TAdN Arundo Eradication Program

Restoration/Revegetation Plan Guidelines

The Restoration/Revegetation Plan contains a written plan, timeline, and budget.

Choosing Revegetation Methods

You must first decide upon the most appropriate revegetation method for your site(s). There are two approaches that can be used to restore the area to a more stable, desirable state: *passive revegetation* and *active revegetation.* You may use active in one place (e.g. high on banks) and passive in another (e.g. lower on the same banks).

Passive revegetation means replanting by natural processes. Nature itself becomes the restoration agent! This method requires the least effort and expertise to restore native riparian vegetation. Wind, rain, and high stream flows generally will carry seeds, plants, and sediment downstream, where they will settle on the lower stream banks naturally. This process is periodic and may take several years. Passive revegetation is unintrusive and fewer disturbances may result in less erosion. It also ensures the introduction of local genetic stock, including *both* native and exotic plants. If exotic pest plants dominate adjacent areas, the eradication site is at risk of being repopulated by these invasive non-native plants.

Passive revegetation is most appropriate when:

- There are established native plants that provide seeds and propagules, either on-site or upstream.
- Few non-native plants inhabit the site or exist upstream of the site
- The site does not contain a lot of disturbed, unvegetated sunny ground that could act as a magnet for non-native pest plants.
- The soils are stable and at low risk of erosion.
- The site tends to flood each year, allowing nearby native plant material to settle and become established.

If these conditions exist, then attempting active revegetation may be a waste of time and resources.

Active revegetation means planting by hand. It usually involves installing and maintaining an irrigation system, and following a weed management schedule. It is often needed to revegetate the higher, drier areas adjacent to streams that may not be affected by frequent flooding. It is generally recommended that you postpone active revegetation until you have the most invasive pest plants under control, since it may be difficult to avoid harming desirable plants during follow-up herbicide treatments. Adequate control can take more than one season.

Active revegetation is most appropriate when:

- The site is located downstream from or near invasive plant species that rapidly invade sites (such as broom, thistle, mustard, and hemlock). In such cases, prompt revegetation with natives may be necessary to prevent invasion of your site.
- The soil or stream bank is unstable and at high risk of erosion.

- A landowner strongly desires a privacy screen or is worried about bank erosion following pest plant removal.

When an eradication site is on an unstable bank or a vulnerable site, revegetation alone may not provide adequate soil or bank stabilization. Soil retention materials and stabilizing structures may be needed to adequately prevent erosion and bank failure. In such cases, materials such as erosion control fabrics and engineered structures should be considered before engaging in invasive plant removal. Your Restoration/Revegetation Plan should include both proposed bank stabilization and revegetation proposals, if needed. For structural changes, consult with a professional. Some sources to consider consulting with are private engineering firms, government agencies, Resource Conservation Districts, and landscape architects.

Restoration of native plant communities is an art and science unto itself. In planning active revegetation, it is best to err on the side of caution and remember that work on your site will likely have impacts downstream. Choose the simplest project that will still satisfy your goals. We strongly encourage the use of locally grown native stock. Seek advice from experienced professionals before you act, keeping in mind that people knowledgeable about native plants or stream dynamics are not necessarily experts in revegetation, or visa versa. As a general rule, plant most species in the fall and early winter to take advantage of winter rains and ensure survival. Plants will need irrigation for the first one or two years.

Elements of the Plan

The following elements should be a part of your Restoration/Revegetation plan:

1) Project Goals and Timeline

Briefly describe what you want to accomplish—the desired long-term outcomes of your plan. Goals should be general, easily understood, and flexible enough to adapt to changing situations. For example, to maximize fish and wildlife habitat, your long-term goals could include eventually shading the stream, stabilizing the ground surface with native plants (not annual grasses), and providing a multi-leveled structure of vegetation from small shrubs to tall trees.

Also prepare a timeline with detailed tasks laid out by months or quarters. A spreadsheet is probably the simplest way to accomplish this.

