

Project Instructions - Hemlock Treatment

Project planning

The sites and priorities for USFS and DNR treatment projects are set by those agencies, preferably at the beginning of the year so we can plan our schedule. There are normally 3 to 4 projects each for the USFS Blue Ridge, USFS Chattooga, and DNR State Parks per year. As our time and resources permit, we also undertake projects for DNR Wildlife Resources (such as the ongoing Cartecay project), POAs, other nonprofits, etc.

Note: If we will be working in a fee area, arrange with the property manager for participants to have fee-free access.

1. Based on the number of trees to be treated or retreated, decide how many teams of 2-3 people are needed. Each team should include at least one experienced Facilitator. An experienced team should be able to treat 120 trees in 4 hours. A less experienced team should be able to treat 60 trees in 4 hours.
2. Solicit experienced Facilitators to serve as team leaders, 1 per team; all team leaders should be identified and confirmed 2-3 weeks before project date. Solicit additional volunteers to work in teams; confirm volunteers as they sign up until roster is full and send a copy of the *Project Details*.
3. Based on the estimated tree diameters, use the *SGH Chemical Calculator* to determine the amount of chemical needed. Order the chemical and arrange to use an adequate number of application devices 2-3 weeks before project date.

Project preparation

1. Prepare copies of the *Release / Waiver of Liability* sign-in form and other required USFS/DNR forms as appropriate.
2. Test application devices for proper functioning at least 1 week before project date to allow repair time if needed. If any soil injector dispenses less than the standard amount, print an adjusted mixing/dosing card (see *Testing & Adjusting Calibration* on Resources page of web site) and attach it to the injector.
3. Assemble project materials, equipment, and supplies 1 or 2 days before project date. Work bags should contain only the items needed for the specific project.

Orientation for team leaders

Ask team leaders to arrive at least half an hour before volunteers are scheduled to report, and welcome them as they arrive.

1. Ask team leaders to sign the Release / Waiver of Liability form (and other USFS forms if applicable) and to fill out and wear name tags so folks can get to know each other.
2. Make sure each team leader is properly attired with PPE:
 - Dressed for the weather and terrain
 - Long pants and long sleeved shirt, sturdy shoes/boots with socks, work gloves
 - Head covering recommended; USFS supplies required hard hats.
3. When all team leaders are present, describe nature of project:
 - Treating or retreating ___ hemlocks for the woolly adelgid
 - Applying Imidacloprid or Safari.
 - Using soil injection, soil drench, or basal trunk spray.
4. Give each team leader:
 - a map of the project area with their assigned work site marked; mention stream crossings or other hazards.
 - a set of data sheets for the trees at their work site with instructions on how to mark the data sheets
 - the names of their team members and any special information about abilities/disabilities if known



