BEGINNER'S GUIDE TO DEVELOPING RESTORATION PROJECTS

A primer for inexperienced practitioners planning to apply for restoration funding

As with cookies, there is no one recipe for a successful restoration project, but there are guidelines to lead to a good result. Successful restoration is the culmination of good planning, preparation, execution and follow-through. A shortcut in any step will leave you frustrated in the next. This short guide is designed to help the relative beginner ask the key questions as they develop a project in order to apply for a Metro Nature in Neighborhoods restoration and community stewardship grant. Luckily, many resources are available to help you answer them in a way that is right for one's project and the ecosystem. One good resource is the Intertwine Alliance's "Regional Biodiversity Guide for the Greater Portland – Vancouver Metropolitan Area" (www.theintertwine.org), which provides basic descriptions of our region's major habitat types and sources of additional information about them.

This document will review the following major stages:

- Selecting the site
- Developing the desired future condition
- Developing a planting plan
- Ordering plants or seeds
- Preparing the site
- Planting
- Post-planting maintenance
- Monitoring

Selecting the site

All sites are not the same. Each has different local and regional importance, accessibility, restoration potential and education or community building value. From an ecological perspective, project sites could form or serve as a catalyst to building a meaningful network. Sites could serve as showcases or key teaching locations to leverage future work. The regional Conservation Data Viewer may help you put the site in some regional context (http://www.regionalconservationstrategy.org/page/home).

If you are choosing between sites, please consider the following key questions:

- What other natural habitat is next door and in the neighborhood?
- Is it near public or otherwise protected land?
- Are nearby sites with similar habitats in good condition or likely to be restored soon, or would the project create an island of habitat in a sea of weeds?

- If the site will be an island of good habitat for a short or long time, is it large enough to function effectively in the meantime?
- Does you have legal access to the site and permission (and permits if necessary) to do the work?
- If needed, is it physically accessible by vehicles or machines?
- Does accessibility require a temporary road?
- If it isn't accessible by vehicle, how will you get materials to the work area?
- Is it a long walk for contractors or volunteers from their vehicles?
- Is there parking nearby for volunteers or contractors?
- Is it near public transportation?
- Do the neighbors support the work?

Developing the desired future condition

In order to decide the appropriate habitat type to restore or create, it is useful to understand the site's history and the current and future factors likely to influence it. The site may or may not be able support the desired habitat type. Consider the following:

- Consult historic vegetation records, soil surveys and old aerial photographs.
- Talk to people who know the management history, if possible.
- Investigate what grows nearby in similar conditions (e.g. slope, aspect, distance from water).
- Learn about the site's hydrology (e.g. when it is wet and dry, when it floods) and consider the effects of a changing climate.
- Determine if the level of maintenance necessary to maintain the desired habitat is possible.
- Consult the relevant section of the Regional Biodiversity Guide for an overview and additional references.
- Get advice from knowledgeable local practitioners. Consider seeking assistance from the local Soil and Water Conservation District, Watershed Council, public natural resources agency or skilled private consultants who are familiar with asking and answering these key questions.

Developing a planting plan

Plant survival depends on the right plant at the right place. Just because it is a native plant, doesn't mean it will thrive in any environment. Consider the following:

- **Planting density:** More plants cost more, but they also compete more aggressively with weeds, thus reducing the time heavy maintenance is needed and creating a native dominated habitat sooner.
- **Number of trees vs. number of shrubs and smaller plants**: Trees make shade that reduces weed issues and cools streams. Shrubs and smaller plants (e.g. herbs and grasses) create important pollinator and wildlife habitats. Planting trees close together forms shade, which reduces many weeds, but may require thinning in the future and suppress other species that need light. Wider spacing increases the period of higher maintenance, but reduces the need for future thinning.
- **Supporting or marking plants with stakes:** Stakes make finding plants much easier during post-planting monitoring, or follow-up maintenance
- **Putting protective tubing around plants:** Protective tubing adds an initial cost, but is sometimes necessary to protect the investment from deer, voles and other creatures that see them as food, which could save money in the long run. Protective tubing will need to be adjusted and later removed, which adds to the cost.
- **Planting in rows vs. more random patterns:** Some people find rows visually unappealing, but they facilitate post planting maintenance and machine based site preparation and future maintenance. Random patterns may feel more natural at the beginning, but makes finding the plants for monitoring or maintenance more difficult.

If you do not have access to expertise in this area, please plan to consult with or hire experts.

Ordering plants or seeds

Planting is necessary in most restoration projects. While there are many good suppliers of wholesale native plant materials in our area, if you can join a program with a plant procurement contract, you may get both a better price and better access to the species desired. Check with Metro, the City of Portland and Washington County Clean Water Services to see if the timing works with theirs. Be sure and plan ahead, supplies of some seeds, shrubs and trees can be limited and as much as a year or more can be necessary for large numbers of high demand species. When you order, consider the following:

- **Seed source:** Local is better, although most stock of common species from within the Willamette Valley should be acceptable.
- **Size:** Too big or too small can be problem.
- **Bare root:** Bare root plants are much cheaper than container stock ($0.50-$1.00 for bare root vs. $2 or more depending on container size), but, they need to be planted in February or March; stored in a cooler before they are planted; and, handled carefully in the field during planting to prevent them from drying out.

- **Container stock:** Container stock can usually be planted without supplemental watering in the fall, and in some sites in late winter or early spring. A long dry summer or late spring or summer planting means watering to ensure the plants live.
- **Cuttings:** For some species cuttings can work and can be planted as early as November, they are sometimes available commercially and sometimes can be made from plants growing right on site or nearby. Be sure to have permission from the landowner before you start making cuttings.
- **Seeds:** Seeds can be a cost-effective method of getting ground cover established. Using too much seed can create competition for the bare root, container stock or cuttings being planted or the least competitive species within the seed mix. Too little seed fails to accomplish the job. The Native Seed Network is a good place to start to find a supplier.

