



Projects restore floodplain ecosystem

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Floodplains are extremely productive ecosystems that support high levels of biodiversity and provide valuable ecosystem services that directly benefit society.

One high profile study concluded floodplains ranked second among ecosystem types based on the monetary value of their ecosystem services, which include flood attenuation, fisheries, groundwater recharge, water filtration and recreation. However, to function as diverse, productive ecosystems, floodplains must periodically flood.

The extent of functional floodplains in the United States has been dramatically reduced from historical conditions because many flood damage reduction projects reduce or eliminate connectivity between rivers and floodplains. To reverse these losses, numer-

ous agencies and organizations seek to restore floodplains while simultaneously minimizing future flood risk.

Nonstructural flood damage reduction measures are an essential strategy for achieving these multiple objectives because they can be consistent with significant ecosystem restoration.

Nonstructural measures modify the characteristics of buildings, infrastructure and land use within floodplains without changing flood characteristics. Nonstructural measures include the elevation or floodproofing of buildings, and the buyout of floodplain land. In contrast, structural measures, such as levees and dams, modify flood characteristics but do not modify the characteristics of buildings or land use within the floodplain.

While U.S. Army Corps of Engineers flood damage reduction projects historically emphasized structural approaches, today's Corps policies



Floodplains support high levels of biodiversity and maintained by floods. (Photos by Jeff Opperman)



Floodplains are very productive ecosystems, as illustrated by the abundant growth of aquatic plants and algae in this floodplain along the Cosumnes River in California.

recognize the multiple objectives of reducing flood risk and restoring ecosystems, and Corps projects are increasingly considering and implementing nonstructural measures. Removing damageable structures from the floodplain is the nonstructural measure that can achieve the most in terms of reducing flood risk while enhancing floodplain ecosystems.

In addition to helping the Corps reduce flood risk and restore ecosystems, nonstructural approaches align the goals of the Corps with those of agencies and organizations that are working to promote functioning floodplains, including The Nature Conservancy (TNC). The Conservancy is the largest nonfederal sponsor for Corps ecosystem restoration projects (based on number of projects).

By bringing in new partners, such as

Systems while reducing flood risk



contain diverse habitat types that are created and

TNC, flood damage reduction projects that feature nonstructural approaches and/or floodplain restoration can draw on a wider range of tools and sources of funding and expertise.

Hamilton City, Calif., has been at risk of flooding despite a private levee system that had been in place for decades. Corps planners initially examined structural solutions to reduce the risk of flooding, but these could not pass cost-benefit analyses. So, TNC, Corps and city leaders developed a plan that combined structural and nonstructural solutions along with floodplain restoration. The substandard levee was replaced with a new levee set back far from the river. This plan also included restoration of 1,500 acres of important floodplain habitat.

“Considering ecosystem benefits was really key,” said Alicia Kirchner, a

Sacramento District regional planning specialist. “Approaching this as a multipurpose project expanded the benefits and resulted in a cost-effective project and a recommendation for federal interest in implementation.”

Nonstructural approaches are just one example of the movement to integrate water management with floodplain management, and a partnership between the Corps and Conservancy for river restoration is doing just that.

In 2002, the Corps and TNC launched the Sustainable Rivers Project (SRP) to restore rivers below Corps dams. The SRP features demonstration projects in nine basins where the Corps, Conservancy and other partners work to define flow regimes that restore downstream ecosystem processes and services, while maintaining or enhancing the original project benefits.

These restoration flow regimes have been defined for six of the nine current sites. While some of the recommended flow components have been implemented, the release of high flows often faces the challenge of downstream floodplain land use.

Addressing this challenge requires integrating floodplain management and reservoir operations. This strategy is being applied at the Willamette Basin SRP site, which is being coordinated with the Willamette River Floodplain Restoration Study.

“The potential benefits from any floodplain restoration

project will be strongly affected by the flow regime at the restoration site,” said Matt Rea, Willamette Basin coordinator for Portland District. “Similarly, the restoration benefits from a reservoir flow release will be strongly influenced by the amount of connectivity between the river and its ecologically important floodplain. Therefore we’re thinking synergistically about the floodplain restoration study and the SRP flow studies, to maximize the benefits of each.”

These projects point toward a new paradigm for river management, one that integrates water management with floodplain management and that restores ecosystems to benefit both nature and people. These integrated and sustainable projects are likely to become even more important in a future with increasing demands on water supplies and uncertainty over precipitation and runoff.

By working together on a range of projects across the country, the Corps and TNC are developing the tools and examples for integrated, flexible and sustainable water management.



During an experiment comparing the growth of juvenile Chinook in floodplain and river habitats of the Cosumnes River, fish reared in the floodplain (right) grew faster than those reared in the river (left).