Project Sponsor response to ISRP Comment

ProjectID: 35053

Biological Feasibility of Reintroducing Fishwheels in the Columbia River
Sponsor: STEWARD AND ASSOCIATES
FY03 Request: $236,260
5YR Estimate: $292,770
Short Description: This project will determine whether a fishwheel can be successfully constructed and operated as selective harvest and sampling gear.
Response Needed? Yes

Thank-you for taking the time to hear our presentation, and for reviewing and commenting on our proposal. We found your questions and comments helpful and are encouraged by their positive tone. Our response, which is described in detail below, provides the additional information you have requested and, we believe, addresses the concerns you have raised. We look forward to meeting with the Province Budget Work Group on September 14th for further discussions.

The questions posed by the ISRP focus on the objectives, tasks and methods of the proposed study, and the feasibility of their implementation. To insure that the ISRP's comments are fully considered, we have included the original comments (in standard font) and our associated responses (in italic font) below. If the ISRP addressed more than one issue within a section, we discuss them separately. We numbered our responses to facilitate tracking the comments.

ISRP Comments:

ISRP COMMENT #1:

This proposal is to test the efficacy of using the fish wheel as a selective terminal fishing gear in the Columbia River system. The intent is to use the fishwheel to catch hatchery salmon and American shad. The goal is to provide economic and cultural benefits to tribal fishermen while providing appropriate protections to protected species.

As the ISRP indicated in its review of an earlier version of this proposal under the "Innovative" solicitation, the re-introduction of fish wheels as a selective fishing technique would be useful for the Columbia River Basin allowing harvestable numbers of healthy stocks of salmon or steelhead to be captured and kept, while allowing fish from other stocks to be released alive to continue to the spawning grounds or hatcheries. The ISRP supports a test of fish wheel feasibility. There are locations where the wheels are very effective and could be used as a selective fishing tool, but their success is site-specific.

The feasibility questions surrounding this gear do not pertain to the gear's technical or economic performance as much as to whether fish wheels are a feasible harvest method in the current regulatory context of ESA protected species, and whether acceptable allocation

mechanisms for fish wheel harvests can be developed.

Fishwheel gear makes fishing a collective, rather than individual operation. This is a fundamental change. It will require a cooperative, rather than competitive, approach to fishing and will also require that some sharing mechanism be worked out among fishers to allocate the catch. The proponents should address how this will be done: who will use the gear, how it will interact with other gear, and how harvest will be allocated.

RESPONSE #1:

The primary concern voiced in the ISRP's introductory remarks is whether fishwheels represent a feasible harvest method given the constraints imposed by ESA regulations and fisheries management, and whether an acceptable means of allocating fishwheel-caught salmon and shad can be developed. Generalizing, will this study provide evidence that fishwheels can be successfully integrated into existing and future Columbia Basin fisheries harvest regulatory and management regimes?

This project is fully consistent with the goals and regulations imposed by the ESA, in terms of both avoiding adverse impacts to listed species and facilitating their recovery, primarily through its emphasis on fishwheels as a selective harvest technique and as a means of reducing shad populations in the Columbia River and its principal tributaries.

We are in consultation with NMFS to determine the appropriate steps to secure the sampling (take) permits required under Section 10 of the ESA. The time between applying for and receiving a Section 10 permit is approximately 3 to 4 months. Thus, assuming the project is green lighted in the fall of 2002, we will have sampling permits in hand by the spring of 2003.

In terms of harvest management, including setting quotas and allocating catch, this study will not attempt to examine the larger and long-term implications of implementing a fishwheel-based harvest system. We expect that our study will inform the discussion and debate about harvest among tribal and non-tribal fishery managers and fishers, however, the work we propose to undertake in this initial phase is limited to test the equipment in the Columbia River Basin and demonstrate its utility as a selective harvest technique under a range of sampling conditions.

We intend to staff the project with tribal fishers and to openly share information with tribes and others so they can evaluate the potential of fishwheel technology relative to their individual or collective goals and preferences. There is precedent for this approach. Several First Nations in British Columbia are currently evaluating their fishing practices based on their observations and experience with fishwheels. To enable a similar first-hand evaluation of fishwheel technology by Columbia River tribes, we will staff the project with Native American fishers from the Cowlitz and Yakama Tribes. Robin Torner of the Cowlitz Tribe has agreed to oversee the hiring of staff for the salmon work and Randy Settler of the Yakama Tribe will help select staff for the Shad work. We will assist the hiring process by providing a list of work requirements and desirable skills for fisheries technicians (field

crew). Robin and Randy will remain directly involved in project implementation; both possess the stature, leadership and communication abilities needed to exchange information with tribal leaders and fishers.

ISRP COMMENT #2:

More detail should be provided about objectives, tasks and methods. For example, why is a literature review of fishwheel design necessary? How much is already known? What factors will be considered in identifying design characteristics of a Columbia River fishwheel? More detail should also be provided about how the experiment will be conducted and about the criteria to be used to evaluate performance. What gear types would it be compared against, and what metrics will be used to measure effectiveness?

RESPONSE #2:

Based on the comments received from the ISRP, and after further reflection, we believe that the structure and scope of our proposal is still appropriate, but that additional detail on the objectives and tasks would be helpful. We have also endeavored to place lesser or greater emphasis, as appropriate, on individual tasks, which are addressed below in the same order as they appear in the original proposal.

