FISHER SLOUGH LESSONS LEARNED

Excerpt from NOAA grant final report
April 30, 2013

Engage partners, trustees and stakeholders early and often to gain their trust and support.
TNC engaged stakeholders in an inclusive and transparent process at Fisher Slough from the inception of the project. We worked hand-in-hand with Dike District 3, Drainage and Irrigation District 17, and area Tribes on development of the mission statement and project goals and objectives. We established the understanding that all project goals would be treated equally during project planning and we maintained that "rule" throughout the feasibility and design work. For instance, Chinook rearing habitat, an important ecological goal, was not weighted more heavily during alternatives analyses than flood storage or other goals; the issues associated with flood and drainage management and potential benefits were never overshadowed by habitat/fish issues. Equally-weighting the project objectives and upholding the "rule" throughout the project created trust that no one would be left out, which resulted in support and input from all parties. DD3 and DD17 were involved in review of the feasibility and design documents, and we asked for and incorporated their input at each step of the process. We also solicited technical and stakeholder input throughout the feasibility and design process via the TAC, which included our partners as well as Tribes, agricultural interest groups, permitters and funders. This kind of process takes time and resources but yields tangible benefits. Incorporating local knowledge and the specific needs of the adjacent landowners strengthened the project design and prevented potential negative impacts. We received valuable insights and were able to respond to concerns early in our process resulting in a technically stronger project, more rapid permitting, a broader base of support, and stronger relationships from which new projects have now emerged than if we had not solicited input from this diverse group.

Completing up-front investigative work is worth the time and money.
Due to limited funding available for ecosystem restoration at the scale that was planned at Fisher Slough, we felt pressure to lower project costs especially during the design phase. We learned that this can cause the project owner and participants to take on additional risks. We also learned that up-front investigations during the feasibility and design phase often end up saving money in the long term, can increase the likelihood of project implementation and can prevent project and construction delays, which can be expensive. Examples from Fisher Slough include:

1. *On-site soils testing*. Initially we tried to reduce costs on design work by reducing the soils testing effort. We got to a point in the design where we needed more detailed information about on-site soils and then struggled to obtain the additional testing and information within our set budget and short timeline.

2. *Soils availability*. We made assumptions about what kinds of soils were available at local pits. It was challenging to find soils locally that met the intent of our specifications within our set budget and short timeline.

3. *Permits*. Initially we tried to reduce costs on permitting work due to funding agency budget concerns, so we scoped out the effort associated with the most bare-bones permit requirements we thought possible, including the use of streamlined permit processes. We ended up not being able to use the streamlined processes and instead needed permits that were more costly and time consuming to prepare and submit.

4. *Ground-based survey*. Another measure we used to save money during design work was to use LiDAR as the basis for our design plans. As soon as the construction contractor was hired and began checking elevations, they found discrepancies between their ground-based data and the design elevations. It was costly and time consuming to fit a full ground-based survey into a set budget and short timeline before construction began.

<u>Know your risk of encountering cultural resources and plan accordingly</u>.
Cultural resources investigations were scoped to provide the bare minimum required and the project team didn't understand the high risk of finding cultural resources on our project site. During 2010 construction, cultural resources were encountered at a location where specific construction activities could not be relocated. As a result significant construction delays and additional costs were incurred. The archaeologist who provided support during construction provided the following recommendations:

- Although not every cultural resources site will be found through testing, any site that is found and can be dealt with ahead of time will reduce potential for delays during construction.
- Because the entire site cannot be sampled, it is important to focus on areas that cannot be avoided by relocating or adjusting construction activities.
- In order to save time and money, consider having an archaeologist on site any time there is exposure of buried sediments during the pre-construction phase (after disking in farmed areas, during geotechnical excavations/borings, etc.)
- Levees preserve archaeological sites really well. Thorough testing should be done on levee removal projects.
- Develop a cultural resources contingency mitigation plan for unanticipated discoveries that details where project construction activities can be adjusted to allow for preservation in place and what mitigation actions will occur in the construction locations where activities cannot be adjusted.

