



Introduction: Fish and Farms: the connection and the threats

Salmon and farming have long been cornerstones of the heritage of Whatcom County and the Nooksack River basin. It is well-documented that the threats to salmon have never been greater than they are now, and chief among those threats is the ever-increasing pressure from urbanization and its associated pollution. At the same time we are seeing unprecedented declines in farms and farmland and with that decline concerns about our local food production. Economic conditions and on-going questions about access to water needed to farm are two of the many pressures on farms and farmland.

Ultimately, the story about fish and farms is about food and families. It is a primary connecting point between Tribes and farmers as both see food production as a way of life and a legacy to be passed on to succeeding generations. This paper deals with why the future of fish and farms in the Pacific Northwest, and in Nooksack river basin in particular, are so interconnected. But facts on the ground, do not account entirely for that connection. Providing food for the village and beyond, and passing that invaluable



Salmon are an essential part of the life and legacy of local Native American tribes. Tribal treaty rights are one of many reasons to commit to salmon recovery as farmers are and have. For a number of powerful examples of actions farmers have taken to improve habitat and restore salmon go to www.farmersforreal.org. (Image: wikimedia)

legacy onto the next generation is even more significant—some might say even spiritual.

As the threats to fish are many and varied, so are the threats to our family farms. In this paper we focus on how the use of and access to water affect both fish and farms. Even if the questions about water access for farms raised here are resolved, farmers will continue to advocate for and work to improve habitat and salmon recovery. Past

actions make that commitment clear. Some of those are documented at www.farmersforreal.org.

The focus of this paper is how the loss of farms and farmland is harming fish recovery, and how the current uncertainty about access to water for farming can harm the interests of environmentalists, tribal members and farmers alike. Habitat is essential for fish and research shows that maintaining farmland is the best way to prevent urbanization of salmon-bearing watersheds. As it stands, the Nooksack and Skagit river basins are two of the last watersheds in the Salish Sea that haven't been overtaken by urban development. Supporters of both fish and farms agree that pavement will be the end of us both. Although some continue to pit farms against fish as a water rights issue, the reality is clear: **if we want to protect fish, we need to preserve farms.**

Whatcom Family Farmers strongly believes that collaboration between stakeholders is the most effective way to ensure a future for both fish and farms. An aggressive, concerted effort is needed now to preserve a future for fish and farms. While some think a contentious legal process will solve the issues, we strongly believe the best way to solve this is through collaboration. By working together we will get much further than involving lawyers working against each other. This isn't a problem of competition for a natural resource. Instead, it is necessary to identify the threats to both farms and fish,

and propose a way forward that will unite common interests and maintain the health of our fish and our farms.

The decline of and threats to salmon

The decline of salmon in the Western United States, and particularly in Puget Sound, has been well-documented elsewhere, so it is not necessary to go into detail here. Suffice it to say, modern salmon runs are significantly lower than historical numbers, and the decreased numbers of salmon have compounding environmental, economic, and cultural effects. Both habitat loss and pollution associated with urbanization are at or at the top of the list of threats to the future of salmon. Here are some of the key issues facing our salmon today:

Puget Sound Salmon spend more time in estuaries and the Sound, less time in open ocean

Compared to Chinook populations in other parts of the Western US, Puget Sound Chinook spend significantly more time in semi-estuarine habitats strongly influenced by urban pollution.¹ Studies have found that the Puget Sound salmon are less likely to spend time in Alaskan waters than even salmon from Washington's west coast.² In fact, up to 30% of Puget Sound Chinook remain in the Puget Sound for the entirety of their marine rearing phase.¹

Estuary salmon are especially vulnerable to urban pollution

Especially for ocean-type salmon, estuary habitat is a high-impact factor for



Urban pollution represents the greatest habitat threat to salmon. Runoff from streets flows into streams carrying fecal coliform and a range of toxins harmful to fish. Farmland protects against this kind of pollution which is why preserving our farms is of critical importance to salmon and orca recovery.

