

## Available Gorse Management Strategies

Developed by the Gorse Action Group in 2017

[www.gorseactiongroup.org](http://www.gorseactiongroup.org)

	Description of Management Strategy	Tips & Notes
<b>Prevention</b>	Most cost effective means of control. When you spot new gorse plants on your property, treat them right away to prevent further spread. Be especially vigilant, looking for new plants in February/ March when flowering shrubs are most visible.	In open areas where forests are adjacent, young gorse plants can look similar to conifer seedlings
<b>Hygiene</b>	Preventing spread of gorse seeds is critical. Use a power washer to remove any vegetation or seed material from equipment (mowers, excavators, mulchers, etc.), undercarriages of ATVs, UTV's and pickup trucks.	Before utilizing equipment in gorse-free or clean areas, please inspect to make sure all machinery is gorse-free.
<b>Manual</b>	Appropriate for isolated plants or small patches. Wear thorn-resistant gloves and clothing, in addition to eye/face protection. Hand cutting with heavy loppers, a chainsaw, or a pole saw. Use a root extracting tool (The Uprooter, formerly known as a weed wrench) to remove small-medium sized plants when the soil is wet.	Tackle outlying, newly emerging infestations <b>FIRST</b> to prevent plants from dropping seed and providing a means to further advance the overall rate of spread. There seems to be some value in re-covering the disturbed soil after removal activities. After removing medium to large plants (only use plants with no seed pods), place the cut portion back over the stump area to provide shade, as the material decomposes it forms a natural mulch.
<b>Mechanical</b>	Mechanical clearing is the most effective way to address extensive infestations. Bulldozers and excavators are effective in removing large gorse plant colonies and much of their root systems. A more practical and less intensive form of mechanical control is the use of mulchers or thrashers attached on the arm of an excavator or tractor to chop and grind gorse plants while leaving a mulch layer in place. Mulch helps to suppress the seedbank and follow-up herbicide treatments.	Pulling creates disturbed soil with many root fragments and exposed seed beds. Be prepared to address a large flush of seeds germinating.  <b><i>Power washing machinery is CRITICAL to preventing spread into gorse-free or clean areas.</i></b>
<b>Grazing</b>	Repeated grazing by sheep and goats has been shown to be effective in reducing seedling establishment and gorse crown regrowth, but intensive animal management is required. When animals are pulled off of an infested site, gorse will return unless competitive plantings (grass & forb mix) are established.	In a long-term study, the best control was achieved by first burning gorse stands, followed by grazing goats or a 2:1 mix of goats and sheep at 10 or more animals/acre. In areas of unburned gorse, sustained goat stocking for 4-5 years provided good control in some situations.

