False Bay Flow and Habitat Assessment Executive Summary
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The False Bay Flow and Habitat Assessment was funded by the Salmon Recovery Funding Board in 2009. Work on the project was conducted from Spring 2009 - Spring 2012. Nonprofit, Washington Water Trust, based out of Seattle, WA. was the project lead. Project partners included: Amanda Cronin (project manager) and Meghan O'Brien of the Washington Water Trust, Russel Barsh of KWIAHT, Center for the Historical Ecology of the Salish Sea, Mary Lou White and James Fletcher of the Wild Fish Conservancy and Cathy Reidy Liermann, PhD, independent consultant. The project also received substantial support from: Steve Boessow at the Department of Fish and Wildlife, Barbara Rosenkotter at San Juan County, Kimball Sunberg, community volunteer, Debra Clausen and Katie Hover at the San Juan Preservation Trust, Eliza Habegger at the San Juan County Land Bank, and Buck Smith at the Department of Ecology.

As the largest watershed in the San Juan Islands, the False Bay Watershed is thought to have historically supported salmonids and to hold more potential than most other watersheds in the San Juan's to support restoration of these species. At the request of individuals familiar with the watershed and interested in the potential for False Bay Creek to support salmon, Washington Water Trust applied for funding to assess some of the less studied limiting factors to salmon recovery in the False Bay Watershed especially the water quantity aspects. The primary objectives of this project are listed below.

- Assess surface and ground water rights on paper and the actual use of surface water in the watershed
- Characterize physical habitat constraints to stream flows in the watershed including ditching, diversions, channelization and ponding
- Evaluate the potential for flow restoration with an emphasis on summer low flows
- Assess landowner and water right holder willingness to participate in flow restoration efforts
- Assess water quality in the watershed
- Research fish use in the estuary and lower mainstem

Four separate but complimentary reports were produced as the final deliverable for this project.

- *False Bay Water Right Assessment Report, Meghan O'Brien and Amanda Cronin, 2011*
- *Flow Restoration Potential and Constraints in the False Bay Watershed, Cathy Reidy Leirmann, 2011*
- *False Bay Creek (San Juan Island, WA) Freshwater Fish and their Prey: Significant Contaminants and their Sources, Russel Barsh, Dr. Jack Bell, Eliana Blaine, Graham Ellis, and Steffan Iverson, 2010*

- *Fish Use Assessment for False Bay Creek Preserve and False Bay Biological Preserve, James Fletcher, 2010*

The conclusions and recommendations of these four reports are summarized in this executive summary. For more detailed information please refer to the specific reports.

To assess water rights, Washington Water Trust utilized Department of Ecology water right records, aerial photos and personal communication with people familiar with valley agricultural practices (O'Brien and Cronin 2011). The assessment concluded that very little irrigation is occurring in the watershed however, there appears to be a relatively large amount of water stored in enhanced and constructed lakes and ponds. The primary mechanism for restoring flows in small streams is voluntary contracts with irrigation water right holders to place water rights into a State program for their protection instream. There may be some potential to place a few small irrigation water rights into the State Trust Water Right Program in the watershed, which would protect them for instream flow benefit. However, the best means of improving stream flow within the False Bay Watershed is likely working with landowners to change reservoir and storage pond management. The largest impoundments are the City of Friday Harbor's water supply at Trout Lake and the privately owned Zylstra Lake. Communication with the Town of Friday Harbor indicated that they may be interested in managing their water supply to benefit flows in the watershed, however without the cooperation of the Zylstra Lake landowner which is downstream of Trout Lake, any flow augmentation will not reach False Bay Creek.

Cathy Reidy Leirmann further assessed the physical constraints and the potential for flow restoration (Liermann, 2011). In addition to the two major impoundments mentioned above, many wetlands throughout the False Bay Watershed have been drained over the years for agricultural development, channels straightened, ditches cut and land paved over. These land use changes have decreased the ability of the system to store the water necessary to provide base flows naturally during summer months. By assessing the limited amount of stream flow data for the False Bay Watershed and consulting the documentation of stream flows of similar streams in the region, Liermann concluded that today's flows are lower than historic flows and low flows begin earlier in the season and last longer than they did in the past. The decline in salmonid populations is likely related to the changes from historic flow patterns that increased the magnitude and duration of the low flow season.