survivability.³ Estuarine salmon are especially susceptible to physiological damage from toxic chemicals, and Chinook salmon in particular spend more time in estuaries than other species, making them more vulnerable.⁴ Since the vast majority of Chinook in the Nooksack River basin are ocean-type,^{5,6} this makes estuary health a primary concern. However, even for those Chinook which are stream-type, preventing urban development is beneficial - studies show that the biological integrity of stream ecosystems declines rapidly with an increase in the percent of urban land cover in a sub-basin.⁷

Puget Sound Salmon have high levels of contamination

Although levels of contaminants in salmon from urbanized watersheds have decreased in the last 25 years, a significant number still have toxic levels of polychlorinated-biphenyls (PCBs) and poly-aromatic hydrocarbons (PAHs).⁸ PCBs most commonly come from electronics and manufacturing, while PAHs are most commonly dispersed as non-point urban and suburban pollution from fossil fuel sources. Tests of Chinook salmon from Puget Sound found that approximately one third had levels of these contaminants high enough to have harmful effects, impacting marine survival.^{9,10}

Estuary exposure to toxins has a lasting impact on salmon

Contaminant levels found in salmon are within the range that suggests a long-term impact on their survival and productivity.⁴ In controlled tests, salmon exposed to PCBs and PAHs as juveniles have a weakened immune system, leading to double the mortality rates from exposure to some naturally occurring pathogens.¹¹ Even brief exposure to toxins during a stay in a contaminated estuary can lead to persistent immunosuppression, leading to survival rates 45% lower¹² due to susceptibility to disease even in the ocean stage of the salmon life cycle.¹¹

Impacts of urban pollution not limited to estuaries



Image of Upper Nooksack river by Lou Nicksic. The Nooksack river system is one of the least populated areas in the Puget Sound and offers significant opportunities for salmon recovery. It is also one of the last remaining viable farming areas in Puget Sound which has lost over 60% of farmland to urbanization.

Although urban impacts on a stream are present directly at the point of urbanization and also far downstream of it to the estuary,⁷ the impacts of urban pollution are not limited to streams and estuaries. Urban pollution eventually goes offshore and effects all salmon, even those from non-urbanized watersheds and estuaries, with a large percentage of persistent organic pollutant accumulation occurring in offshore habitats.⁹

Urban areas in Puget Sound have the highest levels of contaminants in salmon

That being said, the fact that much of the Puget lowlands are heavily urbanized means that water quality in the South Puget Sound is strongly influenced by urban runoff.² The Puget Sound, due to a

combination of geographic and anthropomorphic factors, maintains higher levels of pollution than other habitats.⁹ Generally speaking, fish from urban areas have higher levels of PAHs originating from combustible fuels.⁴ When comparing fish from across the Puget Sound, fish from more urbanized drainages have significantly higher levels of toxic contaminants.¹⁰ Fish from the Duwamish River, which goes through the heart of Seattle's industrial district, in particular have the highest levels of PCBs.⁴

The Nooksack basin has good estuary and a very low level of urbanization

In contrast, since 1986 the Nooksack basin has seen less habitat lost to urban development than nearly any other Puget Sound drainage.¹³ The existence of farmland

plays a hugely important role in the prevention of urban encroachment. The Nooksack estuary as well remains well-suited for salmon. Although the Lummi River portion of the Nooksack delta was lost for salmon habitat due to natural causes in the mid-1800s, the Nooksack River delta area remains undeveloped with good estuary habitat which has actually improved in the last number of decades.¹⁴ Additionally the Nooksack has one of the most connected and diverse delta complexes in all of the Puget Sound, providing better habitat for growing Chinook salmon than most area river systems.¹⁵ The result of this is that the lower Nooksack river habitats are not currently at capacity,¹⁶ unlike most of the rest of the Puget Sound where freshwater habitats tend to be the limiting factor for Chinook.¹⁷

