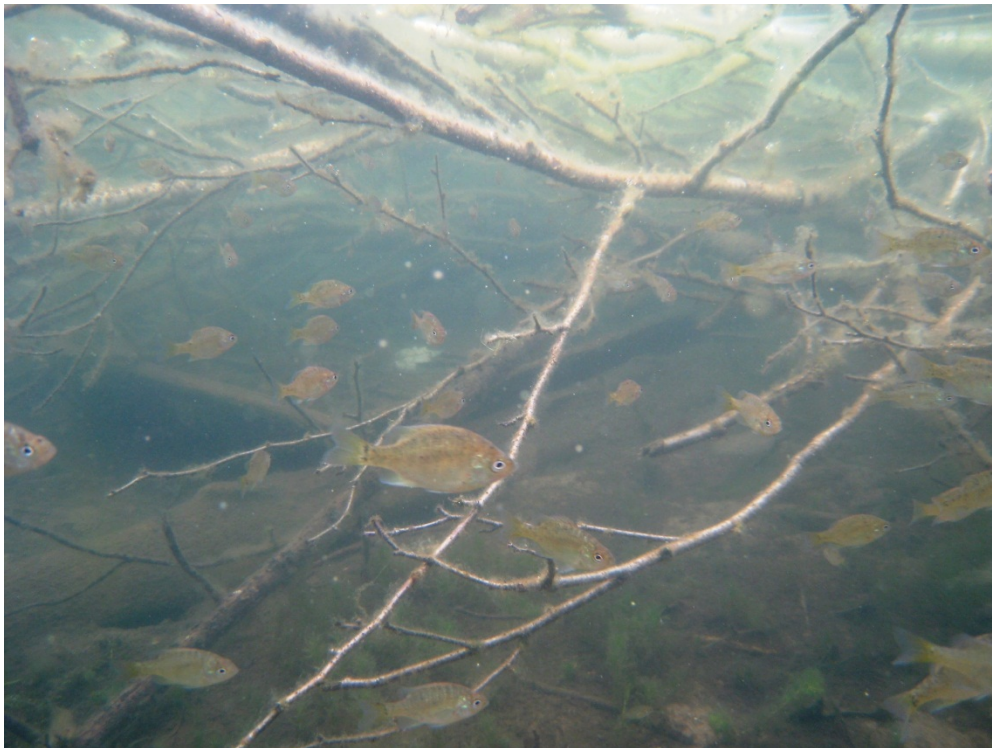


*Best Practices Manual
January 2014*

FISH STICKS BEST PRACTICES GUIDANCE

Trees have been dropping naturally into Wisconsin lakes since the glaciers receded. Until the last century, when logging and lakeshore development expanded, trees stayed where they dropped and provided excellent near-shore, or littoral zone, fish habitat. Fallen trees provide shelter and feeding areas for a diversity of fish species and may also provide nesting and sunning areas for birds, turtles, and other animals above the water. Nearly all fish species utilize woody habitat for at least one portion of their life cycle. Fallen trees add to the natural complexity of the near-shore area, which is reflected in varying habitat materials and aquatic plant communities that are rarely seen in deep water areas.

“Fish Sticks” projects are intended to restore woody habitat in lakes by adding trees to the near-shore area. They are large woody habitat structures that utilize whole trees either grouped together or single trees that result in the placement of more than 1 tree per 50 feet of shoreline. Fish Sticks structures are anchored to the shore and are partially or fully submerged near the shoreline of a lake.



This document provides general instructions to plan and complete a Fish Sticks project next to privately owned shoreline areas. For additional information, please contact your local [fisheries biologist](#).

Phase 1: Planning a Fish Sticks Project

Woody habitat is one indicator of a healthy lake. A diverse native aquatic plant community, good water quality, and natural shorelines are other indicators. Ideally, Fish Sticks projects will be considered and recommended as part of a comprehensive lake management process or plan that seeks to understand the lake's current physical, chemical, and biological conditions; integrates public participation; and recommends activities to protect and/or restore the lake's health. Fish Sticks are one of many possible activities that can be implemented to promote lake health and are best deployed as part of a comprehensive lake management plan. To learn more about developing comprehensive lake management plans, please contact your local lake or fisheries biologist.

