



Mt. Tabor Invasive Plant Control and Revegetation Project

The *Mt. Tabor Invasive Plant Control and Revegetation Project* is a collaborative effort between the Portland Water Bureau (PWB), Portland Parks and Recreation (PPR), and the Bureau of Environmental Services (BES) to enhance ecological conditions and improve stormwater management at Mt. Tabor Park. This project includes removal and control of non-native invasive vegetation, installation of native trees and shrubs, erosion control, and on-going maintenance and monitoring of project elements.

The *Tabor to the River Program* (which implements the *Integrated Taggart D Pre-Design*) integrates hundreds of sewer, green stormwater management, tree planting, and other watershed projects in the Brooklyn Creek Basin to improve sewer system reliability, stop sewer backups in basements and street flooding, control combined sewer overflows (CSOs) to the Willamette River, and restore watershed health. Early in the development of *Tabor to the River*, Mt. Tabor vegetation management was identified as a watershed solution integral to the success of *Tabor to the River* as a whole. During the design phase of the *Tabor to the River*, BES Watershed Services staff developed the Mt. Tabor revegetation concept in coordination with staff from the BES Watershed Revegetation Program (WRP), PPR, and PWB.

The benefits of the project include enhanced wildlife habitat, increased stormwater interception (and thus reduced runoff), and improved landscape aesthetics. In addition to meeting the goals of *Tabor to the River*, this project will also help meet the goals of the City's *Draft Invasive Plant Management Strategy* and Goal 2 of the *Mt. Tabor Park Master Plan Report* (PPR, 2000; below).

Goal 2: Environment

Protect and enhance the environmental aspects of the park.

- Improve the quality of wildlife habitat, especially for birds, within the park.
- Focus efforts in areas that best support wildlife with additional native vegetation.
- Maintain and enhance the ornamental plant material in active areas of the park.
- Manage vegetation to control invasive non-native species.
- Manage the park's forest for disease resistance and long-term health.
- Establish erosion control measures to improve water quality and lessen impacts to the park and adjacent areas.
- Maintain significant views in every direction.
- Monitor, adjust, and integrate uses and activities into the park's natural environment.

Existing Conditions

Mt. Tabor, an extinct volcano cinder cone, is a significant landscape feature in southeast Portland and Mt. Tabor Park is deservedly one of Portland's most beloved and iconic parks. The 195-acre park features open water reservoirs, active use areas, trails, and stands of towering Douglas-firs. According to the *Mt. Tabor Park Master Plan Report* (PPR, 2000):

Mt. Tabor is an irreplaceable resource for the people of Portland. It acts as an oasis, a place of solitude, a place to be in a natural environment within an urban context. Its importance was first noted at the turn of the 20th century and that importance will grow even stronger during the 21st century as Portland becomes more densely populated.

Mt. Tabor Park is also well-known as one of the best birding spots in Portland. As an island of habitat surrounded by urban development, the park is a refuge for both nesting birds and migrating neo-tropical songbirds.

Mt. Tabor Park is classified by PPR as a "hybrid" park because it has both active use and natural area components. Unfortunately, the ecological condition of the natural areas is degraded by non-native invasive plant species, lack of biological diversity, and lack of structural complexity. During the development of the *Mt. Tabor Master Plan*, the consulting biologist reported that "most of the Park is of moderate to low quality for wildlife habitat, with most areas lacking the requisite trees, shrubs, herbaceous growth, water and deadwood features wildlife need to flourish. In several areas, non-native plants are encroaching on native habitat."

In 2005 and 2006, PPR City Nature conducted a comprehensive inventory of the vegetation in Mt. Tabor Park. They delineated the park into 69 vegetation units, inventoried all vegetation, wildlife habitat, hydrologic features, and management issues, and assessed the overall ecological condition. The ecological condition of these units is summarized in Table 1.

