The information presented in this Atlas can be used to help design ecosystem conservation and restoration strategies in the Willamette Basin. This chapter provides an example focusing on the mainstem of the Willamette River. The river and its associated floodplain have been extensively modified since 1850 by construction of dams and revetments, elimination of side channels, clearing of large wood and other obstructions from the river, and conversion of bottomland forests to agriculture, urban, and rural development. As a result, the quantity and quality of river habitat have declined (see Chapters 3 and 4). In this chapter, we illustrate an approach for identifying areas of the river with high restoration potential. The approach explicitly links the potential for ecological benefits from restoration with the social and economic likelihood of restoration success.

Using a consistent analytical framework, longitudinal patterns in selected biophysical and socioeconomic characteristics are quantified along the entire river length, from Eugene to Portland. Three biophysical factors indicative of potential ecological benefits are evaluated: changes in the quantity of river habitat from 1850 to 1995, changes in the amount of floodplain forest from 1850 to 1990, and occurrence of revetments. Areas that have lost substantial channel habitat and floodplain forest have greater potential for rapid restoration of these ecologically important features. Areas with few bank revetments are important resources to protect. Areas with substantial revetments, but low levels of human development, offer opportunities for revetment removal or modification, allowing the river to return to its natural dynamic processes in carefully chosen priority locations. Socioeconomic factors analyzed include human population density, rural building density, road density, amount of public lands, land values, land improvements, and occurrence of flood-resistant crops. Areas with high land values, substantial improvements, or high densities of human populations, buildings, or roads, all represent potential constraints to restoration when viewed at the river network extent. Major investments in infrastructure (e.g., roads or bridges) or urban development in river floodplains are largely irreversible over the near future. By contrast, agricultural lands, particularly those suited for flood-resistant crops, as well as forest lands and publicly owned lands may have greater potential for change.

Areas with high potential for ecological recovery and low socioeconomic constraints have the greatest potential for future restoration. Areas that combine low potential for ecological response with high demographic and economic costs are likely to be poor choices for restoration. However, emphasis on recreational or educational purposes may outweigh other factors in some instances and lead to restoration in such locations. Areas with high ecological potential and intermediate levels of socioeconomic constraints present intermediate opportunities for restoration. In such areas, decision makers can focus on alternative policies and practices that might remove some of the socioeconomic constraints and shift the site into the high restoration potential category. Examples could include changes in lending rules, changes in land ownership, federal farm assistance requirements, or land zoning restrictions that would have minimal economic consequences but major ecological benefits.

The chapter concludes with an example of a method for choosing high priority locations for restoration, assuming the purposes of restoration are to increase river channel complexity, increase floodplain forest area, and increase natural water storage during floods.