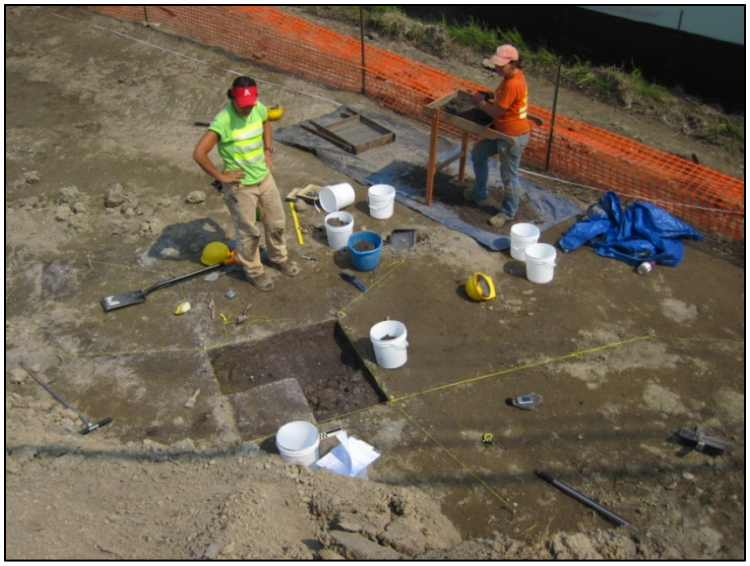

Photo Credit: TNC

Equinox Research and Consulting International staff document an unanticipated cultural resources discovery during 2010. This discovery resulted in project delays and additional costs. For 2011 construction, a contingency mitigation plan protected resources, minimized delays and saved money.

After 2010 delays, additional sampling was done in the spring of 2011 to try and identify if additional unanticipated discoveries were likely. While only one archaeological site was located, it was determined that there was a high potential for even more to be found during construction. For 2011 construction in concert with all parties, we developed a cultural resources contingency mitigation plan that outlined how different types of resources would be handled if encountered during construction. This plan was one of the first of its kind in Western Washington. The plan also identified locations where construction activities could be adjusted to allow for protection in place and where construction activities could not be adjusted. During the 2011 construction four additional unanticipated discoveries were made including one that contained some of the most sensitive cultural materials. These agreed-upon procedures protected cultural resources and reduced delays during 2011 construction, saving the project valuable time and money. The plan and its implementation was widely regarded as a success from the construction standpoint as well as from the stand point of the tribes and state historic preservation office, the entities that are concerned with the protection of cultural and historic resources.

<u>Determine liability responsibilities prior to commencing design.</u>

Liability associated with changes in the layout and ownership of drainage, irrigation and flood protection infrastructure was a challenging issue. Working out the details of bonding and insurance coverage during construction and long term ownership and maintenance of new levees, drainage infrastructure and the restoration area took longer than expected and required significant legal consultation. Before the design was started, TNC entered into an agreement with project partners to outline roles and responsibilities. During design and construction, TNC took on liability and managed risk using contract terms, insurance and bonding. When construction was completed, ownership and maintenance responsibilities of the new infrastructure will be transferred to the Dike and Drainage Districts. TNC also addressed liability beyond the project area such as groundwater effects on neighboring lands.

TNC completed additional modeling and added drainage infrastructure on a neighboring property, and also entered into an agreement that clearly outlined drainage liability responsibilities in the future. We recommend this work be completed simultaneously with final design work.

<u>An owner's representative reduces risk associated with large construction projects.</u>
Construction projects that include flood protection and drainage infrastructure can be technically complex and associated with a large degree of risk (flooding, drainage, etc.), as is the case with Fisher Slough. TNC hired an owner's representative to provide daily, on-site construction observation and construction contract management services. These services enabled us to catch problems early and correct them before they were literally buried and invisible, efficiently and fairly negotiate change orders, and reduce risks and liability associated with the construction.

Photo Credit: TNC

The Owner's Representative on-site observer (Xiaohui Liu of Shannon and Wilson) and Construction Contractor project manager (Caleb Armstrong of Interwest Construction) review materials delivery tickets together to ensure specifications are met before the materials are incorporated in the project.

<u>The true costs of large construction projects are difficult to estimate.</u>
It is difficult to know how much a construction project will cost when applying for funding, which is typically a year or more in advance of actually implementing a project. Due to funding cycles, organizations may need to submit proposals for construction funds based on estimates at the 30% or 60% design stage but the best estimates are not known until the design is completed and bids have been received.