The primary degrading factor is the prevalence of non-native invasive plant species which crowd out and prevent the natural regeneration of native species. The dominant invasive groundcover and shrub species include English ivy (*Hedera helix*), old man's beard (*Clematis vitalba*), and Himalayan blackberry (*Rubus armeniacus*). Several species of non-native invasive trees are also common on Mt. Tabor, including English hawthorn (*Crataegus monogyna*), English holly (*Ilex aquifolium*), and sweet pie cherry (*Prunus avium*). The current conditions largely preclude natural regeneration of canopy trees and a native shrub and herbaceous understory.

Table 1 – Ecological condition of Mt. Tabor vegetation units

Ecological Condition	# Veg Units	Acres
1 – Healthy	0	0
2 – Good	0	0
3 – Fair	4	10.96
4 – Poor	25	68.73
5 – Severely Degraded	40	87.17
TOTAL	69	166.86

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PPR staff and community volunteers have already invested considerable time, expense, and effort in invasive species removal activities in recent years. However multiple factors, including inadequate resources and capacity, steep slopes and difficult terrain, and the sheer extent of the invasive species cover, have limited progress to date. *Tabor to the River* represents a unique opportunity to bring much-needed resources and attention to the enhancement of Mt. Tabor's degraded forested natural areas.

Desired Future Condition

The desired vegetation community on Mt. Tabor is a Douglas-fir – Western Hemlock Forest Alliance. Since the target Douglas-fir canopy already exists, enhancement activities will focus on establishing appropriate mid-story, understory, and groundcover plant species locally typical of this alliance and increasing the diversity of overstory trees. Species locally typical of the Douglas-fir – Western Hemlock Forest Alliance include:

Trees

<i>Abies grandis</i>	grand fir
<i>Acer macrophyllum</i>	bigleaf maple
<i>Pseudotsuga menziesii</i>	Douglas-fir
<i>Rhamnus purshiana</i>	casacara
<i>Thuja plicata</i>	Western red-cedar
<i>Tsuga heterophylla</i>	Western hemlock

Shrubs

<i>Acer circinatum</i>	vine maple
<i>Corylus cornuta</i>	beaked hazel
<i>Gaultheria shallon</i>	salal
<i>Holodiscus discolor</i>	oceanspray
<i>Mahonia aquifolium</i>	tall Oregon-grape
<i>Mahonia nervosa</i>	low Oregon-grape
<i>Oemleria cerasiformis</i>	Indian plum
<i>Physocarpus capitatus</i>	ninebark
<i>Ribes sanguineum</i>	red flowering currant
<i>Rosa gymnocarpa</i>	baldhip rose
<i>Rubus parviflorus</i>	thimbleberry
<i>Symphoricarpos albus</i>	snowberry

Within the broad context of a Douglas-fir – Western Hemlock Forest Alliance, this project will capitalize on opportunities to manage vegetation to favor a diverse array of wildlife species, especially birds, by creating a mosaic of heterogeneous habitat types with diverse assemblages of native plants and varying levels of structural diversity.

Revegetation Plan

As part of the *Tabor to the River* implementation, the WRP, working in close cooperation with partners in PPR and PWB, will undertake a comprehensive vegetation management project at Mt. Tabor Park.

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The ultimate goal of the project is to create a healthy native forest community that has both the biological and structural diversity necessary for clean water and wildlife habitat. Native plant species, including overstory trees, mid-story and understory shrubs, and groundcover grasses and forbs, will replace invasive vegetation.

Goals

- Improve stormwater interception.
- Reduce cover of non-native invasive vegetation to a manageable background level that does not exclude native species or interfere with natural forest regeneration and succession.
- Establish native grasses and forbs, via natural recruitment and/or seed application, in areas where invasive species removal exposes bare soil.
- Establish native trees and shrubs, via planting of bareroot seedlings, to enhance the structural and biological diversity of forested areas and ensure the next generation of tree canopy.
- Prevent soil erosion.
- Enhance wildlife habitat.