- Who may be involved in a Fish Sticks project?
 - I. Individual lakeshore property owners who would like to increase near shore habitat complexity and lake health by dedicating a portion of their shoreline to wood additions.
 - II. Lake Associations/Districts that have management goals of improving fish and wildlife habitat at a lake scale. Often these groups help to inform property owners of the project and help to provide resources to implement the project.
 - III. Department of Natural Resources (DNR) staff who help to facilitate permitting for the project and provide grant funding sources to complete projects. Fisheries biologists may assist in identifying areas that would benefit from wood additions and review permit applications.
 - IV. County Land and Water Conservation Departments that can help implement and provide funding for projects.
 - V. Federal Agencies may opt to participate if portions of shoreline are in federal ownership; they may be able to provide funding sources from grant programs.

➤ Project Coordinator

The project coordinator may be anyone who is interested in implementing a project on a lake. Typically this is someone from a lake association or district but could also be an individual landowner or person who represents a conservation club or County Conservation Department. The project coordinator recruits property owners to participate, completes permits, plans for logistics to complete projects, and is instrumental in project implementation.

- Where should Fish Sticks projects be conducted?

Fish Sticks projects are typically conducted on lakes where the density of trees in the water is less than 200 trees/mile of shoreline (tree defined as a piece of wood ≥ 6 feet with a diameter ≥ 6 inches). They are completed in order to provide additional fish habitat, as well as to expand fishing opportunities by anglers and provide protection to shorelines.

➤ Site Visits and Marking

After initial interest from property owners is gathered by mailings, lake association meetings, or other methods, the project coordinator should meet with each property owner who wants to place Fish Sticks along their lake shore. The coordinator and property owner discuss what the project entails and determine appropriate locations along the shoreline.

It is important to keep Fish Sticks complexes away from high use areas such as docks or swimming areas and also from the property line so not to interfere with the neighbors' use of the shoreline. Consideration should be given to water depth and whether or not the property experiences ice heave. In general, water depth should be greater than 2 feet at 50 feet from shore to obtain ideal benefits from wood additions. Ice heave action is visible in the form of ice pushed up onto the banks (also called "high energy sites"). Often the property owners will know whether ice heave impacts their shoreline. If ice heave is a concern, structures should be placed with the butt end of the tree pulled 10 to 15 feet landward and cabled directly to a tree. This will help the structure remain in place if ice heave does occur. When in a bay or area not exposed to ice heave the butt ends can be placed at the toe of the bank ("low energy sites"). See Appendix A for design examples of how to place trees.

After appropriate Fish Sticks project sites are identified by the landowner, the sites should be flagged with marking tape at each end of the shoreline where trees will be added. This gives the installation crew an easy location guide when the structure is placed. As locations are marked, it is helpful to also mark the locations and number of clusters on a lake map. This will help in determining how many trees are needed at each location. As a general rule, 3 to 5 trees are used for each site (see Appendix A) with about 50 feet of distance between sites.



- When can Fish Sticks projects be done?

The placement of Fish Sticks structures in lakes may be done at any time of the year, except it is not recommended from March 1 through June 15 to minimize adverse impacts on fish movement, fish spawning, and egg incubation periods. There are different considerations when placing structures in open water versus on top of the ice, such as how to place and anchor the trees in the lake. It is recommended to plan the placement of Fish Sticks structures on top of the ice when possible. This allows for access to the lake by driving on the ice. When the ice melts in spring, the trees drop into the water where they are anchored to the shoreline.

- What funding is available for Fish Sticks projects?

There are several funding options, depending on where you are in the process.