2) Existing Conditions

Briefly describe the area(s) that will be restored, including existing vegetation (native and non-native), wildlife, soil, topography, drainage, rainfall and flow regimen adjacent land uses and ownership, and any other relevant factors. Describe any known future plans for the site or adjoining lands. Describe any site conditions that may constrain the revegetation work, including protections for sensitive species. You can learn what listed species are in the area(s) by using database searches, such as the Natural Diversity Database. A qualified biologist should conduct a search for these species.

3) Permitting

If the streambed or bank requires alteration, recontouring, or significant removal of vegetation, a Stream Bank Alternation Agreement (Section 1600) is required from the California Department of Fish and Game. If streambed alteration work is done below the plane of ordinary high-water, a permit is required from the U.S. Army Corps of Engineers.

You will need to determine if you have sensitive species habitat on your site(s). Since existing agency records are usually incomplete, the most accurate method is to have a qualified expert such as a botanist conduct a field survey. Sources of existing information include the Department of Fish and Game, State Parks Department, the California Natural Diversity Database, and the CalFlora website. You can also consult with the U.S. Fish and Wildlife Service. Your eradication plan must use the best possible methods to avoid disturbing wildlife habitat or mitigate any disturbance it is likely to cause.

It is your responsibility to obtain all necessary permits. Even beneficial projects often require extensive permitting. Allow time and an adequate budget for the permitting process.

4) Site Preparation

Often, pest plant debris will be removed in the course of eradication. If plant debris remains in the revegetation areas, it should be secure on the banks and not pose a threat of flooding or property damage. In some cases, it can be used for mulching new plantings or erosion control.

Other debris, including trash, concrete slag, or other man-made materials should be removed to facilitate revegetation.

5) Planting Plan

Develop a list of desired plant species and a planting design. Let experts you work with know you want to use *only* native species! Choose fast-growing natives that can flourish on your site. For example, for a privacy screen at the water's edge, use willow pole plantings (*Salix* species). These are easy to establish in moist soils and grow rapidly. For the same effect on a high bank, try coyote bush (*Baccharis pilularis*). Don't plant expensive or labor-intensive species near the waterline, since they may be washed out in their first winter.

If you plan to do your own propagating, research the proper timing and techniques for the plant species you will be using, the number of plants, source of stock, and genetic origin. Also consider plant spacing and density, mulching, and other post-planting work. If you plan on contracting out this work, be sure you discuss these issues with the contractor.

Revegetation plan drawing(s) should include plant locations, grading, irrigation system (if used), access routes, protective measures such as fencing and signage, etc.

6) **Maintenance**

Plan for maintenance, including pest and erosion control, weeding, replanting, irrigation (if

needed), and fencing and signage (if needed).

7) **Monitoring and Success Criteria**

List criteria you will use to evaluate the success of your plan. Derive these criteria directly from your revegetation goals (Section 1). Examples might include the % survival of various categories of planted vegetation (i.e., trees, shrubs, etc.), % cover (invasive problem species, tree canopy, bare ground, understory shrubs, groundcover, etc.), use of revegetated areas by wildlife, birds, etc. Include plans to photodocument the results. Describe long-term (10-year) monitoring and how you intend to fund it.

8) Responsibilities

List the people who will design, manage, and implement your plan, including specialists such as hydrologists, biologists, botanists, erosion control specialists, landscape architects, and contractors. Describe what each person will do and their affiliation. This information will help other groups plan new revegetation efforts.

9) Cost Analysis

Revegetation costs are extremely variable depending on the needs of the site, the intensity of planting, size of the area planted, and the labor source. You will want to budget for the following types of activities/needs: site preparation (labor and equipment), maintenance and monitoring, materials, and overhead/administration.

10) Appendix

Attach any additional revegetation information and/or plan drawings.

Additional Resources

- Local chapter or state office of the California Native Plant Society.
- Nurseries specializing in local native species.
- Yellow pages listings for Environmental, Conservation, and Ecological Organizations, or Environmental and Ecological Services.
- Society for Ecological Restoration, California Chapter (SERCAL), at www.sercal.org or SERCAL, 915 L Street #C104, Sacramento CA 95814, 805-634-9228.
- Local restoration or mitigation consultants and biologists.