There is no “quick fix” to the ecological degradation at Mt. Tabor Park. The invasive species problem has persisted, and worsened, for decades and there is undoubtedly a substantial bank of weed seeds in Mt. Tabor’s soils. Throughout the course of the project and into the foreseeable future, Mt. Tabor Park will be a “landscape in transition” as invasive species are systematically removed and planted trees and shrubs establish and mature. The removal of woody perennial weeds such as ivy and blackberry will initially create space for new herbaceous annual and biennial weeds which will then require control. By using an adaptive management approach, WRP will continually monitor project areas for new infestations of concern and prescribe necessary treatments. Many herbaceous weeds, while unsightly, are not as ecologically-damaging as English ivy and Himalayan blackberry since they do not create monoculture conditions and are not capable of excluding native plants; these transitory weeds will eventually be out-competed by the newly-established native trees, shrubs, and grasses.

Project Area

As shown on the attached map, the revegetation project is delineated into 14 distinct treatment areas. Treatment areas are identified as “High”, “Medium”, or “Low” priority. Revegetation treatment areas are limited to “natural/semi-natural” areas of Mt. Tabor Park, as identified in the natural area vegetation survey. The actual boundaries of individual treatments will be determined by multiple factors, including site conditions, needs, objectives, PWB’s current and potential future construction activities, proximity to active use areas of the park, proximity to water reservoirs and other water infrastructure, current management practices, and others. WRP, PPR, and PWB will work together to define treatment areas and develop a treatment plan and timeline that meets the goals of the project without conflicting with other park uses or water system safety and reliability.

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Table 2 – Revegetation Treatment Areas

Priority	# Units	Acres
High	4	19.3
Medium	3	24.6
Low	7	29.6
TOTAL	14	73.5

All treatments will be implemented within the following constraints:

- No threat to water system infrastructure or to the safety and quality of drinking water in open reservoirs.
- Adherence to the *Joint Portland Parks and Recreation – Water Bureau Pesticide Use Policy*, which establishes three pest control zones based on “topography, distance, and potential drift or run-off” to reduce risk of any potential negative impacts of pesticides applied around the reservoirs.
- Prevention and mitigation of soil erosion, especially on slopes above water reservoirs and roads.
- No increase in non-desirable and/or illegal park uses, such as off-trail mountain biking, off-trail hiking, and transient camping.
- No conflict with current or potential future PWB maintenance and construction activities.
- Minimal disturbance to wildlife, especially nesting and migratory birds between mid-April and the end of July.

Revegetation Treatments

The WRP has considerable experience and expertise in natural area revegetation. Working throughout Portland’s watersheds—in parks, on other public property, and on private property—the WRP has restored thousands of acres of native forest and wetlands since 1995. The WRP has a long history of successful partnership with PPR, and has implemented dozens of invasive species removal and revegetation projects in both natural area parks (such as Forest Park, Powell Butte Nature Park, Errol Heights, Rocky Butte Natural Area, and Oaks Bottom Wildlife Refuge) and hybrid parks (such as Gabriel Park and Dickinson Park). By contracting with skilled and experienced reforestation companies, the WRP is able to cost-effectively implement landscape-level vegetation management in all conditions and terrains. Most revegetation treatments will be implemented by contract crews under the supervision of WRP staff.

Invasive Species Removal – Manual Cutting (Vines)

Also known as “air gapping,” this treatment involves cutting of vines (mostly ivy and clematis) with either machetes or chainsaws depending on thickness of vine. After the vines are cut, and thus separated from their root system, they are left in the tree or shrub canopy to die and decompose.

Invasive Species Removal – Manual Cutting (aka “brushing)

Invasive shrubs, especially Himalayan blackberry, will be cut with chainsaws. During the maintenance phase, all competing vegetation around planted trees and shrubs will be cut so that planted vegetation is “free to grow.” Cutting treatments will be carefully

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scheduled to avoid disturbance to nesting or migratory birds, especially between mid-April and the end of July.