Estuary contamination in Puget Sound has trickle-down effects on Southern Resident Killer Whales

The rates at which Puget Sound salmon are caught and consumed or otherwise die in the ocean average between 56% and 59%.² One of the reasons that Chinook salmon are regionally significant is the fact that they are the primary food source for Southern Resident killer whale populations, making up over 75% of their diet.¹⁸ Since this population of killer whales consumes more Chinook originating from heavily urbanized South Puget Sound, they are more at risk for contamination by toxic pollutants.¹⁹ Additionally, due to negative impacts to productivity resulting from exposure to urban contaminants, South Puget Sound Chinook salmon have lower lipid content than other Chinook, requiring Southern Resident killer whales to eat a greater number of them and increasing the degree of biomagnification of the contaminants.¹⁹

Predation on salmon by competing species has exploded

As the threats on salmon from development have multiplied so too have other threats. The decline in salmon has also coincided with an explosion in population from one of their primary predators, the harbor seal. Without question, the most significant challenge facing Chinook and therefore Southern Resident orca recovery is the huge impact of harbor seal predation in the Salish Sea. But this impact is highly localized to the Salish Sea. Studies have shown that harbor seals eat mostly chinook smolts and the



Image of encroachment of urban sprawl into farmland in Whatcom County by Lou Nicksic. Whatcom County has about 100,000 acres of farmland in active production but that land is continually under threat from urban expansion. Strong policy actions by state and local governments are needed to protect this farmland and the benefits it provides to salmon recovery. Sadly, instead of protecting this the state is moving toward legal action that will almost certainly lead to the conversion of this remaining farmland to urbanization. The damage to fish recovery may be permanent.

23 million smolts consumed in the Salish Sea alone constitute 83% of all chinook predation by harbor seals from northern California to Alaska.²⁰ While orcas are the largest predator of Chinook salmon, every other predator has an earlier opportunity to consume the prey. Harbor seals, whose population exploded following the 1972 Marine Mammal Protection Act, are the first ones to prey upon the smolts, preventing other predators further downstream from having access to the Chinook.²⁰

One reason for the explosion of harbor seals and sea lions in this area compared to other areas where killer whales roam is the fact that the Southern Residents do not prey on these mammals. Transient killer whales do prey on them helping keep the population under control. But these are infrequent visitors to the Salish Sea.

Decline of and threats to farms and local food production

The challenges faced by farmers in recent years have been as numerous and diverse as those faced by salmon. Chief among those are the increasing pressures from our expanding urban population. These challenges are lesser known than those facing salmon, but by threatening the future of farms they also threaten the future of salmon. Access to water is the primary issue of concern here, but it should be understood that market conditions, foreign competition, rising labor costs, environmental litigation, increasingly regulatory burdens and more all impact the future of our farms.