5. Give each team leader a work bag, a supply of chemical, and the necessary equipment/supplies for their team (see *Checklist*). Team leaders should already be familiar with the work kit contents, but mention that it contains only the items they'll be using.
 - Clipboard, treatment log sheets, and pen – Use to record tree diameters and any special notes.
 - Apron – Someone other than person with injector or sprayer should wear this.
 - Diameter tape – Keep in apron and use to measure trees.
 - Laminated dosing card – Keep in apron and use to determine number of pumps based on tree diameter and wet/dry mixture. If any injectors have nonstandard output, point out the attached mixing/dosing card with adjusted mixing instructions.
 - Laminated infestation photos card – Use to determine/confirm level of infestation.
 - Permanent marker – use to make check-mark on metal tags of treated trees if trees already have tags
 - Nitrile gloves – Use when mixing, pouring, or cleaning up chemical.
 - Hand sanitizer and towels – Use to clean skin if contacted by chemical and clean up before lunch.
 - Mask & goggles – Use when mixing or spraying Safari.
 - Small measuring cup – Use to check calibration of injector if this hasn't already been done.
 - Special measuring cup – Use to measure amount of Safari product.
 - Funnel and paper paint filters – Use for filling injector tank or sprayer tank.
 - Gallon baggie – Put used funnel, gloves, and filters in it to keep work kit clean.
 - Strap with carabiner clip – Use as shoulder strap to carry injector if desired.
 - Cloth tote bag – Use to carry extra chemical jugs to work site. Be sure pour spouts are firmly closed and jugs are upright.
 - Spike – Use to make holes in soil if ground is too hard for injector probe to penetrate.
 - Spray paint – Use to mark treated trees on non-government property.
 - Small hammer, nail puller, metal tags & nails in baggie – Use to tag or re-tag treated trees on public land.
 - Flagging tape – Use to mark start/finish points or to mark treated trees if tags aren't available.
 - Pack of tissue in case nature calls in the woods.
 - Trash bag – Use for woods clean-up and end-of-day clean-up.
 - Small rake if needed to clear needle duff or ground cover from base of tree.
6. Point out location of general / replenishment materials that are on hand if needed (see *Checklist*).
7. Remind team leaders of schedule for the day and indicate whether all teams will assemble for lunch or each team will take lunch at their work site.
8. Present brief refresher as needed and any new or project-specific procedures:
 - Mixing chemical – Indicate wet or dry soil ratio (Imid only); make 96 oz of mixture at a time if using Kioritz soil injector; make 1-gallon master batch or individual batch if doing soil drench or trunk spray; use WARM water provided; if must dip from stream, use clean jug only.
 - Finding trees – Indicate whether trees to be treated are already tagged/marked and how to identify trees with missing tags; whether permissible to add new trees or replacements for trees that can't be found or have died. *Note for government land:* Tagged trees (or trees that should have tags) should be treated or retreated first. Then if there is enough time and chemical and if a site doesn't have the full complement of tagged trees, teams can select and treat additional viable ones up to limit per site. Explain parameters and priorities for choosing additional trees.
 - Clearing ground cover at base of tree, if necessary – just 1 foot from trunk, replacing after treatment.
 - Measuring – Demonstrate use of diameter tape; reading tape at zero mark, not metal tip; measuring each stem of multi-trunk trees and adding for total, measuring trees on slope from the up-side, rounding up to next inch if ½ or greater.
Suggestion: Have each person determine where 4.5 feet comes to on their own body
 - Applying treatment – Indicate number of holes for soil application equals diameter but minimum of 4 holes; within 1 foot of trunk, 4-5 inches deep. Calculate dose for soil drench or trunk spray and use whole amount per tree. Don't use depth plate for foot pressure. Keep injector moving until clean-up time.
 - Marking treated trees – On private land place small dot of spray paint low on side away from view. On public land mark existing metal tag with permanent marker checkmark, if tag is missing or bark has grown around old one, apply new tag driving nail at upward angle and leaving it protruding 1 inch and record its number.
 - Updating data sheets – Indicate what info to record; how to mark if unable to locate tree, if tree is dead, or if new tag is applied.
 - Rotating jobs throughout the day to give team members a variety of experience.
 - Reporting other hemlock pests or problems observed.

Orientation for volunteers

1. **Welcome volunteers** as they arrive and introduce them to their team leaders. Ask team leaders to cover sign-in, name tags, health problems and remedies, proper attire/PPE, any anticipated difficulty with assigned work site, and schedule for the day. Team leaders should retain sign-in sheets for emergency contact info until end of project and then turn in to project leader.
2. **Explain project significance** to natural and human communities (*adjust depending on audience*):
 - **Aesthetically**, these beautiful trees contribute greatly to the enjoyment of those who live, work, and play among them, as well as the many people who come to north Georgia for tourism and recreation.
 - **Ecologically**, hemlocks help maintain the health and biodiversity of our forests and provide food and habitat for a diverse population of birds and other animals, shade for native plants, and cool temperatures for trout streams.
 - **Environmentally**, hemlocks are vital for protecting the quality of our waterways and watersheds, preventing soil erosion on mountain slopes and around waterways, and maintaining our air quality.
 - **Economically**, healthy mature trees such as hemlocks support jobs and local tax revenues associated with tourism and recreation and supporting the value of private properties and the community as a whole.
 - **And on a personal note**, hemlocks are the favorite tree of so many people who grew up visiting the woods, taking their children and grandchildren to the woods for memorable family outings, and teaching lessons of respect and personal responsibility, wise use of resources, and environmental stewardship.
 - **Add any information** that is specific to this project or site, such as protecting endangered species.
 - **But the hemlocks are under attack** by an invasive insect, Hemlock Woolly Adelgid (HWA), and most will die unless action is taken to prevent it – which is where we come in. By treating the trees chemically, as we will do today, we will be protecting them for another 5-6 years.
3. **Introduce treatment product(s)**: The treatment product you'll be using contains the active ingredient Imidacloprid, a mild nicotine derivative that's also in flea collars. It kills the insects, isn't toxic to humans, and provides residual protection for an average of 5-6 years after treatment. However, just for safety, anyone who is handling the chemicals or application equipment will wear gloves.