Invasive Species Removal – Herbicide Application

State-licensed herbicide applicators will apply select herbicides, using only low-pressure backpack spray equipment, according to PPR's nationally-recognized Integrated Pest Management (IPM) Program. The IPM policy contains specific herbicide application practices that have been reviewed by the National Oceanic and Atmospheric Administration (NOAA) to create best management practices for working safely in natural areas and avoiding negative consequences for wildlife and water quality. Specific herbicides used, Garlon 3A (triclopyr) and RoundUp or Rodeo (glyphosate), are widely considered to be among the least toxic and safest herbicides available. By following the best management practices in the IPM policy and adhering to the *Joint Pesticide Use Policy*, herbicide drift to water reservoirs will be prevented.

Invasive Species Removal – Cut-Stump Treatment

Cut-stump treatments are used to selectively kill targeted invasive trees. Trees are cut near ground level with chainsaws and concentrated herbicide is immediately applied to the stump with a small hand sprayer. The herbicide is translocated into the root system, systemically killing the tree and root system and thus reducing or eliminating the potential for re-sprouting. By using a hand sprayer, there is no risk of drift or damage to non-target vegetation.

Downed trees will be chipped and no large brush piles will be created. PPR will identify any individual trees (e.g. memorial trees, heritage trees, and specimen trees) to be preserved. WRP will consult with PPR – Urban Forestry to obtain necessary permits prior to any tree removal.

Erosion Control

In areas where ivy removal or other activities expose bare mineral soil, WRP will apply either cover crop grass or native grass seed to prevent erosion. In areas where slope gradient and soil conditions create significant erosion potential, especially above water reservoirs and roads, WRP will employ the appropriate erosion prevention and sediment control best management practices (BMPs), such as jute fabric and straw wattles, according to the standards in the City of Portland's *Erosion and Sediment Control Manual* (2008). In cases where erosion risk is uncertain, WRP will consult with PPR and PWB to determine if additional erosion control is necessary based on site conditions.

Native Tree and Shrub Planting

Bareroot native tree and shrub seedlings will be planted throughout the project area. Most areas where invasive species will be removed will require some level of revegetation; however planting density will vary, depending on the relative density of existing native vegetation and the PPR's desired future condition (DFC). WRP and PPR will collaborate on the species list and planting design to establish a vegetation community consistent with the DFC; PWB will review the planting plan prior to implementation to ensure that water system infrastructure is not compromised.

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The planting plan will reflect the following considerations, conditions, and constraints:

- Consistency with the *Mt. Tabor Master Plan*.
- Consistency with PPR's DFC for Mt. Tabor Park.
- No tree planting within ten (10) feet of buried water pipes or other critical water infrastructure.
- No tree planting on top of the underground water reservoir, Reservoir 7.
- No planting on dam embankment, as per Federal Energy Regulatory Commission (FERC) requirement.
- Maintenance of significant view corridors.
- Crime Prevention Through Environmental Design (CPTED) principles, including set-backs from trails and high use areas.
- Creation of biologically- and structurally-diverse wildlife habitat, with plants specifically selected to provide food, cover, or both.
- Creation of a mosaic of habitat types, including forest, woodland, shrubland, meadow, and ecotones, to support a diverse array of wildlife species.

Tree seedlings may be protected against animal damage by vexar tubes if deemed necessary. Shrubs will be planted in clusters. All plants will be marked with 4' bamboo stakes to make them more easily visible during maintenance activities. All plants will be mulched to maintain soil moisture and suppress competing weeds. Irrigation and fertilization will not be necessary.

Planting areas will be maintained so that planted trees and shrubs are "free to grow." The establishment phase for planted woody vegetation is approximately three years. After three years, the plants will continue to mature without significant intervention. Since some level of seedling mortality is inevitable and expected, trees and shrubs will be planted at a higher initial density to achieve the target density. If monitoring reveals mortality beyond the anticipated level, additional trees and/or shrubs will be interplanted as necessary in identified locations.