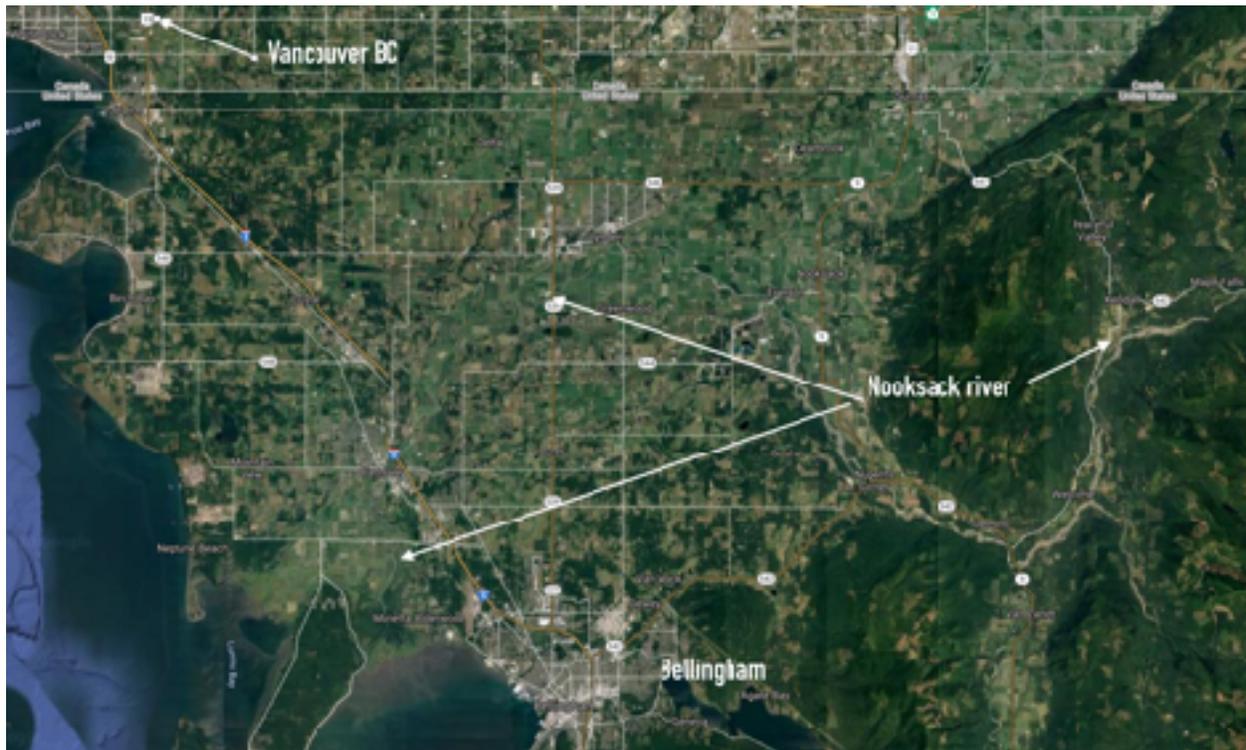
Here we focus on pressures to convert land to urban uses including uncertainty of access to water:

Farmland is being converted to pavement at an alarming and accelerating rate

Since 1950, 60% of farmland in the Puget Sound has been lost to development.²¹

Unfortunately this development is, in almost all cases, permanent, meaning that land will never be converted back to farmland.

From 2001 to 2016 over 50,100 acres of Washington's agricultural land were converted to urban and highly developed (UHD) land use and 47,800 acres of Washington's agricultural land were converted to low-density residential (LDR) land use. This conversion to LDR puts our farms in even greater peril, as farmland near LDR areas is 70 times more likely to be converted to UHD compared to other agricultural land.²² This is over three times the national average.



Whatcom County's 100,000 acres of farmland is remarkably productive. The area's 80 remaining dairy farms contribute to the state's second largest farm commodity, after apples. This region also provides 70% of the nation's production of frozen and processed raspberries and is one of the largest blueberry growing regions in the nation. More than economic benefits, these farms are crucial to fish protection and recovery and contribute to a mixed urban-rural life that is highly valued by those living in this area.

The best farmland is often what gets converted to urban land use

Often the best land for farming is also the easiest to convert. Of the 97,800 acres converted to urban or residential use between 2001 and 2016, 52,500 acres were considered prime farmland, and 29,900 acres were considered “Nationally Significant Farmland.” This further drains the availability of prime farmland to produce high quality crops, and depletes the ability of farms to grow food more efficiently. Across the nation these trends lead to some alarming statistics: 11 million acres of agricultural land were converted to UHD or LDR uses between 2001 and 2016. That’s equal to all the U.S. farmland devoted to fruit, nut, and vegetable production in 2017.²¹ Another way of looking at it is that during that time period nearly 2,000 acres a day were paved over, built up, and converted to uses that threaten the future of agriculture. This occurred despite the Great Recession, plummeting housing starts, and declining population growth.