- I. DNR Funds: competitive grant opportunities

- Lake planning grants are available to develop comprehensive lake management plans or implementation plans for specific activities like Fish Sticks. Small-scale lake planning grants are a good choice for monitoring, building capacity, and developing promotional materials or holding workshops. <http://dnr.wi.gov/Aid/LakeMgmtPlanning.html>
 - Lake protection grants are available to implement activities recommended in a comprehensive lake management plan, restore shoreline habitat, and fund technical assistance. <http://dnr.wi.gov/Aid/LakeClassificationProtection.html>

- II. County Land & Water Conservation Departments

- Counties sometimes have funding for Fish Sticks and other activities (e.g. shoreline restoration). Each county handles the funding process and prioritizes activities differently so it is best to contact your county directly. <http://wlwca.org/countylandconservation.html>

- III. Other Funding Sources

- U.S. Fish and Wildlife Service, other federal agencies and private and local foundations may also have funding available for fishery improvement projects. A check of websites and with your state and county contacts can help you start to find out about these additional sources.

- IV. Partner Contributions

- Most grants require some level of matching funds. Lake associations, sportsmen's clubs and other community groups are often willing to lend financial support to local projects. Examples include donated trees from county and federal land, town road right of ways and private riparian's properties, plowing of ice roads by local conservation clubs and assistance with cabling trees from volunteers.

- What permits are required for Fish Sticks projects?

The placement of Fish Sticks requires a general or individual permit from the DNR. These types of projects may also require permits from the county and/or the Army Corps of Engineers.

- I. General permit applications from the DNR are used when the proposed Fish Sticks project can meet certain eligibility standards. Projects that qualify for a fast-tracked general permit include those that are:
 - Placed on lakes or flowages and do not have an adverse impact on the riparian property rights of adjacent riparian owners
 - Placed at least 100 feet away from certain structures, such as bridges, public swimming areas, and boat ramps
 - Placed and securely anchored within 20 feet waterward or landward from the bank toe, which is the break in slope at the foot of a bank where it meets the lake bed
 - Consist of whole, live freshly cut trees that are either grouped and anchored together with a minimum of one tree with a basal diameter of at least 8 inches, or single trees with a basal diameter of at least 8 inches per tree

For additional criteria and questions regarding the general permit process, visit the fish and wildlife habitat structures [website](#) or contact your DNR [Water Management Specialists \(WMS\)](#).

- II. Individual permit applications are used when the project does not meet the criteria for a general permit. These types of projects may be using materials or placing trees in locations not allowed under a general permit. Review and approval of individual permits takes longer than for a general permit.

For questions regarding the individual permit process visit the fish and wildlife habitat structures [website](#) or contact your DNR [Water Management Specialists](#).

- III. In some locations and for certain types of projects, approvals from the county or the Army Corps of Engineers (ACOE) may be necessary before starting a Fish Sticks project. Contact your county zoning office to check whether the project will need any county approvals. Visit http://wccadm.com/staff_directory.htm for information. The ACOE regulates all waterbodies that are connected to “Waters of the U.S.” In most cases, lakes classified as seepage lakes are not regulated by the ACOE. To determine if your lake is a seepage lake, please see the [Wisconsin Lakes Book](#). Search by lake name, choose “Facts and Figures” and check if the “Hydrologic Lake Type” indicates it is a seepage lake. If your lake is not a seepage lake, contact your [local ACOE office](#) to determine if your project will need a federal permit.

- What equipment and materials are needed for a Fish Sticks project?
 - I. Plow truck to establish ice roads and clear project sites during winter project placement.
 - II. “Road work ahead” signage if trees are transported down public roads during project work. Check first with the county or town roads department.

- III. Trees that are live (freshly cut) or have died within 3 months so that they retain moisture and will sink. Any species can be used, but a mix of species is preferred to mimic natural conditions. Trees greater than 16 inches in diameter at the base are generally too difficult to move and should not be used.
- IV. Chainsaws to fell trees.
- V. Chainsaw protective equipment, includes cutting chaps, helmet, hearing protection, face screen/safety glasses, gloves, safety boots, high visibility vest, and a first aid kit.



- VI. Four wheel drive trucks and cable or chain chokers to drag trees from their source to site locations. Chokers 8 feet in length with a 3/8 inch cable diameter work best.



Chain Choker to attach to hitch and wrap around butt end of tree



VII. Skid steer equipped with hydraulic grapple to place trees at site.



- VIII. Steel cable, cable cutter, and cable clamps to cluster trees together and anchor trees to shore.



