

AFS Western Division Riparian Challenge Entry

**Williamson River Delta Restoration Project—Tulana Phase**

The Nature Conservancy  
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The project is situated on private property owned by The Nature Conservancy. The project area is within the Klamath Resource Area as defined by the US Forest Service.

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The restoration plan is for the Tulana Phase of the Williamson River Delta Restoration Project. It was initiated in 1996; construction was started in 2006 and completed in October 2007.

## Williamson River Delta Restoration Project—Tulana Phase

### Project Need, Goals, and Objectives:

In 1988, the US Fish & Wildlife Service (USFWS) listed the shortnose and Lost River sucker species as federally endangered under the Endangered Species Act. These fish are endemic to the Klamath Basin (Oregon and California) and currently inhabit Upper Klamath Lake, Clear Lake Reservoir, Tule Lake, the Lost River, and the Klamath River, and their tributaries. These two species were once so abundant in the Upper Klamath Lake watershed that they served as a staple food source for the people of the Klamath Tribes and local settlers to the extent that they were canned and distributed commercially. Declining numbers of suckers were first noted in the 1960's, and the populations were deemed in peril of extinction by the mid-1980's. The USFWS cited several reasons for their declining numbers including water quality degradation, habitat loss, and predation by exotic species among others.

Lost River and shortnose suckers exhibit analogous life history strategies. Adults are long lived and spend the majority of their lives in the lakes. In spring, they migrate up inflowing tributaries to spawn. Currently, the Williamson and Sprague Rivers are the predominant spawning sites for suckers residing in Upper Klamath Lake (USFWS). Larvae hatch and drift downstream to rear in shallow riparian and littoral areas or lake-fringe wetlands. Recruitment from larvae to adults is highly variable for these species, and definitive reasons for recruitment failure are not well established; however, low adult recruitment success was influential in the decision to list these species as endangered in 1988.

The Williamson River Delta (hereafter WRD; the delta) wetlands restoration project (described here) is intended to restore critical nursery habitat for the larval and juvenile life stages of the endangered Lost River and shortnose suckers. The restoration effort was identified and given a priority status by the Upper Basin Working Group (Hatfield Committee) in the mid-1990's and the National Research Council because of its tremendous potential for aiding the recovery of these species primarily due to its proximity at the terminus of a key sucker migratory corridor—the Williamson River.

The project area straddles the last four miles of the Williamson River, and prior to the 1940's, it was a vast expanse (~6,000 acres) of emergent wetlands connecting the Williamson River, Upper Klamath Lake, and Agency Lake (Figure 1). Starting in the 1940's, these wetlands were drained and converted to cropland and pasture. The entire delta was farmed until the late 1990's with some areas still remaining in alfalfa and grain in 2007. The Nature Conservancy purchased the WRD through partnerships in phases starting in 1996 with the intent to implement a massive wetlands restoration project that reconnects the delta to the river and lakes as it was historically. Specifically, the project is designed to restore emergent marsh and rehabilitate thousands of acres of nursery habitat for young-of-the-year suckers. Larval and juvenile suckers will again have access to habitat historically available to them in critical areas at the mouth of the Williamson River now that the project is complete. This is expected to dramatically increase the probability of survivorship for larval suckers and their recruitment to adults.

In addition to providing habitat for endangered suckers, these deltaic wetlands historically filtered and trapped nutrients and sediment that drained the two-million-acre Williamson and Sprague River Watersheds. The loss of wetlands functions including the inability to trap and filter sediment and nutrients at the mouth of Williamson River has contributed significantly to poor water quality in Upper Klamath Lake. At times, poor water quality resulted in direct mortality to adult suckers. Water quality in Upper Klamath Lake is further impacted by tail-water pumped to the lake from converted agricultural lands. U.S. Geological Survey studies indicate tail-water pumped from historic wetlands that are now croplands have a substantial impact on lake water quality. Tail-water from the Williamson River Delta farming operations historically were measured to contribute over 12.5% of all the phosphorus coming into Upper Klamath Lake system annually.

The restoration of the Williamson River Delta specifically addresses these three concerns: (1) the loss of critical habitat for endangered fish; (2) the degradation of water quality due to the loss of wetland function; and (3) the discharge of tail-water from agricultural lands adjacent to the lake. All these are major contributors to the decline and ongoing threat to the Lost River and short-nosed sucker species.

