EPA Puget Sound Financial and Ecosystem Accounting Tracking System (FEATS)

v. September 2012 for Lead Organization Subawardees

Photo by Rebecca Pirtle, Editor, Kingston Community News (Doe-Kag-Wats Estuary of the Suquamish Tribe)

PROJECT INFORMATION

1. Federal Grant Number	PA-00J322-01	***2a. Reporting Period Start Date:**	10/1/2016	***2b. Reporting Period End Date:**	3/31/2017

3. Subaward Organization (Name and complete address including zip code) Name: Skagit River System Cooperative Address 1: PO Box 368 Address 2: City: LaConner State: WA Zip Code: 98257-	**4. Subaward Project Manager Contact Information** Name: W. Gregory Hood Phone: (360) 466-7282 Ext: Fax: (360) 466-4047 Email: ghood@skagitcoop.org

5a. EPA Program **LO - Tribal**	**5b. Subaward Project Title and Contract No.** Assessment of the Geomorphological and Ecological Consequences of Dike Breaching vs. Dike Removal for Estuarine Habitat Restoration 12EPA PSP428	***6. Collaborating Organizations/Partners** None

<u>Subawardee Submission Instructions</u>: LO fills in the white boxes. Subawardee fills in the yellow boxes (boxes with asterisks). Refer to guidance document for how to fill out the boxes. After filling out the yellow boxes, save and e-mail it to your LO Project Manager for approval. LO will roll up the information and submit to EPA for approval.	**LO Project Manager:** Dani Madrone **LO:** Northwest Indian Fisheries Commission **Phone:** 360.528.4318 **email:** dmadrone@nwifc.org **EPA Project Officer:** Lisa Chang	***7a. Name/Title of Person Submitting Report**	W. Gregory Hood Principal Investigator
		***7b. Date Report Submitted**	4/30/2017

FUNDING/COST ANALYSIS

8a. Total Assistance Amount Awarded:	$165,395.00	**8b. Funding Year (Federal Fiscal Year Funds Appropriated)**	FY 2012 ---------- ---------- ----------	***9. Amount Spent To-Date:**	$164,501.34	***10. Amount Reimbursed To-Date:**	$164,501.34
11. Match Amount Required	$0.00	***12. Total Match Amount Spent and Documented To-Date:**	$0.00	***13. Have you experienced any cost overruns or high unit costs?**	No		
***14. What issues or questions do you need the LO Project Manager to respond to?**	None						

BUDGET UPDATE

	15a. APPROVED BUDGET			*15b. SPENT TO-DATE		
	LO (EPA) Funds	MATCH	TOTAL	LO (EPA) Funds	MATCH	TOTAL
Personnel	$80,551.00		$80,551.00	$75,725.39		$75,725.39
Fringe Benefits	$27,267.00		$27,267.00	$26,801.84		$26,801.84
Travel	$1,500.00		$1,500.00	$5,990.91		$5,990.91
Equipment	$400.00		$ 400.00	$0.00		$ 0.00
Supplies	$1,290.00		$1,290.00	$4,107.52		$4,107.52
Contracts	$20,000.00		$20,000.00	$23,808.50		$23,808.50
Other	$3,500.00		$3,500.00	$1,304.96		$1,304.96
TOTAL DIRECT CHARGES	$134,508.00		$134,508.00	$137,739.12		$137,739.12
Indirect Charges	$30,886.00		$30,886.00	$26,762.22		$26,762.22
TOTAL	$165,394.00		$165,394.00	$164,501.34		$164,501.34
***Explain Any Discrepancies:**						

ECOSYSTEM GOALS ADDRESSED

16a. Primary Goal	Healthy Habitat
16b. Additional Goals	Healthy Species ---------- ---------- ---------- ---------- ----------

DIRECT THREATS ADDRESSED

17a. Primary Threat	Dams/Levees/Tidegates
17b. Secondary Threat(s)	---------- ---------- ----------

LINKAGES TO PUGET SOUND ACTION AGENDA (Version Adopted August 2012)

18a. Primary Strategic Initiative	**Tribal Habitat Priorities**
18b. Sub-Strategies Employed	**A.6 B.1**
18c. Near-Term Actions Supported	

LINKAGES TO EPA PUGET SOUND PERFORMANCE MEASURES

19. Measure(s)	Habitat Restored/Protected ---------- ----------

LINKAGES TO PUGET SOUND DASHBOARD INDICATORS

20a. Primary Indicator	Estuaries
20b. Secondary Indicators	Wild Chinook Salmon ---------- ----------

PROJECT LOCATION

21a. Latitude	48.358889	**21b. Longitude**	-122.467222
21c. Hydrologic Unit Code	17110007 - Lower Skagit	----------	----------
21d. Action Area	Whidbey	----------	----------

MEASURES OF SUCCESS (Key Outputs)

*22a. Description (e.g., "shellfish beds reopened")	*22b. Unit (e.g., "acres")	*22c. Project Target ("number")	*22d. Project Measure To-Date ("number")
Fish distribution data analysis nearly complete. Manuscript has been drafted, with only portions of the results and associated discussion requiring completion. We anticipate submitting the manuscript for journal publication by the end of May 2017.	manuscript	1	1
We have digitized LWD distributions on the marsh surface and in tidal channels for the Skagit, Snohomish, Stillaguamish, and Dosewallips deltas and begun analysis of distribution patterns--these preliminary results were presented at the 2016 Salish Sea Ecosystem Conference and sparked signficant interest and feedback in the audience due to its applicability to restoration design and evaluation.	slideshow presentation at a conference	1	1
The GIS work for the LWD anslysis has been ground-truthed with field surveys to be certain that in-channel LWD is not being missed during air photo analysis. Results indicate high detection rates in air photo analysis, especially for large LWD of geomorphic significance. Manuscript has been drafted: Introduction and Methods are complete. Results and Discussion remain to be written. Anticipate MS completion and submission for journal publication by late summer.	manuscript	1	1

PROJECT MILESTONES

Instructions: In the tables below, please explain your progress toward meeting agreed outputs for the period, **reasons for slippages**, and any additional information including **reflections, lessons learned, and/or thoughtful analysis**. When appropriate, include analysis and information of **cost overruns or high unit costs**, and changes to work plan or budget not requiring prior approval from EPA. We encourage photo documentation - please attach to the report as a separate document.