Temporary Exclusion

To discourage off-trail hiking and biking or unauthorized access to sensitive areas, temporary fencing or other exclusion methods, will be used in areas identified by and according to standards specified by PPR or PWB staff.

Monitoring

WRP staff will monitor all project areas to ensure that objectives are achieved. Monitoring is a key step in the adaptive management process; the relative success or failure of individual treatments will be used to inform future treatment prescriptions.

Project Timeline

Revegetation within each treatment area will last five years minimum. Revegetation will be initiated as funding is identified and secured, beginning with High priority areas first. A generalized treatment schedule is outlined below; actual timeline is highly contingent on treatment start date. WRP staff will strive to time treatments according to plant life cycle and season to maximize effectiveness. WRP will develop the final treatment plan in

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coordination with PPR and PWB. WRP, PPR, and PWB staff will communicate regularly throughout the project regarding both planned and previously implemented treatments.

Year One

- Invasive tree cut-stump
- Manual vine cutting (air gapping)
- Herbicide application, all targeted, non-native vegetation (may include vegetation compression, aka “mashing”)
- Understory cutting, all targeted, non-native vegetation
- Seed application (as needed)

February-March Year Two

- Tree and shrub planting

Year Two – Year Five

- WRP staff, in consultation with PPR, will employ adaptive management to determine type and timing of treatments necessary to ensure control of targeted invasive species and successful establishment of planted native vegetation.

After Year Five

- PPR will assume primary responsibility for on-going maintenance of all areas.

Project Coordination and Partnership

Since *Mt. Tabor Revegetation* is a partnership between three City bureaus, regular and open communication will be integral to project success. Although WRP staff will be responsible for on-the-ground implementation of revegetation treatments, all three bureaus will be actively involved in the planning process. A Memorandum of Understanding will detail the roles and responsibilities of each of the bureaus and key staff. Appropriate representatives from the three bureaus should meet as needed (at least annually) to review upcoming scheduled revegetation treatments, discuss new or on-going issues, and develop management strategies to meet project goals and objectives.

Additionally, interested community groups, especially the Friends of Mt. Tabor and adjacent neighborhood associations, should be consulted early and often during the project planning phase as well as during project implementation to ensure that community concerns are acknowledged and considered in the decision-making process.

Public Information and Education

BES, PPR, and PWB shall coordinate a comprehensive public involvement effort to inform park users and the general public about the project. Outreach tools may include: park signage, brochures or fact sheets, open houses or other public meetings, and placement of stories in local media. Main messages should include: the need for project and project goals, the reasons for responsible use of herbicide and actions to prevent potential negative impacts, expectations for the aesthetic look of park vegetation during “landscape in transition” phase, how community members can participate in the project,

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how citizens can help meet goals of greater *Tabor to the River*, and prohibited park user behaviors (off-trail use, etc.).

References

Mt. Tabor Park Master Plan Report (Portland Parks & Recreation, 2000)

<http://www.portlandonline.com/shared/cfm/image.cfm?id=175296>

Mt. Tabor Park natural area vegetation inventory

<http://www.portlandonline.com/parks/index.cfm?c=39872&a=96559> and

<http://www.portlandonline.com/shared/cfm/image.cfm?id=96639>

*note: online summary includes only 2005 survey data

Portland Parks Integrated Pest Management Program

<http://www.portlandonline.com/shared/cfm/image.cfm?id=116237>

City of Portland Invasive Plant Management Strategy Report

<http://www.portlandonline.com/bes/index.cfm?c=47815&>

City of Portland Erosion and Sediment Control Manual

<http://www.portlandonline.com/shared/cfm/image.cfm?id=192327>

Friends of Mt. Tabor Park

<http://www.taborfriends.org>