Note: If using Safari, indicate that it's a nicotine-based fast-acting treatment that gains control over HWA within 3 to 8 weeks. It only lasts about 2 years but is very effective in saving heavily infested hemlocks or very large infested hemlocks. It's also very expensive and must be mixed and dosed accurately so avoid using more than is needed. Anyone spraying Safari will also wear mask and goggles.
4. **Introduce application method(s)**: The application method will be soil injection using Kioritz soil injectors to place the treatment material directly into the root zone. The tree takes up this systemic material and disperses it throughout the entire plant. The treatment binds quickly to the organic matter in the soil and migrates less than a foot from each injection point.

Note: If using Safari, indicate how and where it will be applied – soil injector, soil drench, or basal trunk spray.
5. **Remind everyone of environmental safety** (as the task and setting dictate):
 - Don't allow chemicals to spill into waterways or go down drains.
 - Don't wash equipment in waterways or down drains.
 - Trees that are right on waterway should be treated on side away from stream.
 - Don't use more or less chemical than is called for.
 - If doing trunk or foliar spray, avoid drift and splash-back.
6. **Remind everyone of personal safety**:
 - Ask if anyone has serious allergies and whether they've brought what they need with them.
 - Wear PPE, nitrile gloves if handling chemical, masks & goggles if spraying, hard hats if USFS project.
 - Look out for holes, snakes, bees, poison ivy, briars / tangling vines, eye-level branches, steep / slippery terrain.
 - Be careful crossing streams; avoid slippery rocks and logs; don't get wet if weather is cold.
 - Be mindful of heat and adequate hydration, cold and hypothermia, changing weather conditions.
 - Keep eyes open for hazards and ears open for falling branches or trees.
 - Stay within sight/speaking distance of other team members.
 - Seek project leaders immediately in case of spill, accident, or other emergency.
7. **Ask if there are any questions** and let teams know the project leader(s) will be traveling from team to team throughout the day to replenish supplies, handle communications, or address any issues that may arise.

THANK YOU FOR VOLUNTEERING, BE SAFE, AND HAVE FUN!