Stated simply, the objectives of this restoration project are to re-establish the hydrologic connection between the Williamson River Delta, Upper Klamath Lake, and the Williamson River in order to:

- (1) Restore 5,800 acres of riparian and lake-fringe wetland habitats for endangered fish species by breaching lakeshore and riverine levees;
- (2) Facilitate nutrient removal from surface water and improve water quality in adjacent waterways by: (a) restoring perennial emergent marsh vegetation to promote nutrient uptake into plant tissues, (b) through the soil accretion processes, and (c) by eliminating the return of tail-water from agricultural fields into the lake.

In total, this phase of the project restored about 3,500 acres of historic wetland and riparian habitat at the Williamson River Delta to date with about 2,000 more acres to be completed in the Goose Bay Phase of this project. The restoration was accomplished by breaching lakeshore and river levees at strategic locations to re-connect the historic delta habitats to Upper Klamath Lake and the Williamson River. Virtually every study, report, and assessment addressing endangered suckers and/or wetland restoration in the Upper Klamath Basin over the past 15 years has identified Williamson River Delta restoration as an extremely high priority for providing direct benefit to the recovery of these two endangered suckers.

## **Project Progress**

Small-scale experimental restoration projects at the Williamson River Delta were initiated in 2000 and 2003-2004. These pilot projects restored riparian and wetland habitats totaling approximately 500 acres. Recent scientific studies describe the use of these newly restored wetlands at the delta by endangered young-of-the-year Lost River and shortnose suckers. The

restoration actions and subsequent monitoring results validate previous recommendations about the importance of this area for suckers. They also strongly support the rationale that full restoration of aquatic habitats at the Williamson River Delta will provide direct benefits to endangered suckers and water quality in this Upper Klamath Lake system.

Final design planning for the entire delta restoration began in 2004 following the successes and lessons learned from the early action restoration efforts. The NEPA process was completed in February 2006 with the publication of the Record of Decision in the Federal Register. The proposed scope is illustrated in Figure 2, which diagrams the preferred alternative described in the Environmental Impact Statement for the project (July 2005). This design includes removing portions levees at nine locations around the perimeter of the Delta and seven locations along the Williamson River. It also proposes restoring the historic sections of the Williamson River as seen in historic aerial photographs and creating a wider riparian zone along the river. Specific details on the restoration elements and the science and engineering behind the preferred alternative are described in detail in the final Environmental Impact Statement for the project (July 2005).

Construction for the Tulana Phase of the delta restoration began in June 2006 and continued through 2007. Efforts from these two years involved removing moving 750,000 yards of levee material in 2006 and more than one million yards in 2007. Preparatory earth moving was completed on both Tulana and Goose Bay portions of the project, and the lake- and river-front levees on the Tulana portion of the project were breached in fall 2007 using explosives. This event resulted in the reflooding and reconnection of about 3,500 acres of historic wetlands to Upper Klamath Lake and the lower three miles of riparian habitat along the lower Williamson River. Before and after construction photos are in Figure 3.

### **Project Partnerships**

All of phases of this project have been founded in partnerships starting with the design process, which involved creating an interdisciplinary group that served as a Technical Advisory Team for the project. The team was comprised of engineers, fish biologists, hydrologists, and other stakeholders. Team representatives were from the US Fish & Wildlife, PacifiCorp, US Bureau of Reclamation, Oregon Department of Fish & Wildlife, The Klamath Tribes, The Nature Conservancy among others. The role of the team was to ensure a design that best achieves a broad array of objectives in the best possible manner. This team was instrumental in planning the project design and assisting with technical aspects of project implementation as well as monitoring.

The total costs for all phases of this project will approach \$9 million. Many project partners contributed funds to the project in addition to their technical advice. Funding partners include: National Fish & Wildlife Foundation, USDA Natural Resource Conservation Service, Oregon Watershed Enhancement Board, US Fish & Wildlife Service, US Bureau of Reclamation, North American Wetlands Conservation Fund, US Environmental Protection Agency, and PacifiCorp.

## **Monitoring Plan Components**

The Nature Conservancy in coordination with its partners is actively monitoring effectiveness for the other restoration project objectives using measurable indicators related to project objectives: (1) Presence/Absence of larval and juvenile suckers in restored riparian habitats and fish condition of captured organisms; (2) Establishment of wetland vegetation along a gradient including riparian/wet prairie, emergent marsh, and deep water emergent marsh community types; (3) Improved water quality parameters (DO, pH, specific conductance, and concentrations of N and P forms) within restored wetlands.