<p><b>Herbicide</b></p>	<p>Triclopyr (2% solution) has been shown to be the most effective herbicide along the Oregon coast. Capstone (Triclopyr+ small amount of Milestone) is the latest product being used with great results on coastal shrubs, including gorse. Adding a small amount of a silacone surfactant (e.g. Syl-tac) has been shown to increase success as well.</p> <p>Other herbicides shown to have some effectiveness include: glyphosate, Metsulfuron, and Triclopyr + 2,4-D (Crossbow®). Complete spray coverage of all branch and stem surfaces (even the undersides of branches) is essential. Use of an adjuvant (MSO, to help with uptake of the herbicide is very important. For best results, apply when plants are actively growing, during spring to early summer months and after first fall rains. Other times can be effective as well. Check for regrowth in 12 months. <b>ALL herbicides must be used in accordance with the label instructions, including wearing appropriate clothing and gloves.</b></p>	<p><i>DO NOT spray when plants are in full flower or when bees are active.</i></p> <p>Only aquatic registered formulations of Triclopyr (Garlon 3A or Vastlan®) and glyphosate (Rodeo®, AquaMaster®, AquaPro®, etc.) should be used near water. A non-ionic surfactant should be used for applications near water.</p> <p><i>Crossbow should NOT be used near water and can volatilize (move off site) in temperatures over 75 degrees.</i> For information on the toxicity, half-life, and environmental fate of herbicides, please refer to the National Pesticide Information Center fact sheets, <a href="http://pic.orst.edu/">http://pic.orst.edu/</a></p>
<p><b>Herbicide: foliar</b></p>	<p>Foliar applications refer to spraying of all leaf and stem surfaces.</p>	
<p><b>Herbicide: cut stump or hack squirt</b></p>	<p>Cut Stump treatments refer to cutting/chopping down a gorse plant and applying (spraying or painting on) a concentrated herbicide to the cut surface, immediately apply herbicide solution after cutting. Triclopyr products (Garlon 4 or 3A) have been found to be most effective. A 25% Garlon 4 Ultra in 75% oil carrier (MSO, etc.) or undiluted Garlon 3A or 50% Garlon 3A in spray solution/water. A gel formulation of Triclopyr can be used or a wick applicator to limit off-target impacts. A 50-100% glyphosate solution has been found to be effective in Lincoln County, OR.</p>	<p>Care must be taken to thoroughly understand the precautions when using a concentrated product. Approved herbicide applicator eyewear (brow and side eye protection) should be worn to avoid potential eye injury. READ the label very carefully to not go over the legally allowed herbicide per acre limits.</p>
<p><b>Herbicide: basal bark</b></p>	<p>Basal bark applications refer to applying a concentrated herbicide to the lower portion (lower trunk to height of 12-15 inches) of the gorse stem. Spray should wet the lower stem, but not to the point of runoff. 20% Garlon 4 Ultra in 80% oil (MSO, etc.) carrier or undiluted Pathfinder II as a ready to use formulation. Plants should not be cut for at least 1 month following basal bark treatment.</p>	<p>Care must be taken to thoroughly understand the precautions when using a concentrated product. Approved herbicide applicator eyewear (brow and side eye protection) should be worn to avoid potential eye injury. READ the label very carefully to not go over the legally allowed herbicide per acre limits.</p>
<p><b>Pasture Fertilization</b></p>	<p>In managing pastures, the addition of nitrogen and lime can result in a soil pH that is not favorable to gorse and has shown to be effective in some situations.</p>	<p>Active pasture management, including soil testing is key to the successful use of this strategy.</p>

<b>Controlled burning</b>	Can be a useful tool before grazing or in dense thickets before spraying. Burning alone does not kill the root system, resprouts are common after treatment. Fire stimulates a flush of seedling germination. Use of herbicide following a burn provides good control. Continued annual maintenance is required.	Use of controlled burning must be carefully assessed and locally coordinated with Fire Districts due to the high flammability of gorse and the potential for unintended, escaped fire situations.
<b>Competitive Planting/ Shading</b>	The Oregon Forest Research Laboratory (Portland, OR) recommends using acid-tolerant, fast growing trees. Monterey pine and Douglas fir showed greatest success although the former is more susceptible to animal, pest and disease risks. Small areas of open space should be cleared within the gorse patch for planting seedlings. Within these spaces, gorse plants and their root crowns should be removed by hand either in a checkerboard pattern, parallel rows, or at random. Seedlings should be at least 18 inches tall and 5/16 of an inch thick at the base, and should be protected with a barrier such as a tree tube or wire cage.	This technique works best when soil disturbance is kept to a minimum. Annual follow-up in these spaces should ensure that nearby gorse plants do not overtop the tree seedlings. It takes 10 to 15 years for the shade to stunt/kill the gorse plants and it is unlikely that all the gorse will die. While established gorse plants can withstand shade; increasing shade prevents further gorse germination.
<b>Biocontrol</b>	The gorse seed weevil ( <i>Exapion ulicis</i> ) and spider mite ( <i>Tetranychus lintearius</i> ) have both been released and become established in Oregon. The seed weevil reduces viable seed in some seed pods (some studies show 35% reduction of seed each year), but does not kill established stands. Heavy mite infestations can kill branches and are apparent by dense webbing that covers branches. A new biocontrol agent (a sap-sucking thrip, <i>Sericothrips staphylinus</i> ) is awaiting final approval for release.	Biocontrol is rarely a "silver bullet", but rather is used for regional-scale infestations in an integrated approach to reduce seed loads and weaken overall plant vigor, sometimes weakening plants making them more susceptible to other control methods and less competitive against desirable plants.
<b>IPM: Integrated Strategies</b>		
<b>Monocultures</b>	Oregon State Parks and Recreation has developed a guiding document for removal of large stands of gorse on State Park lands. This detailed document includes removal methodology and specifications (including: mechanical, herbicide, and replanting phases), as well as suggested timelines to guide management and tables of estimated gorse removal costs per acre, per year of a multi-year gorse removal and restoration program.	For a copy of this Oregon State Parks and Recreation guiding document, please contact Sherri Laier, <a href="mailto:sherri.laier@oregon.gov">sherri.laier@oregon.gov</a>

