



## Restoring Ecosystem Services to Prevent Flood Damage In Napa River Basin

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**Short title:** River restoration to avoid flood damage, USA

**Key Message:** By enhancing ecosystem services in the Napa River Basin, the city of Napa, California is saving money by preventing floods.

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Picture 1 and Picture 2: Before (left)/after (right) for East Terracing of the Napa River/Napa Creek Flood Control Project  
Courtesy: Julie Lucido

### What is the problem?

The Napa River Basin ranges from tidal marshes to mountainous terrain and is subject to severe winter storms and frequent flooding. The area is famous for its wineries and attracts many tourists from around the world. The population in the City of Napa is 77,000 people. Residents and businesses along the Napa River in the City of Napa have endured about 30 floods in the last 150 years. The region has suffered major repetitive losses due to frequent flooding in populated areas. The present value of damageable property within the floodplain is well over US\$ 1 billion. Lower Napa River is also subject to tidal influence.

A major flood in 1986 forced the evacuation of some 5,000 residents, took three lives, and caused an estimated \$100 million in County damages (1986 dollars). This has revived public interest in flood damage reduction. The U.S. Army Corp of Engineers proposed to solve the problem by providing flood protection using traditional channel deepening. Local citizens and the resource agencies did not approve the plan because of damaging effects to the environment with the potential loss of habitats and degradation of water quality.

### Which ecosystem services are considered and how?

To identify an alternate plan, a new approach emerged that looked at flood control from a broader and more comprehensive perspective. Local engineers, architects, biologists, aquatic ecologists, business, agricultural leaders, environmentalists, local, state, and federal government officials including the U.S. Army Corps, community organizations, and residents formed a civic group - the Citizens for Napa River Flood Management. The different stakeholders came up with a new plan called the "Living River Guidelines." Engineer Julie Lucido remarks that Napa has "*taken the time to do it right*" by developing the "living river initiative."

To develop the plan, the US Army Corps of Engineers and the Napa County Flood Control and Water Conservation District conducted a series of meetings involving 25 agencies and 400 individuals over a two-year period. The plan was formulated with the help of specialists in hydraulic engineering as well as environmental scientists and ecologists. The community, along with the governmental resource agency representatives who were charged with the protection of the environmental and wildlife, had the project vision and the scientists supplied the technical studies, engineering designs, and practices to make the vision into a workable plan for the flood project system of improvements to meet the multiple goals. Input from the stakeholders was evaluated and incorporated as appropriate.

The goal of the "living river" initiative is to increase the river's capacity to handle flood waters while maintaining and restoring the original shape and alignment. Engineers replaced high floodwalls and levees with terraced marshes, wider wetland barriers, and restored riparian zones. Instead of digging the river deeper they restored the river to its original shape, allowing it to meander as much as possible. The project started in 2000, when over 700 acres around the city of Napa were converted into marshes, wetlands and mudflats.

The Corps developed the revised plan into an Environmental Impact document. The engineers calculated the maximum flow of the river at the 100 year flood period. The impact assessment was accomplished by tiering as several environmental assessments were conducted over the project period and planning. Tiering is a beneficial tool for governments as it allows for the elimination of repetitive issues which have already been addressed in previous impact assessments. Tiering in the Napa River Flood project was appropriate because it helped the agency to focus on the issues which were ready for decision and exclude from consideration issues already decided or not yet ripe (2009).

### **What input was required to go ahead with flood plain restoration? What policy instrument builds upon this ecosystem service information?**

The current estimate for the project is approximately \$400 million. The local share of the project cost is approximately 50% and derived from a sales tax increase by 1% for 20 years. This tax increase was approved by voters in 1998 and required 2/3 support. Each year the sales tax will raise \$8 million to \$10 million for the Project. The other 50% comes from federal sources through the budget of the US Army Corps, and through grants and loans from the state.

To accommodate the project and to build the floodplain, it was necessary to acquire private property. The Napa County officials worked closely with affected property owners to purchase the required land and improvements and to offer relocation assistance. Many of the potential real estate conflicts were avoided or minimized through extensive negotiations with the property owners. Napa County officials say they had to buy out multiple commercial structures, a portion of a trailer park, some warehouses and about 16 residential units. The Project could also utilize Eminent Domain law, which gives the government the right to obtain land from the owners by paying them a fair compensation, if it is for the greater good of society. This process is avoided whenever possible.

### **Consequences and Challenges**

The flood project in Napa is a success because of the many benefits of the project and the multiple ecosystem services it has created. The benefits of the project include reducing or elimination of loss of life, property damage, cleanup costs, and lost business revenue which traditionally accompany floods, and the need for flood insurance. In addition, the flood project provides opportunities for the citizens of Napa by constructing recreational trails which encourage walking and cycling, by increasing access to urban areas of Napa, through property value enhancement and continual tourist income during flood events. In fact, the flood project has created an economic renaissance in downtown Napa with development of several luxury hotels and housing along the Napa River - an area which had earlier been viewed as a blight area due to frequent flooding.

Extensive private investment in property development totalling US \$400 million has been sparked since the approval of the Flood Project. The project has also improved water quality, creating hundreds of acres of urban wetlands and enhancing and restoring wildlife habitats. By the time it is complete the project will protect over 7,000 people and over 3,000 residential/commercial units from the 100-year flood event on the Napa River. As of 2009, the project is over half way complete, and the total cost is estimated to be 400 million US dollars (2009). The project is being implemented with success but is facing difficulties meeting its timelines.

Flood insurance rates will either be lowered or eliminated when the regulatory flood maps are changed through the Federal Emergency Management Agency (FEMA). The first map change is expected to be implemented by September 2010. Roughly 3,000 properties will have their flood insurance rates lowered at the conclusion of the project.

This project is an award-winning model for integrated flood protection and watershed management. It is also successful since it did not rely on any single approach, such as raising levees or moving all structures out of harm's way, but combined multiple values the ecosystem can provide.

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