Phase I

Task 1.1. Literature review and interviews

This task is the first to be completed under Phase I of the study. Although we are very familiar with the peer-reviewed and non-published literature and have considerable experience in designing, building, and fishing fishwheels, we view a more comprehensive review of available information, including first-hand accounts by other fishers, as an essential and reasonable first step in the project. The primary goal is to ensure that all relevant, up-to-date information has been considered in the design and construction of the fishwheel, and that the fishing and experimental techniques to be applied are scientifically sound and feasible. Fishwheel technology and practices are evolving rapidly as new materials, gear modifications, and methods are being tested. Given that our engineer (Barry Manuck) has been actively engaged in this activity and is well acquainted with other fishwheel users in the Pacific Northwest, we believe that soliciting feedback on our proposal and incorporating useful information would be a prudent pre-implementation step.

Much of the knowledge on fishwheel materials, design, etc. is concentrated in the hands of local practitioners or is buried in hard-to-find, unpublished reports. We will track down all relevant information, evaluate its applicability to our study, and provide a summary in our final project report for the benefit of other fishwheel users.

The capture efficiency of fishwheels varies depending on species, location, hydraulic conditions, and design and operation parameters. Michael Link and Karl English of LGL,

Ltd summarized the capture efficiency of different fishwheel types used in British Columbia.[1] *We will update their report by summarizing results of more recent studies, and by incorporating the results of our study. A preliminary assessment of available information will help us determine how best to adapt existing technology to the specific conditions we expect to encounter in the Columbia River.*

Task 1.2 River and site selection

Each river and potential site will present different characteristics and challenges to operating the fishwheel to achieve maximum benefits. Factors such as flows, depth, access, anticipated fish abundance and biological characteristics (e.g., size, swimming depth, ability to detect and avoid traps) can all influence the deployment and operation of the gear. The information necessary to select appropriate fishing locations will be determined from site visits, a review of site-specific environmental data, fishery reports, and interviews with local fishers.

Task 1.3 Fishwheel Design

We will use the information from Tasks 1.1 and 1.2 to determine specifications for fish wheel size, design, power winch capacity, and towing and anchoring devices by reference to project sampling objectives and anticipated environmental conditions. The fishwheel, boat, and trailer system will stress functionality, flexibility, ease of use, and safety for the range of anticipated conditions.

The fishwheel design that we would modify has the following characteristics:

The unit measures 38 ft long by 10 ft wide. The 10 ft wide baskets fish to a depth of 4.0 ft and are driven by a power assist with a 285-1 reduction gear. The pontoons are foam filled for safety and have tapered ends to so that they can be readily towed to sample locations. Ramp nets (leads) are adjustable in depth (range: 10-60 ft) and width. There is ample deck space with railing to allow a 3 or 4-person crew to safely process the catch and samples.

Phase II

Task 2.1 Develop objectives, methods, and sampling protocols.

A factorial design will enable a test of the effects of three factors – sampling location (e.g., sites representing different conditions), light intensity (day/night), and species (chinook/steelhead) – on capture efficiency (e.g., catch per unit time and percentage of marked fish released upstream recaptured in the fishwheel) and capture/handling effects (e.g., visible descaling/abrasions and delayed mortality). The null hypothesis of no effect will be tested for different levels of each treatment (independent) variable under a

[1] *Link, M. R. and K. K. English. 1996. The 1993 Fishwheel Project on the Nass River and an evaluation of fishwheels as an in-season management and stock assessment tool for the Nass River. Canadian Technical Report of Fisheries and Aquatic Sciences, 2130.*

completely randomized design or, if the data allow, under a randomized block design (blocking by sites). The basic RB design is depicted in the following table (X = response/ dependent variable).

Species (Chinook/Steelhead)	*CH*		*STHD*		*CH*		*STHD*		*CH*		*STHD*	
Light Intensity (Day/Night)	*D*	*N*	*D*	*N*	*D*	*N*	*D*	*N*	*D*	*N*	*D*	*N*
Location (Blocks)												
Cowlitz Site A	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
Cowlitz Site B	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
Cowlitz Site C	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*

This experimental design will enable us to determine if particular configurations are more productive that others.

Samples of hatchery and non-marked, presumably wild, salmonids caught in the fishwheel will be tagged for long-term survival. Tags will be recovered from the hatchery and from spawning ground surveys. We will explore the possibility of obtaining a sizeable number of hatchery fish from the Cowlitz Salmon Hatchery that can be marked and released downstream of the fishwheel to determine its sampling effectiveness under different conditions. Survival studies will not be conducted on American Shad.

Task 2.2 Deploy fishwheel and collect data.

This step is self-explanatory; however, we will be glad to respond to any further questions at the PBWRG meeting. To minimize handling and retention times, sampling will be restricted to observations of origin (hatchery/wild), species, sex, and length. Additional biological data such as DNA, pathogen, and scale samples will be collected if requested and approved by the appropriate agencies. If large numbers of fish are caught, subsamples will be taken. Preliminary power analysis indicates that samples of 40 fish per day would provide statistically tractable data.

Phase III

Task 3.1 Data analysis and reporting.

The analysis and reporting task will follow standard reporting methods. A report that describes the purpose, methods, and results of the study will be prepared and after outside review, published in final. All primary data and analytical formulae and results will be tabulated into appendices that, depending on the quantity of data collected, will be

published in hardcopy or on compact disk.