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THE SAN JOAQUIN RIVER SETTLEMENT:
Analysis and Implications for Future Negotiations and Funding

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"Whiskey is for drinking. Water is for fighting over." – Mark Twain

PROJECT SIGNIFICANCE

California's water is limited in supply and competing demands have put a strain on the availability of this resource - a strain that potentially may be further compounded and complicated by declines or increased variability in water supplies in response to climate change. This juxtaposition of interests is especially apparent in cases where large restoration projects affect many localities and interests. As a result, it is reasonable to expect that current water allocations will need reapportionment to meet changes in demand across competing interests. Thus, it is necessary to develop efficient, effective, and low-cost approaches to facilitate future reallocation efforts.

Using the San Joaquin River Restoration Settlement ("Settlement") as a case study, we analyzed the scientific, economic, and political factors affecting the settlement negotiations, final agreement, and implementation of the agreement. Our analysis allowed us to identify key steps and common negotiation and restoration plan elements that must be addressed in the negotiation processes. A negotiation template incorporating these commonalities was created for use in future water reallocation negotiations. Lastly, the negotiation template is accompanied by a funding guide, which details the various funding opportunities available and outlines the process by which private funds may be obtained.

BACKGROUND

Historically the San Joaquin River (SJR) was home to a variety of wildlife, including an abundant population of Chinook salmon (Autobee, 1994). However, by the 1900s most of the SJR's water was being diverted to support California's booming agricultural industry. The demand for water became so great it prompted the construction of Friant Dam in 1939. Operation of Friant Dam solidified the fate of an already dwindling population of Chinook salmon, and by the late 1940's Chinook salmon had virtually disappeared from the upper SJR. As a result several lawsuits and protests have been filed with the state, including cases in 1947, 1958, and most recently, in 1988. In 1988, the Natural Resources Defense Council led a coalition of conservation and fishing groups in a lawsuit asserting that operation of Friant Dam was in violation of California Department of Fish and Game code §5937 requiring sufficient flows to be released to maintain existing fisheries below a dam. After several years of litigation, the parties finally sat down and began negotiating in 1999; however the issue was not resolved until 2006 when a settlement was reached.

OBJECTIVES AND METHODOLOGY

Our project focused on four main objectives, including:

1. To examine the efficiency and effectiveness of the settlement process
2. To assess feasibility of the San Joaquin River Restoration Settlement plan
3. To develop a template to be used in similar reallocation negotiations
4. To develop a funding guide to attain funds for the SJR restoration and other restoration cases

1939-1944: Friant Dam is built

1947: First lawsuit is filed

Late 1940s: Chinook salmon are essentially extirpated

1958-1959: DFG files protest against operation of Friant Dam

1988: NRDC lawsuit is filed

1999: Parties begin the first round of negotiations

2006: Settlement is reached and preliminary assessments begin

2007-2009: Phase 1: development of EIS/R, as well as fisheries & water management plans.

2009-2013: Phase 2: channel reconstruction and modification, as well as the acquisition of a salmon reintroduction permit.

2014-2025: Phase 3: final channel modifications, restoration flow releases, and salmon reintroduction.

To achieve each of the objectives we utilized a multidisciplinary approach, including the following:

- Literature review, including salmon studies, related legal cases and legislation, and economic analyses
- Data analysis, including historical water supply, historical precipitation and runoff data
- Interviews and surveys of the parties involved and experts in relevant fields to determine key negotiation and restoration factors
- Economic impact analysis of the current water users and identification of potentially significant economic factors that were either not addressed and/or lack sufficient data

ANALYSIS

Our analysis of the restoration plan focused on three main aspects of the restoration: Chinook salmon reestablishment, climate change implications, and economic concerns. We examined factors affecting the prospect of successful salmon re-introduction, and identified 3 key factors that will contribute significantly to the likelihood of salmon survival, including: water quality, water temperature, and flow rates. Currently, several pollutants have been found in the lower San Joaquin River. These pollutants, which include Selenium, Mercury, and several pesticides, have been linked to increased mortality rates, deformities and swimming impairments in salmon, and subsequently, are likely to impact salmon reproduction and survival (Monsen *et al.*, 2007). Along the lower San Joaquin River, agricultural runoff has been identified as the primary source for many of the pollutants of concern. This raises concerns regarding the potential water quality in the restoration reaches, which are bordered by agricultural lands (Figures 1 and 2). However, the impacts

Figure 1. This photo shows one of the potential spawning areas, which is currently filled with agricultural runoff.