- IX. Live trees or sturdy steel fence posts for shoreland anchors. To protect live trees used as an anchor, run cable through garden hose sections that surround the live trees.



- X. Sled to haul cabling and anchoring equipment.
XI. Portable gas powered winch and skidding cone used in situations where large equipment and trucks cannot be used to place trees on the water. An ice auger may be needed to check ice thickness or to cut a hole to anchor the portable winch.



Skidding Cone to help drag trees

Phase 2: Implementing a Fish Sticks Project

After site planning is complete, funding is acquired, and permits are approved, you may begin your Fish Sticks project. Most of the suggestions below apply to placement of Fish Sticks structures on top of the ice.

▪ Ice Road Development and Snow Plowing

When Fish Sticks complexes are built on the ice, it is important to have ice roads plowed in advance so ice thickness can increase. Ice roads should be plowed as soon as the project coordinator determines it is safe to drive a plow truck on the ice (> 12-inch thickness) and after every major snow event until the structures are placed. The roads should be plowed wide enough to allow two vehicles to pass one another for easy transport of trees to the sites behind 4X4 trucks. The ice road network should be developed from the area the trees will be coming from to each individual shore site.

In addition, each project site should be plowed along the shoreline before the structures will be placed. Snow mounds from plowing should not be pushed up to shore but rather toward the middle of the lake to keep the snow banks away from where the butt end of the trees are placed and to keep the snow weight away from the area where machinery will be operating. The project site should be plowed approximately 200 feet out from shore to allow space for staging the trees before they are placed by machinery.

▪ Felling Trees

Felling is inherently dangerous work. People who are involved in cutting trees should be experienced, have proper chainsaw safety gear, and preferably be FISTA certified (Forest Industry Safety and Training Alliance, Inc.). Safety gear includes: chainsaw boots, chaps, helmet, eye and ear protection, gloves, and a first aid kit. The sawyer should also wear clothing that is highly visible so that anyone in the area is aware of his/her location.

Trees ideally should be obtained as close to the project sites as possible. Sources of trees near boat launches are preferred for easy access to the lake. Past projects have utilized trees from private and public land and have been moved along town roads for short distances. Trees can also be obtained from upland shoreline areas adjacent to project sites; these trees are often donated by landowners and must come from a distance greater than 35 feet from shore to meet shoreland zoning requirements. (Check with your county land and water conservation department for any additional requirements.) Trees adjacent to project sites may be dragged onto the ice with cable winches and skidding cones, rather than pulling them with trucks. Felling the tree so that the butt end of the tree is toward the ice works best for dragging the tree onto the ice in this manner.

▪ Transporting Trees

Four wheel drive trucks with hitches are used to drag trees from the cutting location onto ice roads to the site location. Choke chains and cables work well for this purpose.

The loop end of the steel cable is attached to the truck hitch and the other end is looped around the butt end of the tree. Cable chokers are commonly used by the forest industry and can be obtained online by searching for “logging chokers.” Chains can also be used but are not as efficient as cable chokers.

If trees are transported down public roads, road work signage is recommended prior to and during project work. Check with the county or town roads department first. Afterward, cleanup of the road must be done to ensure motorist safety.

- **Placing Trees**

After the trucks unhook the trees on the lake near the project site, the most efficient way to place trees next to the shoreline is with a skid loader that is equipped with a grapple. Trees can be individually picked up and precisely placed. Some trial and error for the equipment operator will be necessary to gain experience with how to best manipulate trees. Powered winches may be used to place trees when gaining access with heavy equipment is not feasible. (See Appendix A for placement designs)

- **Cabling and Anchoring Trees**

Trees must be cabled and anchored to shore in a manner to prevent them from moving from the placement area. Trial and error has shown that 3/8 inch galvanized steel cable works well. The cable is looped around the butt end of a tree and secured with cable clamps. The other end of the cable is run to either a live tree on shore or to a sturdy metal anchor placed on shore. If a live tree is used, run the cable through a cut section of garden hose wrapped around the tree to prevent the cable from girdling and killing the live tree.

