

# Project Management - Hemlock Restoration on Trout Streams

This document is for the project leader of a charitable project approved by the SGH Board and Trout Unlimited to plant a large number of hemlock saplings on a designated trout stream. Separate instructions exist for projects to plant a hemlock field insectary or plant a large number of saplings on nonprofit property or public land and for individual property owners wanting to plant trees on their own land.

## Site selection

1. At present, this initiative is limited to non-federal land. Candidate trout streams may be recommended by public or private property owners / managers but must be approved by SGH, Trout Unlimited, and property owner / manager.
2. Survey the planting site to ensure a good growing environment.
  - Look for potential hazards such as leftover construction debris, chemical or oil spills, and bits of mortar or limestone that would create alkaline soil conditions.
  - Note the texture and structure of the soil. Loamy soil or amended clay soil is best for hemlocks.
  - Check for drainage patterns that would cause excessive dryness or soggy conditions and avoid such areas.
  - Collect soil sample and submit for soil test.
  - SGH and the property owner / manager will coordinate any minor site preparation needed, such as removal of small bushes or debris
3. Once a site is approved for planting, SGH, TU, and the property owner / manager will execute a *Memorandum of Understanding (MOU)* covering permission to access the site over multiple years, any site preparation needed, specifications for planting, roles and responsibilities for installation and maintenance.

## Project planning

1. A hemlock restoration project normally involves planting 60 saplings (generally rescued), which SGH will provide at no cost to the property owner / manager. For best survival, saplings should be 2 – 4 feet tall, well branched, and healthy. They may be either bare-root stock for immediately transplanting or container stock that has been in pots for at least a year. Balled-and-burlapped saplings are not preferable.
2. Based on the number of trees to be planted, SGH will estimate and acquire the necessary supplies for planting – such as soil amendments, HWA treatment product, and mulch – at no cost to the property owner / manager. See *Checklist*.
3. Also based on the number of trees to be planted, SGH and TU will work together to engage an adequate number of volunteers from our own memberships, Master Gardeners, students seeking service credit hours, and other organizations. Typically a group of 15 volunteers can plant 24 – 30 saplings in 2 – 3 hours. When volunteers sign up, we will confirm their participation and send a copy of the *Project Details*.

## Project preparation

1. Prepare copies of the *Release / Waiver of Liability* sign-in form for adults and minors; also planting instructions for volunteers.
2. Choose and mark the planting location for each tree with a small flag. Trees should be spaced 10 to 35 feet apart to ensure adequate light, water, nutrition, and air circulation so they can remain vigorous. Since the goal is to have the trees provide shade for the stream, optimal planting sites will have the following characteristics:
  - within 6 to 20 feet of the stream but not in danger of being flooded frequently or washed away.
  - where they will cast shade on the stream (ideally on the west side of a stream to cast shade in the afternoon).
  - where they are not in competition with other vegetation and will have access to sunlight.
3. Arrange to get fresh water from a hose or faucet if possible. If water will be taken from a stream, bring one or more clean containers to use for dipping. Chemical jugs must never be dipped into a waterway.
4. Assemble project materials, tools, and supplies 1 or 2 days before project date and stage them at the planting site. Water the trees the day before so their root balls will be fairly soft. Be sure tools are in good working condition and marked with owner's name.
5. Prepare large tubs of soil mix (1 per team), baggies of soil additives (1 per tree), and gallons of initial watering mix (1 per tree). See *Checklist*. Have more materials on hand as needed.



6. Each team base site should also have 1 bucket for carrying dirt and at least 1 shovel and 1 pick/mattock.

## Orientation for volunteers

1. **Welcome volunteers** as they arrive. Ask each participant to sign the *Release / Waiver of Liability* form and fill out and wear a name tag so folks can get to know each other. Be sure sign-in info is complete and legible. Emphasize the importance of listing an emergency contact who will be accessible during the project.
2. **Make sure each participant is properly attired** -- Dressed for the weather and terrain with long pants and long sleeved shirt, sturdy shoes/boots with socks, work gloves. Provide work gloves for anyone who doesn't have them.
3. **Explain project significance** to natural and human communities (*adjust depending on audience*):  
As loss of the hemlock is of particular concern along our trout streams, SGH in partnership with TU has developed an initiative to create, enhance, or restore a healthy hemlock population along these waterways in support of:
  - watershed protection and water quality;
  - the numbers, health, and diversity of the aquatic inhabitants (especially trout);
  - the public's ability to access and enjoy these areas; and
  - the economic impact of the related tourism and recreation.