<p><b>Steep Slopes</b></p>	<p>The removal or mowing/mulching of gorse on steep slopes is problematic due to the inability to operate heavy machinery safely, and without posing undue risk to soil and cliff/slope stability. In many cases, access for machinery is impossible. In these situations, manual removal of gorse is required. Often times, the gorse plants are large requiring the use of chainsaws, pole saws, and heavy loppers. Ideally plants can be cut at the base and herbicide applied immediately (i.e., cut stump method). If not, annual follow-up with selective herbicides to treat resprouting from root crowns and new gorse seedlings will be necessary. Cut plants can be dragged/piled for burning or mulching if moved to where machinery is accessible.</p>	<p>Use of heavy protective clothing and hand/face/head protection is imperative. Trials are underway near Coquille Pt. in Bandon to determine if this method of removal poses a risk to soil/cliff stability.</p>
<p><b>Riparian Areas</b></p>	<p>Working in riparian areas can be challenging for a number of reasons. Heavy machinery can get stuck, damage the sensitive wetland and many areas can be inaccessible requiring hand work. However, the ground pressure (psi) of a person is more than a tracked vehicle weighing thousands of pounds. To minimize rutting and soil disturbance in sensitive areas and areas with soft soils, machinery used to cut and grind the gorse monocultures should always be tracked. A flail mower head attachment can reach between 12' and 30' so actual entrance to an area is not necessary.</p> <p>Wetland vegetation is extremely resilient and will often remain in the seed bank, growing and filling in areas that were once choked with gorse. To help the process along, plant grasses. Broadcast wetland grass seed at a rate of at least 15lbs/acre to allow for continued herbiciding of gorse with Garlon 3A. Best seeding windows for grass seed in wetlands is Sept.10-October 15 or immediately after retreat of surface water in spring/early summer. Once gorse is under control and being spot treated only, plant wetland shrubs and trees</p>	<p>Always determine staging areas on uplands for herbicide mixing and equipment refueling. Drip containment diapering of equipment staged near wetlands may be necessary to prevent leaks. Herbicides, by law, must be aquatic approved when working in wetlands. The most commonly used of these chemicals is triclopyr amine (Garlon 3A) and Aquatic approved glyphosate (Rodeo). Wetlands are usually spot treated rather than broadcast sprayed to minimize impact to non-target species.</p>

<p><b>Competitive Plantings</b></p>	<p>As described in Liza Ehle’s 5-step plan, replanting/revegetation is important to establish competitive species as soon as possible after gorse plants are removed or mowed/mulched. Other nitrogen-fixers, legumes, and acid tolerant tall grasses can out-compete gorse once the seedlings have an opportunity to use the mulch layer, open space, and sunlight. Nitrogen-fixers like perennial rye, clovers, lupine, ceanothus and red alders can quickly do the same root work to loosen soils, provide nitrogen and restore ecological balance that encourages other vigorously adapted species like Sitka spruce, willow, twin berry, huckleberry, salal, etc.</p>	<p>5 step Strategy:  <a href="http://www.wildriverscoastalliance.com/gap/Go%20Natives%20Nursery">http://www.wildriverscoastalliance.com/gap/Go Natives Nursery</a> (Bandon High School) can provide recommended native plants and advice.</p>
<p><b>Native Plant Areas, Bradley Sister Method</b></p>	<p>An approach developed by the Bradley sisters in Australia. It combines the strategies of containment and reduction and can be used most successfully in natural areas where weed stands are close to or intermingled with native vegetation. This approach uses carefully planned hand weeding to favor native vegetation, which fills the area where the weeds have been removed. Gorse removal is done outwards from the edge of the best stands of natives. Start weeding in a strip about 12 feet wide. As you weed, be careful to replace any leaf litter that gets disturbed and use the weeds themselves as mulch when no mature seeds are present. Once your cleared strip is reclaimed by desirable vegetation, begin to clear another block. Using this method, the two Bradley sisters (both over fifty) cleared a 40-acre woodland reserve so successfully that the area needed only slight attention once or twice a year (mainly in vulnerable spots such as roadsides and creek banks) to be maintained weed-free. They expended o an average of 45 minutes per day between the two of them. This low-cost, low-impact approach enables restoration to occur with minimal labor or equipment.</p>	<p>Choose an area you can visit easily and often, where the native vegetation meets a mixture of natives and weeds not worse than 1 weed to 2 natives. <i>If you choose the most heavily infested areas to clear first, the weeds will re-invade very quickly because you have provided them with ideal conditions: bare, disturbed soil and full sunlight.</i> The length of this strip will depend on how much area you can easily maintain by visiting it once or twice a month during the growing season. <i>It is not necessary for the plants to be tall, but it is important that they form a dense cover over the soil and that they fill in the weeded area right up to the edge.</i> Avoid increasing the area you are maintaining until the native vegetation has moved in. <i>Nothing will be gained by hurrying this process; allow the desired plants time to grow and stabilize the area.</i></p>