Sturdy steel fence posts may also be used to anchor trees to the shore. Posts should be driven at an angle with the top of the post away from the water to help keep the cable from slipping off the top of the post. Set the posts deep to keep them from pulling out. It is best to drive the posts in before frost forms because it can be difficult or impossible afterwards. The cable can then be anchored to the steel post.

If building a Fish Sticks structure where trees are clustered and “tied” together at one site, cabling with ¼ inch steel cable at the intersection of the trees in the structure works to help keep the structure intact and prevent lateral movement along the shoreline. If this type of structure is used, the cluster of trees can be cabled to the shoreline by cabling the trees on either end of the cluster with a cable or anchor, rather than cabling each individual tree. (See “low energy design” in Appendix A)

- **Checking Project Sites at Ice Out**

Fish Sticks structures must be checked after ice melts in the spring to ensure that they remain in place. If structures move, the project coordinator must move the structures back to their original location. Boats and portable winches can be used to move the trees. It is best to check structures as soon as possible after ice out or at least within 10 days. Project coordinators are responsible for monitoring the project sites to ensure

that the structures continue to remain securely anchored over time. After initial installation, the Fish Sticks structures cannot be removed without written authorization from the DNR.

- **Expected Results!**

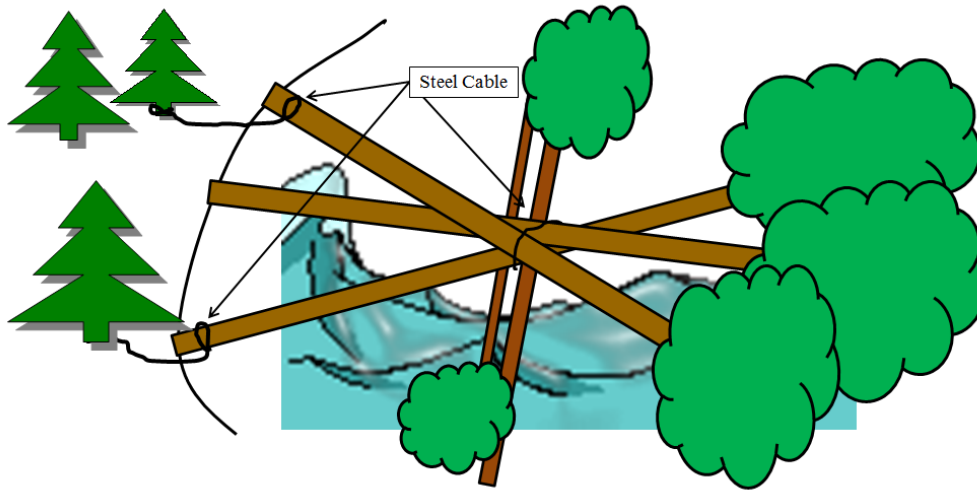
Landowners can expect to see trees in the water that mimic what would happen naturally. Fish and wildlife will use the habitat provided by these projects and their increased presence should be noticeable. Below are pictures of completed projects.





Appendix A. Fish Sticks Design Schematics

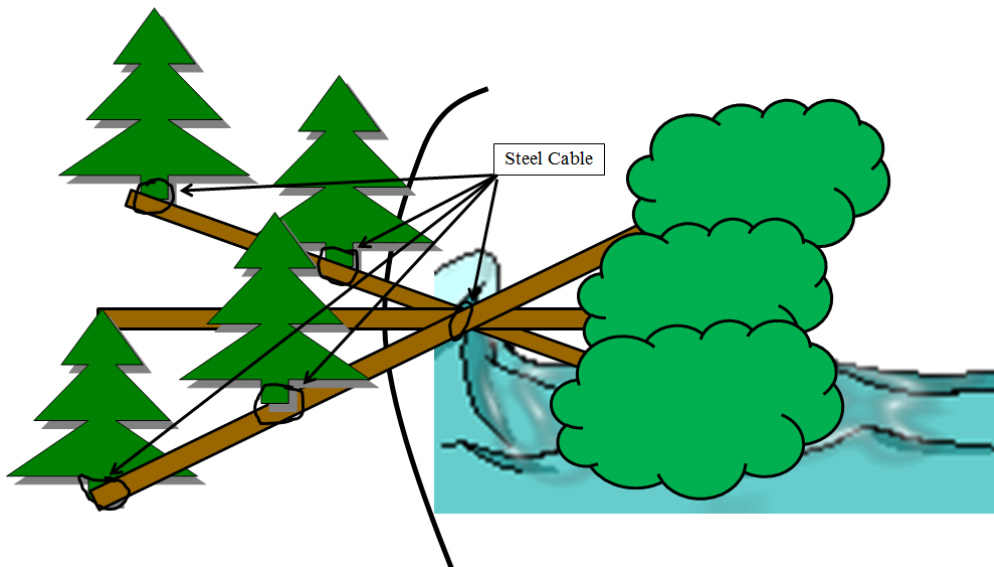
- I. Low Energy Design – Used when ice heave or strong winds are not an issue at the placement site
Ice heave action is visible in the form of ice pushed up onto the banks. When in a bay or area not exposed to ice heave, the butt ends of single trees or clusters of trees can be placed at the toe of the bank (edge of the shoreline).