Figure 2. Map of the proposed restoration reaches along the San Joaquin River.

of agricultural runoff cannot be assessed until flows have been reestablished along these reaches.

Of more immediate concern is the ability of operators to meet the temperature and flow requirements. Examination of historical temperature data reveals that the temperatures in the lower San Joaquin River routinely exceed the Settlement's maximum temperature objective of 18ºC (Table 1) (McBain and Trush Inc., 2007). A more thorough analysis reveals that salmon have different temperature requirements for different life stages; however the historical data shows that the average daily temperatures routinely fall within the temperature range of decline for all life stages for both fall and spring runs. This indicates that salmon survival is questionable unless temperatures can be controlled.

Table 1. A comparison of the temperature ranges of decline (°C) and the historical daily maximum and average temperatures (°C) during the fall and spring runs of Chinook salmon (McBain and Trush Inc., 2007).

	Temperature Range of Decline (ºC)	Fall Run Historical Temperatures (ºC)		Spring Run Historical Temperatures (ºC)	
		Max	Avg.	Max	Avg.
Migration	12-21	16-22	13-16	16-24	12-17
Holding	14-21	---	---	16-31	12-24
Eggs	12-16	14-17	10-12	12-27	9-23
Juveniles	18-24	15-20	11-15	12-24	10-17

In order to attempt to control water temperatures and increase the likelihood of salmon survival, the restoration plan calls for the creation of a seasonally variable flow regime. However, the ability of operators to release adequate flows, particularly for fall run Chinook salmon, may be in jeopardy as a result of climate change. While climate change is not currently considered in the Settlement, regional climate models indicate the Sierra

snowpack which supplies the region with water is expected to decline by approximately 50% by 2090 (Van Rheenan *et al.*, 2004). Additionally, an analysis of the regional runoff data reveals that runoff from snowmelt has been decreasing since the 1950s (USGS, 2007). Furthermore, the peak runoff discharge, which historically occurred from late May to early June, has been occurring earlier in the year with the peak now occurring typically in April to May (Figure 3).

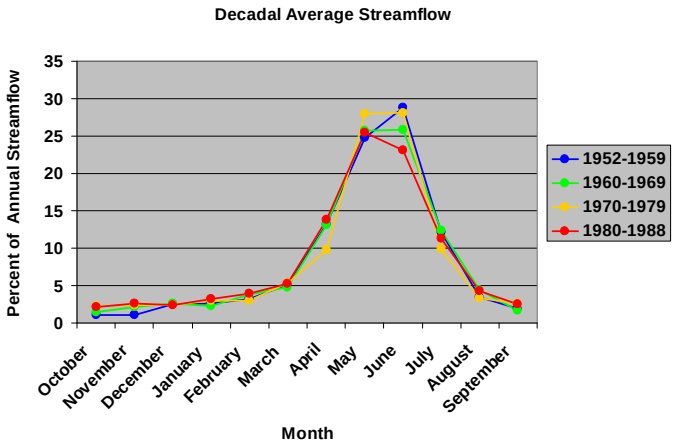

Figure 3. The hydrograph for decadal averages displays the average decadal percentage of total annual flow for the available data.

Given these concerns, the overall survivability of Chinook salmon in the San Joaquin River is questionable. However, the restoration plan provides several tools, including the reassessment of flow regimes, that are designed to adapt to changes in the environment and increase the ability of operators to meet the salmon needs.

Lastly, the Settlement does not examine the potential economic impacts that may result from the implementation of the restoration plan, including impacts to the local and regional agriculture, recreation, and hydropower industries. Of these impacts, the most prominent is the potential impact to the agricultural industry serviced by Friant Dam, which generated $2.5 billion in 2002 alone (FWUA, 2006). An analysis of the water supply, given the implementation of the restoration agreement, indicates that Friant users could experience, on average, a 19% decrease in their water supplies (FWUA, 2007). This decrease in supply is expected to translate into decreased crop production, and, as a result, potentially a loss in agricultural jobs. Currently, several urban areas, including the cities of Orange Cove and Lindsay, are predominantly agricultural communities and thus, are dependant on the water supplied by Friant Water Users Authority for their economic well-being.

NEGOTIATION TEMPLATE

(See our final report or informational packet for a full copy of the negotiation template and supporting documents.)

