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Reach and Focal Area Selection

The analyses on the preceding pages provide a coarse-grained prioritization for the whole river network, but the choice of project focal areas requires more detailed study of local conditions. This includes the willingness of local landowners to consider restoration actions, the proximity of population centers, the percentage of public land ownership, the presence of transportation infrastructure, the degree to which remnant channel features are present, the type and extent of revetments, historic channel dynamics, flood storage capacity, and finer-grained analysis of historical floodplain vegetation.

Here we illustrate how this can be approached using a hierarchy of selection factors at differing spatial scales as diagrammed in Figure 206.[156] In the illustrative example shown, the chosen restoration purposes are 1) increase channel complexity, 2) increase area of native floodplain forest, and 3) increase non-structural storage of flood water. With slice priorities mapped at the full river network extent in Figure 205, a reach was chosen which met the criteria listed under "Reach Extent Selection Criteria" in Figure 206 and which had a large number of contiguous green slices in Figure 205. The chosen reach is shown in Figure 207. Note the slice numbers in black at the western edge of the historical floodplain in Figure 207, and that slice 190 is pale orange, indicating low economic/demographic constraint and comparatively low increases in ecological potential inasmuch as measurements of revetments, channel complexity, and vegetation in this slice do not merit restoration actions. Slice 189, Harkens Lake, which is immediately downstream of slice 190, has more than twice as much revetment, and has experienced significant declines in channel complexity and woody vegetation along the bank. Thus it is a high-priority focal area within this reach for restoration. As Figure 207 shows, Harkens Lake is not the only potential focal area, but is used here to illustrate how the approach may lead to restoration on the ground. Seven potential focal areas lying within the reach between Corvallis and Eugene were evaluated. Harkens Lake was chosen based on rankings among criteria listed in Figure 206 under "Focal Area Selection Criteria" and "Focal Area Ranking Criteria" that support the purposes listed above. Coincidence between areas of high flood storage potential, ratio of predicted increase in channel complexity and forest area to cost of restoration actions, and strategic public land ownership was emphasized. This too employs a constraints and opportunities approach, but through flood storage, adds protection of downstream life and property as an objective of fluvial process restoration.

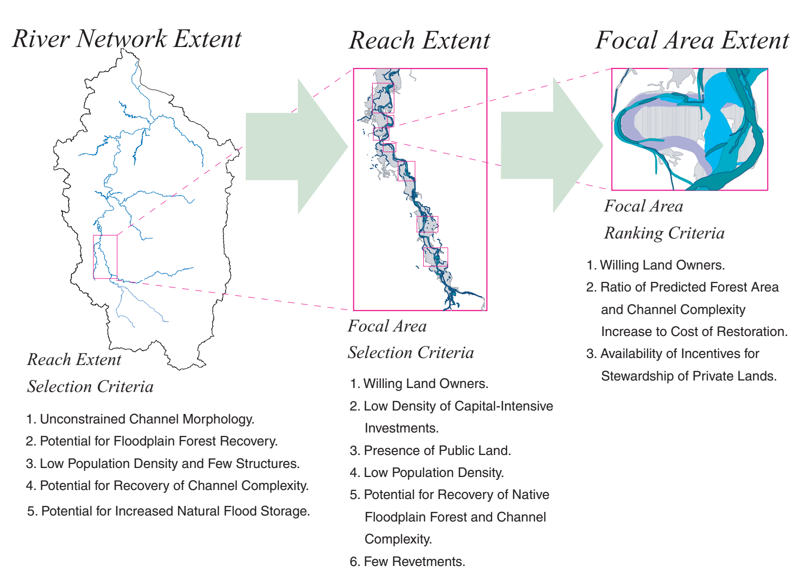


Figure 206. *Reach and focal area selection criteria employed in the example on pp. 144-47. The primary restoration purposes these criteria support are 1) increasing river channel complexity, 2) increasing area of native floodplain forest, and 3) increasing non-structural flood water storage. Indirectly supported restoration purposes are to increase native fish populations and riparian-dependent wildlife habitat.*