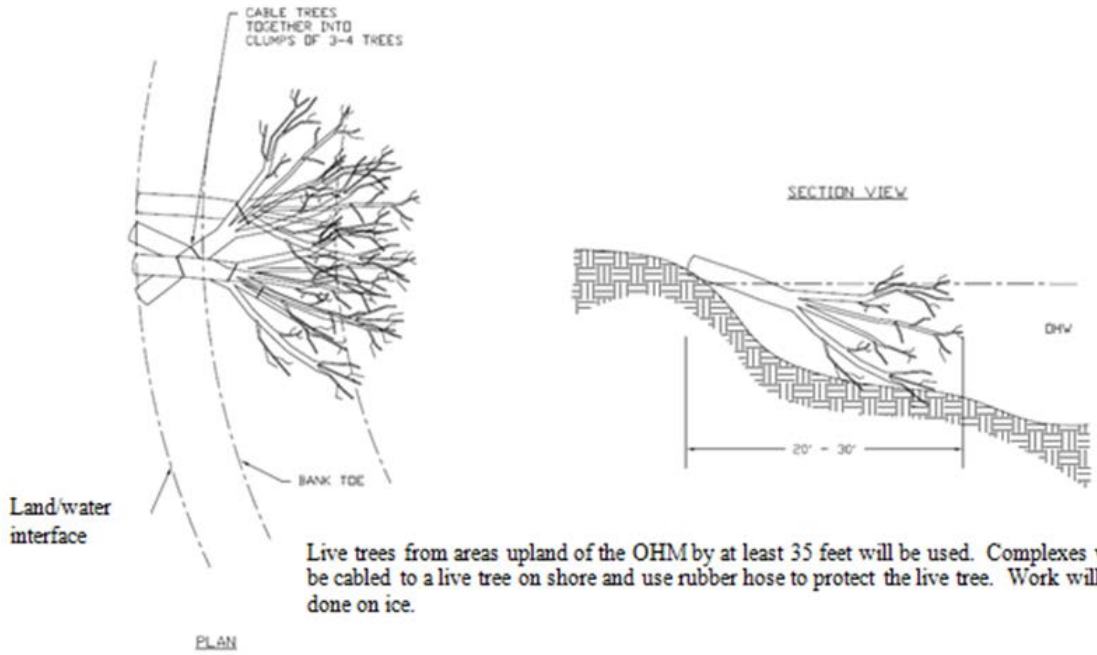
Fish Sticks Low Energy Design

- II. High Energy Design – Used when ice heave often occurs on the shoreline.
If ice heave is a concern, single trees or tree structures should be placed with the butt end of the tree pulled 10 to 15 feet landward and cabled directly to a tree. This will help the structure remain in place if ice heave does occur.

High Energy Fish Sticks Design



- III. Design example from prior Fish Sticks projects on lakes in Douglas and Bayfield counties. In general, 3 to 5 trees are used for each site with about 50 feet of distance between sites.



Live trees from areas upland of the OHM by at least 35 feet will be used. Complexes will be cabled to a live tree on shore and use rubber hose to protect the live tree. Work will be done on ice.