Final Report for 2009 Puget Sound Tribal Implementation Project- Stillaguamish River



Peak flows and Chinook survival in the Stillaguamish Watershed: Modeling the relative importance of natural and anthropogenic factors; prioritizing restoration and protection actions utilizing a parcel-based GIS framework.

EPA Cooperative Agreement

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*Accomplishments and Lessons Learned by Task.*

Task 1: Project Management

Management of this project included eight semi-annual FEATS reports to EPA. While the FEATS form was initially unfamiliar and slightly confusing (this was my first EPA grant), my grant manager helped greatly to work through the difficulties with me on the first project, and thereafter the reports were on time, and needed minimal editing. Based on my experiences managing this project, I will be able to administer future cooperative grants more smoothly.

We had three partners on the project: the National Oceanic and Atmospheric Administration (NOAA); Forterra (formerly Cascade Land Conservancy); and CoreGIS. Subawards were needed for each organization, and it the process took longer than anticipated. Mainly this was due to the extensive process that large organizations like NOAA and Forterra require for a subaward. Nevertheless we were able to successfully negotiate all the agreements covering the landcover classifications (CoreGIS), hydrological modeling (NOAA), and GIS prioritization tool (Forterra) in a timely manner. The delay in getting the subawards approved pushed some of the deliverables back, but we were able to complete the overall project with a six month extension. The extension was needed, in large part, due to the federal government shutdown of 2013 that occurred during the middle of NOAA’s modeling work, and caught us completely off guard.

Dealing with the subawards and subawardees impressed upon me the need to double the time estimates needed to set up formal agreements with large project partners in the future. The Tribe is a lean organization and agreements can be formalized quite quickly, but I shouldn’t expect the same turn around at larger institutions.

This final report was the final piece of Task 1, and was greatly aided by clear direction from the EPA project manager that helped to close out this cooperative agreement.

Task 2: Coordination and Outreach

This task centered on communication within the project and project partners and the dissemination of the project findings outside of the partners. It became clear early on that the project partners were, like me, extremely busy. It was hard to get everyone together for regular face to face meetings or conference calls, so we settled on doing project business via email on an as needed basis. This turned out to work with everyone’s schedules much better and allowed everyone to have a written record of the correspondence on the various aspects of the project.

The website for the project, was eventually set up at the following address: <http://stillaguamish.nonprofitsites.com/peak_flow_research.asp>

We are in the process of updating the site the final project outputs, some of which only became available that the end of the project. I have to go through another busy staff member to apply updates to the website, so updates were not as frequent as I would have hoped at the project outset, but we are committed to hosting the data and fielding questions from regional stakeholders as the site becomes better known.

I was able to attend a conference a year for the first couple years of the project, but the final year and bit of the project I was unable to find a local conference (for budgetary/travel reasons) that would be appropriate to share the project results. Also, the final project results were not available until the very end of the grant period so that limited the opportunities to share results during the project period. I was able to share the project results to the Technical Advisory Group of the Stillaguamish Watershed Council at the very end of the grant period and the results were well received. My grant manager brought up the idea of an EPA sponsored webinar to disseminate the project findings and approach, and I would be open to that outside of the contract period for the project.

Task 3. Data Collection

The successful completion of the project depended on providing the project partners with a wide variety of current and historical data including: flow, precipitation, instream temperature, and historical photos. Initially we anticipated the need to purchase QuickBird imagery at substantial cost to complete the landcover classifications. However, NOAA indicated that the scale of the project (watershed wide) meant that we didn’t need that level of detail and free LandSat imagery would suffice. We developed an approved QAPP for the instream temperature data collection, but again NOAA decided that the increased resolution of spawn timing was not needed to model effects of peak flows. Taken together both of these outcomes reinforced the dynamic nature of large projects with multiple project partners

The landcover classifications were one of the smoothest pieces of the entire project, due entirely to the skill, speed, and precision of project partner CoreGIS. They stepped in to fill the void left by Snohomish County when our original partner determined that classifying historical B&W photos was beyond their skill set. CoreGIS was also asked to do three additional (1991, 2001, and 2006) classifications once it became apparent that we would no longer be able to use the existing Snohomish County classifications after CoreGIS found a systematic methods flaw in their work. They completed all of work with incredible speed and skill, and I realized the value of choosing good partners when completing a project of this size and complexity. We found CoreGIS through project partner Forterra, and the entire project may have been sunk without them.

Task 4: Hydrologic Modeling

NOAA was responsible for this task, taking the landcover data and modeling both climatic and anthropogenic drivers of peak flows in the Stillaguamish. They were hamstrung by the lack of environmental data sets going back to the 1950’s, but still were able to produce models for both the trend of increasing high flows, and decreasing low flows. In the case of peak flows, climate (increasing rainfall, decreasing snowfall) was the dominant driver, whereas for low flows landcover (immature vegetation) was the dominant factor. The low flow analysis was a bonus result that we did not anticipate, but was detailed in the final report. Their final report is a comprehensive analysis of the drivers affecting both peak and low flows in the Stillaguamish and will be a valuable resource for watershed stakeholders as they learn how best to mitigate natural trends, and restore man-made alterations to the hydrology of the watershed.

Task 5: GIS parcel Based Protection and Restoration Framework

Forterra, in conjunction with biologists from the Stillaguamish and Tulalip Tribes, took the findings from the NOAA peak flows and developed a GIS restoration and conservation prioritization tool for the floodplains and upland forests of the NF and SF Stillaguamish. This tool recognizes that peak flows are primarily driven by climatic factors and provides guidance for watershed stakeholders on the best ways to mitigate the effects of peak flows while minimizing actions that may exacerbate peak flows. One component of the tool deals with upland forest acquisition and management, while the other prioritizes lands along the NF and SF Stillaguamish for Conservation (Acquisition) or Restoration actions. The tool is well documented in a series of documents that will be posted to the project’s website. In addition, the GIS tool will be distributed to watershed stakeholders on an as-needed basis.

It was surprising that land use wasn’t a bigger driver in peak flow events, but during our research we discovered that during the most intense rain events all landcover types behave as if they are impervious- whether it is a clear cut, or an old growth forest. This was a different direction than we had anticipated going at the outset of the project and underscored the importance of having a team that can maintain flexibility and be open to new ideas/approaches. Forterra excelled as a project partner, gamely devoting extra time and energy to re-scope their portion of the work to produce a tool that would be useful for watershed stakeholders, while staying true to the results of the NOAA modeling.

Next Steps

For years, Stillaguamish watershed stakeholders did not understand what was driving the trend of increasing peak flows, or what could be done to reverse the trend or mitigate its effects. This project identified a changing climate as the primary driver behind increasing peak flows, and has detailed restoration and conservation strategies/locations through a GIS tool available to any watershed stakeholder (provided they have ArcGIS). This fills a significant data gap/restoration need identified in the 2005 Stillaguamish Chinook Recovery Plan.

In addition, the Stillaguamish Watershed Council has been in the process of developing an acquisition strategy to guide the protection of lands in the floodplains of the river and its major tributaries. The GIS prioritization tool produced by this project will be able to be used as the basis for this strategy as it is fully developed in coming months. The ultimate goal of the strategy will be to link together a corridor of protected and restored parcels along the North Fork, South Fork, Mainstem Stillaguamish, and its major Chinook bearing tributaries.

By filling a data gap, and developing a GIS tool that can be used to prioritize conservation and restoration actions, the EPA Peak Flows project has made great strides in advancing Chinook recovery efforts in the Stillaguamish Watershed.