Preparing the site

A site full of weeds at planting time means poor survival, years of slower growth and increased effort to just keep the plants alive until they are "free to grow". Take the time to get as clean a planting bed as possible. Up to two years of pre-planting weed control can be necessary. Consider the following key questions:

- Does the whole site need to be controlled or only planting strips? Strips are more affordable.
- Are the weeds on site currently likely to leave a seed bank that will require aggressive follow-up?
- Are the weeds on site shade tolerant (e.g. ivy, garlic mustard) and thus likely to grow back, or will the shading eventually suppress them enough to where you can live with them (e.g. blackberry, broom and clematis).

Planting

Planting is an art and a science. You can choose to use paid contract crews, volunteers, or something in between (e.g. AmeriCorps, Job Corps).

Volunteers are great and offer the opportunity for education and outreach, but they are **not** free. Recruitment, coordination, training and appreciation all take time. If you use volunteers, be sure and have good training, and don't be shy about following up with the volunteers to ensure good planting technique. Each plant represents a big investment in time and effort. Sloppy planting leads to low survival.

Volunteers are usually slower than paid crews. If there is a big planting area, be sure to have enough capacity to get the job done within the seasonal window of opportunity.

Although each member of a contract crew costs about $200 per day, they can typically plant between 800 and 1000 bare root plants per day. This means the gets the job done with less project oversight and less time that the bare root plants will be out of the ground. If you are

interested in contracting, you may be able to use the master contracts of a local jurisdiction or agency. If so, this "cooperative procurement" may simplify the process. Contractors generally have a lot of experience planting, but it still pays to make sure they understand the plan and you should plan to have someone onsite occasionally to ensure the planting crew is doing things according to directions.

Post-planting maintenance

It cannot be overemphasized, even with good site preparation, follow-up maintenance is important. Weeds such as blackberry or reed canary grass can re-establish, outcompete, and kill young natives after a planting. Except where you are working under an established forest canopy, you should plan for two to four years of post planting maintenance. This means mulching, mowing, circle, or row spraying with herbicides. Sunny sites with a lot of grass may require spring and fall actions.

As with planting, consider if the project has the staff or volunteer capacity to protect the plants or whether contractors are necessary.

Monitoring

How well did the project work? Funders generally will require an evaluation of the project. Counting living and dead plants and taking pictures from permanent photo-points are good simple approaches to track changes over time.

- **Counting plants:** Bamboo stakes and plastic tubes make it easier to find and count the surviving plants. If many of the plants have died, consider whether replanting is needed or whether the remaining plants will be able to fill in the gaps as they grow. Some supplemental planting is often required after a particularly dry summer.
- **Photo-points:** Clear photographs are an easy way to document change over time when taken from the same place and using the same lens and zoom. Having a sign with plot numbers and the date visible in photographs is the gold-standard for photographic monitoring. There are good guides to this available on the internet.

Some approximate costs associated with restoration planting*

Realistically, you should plan to spend somewhere between $5,000-$7,000 per acre for a typical acre of restoration in riparian or upland forest, including site preparation, planting and post-planting maintenance. Easy sites might be as little as $2,300 an acre or difficult sites could be as much as $9,000 or more. Other habitats also vary considerably, depending on site goals and conditions.

Item	Typical Cost	Comment
Bare root plant	$0.50-$1.00	The cost is variable depending on species, size and number ordered. Consult other restoration practitioners and nurseries for recommendation on best stock type for site conditions.
4" container stock	$1.00 - $1.50	Wholesale price per plant.
1 gallon container stock	$3.75	Wholesale price per plant.
3' Vexar Tube	~$0.45/tube to install, plus cost of tube ($0.29 – 0.75 each)	
Protective tube	$1 each	Taller, blue tubes for protecting oak trees.
Bamboo stake	~$0.15/stake, plus cost of stake ($0.05 - 0.20)	Cost depends on length.
Professional planting crew	$200 / person / day	Each person can plant 800-1000 plants. Generally 6-10 person crews.
Professional site prep - scalping	~$0.25/scalp	
Professional planting maintenance, circle spray	$200 - $250/acre or $30 - $35/hour	
Consultant time	$50 - $300 per hour	Planting plans should be near the lower end of the range; complex engineering near the top.

*Prices are often based on volume, but these should get you in ballpark as you start thinking about the project.

RESOURCES

The Willamette Valley Landowner's Guide to Creating Habitat for Grassland Birds

http://www.dfw.state.or.us/conservationstrategy/docs/grassland_bird_habitat/Grasslands.pdf

Landowners Guide to Restoring and Managing White Oak Habitats

http://www.blm.gov/or/districts/salem/files/white_oak_guide.pdf

A Guide to Riparian Tree and Shrub Planting in the Willamette Valley

https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/24003/em9040.pdf?sequence=1

Plant Native – Native Plant Nurseries in Oregon

http://www.plantnative.org/nd_or.htm

Guide for using Willamette Valley Native Plants Along Your Stream

http://www.linnswcd.oacd.org/NativePlantGuide05.pdf

Pollinator Conservation Resources

http://www.xerces.org/pollinators-pacific-northwest-region/

The Portland Plant List

https://www.portlandoregon.gov/auditor/34460?a=322280

Restoring Rare Native Habitats in the Willamette Valley – A Landowner's Guide for Restoring Oak Woodlands, Wetlands, Prairies, and Bottomland Hardwood and Riparian Forests

http://willamettepartnership.org/publications/other-publications/Landownerguide.pdf