There are more than 400 established permanent vegetation sampling plots across the preserve, and vegetation development in already completed restoration wetlands at WRD are sampled annually and a monitoring report is revised every two years (funded by NFWF). Additionally, an extensive program to monitor larval and juvenile sucker abundance and habitat preference is ongoing as is an effort examining the effects of non-native fish populations on larval and juvenile sucker rearing success (e.g., Crandall et al. in press 2008; Hendrixson et al. to be submitted April 2008; funded by USFWS and NFWF). Fish and vegetation monitoring will be tightly linked to a major water chemistry assessment project that includes describing the effects of restored wetlands on phosphorus, carbon, nitrogen, and a suite of physical parameters on downstream surface water chemistry. Together, these pieces will comprise a holistic, integrated, and comprehensive monitoring program that will assess effectiveness of the restoration wetlands at achieving all project goals.

## **Information Dissemination to the Public**

Public outreach efforts to inform project partners and the public of project goals and activities have been ongoing for several years and will continue. The Nature Conservancy has held several open houses occurring at least one per year. They offer dozens of tours each year to a wide array of audiences such that the public can experience the restoration project. Also, this project attracted local, regional, and national media attention when 200,000 pounds of explosives were detonated in four sections of levees totaling two miles in length. This media attention served as an excellent source of information for the public. Stories describing the project appeared in 2007 in the following news sources: Klamath Falls Herald and News (3 stories); KOTI TV News (3 stories); The Oregonian; USA Today; Oregon Public Broadcasting/Oregon Field Guide; The Associated Press; NationalGeographic.com and others. Further, monitoring results are also being published in peer reviewed scientific journals that are available to the public. The Nature Conservancy fully intends to continue public outreach to disseminate information about the project specifically targeting: (1) the public for educational purposes; (2) public agencies and land managers such that lessons learned from this project can be utilized as adaptive management on established and future projects.

Figure 1. Are map showing project location within Oregon and the Klamath Basin.