23a. Subaward Work Plan Component/Task: Assessment of the Geomorphological and Ecological Consequences of Dike Breaching vs. Dike Removal for Estuarine Habitat Restoration.

23b. 2012 Action Agenda Near-Term Action(s) Supported:

***23c. Estimated Costs:** $165,395.00
Actual Costs to Date: $164,501.34
(If required to report – contact your Project Manager)

23d. Sub-Task No.	23e. Sub-Task Description (include due date)	*23f. Date of Status	*23g. Status	23h. Outputs/Deliverables	*23i. Remarks

1.1	Develop predictive models of geo-ecological responses to variation in planform tidal network and dike-breach geometry resulting from dike removal or breaches	4/26/16	COMPLETED	Predictions of the ecological consequences of dike breaching vs. dike removal relative to reference marsh tidal channels resulting from differences in tidal channel planform geometry; Shapefiles of spatially explicit predictions.	This was focused on large woody debris. Manuscript is in preparation.
1.2	Field sampling and lab processing of sediment, detritus, benthic invertebrate samples	10/31/15	CANCELLED	Predictions tested; Shapefiles, spreadsheets of sampling locations and results	We are focusing on fish patterns, which we believe have a higher likelihood of showing interesting results.
1.3	Field sampling and processing of nekton catches	4/26/16	COMPLETED	Predictions tested; Shapefiles and spreadsheets of sampling locations and results	We have completed 3 years of sampling of fish on marsh surfaces. The question is whether fish access marsh surfaces so that site access can be through marsh perimeters, in which case remnant dikes would impact access. Manuscript is in preparation.
1.4	Synthesis, evaluation, communication of results and policy implications	10/31/15	CURRENT	Rapid assessment monitoring metrics that link geomorphological patterns to ecological patterns and processes; Policy recommendations regarding the relative benefits and costs of dike breaching vs. dike removal; Publication of results in at least one peer-reviewed journal; Presentation of results at conferences and workshops, and to local/regional managers—including those at SRSC who will	Presented results of LWD distribution analysis on marsh surface and within tidal channels at the 2016 Salish Sea Ecosystem Conference. LWD is related to marsh surface tide pools and to fish use of those tide pools. Two manuscripts are in preparation, one on large woody debris distribution in tidal marshes, one on fish use of flooded tidal marsh surfaces during higher high spring tides.

				find immediate use and application	

CHALLENGES AND SOLUTIONS (specific to reporting period)

*24a. Task No., Sub-Task No.	*24b. Challenge	*24c. Solution

HIGHLIGHTS/LESSONS LEARNED/REFLECTIONS

***25.**

Two manuscripts are in preparation, one on fish use of marsh surfaces and one on the distribution of large woody debris (LWD) in tidal marshes. To my knowledge there have been no publications on the distribution of LWD in tidal marshes. This work will provide important guidance for restorationist who often import a lot of LWD to tidal marsh restoration projects without knowing anything about reference marsh conditions--how much LWD is normally found in marshes, where is it normally found, is LWD movement important.

The second manuscript will describe our findings regarding fish use of flooded marsh surfaces. In 2014, 2015, and 2016, 25% to 70% of the fish caught in tidal channels were wild juvenile Chinook salmon (0+), which was a little higher than their proportion in marsh surface catches, which was 17% to 35%. In both locations, they were the most common fish caught from March to June. Juvenile chum (0+) were caught at similar proportions in channels (13% to 22%) and on marsh surfaces (4% to 37%). Suprisingly, yearling coho (1+) were more common on the marsh surface (0% to 25%) than in the channel (0.2% to 2%). Three-spine sticklebacks were not surprisingly proportionally more common on the marsh surface (7% to 51%) than in tidal channels (2% to 11%). We have found stickelbacks in marsh surface tide pools at all stages of their life history, adults, adults with courtship coloring, gravid adults, and juveniles from March through July. In contrast, peamouth were more common in tidal channels (0.1% to12%) than on marsh surfaces (1%-3%)

The work on marsh surface use by fish is important, because for the first time it shows that juvenile salmon and other estuarine fish use the flooded marsh surfaces of tidal marshes in the Pacific Northwest. Such work has been done in Atlantic and Gulf Coast marshes for non-salmonids, but this is the first time it has been shown for salmonids on the West Coast. Research scientists and restorationists have up till now ignored the potential for juvenile salmonids to directly access and benefit from flooded tidal marsh surfaces. This has contributed to interest in installing SRTs (self-regulating tide gates) rather than full tidal restoration of historic marsh habitat in some instances. SRTs allow limited, controlled tidal inundation that floods a remnant tidal channel without flooding adjacent lands, the idea being that the channel is the most important part of the system for juvenile salmon, that marsh surfaces "only" provide indirect benefit through secondary production and export to the channel. Our work shows that flooded tidal marshes are more important than assumed, that they are directly occupied by juvenile salmon, so that prey resources there may be directly consumed.