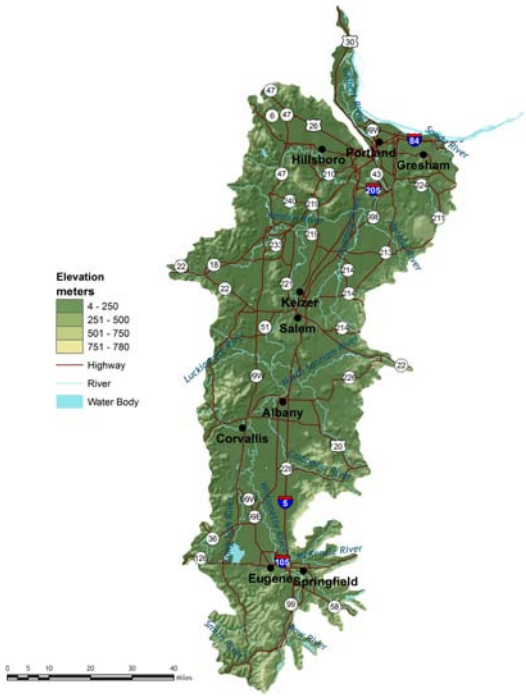

Figure 2. Willamette Valley ecoregion.

Image from *The Oregon Conservation Strategy*. 2006. Salem, OR: Oregon Department of Fish and Wildlife. Reproduced by permission.

Survey shows variable success with riparian tree planting

Slightly fewer than half of 105 riparian tree-planting projects in western Oregon achieved tree survival rates of 75% or more, according to a 2002 study by the Oregon Watershed Enhancement Board.

In 40% of the projects in the study, fewer than half the trees survived.

Projects installed under the Conservation Reserve Enhancement Program were more successful than projects funded by grants. The study's authors attributed this difference to the greater use of site preparation, postplanting maintenance, and tree protection under the program.

Source: Anderson, M., and G. Graziano. 2002. *Statewide Survey of OWEB Riparian and Stream Enhancement Projects*. Salem, OR: Oregon Watershed Enhancement Board.

STEP 1. PLAN YOUR PROJECT

Know your watershed

Your project goals should reflect conditions and needs in your local watershed. Identify what is missing or most in need of enhancement, and set priorities accordingly. In western Oregon, for example, warm stream temperature is commonly identified as the primary water-quality issue, so providing shade to maintain cool water conditions is often a priority.

Begin planning by reviewing watershed assessments from your local watershed council or larger public or private landowners in your watershed (find your local watershed council at *http://www.oregon.gov/OWEB/WSHEDS/wsheds_councils_list.shtml*). Many watershed councils have already identified key constraints and opportunities in watersheds or subbasins (e.g., elevated stream temperatures or lack of large wood).

Know your site

Once you understand watershed conditions and needs, examine your site. Identify specific challenges (e.g., frequent flooding [figure 3], poorly drained soils, abundance and type of weeds, or likely animal damage) that might be serious constraints to a successful planting.

Next, determine what could be enhanced at your site to contribute to overall watershed health. Consider things you might try to change (e.g., amount of shade, bank stability, or livestock use near the stream). Some changes might be easy; others might be difficult or expensive. Some actions will have almost immediate benefits; improvements from other actions won't be evident for years or decades. Make sure any difficult and expensive actions line up with your priorities.

Be sure to consult others. Identify partners in conservation organizations or other agencies who might be able to help identify needs and opportunities at your site (figure 4).

Checklist for Step 1: Plan your project

Time and thought at this stage will lead to a better, more cost-effective project in the long run.

- ☐ Assess needs for the riparian area in the context of watershed conditions and priorities. What is missing or most in need of enhancement?
- ☐ Observe site conditions to determine what actions will address identified needs and have the greatest potential for success.
- ☐ Set goals based on what will help restore key functions in the future rather than what is thought to have prevailed in the past.
- ☐ Consider promoting natural regeneration of trees and shrubs and other passive restoration approaches as well as planting. Try to get the greatest value for your investment.
- ☐ Think about possible obstacles, such as a mismatch between project size and budget, equipment availability, and your time, skills, and commitment. Is there a good chance of success?
- ☐ Develop a site-specific design that addresses local watershed issues, is appropriate for site conditions, and can be accomplished with available resources.

Figure 3. Flooding of a young riparian planting on the North Yamhill River, Yamhill County, Oregon.

Photo by Amie Loop-Frison, Yamhill Soil and Water Conservation District.

Figure 4. Assess current site conditions to determine benefits already being provided, what is needed, and establishment challenges.

Photo by Tara Davis, Calapooia Watershed Council.

Restore functions, not just vegetation

Conditions before European settlement are sometimes used as a guide for desirable riparian conditions. But restoration to presettlement conditions is often difficult or inappropriate. Few accurate or detailed records of those conditions exist, and existing records are snapshots of single moments in time, with no assurance that they are representative of a longer time frame. Also, because riparian ecosystems are complex and change over time, there is no "natural" condition for a given area.

Ecologists recommend restoring or enhancing important riparian functions (figure 5), not just vegetation conditions. For example, development across the Willamette Valley has led to loss and degradation of many habitats, including once-extensive networks of riparian forests, prairies, and savannas. This, in turn, reduced plant and animal populations. One functional goal is to improve habitat by restoring or enhancing conditions that are critical to survival of a species or group of species. See Appendix A (page 22) for more examples of riparian functions.

Riparian vegetation provides many important functions for aquatic habitats. For example, restoration projects designed to aid salmon populations often focus on establishing tree species that create shade, reduce stream temperatures, and drop leaves and insects into the stream. Plantings will eventually provide large wood, which is important for modifying stream channels and creating in-stream habitats.