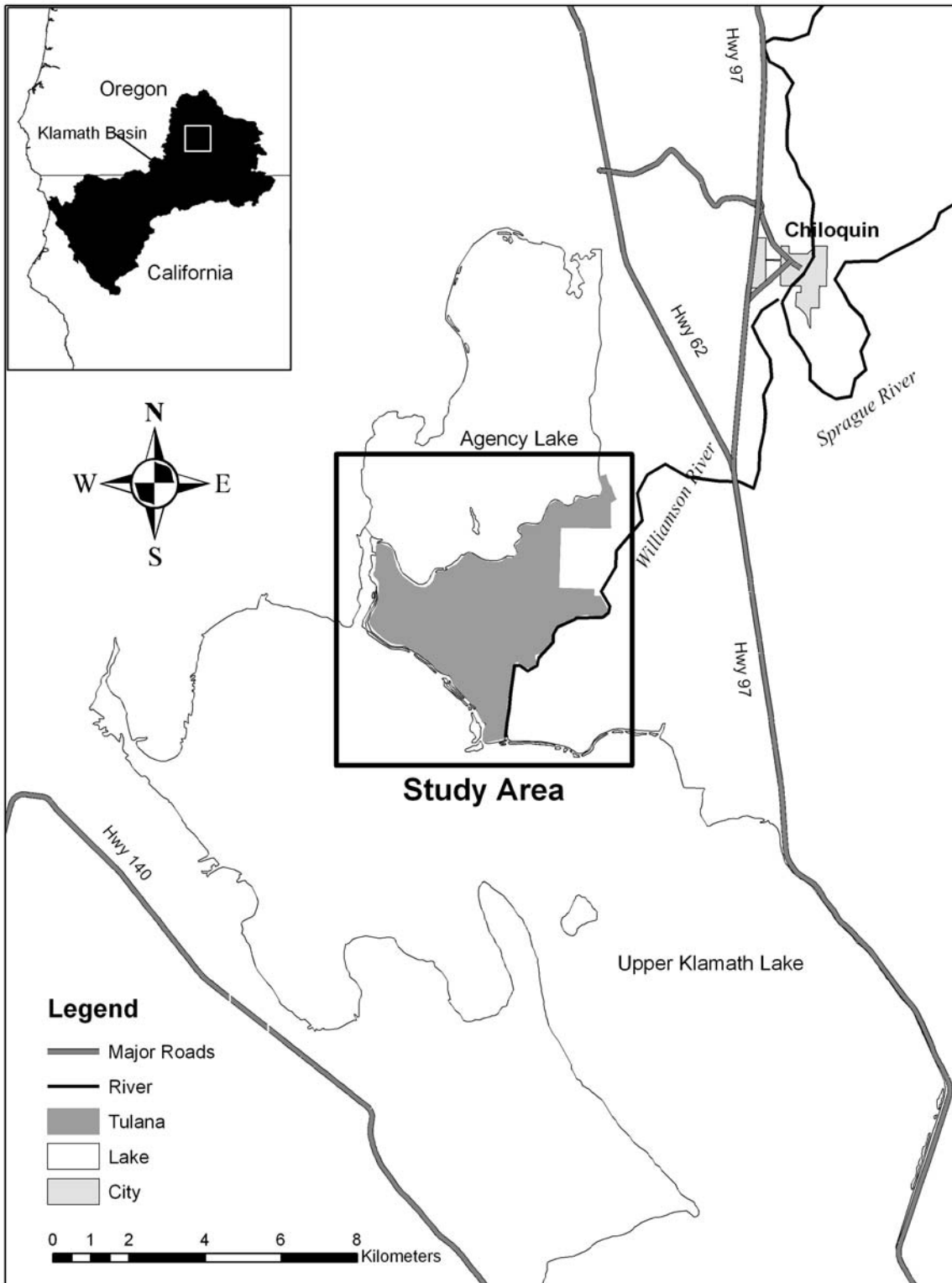


Figure 2. Map of project area showing design features of the Preferred Alternative from the Final Environmental Impact Statement for the project.