The third report (Barsh et. al.) focused on a number of water quality indicators and their impact on fish and their prey base that had not previously been assessed in the False Bay Watershed. Russel Barsh led a team to analyze the following parameters, "temperature, conductivity, pH and dissolved oxygen; colorimetric determination of nutrient loading (nitrates, ammonia, and phosphates); ELISA immunoassays of tissue extracts from fish and invertebrate prey for polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and widely used pyrethroid pesticides; and ESI mass spectrometry of nonyl phenols (NPs) in fish and invertebrate tissue as a measure of exposure to nonionic surfactants". Several land use practices were identified that contribute to poor water quality in False Bay Creek which are exacerbated by low flows. These practices include use of chemicals for home and professional gardening, County road maintenance, and removal of vegetation from riparian areas and road ditches. Of particular concern are the low dissolved oxygen levels that were found in the study to be at levels

very harmful to fish. Water quality must be addressed in conjunction with any habitat restoration to restore salmonids in the False Bay Watershed.

Fish use in lower False Bay Creek and the estuary at False Bay were assessed in the fourth report by Wild Fish Conservancy (Fletcher, 2011). Sampling occurred at two sites, one near the mouth of the creek and one just upstream of the Bailer Hill Road crossing. Chum salmon were the only salmonids observed and only four juvenile chum salmon were counted during the study period. While it is possible that the juvenile chum found during the study period were offspring of adults spawning in False Bay, recruitment levels are too small to support a viable population and spawning adults should be regarded as strays. While coho salmon were not observed, they have been documented in previous years by Washington Department of Fish and Wildlife staff. These are likely strays as well and not spawning in the creek naturally, especially given the poor flow and habitat conditions found in the creek in the summer time. Other non- salmonids found using the creek include pumpkinseed sunfish, a non-native fish commonly stocked in farm ponds, three-spined stickleback and staghorn sculpin.

Overall salmon restoration in the False Bay Watershed will require improved water quality and water quantity conditions. While opportunities for improved water quality are more straightforward and could be implemented right away with landowner cooperation, opportunities for flow restoration are very limited in the False Bay Watershed. Flow enhancement may be achieved by working with the owners of private storage impoundments to manage in ways that benefit downstream flows. Ultimately the success of these efforts depends on willing landowners. Despite the fact that outreach efforts under this study did not result in any interested parties at this time, ownership and land use goals change over time and we may have more success in the future. In summary, the combined recommendations of the False Bay Flow Assessment project are listed below.

- Current efforts to establish/restore salmonids in False Bay Watershed may benefit by prioritizing flow restoration in May and June, followed by efforts to gain consistent flow throughout the entire summer – a condition which may never have existed for many reaches in the watershed.
- A flow restoration target of a minimum 0.25 cfs into July is recommended in order to mimic historic timing of dry spell onset, followed by 0.1 cfs through October. Sustaining the 0.25 cfs throughout the entire summer would be optimal. Flow restoration will most likely be achieved via working with upstream landowners to modify impoundments to release more water during the spring, summer and fall.
- Throughout the watershed, restoration efforts should be targeted at resident cutthroat trout which are the optimal salmonid species for the watershed given natural history and hydrology. Lower in the watershed, sea-run cutthroat trout could be targeted for restoration. In addition, attention to restoring chum salmon in the lower reaches may bring community attention and funding.
- Construct wider, denser, and more effective woody riparian buffers, especially in the agricultural areas north of Bailer Hill Road, to reduce nutrient loads (especially ammonia), moderate summer water temperatures, and sequester contaminants.

- Remove fish passage barriers, especially at constructed ponds and private crossings.
- Educate landowners on the importance of fencing cattle out of the stream. This may take funding to construct alternate water sources and appropriate crossings.
- Ensure that all county roads are equipped with appropriate vegetated ditches that drain to natural or constructed wetlands sufficient in soil depth and vegetated areas to impound and degrade motor oils, motor fuels, road tars and asphalts.
- Reduce outdoor home and garden use of products containing pyrethroids and nonionic surfactants within the False Bay watershed, in particular the pyrethroid species that are most toxic to salmonids. This includes pesticides and herbicides that are sold in hose sprayers, or as concentrates to be mixed with water for use with a hose sprayer.
- Coordination with private landowners will be key to achieving any of the above opportunities.
- Coordination of efforts to restore habitat, mitigate contaminant runoff and restore flows will maximize opportunities for salmonid restoration.