By planting more hemlocks along trout streams in partnership with TU and property owners / managers who are committed to caring for them long-term, as we are doing today, we are helping to protect the health of our waterways and their inhabitants, the public's access and enjoyment of these resources, and the economic vitality of the community.
4. **Explain layout of planting site** and location of all materials.
5. **Explain composition** of soil mix and initial watering mix.
6. **Divide volunteers into teams** of 2 – 3 and distribute tools and supplies.
7. **Give personal safety briefing:**
  - Look out for holes, snakes, bees, poison ivy, briars and tangling vines, eye-level branches, steep or slippery terrain.
  - Be mindful of heat and adequate hydration, cold and hypothermia, changing weather conditions.
  - Stay within sight/speaking distance of other team members.
  - Seek project leaders immediately in case of a problem.

## Planting Tasks

Give out volunteer instructions for planting. Explain the process and demonstrate with the first sapling. Ask if there are any questions. Then have teams get started. Project leader should float among teams constantly to ensure proper planting, answer any questions that arise, and assist with resupplying materials as needed.

1. **For each planting site**, the team should go to central location and get a tree, 1/2 bucket of prepared soil mix, baggie of soil additives, half a bag of shredded hardwood mulch, gallon of initial watering mix, and clean jug for dipping additional water from stream.
2. After removing the marker flag, **dig a hole** 3 – 4 times the width of the container (i.e., so you could place the pot in the hole 3 – 4 times in a triangle or square) but only 2" deeper than the dirt in the container. Pile the removed dirt next to the hole.
3. **Combine 1/2 bucket of soil amendment** with the native soil removed from the hole plus the contents of baggie of soil additives. Do this mixing beside (not in) the hole. Put 2 – 3 inches of this soil mix back into the hole.
4. **If the sapling is in a container, remove it carefully** and set container aside. Tickle the root hairs so they're facing outwards. If the roots are pot-bound, use a sharp tool to make several half-inch-deep scrapes all around the root mass to free them.
5. **Place a bamboo stake** of appropriate height in the center of the hole.
6. **Place the tree in the center of the hole** as close to the bamboo stake as possible, and be sure top of root ball is sitting a couple inches above grade.
7. **Fill the hole halfway with soil mix.** Then sprinkle a *small* amount of Soil Moist water retention crystals all around the roots of the tree (about 1 tsp per gallon of root ball size). This will be in the small covered cups.

8. **Fill the hole the rest of the way** with soil mix so that it just covers the root ball. Firm the dirt with foot to eliminate air pockets. The tree should now be sitting exactly at grade, level with the surrounding ground.  
*Note:* Don't create a "watering saucer" around the tree unless it's on a steep hill; if this is the case, a very shallow watering saucer can be created but should be removed by the end of the first year when the soil will have stabilized.
9. **Use velcro tape** to attach the sapling to the stake LOOSELY at the half-way point and about 6 inches from the top. The tape should be removed by the end of the first year.
10. **Apply 2-3 inches of shredded hardwood mulch** from the trunk out to the drip line, pulling the mulch back couple of inches so it's not actually touching the trunk. This is to maintain stable soil moisture and temperature.
11. Immediately after planting, **water thoroughly** but slowly right at the base of the tree, using 1 gallon of initial watering mix per gallon of root ball. Two or three hours later, firm the dirt again with foot to eliminate any remaining air pockets and **water again with plain water**, using 1 gallon of plain water per gallon of root ball.

## At end of planting project

1. **Collect SGH tools**, other supplies, and empty containers from volunteers and make sure all are accounted for. Clean tools. Make note of anything that needs repair or replacement.
2. **Forward original** signed *Release / Waiver of Liability* forms to Donna, copy retained by project leader.
3. **Thank volunteers for their good work** and wish them safe travel home.

## Ongoing maintenance of saplings

The property owner / manager will be responsible for all ongoing maintenance of the saplings, including watering the trees during the establishment period and times of severe drought, monitoring them for health, and continuing HWA protection. The property owner / manager should contact SGH if any problems are observed.

### Maintenance tasks during first 6-9 months after planting

1. **Water once a week:** Give each tree 1 gallon of water per foot of tree height. Water slowly right at base of trunk. Do not spray the foliage except during the summer, and then be sure there's time for the foliage to dry before evening.
2. **If watering with a hose:** Turn nozzle to "full." When moving the hose, be careful not to pull it against the little trees or disturb the mulch and needle duff under the trees. When finished watering, retract the hose into the reel box with water pressure still on. Then turn off faucet and drain the hose. During cold weather, also disconnect the hose from the faucet.

### Maintenance tasks after establishment period

1. **Watering:** Generally no regular watering is needed after the first 6-9 months except during periods of drought. During drought, water once a week as described above.
2. **Monitoring:** During the first 5 years following planting, the trees are protected against HWA; however, they should be monitored for signs of early HWA reinfestation, other insect pests, fungal diseases, discolored foliage, and physical damage. Any concerns or signs of problems should be reported to SGH project leader.
3. **Retreating for HWA:** The property owner/manager will be responsible for the retreatment of the trees after 5 years or soon if they become infested before 5 years. SGH will provide advice and assistance as needed.