Our research indicates that negotiation, when compared to litigation, provides a much more efficient and cost-effective approach to restoration and water reallocation projects. Through our research of the San Joaquin River Settlement, key steps in the negotiation process were identified, along with common negotiation and restoration plan elements that must be addressed. These common elements were compared to other restoration case studies, including the Colorado, Russian, and Trinity Rivers to name a few, to determine commonality among the various restoration efforts. The commonly identified elements were used to develop a template for future water reallocation negotiations.

Our template details a 3-step process which is specific in nature, yet flexible in application so that it may be applied to a variety of restoration cases. These 3 steps include:

1. Identify process participants
2. Determine the restoration and stakeholder requirements to be addressed in the restoration plan
3. Utilize working groups to create one or more restoration plan options, from which a final plan will be created

In order for this process to be successful, we recommend that participants hire one or more outside consultants to oversee the process and determine the restoration and stakeholder requirements. Once these requirements have been identified, working groups should be utilized to create one or more restoration plan options, from which a final plan will be created. Lastly, in an effort to avoid litigation stemming from the negotiation process, we recommend that process participants sign a memorandum of understanding that binds each participant to the restoration plan and to an agreed upon cost sharing plan.

FUNDING GUIDE

Even if the negotiation process is successful, the success of the restoration plan is largely dependent of the availability of funding to carryout the plan. As seen in the case of the San Joaquin River Settlement, restoration cases are typically dependent on federal and state government funding sources. Furthermore, the process of obtaining government funds is often arduous and highly uncertain.

"…negotiation, when compared to litigation, provides a much more efficient and effective approach…"

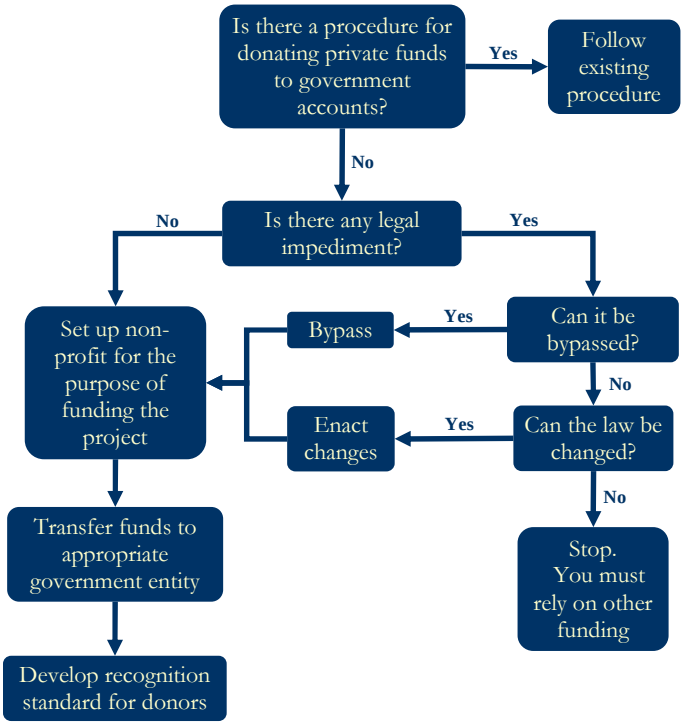

Figure 4. The procedure for obtaining private funding for government projects.

Subsequently, restoration efforts could be greatly aided through the use of private funding sources; however, in a majority of states, agencies are unable to obtain private funding, despite the willingness of private donors to contribute, due to legislative barriers and/or a lack of understanding of the process. As such, we have created a funding guide to complement the negotiation template. The funding guide details a variety of funding sources available from corporations to foundations, and includes a procedural flowchart to guide participants through the steps necessary to obtain private funding for government projects (Figure 4).

CONCLUSIONS

Our analysis of the San Joaquin River Settlement, as well as the examination of numerous other restoration cases, has led us to conclude:

1. The survivability of salmon is questionable.
2. Collaborative negotiations, rather than litigation, increase the efficiency and cost effectiveness of the process.
3. Significant state and federal policy reform is needed to address the shortcomings of environmental protection and funding legislation.

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"In this day and age, water is becoming the scarce and precious commodity of highest value, not unlike the gold and silver that attracted settlers who came here more than a century ago. But a vital difference is that our water sources are a known quantity, and they are limited."
– Senator Larry Craig

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(See our final report for a complete list of references.)

Historical photos and restoration map are courtesy of the Natural Resources Defense Council. All other photos were taken by the San Joaquin Group research team.
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