Example Conservation and Restoration Actions

The primary opportunities at Harkens Lake are to conserve riparian forests on private lands (locations 1 and 2 in Figure 208) and to restore floodplain forest on publicly owned land (location 3 in Figure 208). Reconnecting the floodplain depression and the oxbow (i.e., Harkens) lake to the main river channel can be accomplished by breaching the barriers created by road embankments and revetments (locations *a* and *b* respectively in Fig. 209c). This would allow more floodwater to be stored and gradually released during a flood, reducing the severity of downstream flooding. This increased exposure to regular flooding at Harkens Lake would facilitate reforestation of native floodplain forests, thus harnessing the natural tendencies of riverine processes to sustain native terrestrial and aquatic ecosystems through time. The simulation in Figure 209 compares how Harkens Lake might evolve during a flood comparable in magnitude to the December 1996 flood, depending on whether or not the river is allowed access to a remnant side channel through breaching an existing revetment. Compare the simulated flood conditions prior to restoration in Figure 209b with the simulated flood conditions after restoration in Figure 209d, noting especially areas designated 3 and 4 in Figure 209c.

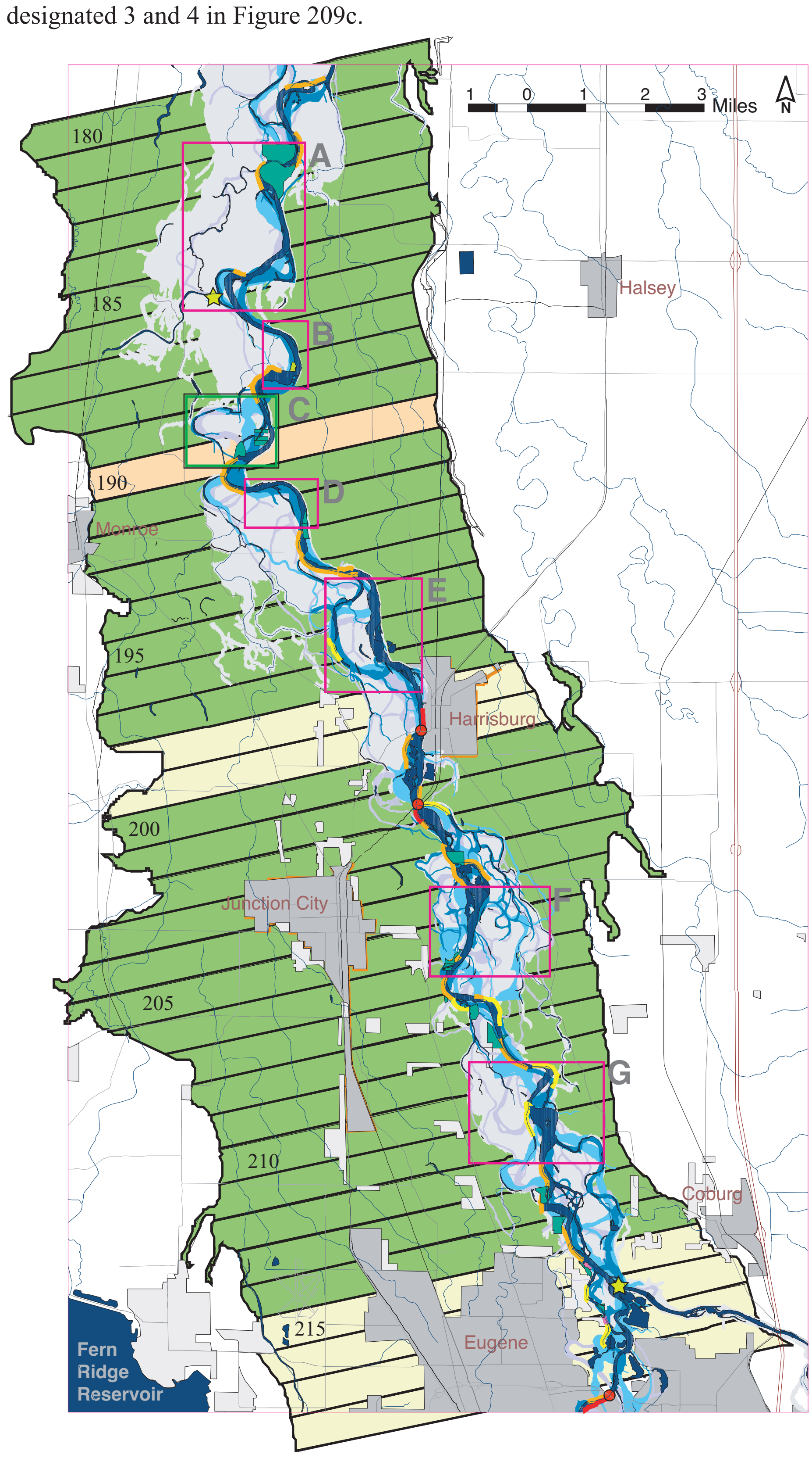


Figure 207. *Candidate focal areas in the reach downstream of Eugene. Focal area C, Harkens Lake, is illustrated on the facing page. Slice colors correspond to those used in Figure 205 on p. 145. In the map above, blues in the mainstem river corridor represent river channel locations at different times, orange and yellow are revetments, red dots are bridges, and yellow stars are major confluences.*

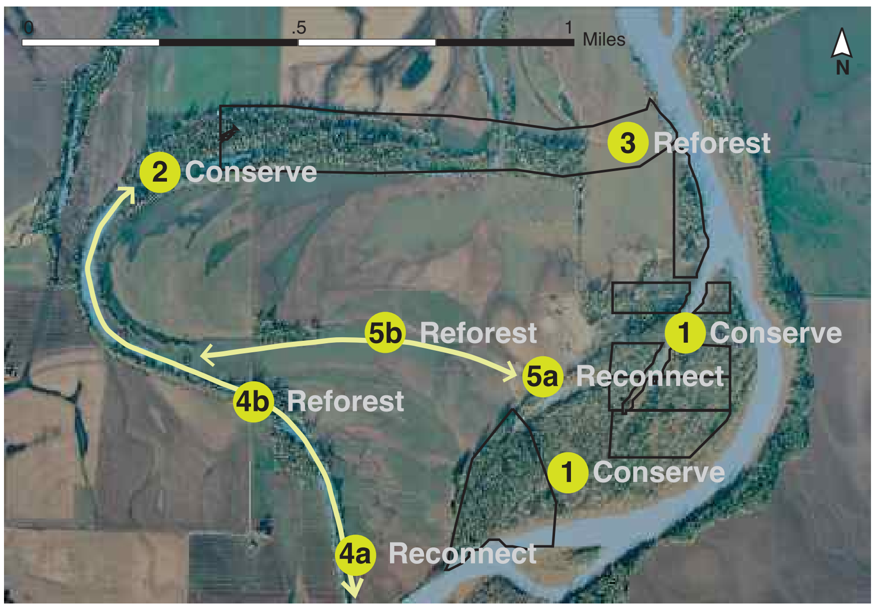
Changing Slice Priority Through Policy Choices