<b>Forest</b>	<p>Once the forest canopy begins to close, shade deters gorse from invading forested areas. When a timber harvest or fire occurs, it is important to monitor and spray any gorse seed that emerges from the seed bank or new seed that may colonize on disturbed and exposed soils. The sooner tree seedlings are planted back into cleared sites the better since leaving exposed soils results in secondary invasion by invasive weeds, including gorse. A long-term (1946-1964) tree planting study conducted by OSU and the Dept. of Forestry in the Bandon area revealed many practical tips, including: "Control of gorse through tree planting should be attempted only in areas that are to be kept as forested land for several decades... planted trees will probably need 20-30 years before they can shade out gorse, although this period may be shortened somewhat by close spacing of planted seedlings. Use of additional overstory plantings in conjunction with reforestation may assist with gorse (and other invasive weed) control.</p>	<p>Cleaning equipment before entering and leaving timber harvest sites is key in preventing new introductions of gorse. Viable seeds have been shown to be easily transported by equipment used in silviculture activities. Preventing the transport of seeds from one location to another will help to prevent further gorse infestation. It may be wise to consider additional overstory vegetation to provide shade until the tree seedlings are able to take over providing required shade to inhibit gorse (and other invasive weeds).</p>
<b>Pasture</b>	<p>On ~100 acres of heavily gorse-infested land, initial control was through mechanical means, then ongoing control (now in 9th year) has been primarily through intensive grazing. Initial control (mulching/ grinding in year 1; disking in year 1-3; fertilizer/ compost, plus grass seed mix, with intensive grazing starting in year 1), then ongoing control largely through intensive grazing, plus compost, and hand-cutting plants (once/ year) that start to get established.</p>	<p>Case Study available upon request. A case study was developed with details and tips in how to remove large stands of gorse and convert land to healthy pasture ground through an integrated approach.</p>
<b>Rights of Way/ Corridors</b>	<p>Brush or flail mow prior to seed set and 1-3 months prior to foliar herbicide application of 2% Triclopyr. If herbicide treatment can/will occur in spring, then brush mowing the prior season should be attempted; All equipment should be pressure washed at the site of infestation prior to relocation. Plan to treat all infestations for 3 consecutive years. Ground disturbance should be minimized to the extent possible.</p>	<p>GPS data about the extent of the infestation and timing of treatment should be recorded; infestation location data should be shared with neighboring organizations or the Gorse Action Group, especially if there are adjoining populations on public or private land.</p>

## Methods Tried, Found to be Ineffective

### **Wood Vinegar (and biochar)**

In 2014, OSU put out a trial in Bandon testing pyroligneous acid (wood vinegar) as a potential method of control for gorse; results were inconclusive. It is important to note that decades of testing of acetic acid (vinegars) and natural oils (clove, citrus, etc.) on a wide variety of weed species has only shown effectiveness on seedlings of annual species (acids and oils rupture cells that make up the outler layers of leaves leading to seedling desiccation) while showing little to no success for tough woody, perennial species.

Wood vinegar is a byproduct of pyrolysis, a thermochemical composition of carbon-based material. Wood vinegar has been used in Asia as a natural pesticide. Another byproduct of pyrolysis is biochar, a heavy pyrolytic oil that can be burned similar to heating oil. Studies have been conducted to test if gorse could be used to make marketable biochar; attempts were found to not be cost-effective.