Habitat Status and Trends Monitoring for Skagit Salmon and Steelhead Recovery

FY18 Workplan Final Report

June 14, 2022

Skagit River System Cooperative Research Program

This report describes work completed on the Habitat Status and Trends (HST) Monitoring for Skagit Salmon and Steelhead Recovery project between June 4, 2019 to February 1, 2020 (Amended to 10/31/2021).

The work conducted was funded by a subaward of the Swinomish Tribal Community to Skagit River System Cooperative. The original award was funded to the Swinomish Tribal Community by the Northwest Indian Fisheries Commission agreement #18EPA PSP438, awarded September 1, 2018 via CFDA 66.122 entitled Puget Sound Protection and Restoration: Tribal Implementation Assistance Program. The Federal Grant # for this award is: PA-01J27601.

Table 1 shows the deliverables according to the Habitat Status and Trends Monitoring for Skagit Salmon and Steelhead Recovery FY18 Workplan.

<table>
<thead>
<tr>
<th>Task</th>
<th>Output</th>
<th>Deliverable(s)</th>
<th>Outcome(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1. Identify the suite of habitat indicators to measure</td>
<td>List of habitat indicators</td>
<td>Approved QAPP Monitoring plan to local watershed (i.e., tribal and state co-managers, watershed lead entity) and Puget Sound region (i.e., NOAA and PSP)</td>
<td>Informed local watershed and Puget Sound region of Skagit habitat and trends</td>
</tr>
<tr>
<td>Task 2. Develop monitoring protocols for each indicator</td>
<td>Detailed methods for indicators</td>
<td></td>
<td>Triggered pathways for corrective actions to habitat protection and/or restoration strategies through local(^1) and regional(^2) adaptive management plans</td>
</tr>
<tr>
<td>Task 3. Develop a monitoring schedule (i.e., which years to measure specific indicators)</td>
<td>Long-term schedule for monitoring indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 4. Provide habitat indicator results</td>
<td>1. Annual report to Swinomish Tribal Community and NWIFC on habitat status and trends for identified indicators in Task 1. 2. GIS habitat data.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 5. Participate in the Skagit Chinook Monitoring and Adaptive Management process</td>
<td>1. Participate in Lead Entity Monitoring and Adaptive Management Committee meetings 2. Create referenceable technical reports of monitored indicators (Table 2) that include adaptive management recommendations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Skagit Chinook Monitoring and Adaptive Management Plan  
\(^2\) PSP Action Agenda
**Tasks 1-3**

The HST Monitoring for Skagit Salmon and Steelhead Recovery Project is a multi-year effort with annually linked workplans. Tasks 1-3 were completed in the first year of the workplan (FY16). Deliverables and outputs associated with completing Tasks 1-3 are reported the FY16 Final Report (SRSC Research Program 2021).

**Task 4. Provide habitat indicator results**

For the FY18 award, we developed habitat indicator data following the Quality Assurance Project Plan for HST monitoring for Skagit Salmon and Steelhead Recovery (Hood et al 2019) for the following habitat types: spawning habitat, freshwater rearing habitat, and tidal delta rearing habitat. For spawning habitat, HST datasets for landslide rate and forest road sediment reduction treatment were digitized in the headwaters of Chinook salmon spawning watersheds for 13 periods between 1962 – 2019 (inclusive). For freshwater rearing habitat, HST datasets for mainstem channel and mainstem edge as well as their riparian corridors were completed for the periods 1996, 2006, and 2016. For tidal delta rearing habitat, HST datasets were completed for landscape connectivity for the periods: 2000, 2004, and 2013 and digitizing the extent of invasive vegetation within the Skagit tidal delta for the same periods began but was not completed for the full spatial extent of the Skagit tidal delta.

**Task 5. Participate in the Skagit Chinook Monitoring and Adaptive Management process**

a) **Participate in Lead Entity Monitoring and Adaptive Management Committee meetings**

We participated in the Skagit’s Lead Entity Monitoring and Adaptive Management Committee meetings and meetings with WDFW, our co-manager for salmon and habitat recovery, to plan estuary restoration of a 270-acre WDFW property; and other similar estuary restoration planning/feasibility/design meetings.

b) **Create referenceable technical reports of monitored indictors that include adaptive management recommendations**

For the FY18 award, HST datasets were used to develop three referenceable technical report or manuscripts.

Skagit tidal delta HST datasets were used for an analysis of estuarine large woody debris (LWD) patterns which are uniquely different than LWD patterns in streams. The analysis resulted in a publication to provide LWD design guidance for estuarine restoration projects (Hood 2021a).

Skagit tidal delta HST datasets were also used for analyses related to the sustainability and productivity of estuarine habitat for juvenile Chinook salmon rearing (Hood 2021b and LeMoine 2021). Hood (2021b) investigated the sustainability of estuarine bayfront habitat in light of climate change predictions for sea level rise and storm intensity, but also included complexities within the investigation for (a) differential sediment accretion rates across the bayfront and (b) an interaction between nutrient population derived increases in algal wrack suffocation of native marsh plant colonization. LeMoine (2021) investigated the resilience of Skagit tidal delta juvenile Chinook salmon habitat due to interactions with climate change predicted temperature increase and marsh vegetation species composition. LeMoine (2021) found climate drivers (e.g., air temperatures, river discharge) and local sites conditions (e.g., vegetation) influenced water temperatures of tidally influenced channels in the Skagit River delta. Evaluation of future scenarios suggests available juvenile Chinook salmon habitat will decrease as climate drivers increase water temperatures, yet restoration and flow management might lessen this effect. Overall, LeMoine (2021) was a good first step in understand the Skagit estuarine thermal relationships and resulted in a recommendation to improve the temperature monitoring network in the Skagit River estuary.
References:


Hood, WG. 2021b. Skagit Delta Bayfront Sustainability Indicators. Final report (Part A, 1 of 2) for Grant No. A18AP00202 prepared for U.S. Interior Department, Bureau of Indian Affairs. Skagit River System Cooperative, LaConner, WA. 15 pages.