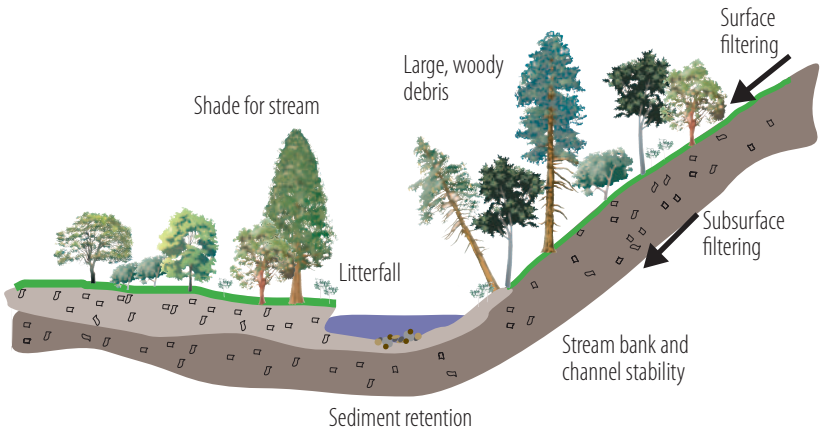

Figure 5. Important functions of a riparian area include shade for the stream, stream bank stability, woody debris for the stream, sediment retention, litter for aquatic organisms in the stream, water filtering, aquatic habitat, and riparian wildlife habitat.

Riparian areas are also important terrestrial habitats. A well-developed shrub layer provides foraging and nesting sites for migratory songbirds. Large trees are needed to provide nesting or foraging sites for large birds, such as herons and pileated woodpeckers. Large trees take time to develop, but you may accelerate their growth by planting fast-growing species, spacing them far apart, and controlling weeds and other competition. You can also provide some functions normally provided by large trees through interim actions, such as installing nesting boxes (for wood ducks and screech owls) or platforms (for osprey).

Consider passive restoration

Consider whether your site will be able to grow and develop as you desire *without* actively planting it (a passive restoration approach). For example, you may be able to meet tree establishment goals by encouraging natural regeneration of species already present and reproducing on the site (see Appendix B, page 23). Perhaps the only action needed is to remove grazing livestock, weed competition, or intensive cultivation.

Identify obstacles

It is important to assess operational constraints, identify problems, and resolve conflicts during the planning phase. Think about and discuss the following questions with advisors and organizational partners:

- How much money, time, and energy are available for this project?
- Is the budget adequate for the size of the project?
- Do you have a good understanding of demands on resources to accomplish key activities throughout the project (from planning, to planting, to weed control and maintenance)? Can you realistically meet those demands in a timely way, considering your other commitments, health, and access to and skill in using equipment and tools? If not, is there money in the budget to hire help?
- What conflicts might arise with adjacent land uses (e.g., farming or grazing), and how can these be resolved?
- Is there good access to the planting site, and can you move in any needed equipment or supplies?
- Does the site location allow frequent visits for monitoring and maintenance, or will you visit the site only occasionally?
- How will you determine project success? What are the consequences of an unsuccessful planting?

The scale of the project is also an important consideration. Small projects (e.g., dozens to a few hundred trees) allow use of a wider range of techniques, such as hand-cutting competing vegetation, that might be prohibitively expensive on larger projects. As the project's size and complexity increase, so does the need for cost-effective methods of site preparation, planting, and vegetation control. Balance the scale of your project with the budget, time, and other resources available.

Design your project

Although it is helpful to look at other plans and projects, be sure to design a riparian planting that is specific to your site, reflects identified goals, and can be accomplished with available resources.

Your design will need to address many features:

- Width and position of the planting
- Species to plant and type of planting materials
- Plant spacing and arrangement
- Access for people and equipment (for maintenance and monitoring)
- Fencing or other protection from livestock and wildlife

You also need to decide how to prepare the site for planting, how to protect seedlings from weed competition, and how to maintain the planting. The following sections provide more information on these topics. Also see Appendix C (page 24) for additional project design considerations.

Checklist for Step 2: Select and obtain plant materials

Species, source, and stock type are important considerations.

- ☐ Identify species that will provide the key riparian functions you identified during planning.
- ☐ Choose species that are well adapted to your site. Consider tolerance to shade, flooded or waterlogged soils, and drought.
- ☐ Select locally adapted, genetically diverse seedlings or other plant materials that fit your site conditions, management constraints, and budget.
- ☐ Plan ahead. Order seedlings and other types of planting stock well in advance.

STEP 2. SELECT AND OBTAIN PLANT MATERIALS

Species selection

Your plant selections will affect the appearance and function of your riparian planting for decades. Trees and shrubs must be able to survive and prosper when planted and also provide the functions you need in the future. Tables 1 and 2 list characteristics of native trees and shrubs.

Site adaptation

Choose species that are well adapted to site conditions. Moisture—either the lack or excess of—is often the most important factor in both planting success and long-term survival. Consider how the local climate and soils affect moisture, and select species on the basis of moisture needs and flood and drought tolerance. Start by identifying native species growing on similar sites nearby.

Conifers, such as Douglas-fir or western redcedar, are often a priority for riparian plantings in mountainous areas because they provide dense shade and durable, large wood. However, many conifers are not as well adapted to riparian areas in the Willamette Valley that are flood prone or poorly drained and should be selected with caution.

Tolerance to floods and poor drainage

Areas along the stream channel and banks as well as sloughs and swales may be subject to frequent or prolonged flooding. Species selected for these areas must have high flood tolerance. Black cottonwood, bigleaf maple, western redcedar, red alder, white alder, and Oregon ash tolerate flooding (figure 6).