For Fisher Slough, we applied for funding at the time the 50% design was being completed. Additional project features were added and the engineer's estimate increased by approximately 25% between the time TNC applied for ARRA funds and the time the project went to bid. As a

result, TNC was limited in the amount of funds available to complete the project and was forced to consider cost above nearly all other factors when selecting a contractor. It also left TNC with very few funds for potential changes during construction. Despite thorough planning and close coordination with our project partners, we encountered changes that required additional resources. Primarily, construction and construction management costs increased due to an unusually wet construction season, unanticipated cultural resources discoveries, and other changed conditions in the field. This project benefited from close coordination with our funders and partners who were able to provide additional funding to cover these increased costs, and from creative thinking about how to cut costs with the construction contractor and Owner's Representative. Still, for some time, TNC was concerned about running a deficit, which would have had a significant effect on our organization's finances. Throughout the project, TNC was forced to make decisions about continuing a project with increasing costs without any assurance that those additional costs would be covered. A smaller organization may not have been able to proceed with construction in such circumstances. Organizations and their funders interested in completing similar projects should carefully consider the full costs of these projects, which are most solid when the design phase budgets are completed, and develop adaptive funding mechanisms to address changes in costs as projects are developed and designed.

Don't underestimate staffing needs

Dedicated project management staff are critical to tracking all the details of a complex project such as Fisher Slough. Project management staff are needed throughout the life of a restoration project for project planning, grants procurement, management and reporting, landowner agreements, contractor hiring and management, monitoring, and a high level of partner and landowner coordination. TNC started with a half-time project manager from 2004 through 2007. In 2008 a full-time project was hired and by 2009, when construction started, an additional half-time project manager was employed to cover the workload. Additional part-time staff provided critical support related to monitoring and stewardship in 2010, 2011 and 2012. Project managers also had support from grants, contracts and legal specialists at TNC who were involved throughout the life of the project. In order to be most proactive and efficient, it is important to have sufficient staff time allocated to address the myriad of issues that come up.

Funding networks need to be developed for large, multiple benefits projects.

We need to work with single issue funders, such as those interested in salmon recovery, to help them understand that in built environments such as the Skagit, flood and drainage infrastructure costs may be a necessary component to achieve fish benefits. Some funders wouldn't pay for certain elements of the Fisher Slough project because those elements didn't have direct fish benefits. NOAA paid for all project elements because the project couldn't be completed and fish benefits couldn't be realized without doing so. Not only is this key to implementation, its critical for buy in from the local stakeholders and communities that will have needs and interests that intersect with restoration work and will need to be incorporated into planning and design. A coordinated investment strategy that brings together local, state, federal agencies and NGOs to provide funding and technical assistance for a diverse array of

community priorities (e.g. flood and farmland protection) is critical to the longer term success of Puget Sound recovery and restoration of ecosystems in other geographies.

Sufficient pre- and post-project data provides a basis to evaluate outcomes and adaptive management actions.

Having enough data to characterize pre- and post- project conditions is critical in answering questions about project outcomes and in adaptively managing the site to maximize these outcomes. We had funding to collect one year of pre-project data. Now that we are comparing pre-project data with post-project data, it is difficult to determine if the pre-project data is representative of average conditions. More than one year of pre-project data would have given us some indication if the pre-project data from 2009 was typical for Fisher Slough. The importance of multiple years of pre-project data can be the difference between being able to say whether project objectives have been met or not. For example, post-project fish densities at Fisher Slough are the same upstream and downstream, which is the same as pre-project conditions. We believe that there are uncertainties regarding the ability of the new floodgate design to provide fish passage improvements because we cannot confirm if the one-year of pre-project monitoring data is representative of the pre-project fish densities or was an anomaly.

Fish monitoring at Fisher Slough

Photo credit: TNC

Sufficient pre- and post-project data can also be important in informing adaptive management actions. TNC has had to conduct multiple rounds of solicitations in order to cobble together the funding needed to conduct post-project monitoring that will support adaptive management. For projects that have high visibility and employ relatively new techniques, such as the Muted Tidal Regulator flood gates (patent pending), it is important that enough post-project funds

are available to understand if these designs are working and if the adaptive management actions to these designs are successful.

A well-developed monitoring plan targets funds to the most critical questions

The detailed monitoring plan we developed early in the design phase of the project minimized monitoring costs, and helped us more successfully communicate what is being monitored and why when we applied for funding. During development of the monitoring plan we evaluated which items needed to be monitored on an annual basis and which only required periodic evaluation at certain project milestones. In doing so we were able to minimize cost while producing results that would answer the most critical questions regarding project outcomes.