Getting started: team leaders with their teams

1. **Go over schedule** for the day and indicate how team will get to the work site. Advise volunteers to take their lunch with them to work site. Indicate whether everyone will get together for lunch (time and place) or each team will eat at their work site when they choose. If anyone has not brought a sack lunch, provide something from “extras” bag. If anyone needs to leave early, they must check out with project leader and turn in equipment and supplies.
2. **Briefly describe jobs** on team and suggest rotation to give everyone a chance to learn and practice different activities.
 - mixing chemical and loading injector
 - finding the trees
 - measuring & recording dbh
 - clearing ground cover from base of trees
 - indicating number of holes & pumps per hole
 - doing the injections
 - marking the tree or tag to show treated
 - replacing ground cover
3. **Give out supplies and equipment** according to initial jobs chosen. Go over contents of work bag. If using Imidacloprid, indicate mixing for wet/dry conditions.
4. **Explain and demonstrate special features of injector:**
 - The Kioritz injectors are no longer made and parts are not available, so PLEASE take good care of them. If you notice one is not working properly or if something happens while you’re using it, please let me know.
 - Make sure the calibration ring is all the way down, the white plastic collar just above the tank is tight, and the baffle and all probe parts are tight.
 - The tip has 4 emitter holes. Make sure they’re open before using the injector. If a hole is clogged, clear it using a metal paper clip or large safety pin. It should go all the way through and out the other side.
 - Don’t use the metal baffle as a foot push. It’s there to prevent the injector from going too deep in the soil and will break under hard use.
 - Use shoulder power to push the injector probe into the soil. The tip is not a jack hammer.
5. **Mix and load chemical.** Team leaders should explain and demonstrate this for the first batch. Subsequent refills may be handled by taking additional mixed batches in tote bags, on-site mixing, or delivery of mixed chemical by project leader.
 - Show volunteers that chemical jugs are marked with orange tape and must never be dipped into any water source, even if they look clean. Jugs marked with green tape are for clean water only and can be dipped into water sources.
 - Point out the ounce markings on the orange tape. The injector will hold 96 ounces, so that’s the amount that should be mixed in each jug if applying treatment by injector. If each team will mix their own chemical, use mixing proportions shown on mixing/dosing card.
 - Push injector into ground at 45° angle so fill cap faces straight up. Remove cap and filter and put filter in safe place.
 - Slowly pour 96 ounces of mixture through funnel and paper paint filter into injector tank. Replace fill cap. Also use funnel and filter for filling sprayers.
 - Use towel to wipe off spillage from hands and applicator.
6. **Indicate that team leaders will provide OJT** as needed for new or less experienced volunteers and instruction for any unusual circumstances.
7. **Ask if there are any questions** and let teams know the project leaders will be traveling from team to team throughout the day to replenish supplies, handle communications, or address any issues that may arise. Provide project leader cell numbers or other way to get in touch if needed.
8. **Proceed to site**, affix caution signs, at beginning and end of work site, and start treating trees.

Care of injectors at lunch break

If any treatment mixture remains in injectors, pour it into a chemical container and cover it to prevent exposure to sunlight. Clean injectors by triple rinsing and pumping them with clean water away from any waterway or drain, preferably under a hemlock.

Care of injectors at end of project

1. **Pour any unused mixture** that was made with a powdered product around the base of hemlocks as the treatment material tends to fall out of suspension and doesn't keep well. Unused mixture that was made with a liquid or granular product may be poured into a chemical storage container with a screw top, marked with chemical name and mixing ratio used, and stored in a place that is away from sunlight and not subject to freezing.
2. **Check condition of application equipment** as it is turned in. Retrieve any missing parts.
3. **Clean injectors** by triple rinsing and pumping with clean water away from any waterway or drain, preferably under a hemlock. Remove any debris from tip area, and rinse outside of injector to remove chemical residue and dirt. Use towel to clean and dry the entire injector. When injector is placed in storage, stand it upside down on theommel handle to allow remaining moisture to drain out. Do not keep it where temperature may drop below freezing
Note: If using Safari in a sprayer, clean it thoroughly by rinsing, shaking, and spraying clean water through device until fluid comes out clear.
4. **Clean mixing jugs** and lids as above by triple rinsing and drying.

At end of project

1. **Collect work bags, tools, and other supplies** back from volunteers and make sure all original contents are accounted for. Clean tools. Make note of items that may need replacing, such as treatment log sheets, pen, spray paint, nitrile gloves, paper paint filters, gallon Ziploc baggie, hand sanitizer, towels, or trash bag.
2. **Collect sign-in sheets and treatment logs** from each team:
 - Original signed *Release / Waiver of Liability* forms to Donna, copy retained by project leader.
 - Original signed *USFS Job Hazard Analysis* form to Donna, copy retained by project leader.
 - Original *treatment logs/data sheets* to Donna, copy retained by project leader.
 - Original *USFS Pesticide Application Data* form and original *chemical tracking document* retained by project leader.

THANK EVERYONE FOR THEIR GOOD WORK AND WISH THEM SAFE TRAVEL HOME.