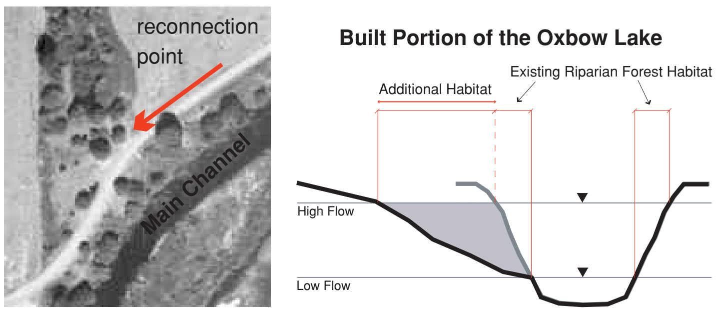
Another potential use of this approach is to explore what actions could be taken to shift a slice into the green, high potential benefit, quadrant. One example is offered by slice 198 at Harrisburg, mapped in Figure 207 and shown in the scatter plot at lower right in Figure 205. Since it is easier to change factors affecting demographic and economic constraints than those effecting biophysical factors, we examined each of the constraint factors for slice 198. Of the factors and weightings listed at top of page 145, we explored how much more area of public land (the inverse of area of private land) would be required to shift slice 198 from pale yellow to green. The answer is 173 acres (70 hectares), which constitutes approximately 6% of the 2800 acres (1135 hectares) total in slice 198.

Accomplishing Restoration Goals

Accomplishing such change in landscapes dominated by privately owned land will require fair compensation to landowners for reductions in economic production. Incentive programs offer one way to meet this growing need. Landowner participation in restoration incentive programs has been low, primarily because the programs are fragmented, complex, and inadequately staffed.[157] With high-priority locations for restoration identified, it may be possible to examine technical support requirements, reduce regulatory barriers, link federal and state programs, and devise the specific tools (e.g., easements, habitat plans, and stewardship agreements) to meet the individual circumstances of owners of high-priority lands. New and more flexible incentives for private landowners are needed to encourage natural resource stewardship, together with adequate funding for existing conservation and restoration programs. Linking these efforts with the type of restoration approaches illustrated in this chapter holds much promise for the future of the Willamette River, its floodplain, and those dependent on it.

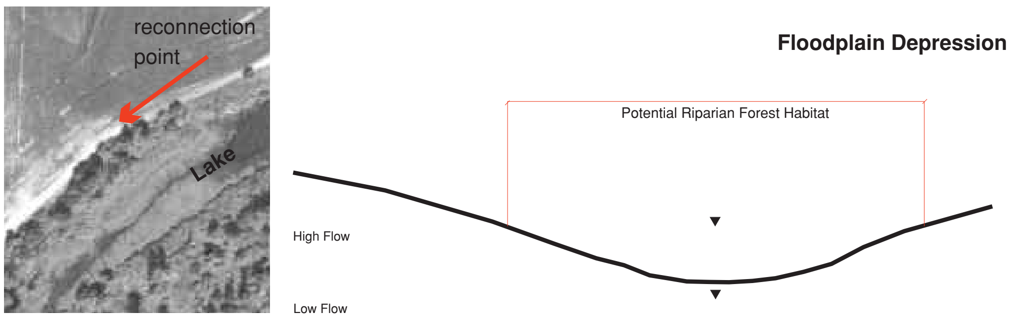
Figure 208. *Designing cost-effective actions for increasing flood storage and floodplain forests at Harkens Lake. Note location 3 is the only publicly owned parcel.*





Detail and Diagrammatic Cross Section of a in Fig. 209c

Sources for Photographs
A. USACE, 1996b B. Spencer Gross, 1996 C. Spencer Gross, 1996



Detail and Diagrammatic Cross Section of b in Fig. 209c

Before Restoration

After Restoration

Figure 209a

Figure 209c

Figure 209b

Figure 209d

Figures 209 (a - b): *Simulated December 1996 flood event before proposed restoration. The numbers in Figs. 209a and 209c indicate the sequence of inundation during a flood, lower numbers showing areas flooded sooner. Visualizations this page by: David Diethelm*

Figures 209 (c - d): *Simulated December 1996 flood event after proposed restoration. An estimated additional 65-80 acre-feet of flood water storage is outlined in blue in Figure 209d and an estimated additional 62-70 acres of floodplain forest is outlined in yellow in Figure 209d.*