

BULLETIN

News from *SubTerra, Inc.*[®]

Williamson River Delta Preserve Restoration Project - Tulana Levee Breaches Klamath Falls, Oregon

In the 1950s, Levees were constructed around the the Williamson River Delta creating 7000 acres of farmland in the Klamath Basin. This area proved to be rich farmland, but at the expense of fish habitat. In 1998 two fish species were placed on the endangered species list and The Nature Conservancy purchased the land with plans to return the area to its original state.



The original wetlands provided a safe environment to allow the fish to grow in size and strength before entering Upper Klamath Lake. However, after construction of the levees, the fish went down-stream much earlier, exposing them to colder water and predators far sooner in their life cycle.

Because wetlands work as natural filters to eliminate pollutants, water quality in Upper Klamath Lake also became affected by the presence of the levees, impacting not only the communities that depended on the lake as their water source, but also many species of waterfowl and birds in the region.

In order to undo the past, the levees, constructed from soils from the immediate area, would have to be removed and the materials spread across the area. ZCS Engineers determined that blasting would be the most effective method. Their models predicted that the sudden breach of large

sections of levee would allow rapid inflows from Upper Klamath and Agency Lakes to erode the levees further.

SubTerra, Inc. was brought to the team by ZCS to write the blasting specification in accordance with Oregon Department of Fish and Wildlife regulations and to review blast plans. Using recommendations by the Canadian Fisheries, *SubTerra* predicted that the blasting would cause only a modest increase in in-water overpressure, keeping fish in the lake safe. After reviewing test blast plans, *SubTerra* was on site to view the test blasts performed by Wallace Technical Blasting.

Based on five test patterns, Jerry Wallace finalized the layout of nearly 2900 holes for the full-scale event on October 30, 2007. Over 100 tons of explosives were required to breach four half-mile sections of levee in spectacular fashion flooding the 2500 acres.

The project was The Nature Conservancy's largest restoration effort to date, and the first time explosives had been used in wetland restoration.



Left: Regional map showing restoration area and four breach sections. **Above:** One of the half-mile sections of levee is "unzipped" in a matter of a few seconds.