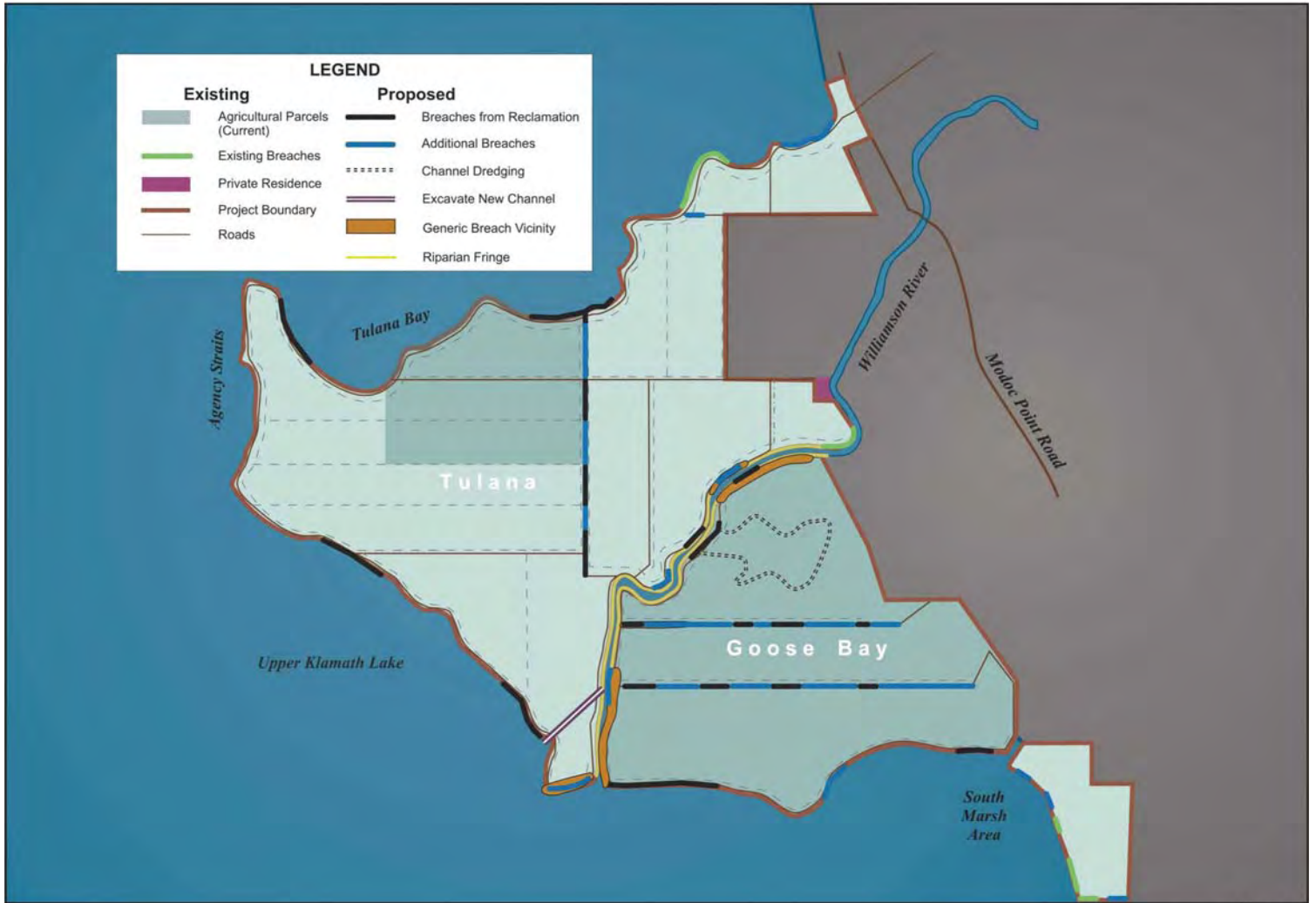


Figure 5  
Alternative 1 - Preferred Alternative

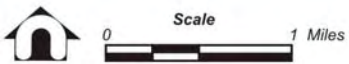


Figure 3. Photographs showing project area before (taken August 2007) and after (Taken November 2007) construction was completed.



Here's an article from the Oregonian about tomorrow's dike breaching at the Williamson River Delta.

Sucker fish are getting back their old home

Klamath - Levees will be blasted to flood a historical wetland and restore the endangered fish's habitat

Monday, October 29, 2007

GAIL KINSEY HILL

The Oregonian

Explosives engineers will blow up portions of 50-year-old levees above Upper Klamath Lake on Tuesday, hammering a swift river into a slow marshland for the benefit of a fish whose survival in part once halted irrigation to downstream farms.

The federally protected sucker depends on such wetlands, and the action represents a replumbing of a key section of the embattled federal water project in the agriculture-intense Klamath Basin. "It's a large, complicated project with extremely high expectations," said Curt Mullis, field supervisor with the Klamath Falls office of the U.S. Fish and Wildlife Service. "We're hopeful and optimistic."

The tightly timed series of explosions are scheduled to go off Tuesday under heavy security. The nitrogen-based pipe bombs -- 2,900 of them embedded 12 feet deep -- are supposed to open up huge holes in the massive dirt berms. Water will then pour in, flooding 2,500 acres of the Williamson River Delta Preserve. The levees were built in the 1950s to convert rich bottomland soils into farmland and to channel the Williamson River directly into the Upper Klamath Lake. For half a century, farmers grew crops such as wheat, barley and alfalfa on great swaths of the drained land. In its natural, pre-levee state, the Williamson River meandered haphazard and wide toward Klamath Lake, creating a huge marshland. Newly hatched Lost River and shortnose suckers used the soggy terrain to rest and feed as they made their way from upriver spawning beds to the lake. The levees turned the Williamson into a faster -- and more lethal -- ride.

"They created a canal that effectively shoves the fish into the lake without the benefit of the wetlands," said Mark Stern, The Nature Conservancy's conservation director for the Klamath Basin. In 1988 the Lost River and shortnose sucker were declared endangered under the federal Endangered Species Act. Scientists determined that the drained marshlands were a primary reason for the suckers' decline. The levees' destruction will come after 12 years of negotiations between interests that often have been at odds, including The Nature Conservancy, U.S. Fish and Wildlife, the Klamath Tribes and the electric utility PacifiCorp, which operates dams on the Klamath River. The Nature Conservancy took the lead in the Williamson River project, using \$5 million donated by PacifiCorp and the Natural Resources Conservation Service -- an agency within the U.S. Department of Agriculture -- to buy the delta farmland.

In the mid-1990s, then-Sen. Mark Hatfield, R-Ore., also helped secure an appropriation of \$5.5 million for site restoration and management. Stern said the project evolved relatively conflict-free. The various interest groups understand that the delta's restoration is key to the suckers' recovery, "and that resonates with everybody," he said. The farmers on the lake's southern edge, in Oregon and Northern California, remain wary. They're not directly involved in the project, but anything affecting the Klamath Basin's water affects them. The sometimes bitter fights over water peaked in 2001, when a severe drought and fish protections, including those for coho, prompted the federal government to shut off irrigation for farmers. Angry farmers occupied canal head gates and briefly pried them open, gaining national attention.

Debate over how to deal with yearly water allocations continues. "This summer was agonizing," said Greg Addington, executive director of the Klamath Water Users Association. "Conditions were dry; it was touch-and-go." That's one reason Addington hopes Tuesday's detonation succeeds in helping the suckers. "We're basically supportive," he said. "From a water standpoint, it's in our best interests to want healthy populations of sucker fish." Agency officials admit other thorny issues remain, including development of an adequate recovery plan for the coho. "We're not making grand claims about solving all the problems," said Mullis. But the delta project "definitely has some positives."

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