Much of Whatcom and Skagit farmland would be subject to development if it loses access to legal water

According to the American Farmland Report, much of the land in Whatcom and Skagit counties is listed as Nationally Significant Farmland. The report notes: “This land is best suited to produce abundant yields of nutritious food with the least environmental impacts, even as weather conditions become more unpredictable. It lays a strong foundation for thriving agricultural economies and



Locally grown food is highly valued by today's consumers. The 2020 pandemic has highlighted the value of US and local food production. But too few are aware that our farmers are steadily losing ground to foreign producers. Over 50% of fresh fruit and 34% of fresh vegetables are grown outside our borders. This has significant food safety and health consequences as documented by the FDA and the CDC.

offers high potential for carbon sequestration.” Given the current threats and uncertainty for legal access to water for farms, the potential for developing farmland looms even greater for our farms in this region.

Food security is quickly turning from a strength into a weakness in our country and in the Pacific Northwest

Statistics show that 11.1 percent (14.3 million) of U.S. households were food insecure in 2018 and households with children had a substantially higher rate of food insecurity (13.9 percent) than those without.²³ Low-density residential development places farmland that produces fresh food especially at risk. Many of the farms in these areas are small farms with correspondingly low margins, making them more vulnerable to competition for land and foreign competition.²⁴ In fact, since the 1990s imports have risen by 12 to 34 percent for fruits and 10 to 34 percent for vegetables. The New York Times reported in 2018 that Americans now import over half of our fresh fruit and approaching half of our fresh vegetables.²⁵ These imported fruits and vegetables are much more likely to contain pesticide residues and food-borne illnesses.

Converting farmland to development accelerates global warming

Farmland produces far fewer greenhouse gas emissions than land converted to housing or commercial use. Due to multiple negative impacts, farmland that is converted to other uses emits greenhouse gases at a level 58-70 times greater than if it had remained in farming.²⁶ In addition farmland captures significant amounts of the carbon that accelerates climate change. Research from one county estimates that GHG emissions associated with urban landscapes are up to 70 times greater per acre than those from irrigated farmland when human emissions related to transportation, electricity, natural gas, and water are accounted for.²⁷

Climate change is creating new challenges for existing farms



Water is needed to irrigate crops and most of it is now taken from the massive underground reservoir known as the Sumas-Abbotsford aquifer. Farms converted existing rights to take water from streams and the river to groundwater rights to help protect the streamflows needed for fish. Farmers even led a project to use groundwater to enhance flows in the Bertrand creek during the low flow late summer. But policies, bad court decisions and outdated laws reduce opportunities to conserve more water and properly manage water for farms and fish. State action to litigate water rights would likely make this already bad situation far worse.

Current trends toward decreasing summer rainfall and increasing temperatures are creating challenges for farming as well as salmon. Climate change may increase water shortages in the Pacific Northwest because it is expected to accelerate snowmelt, which would increase spring flood risk and reduce summer water availability.²⁸ This adds to the difficulties for farms competing in a global economy.

Outdated water laws put further restrictions on irrigation for farms

Washington state water law is based on an extremely outdated legal structure created in the late 1800's and early 1900's. Farmers who used water before the state's water code was adopted were required to file "water right claims" representing pre-code water rights. While some filed these claims with the State, others did not or filed claims with

errors that cannot now be corrected. After the state adopted its water code, new water rights were issued until the 1980's, when Ecology began to limit new water rights for irrigation. But Ecology also issued water rights after (or "junior") to its instream flow rule adopted in 1985. At the time, Ecology said that the instream flow rule would not impact groundwater rights, only direct surface water withdrawals – but then a few years later changed its legal interpretation of its own regulation. Now, groundwater is also impacted by Ecology's rule: groundwater uses junior to the data of Ecology's 1985 rule could be curtailed if the flow level is not being met. These changes have significant impacts on water for farming.

In the 1980's and 90's, Ecology recognized many of the flaws in the water code, and how Ecology had implemented it over the years. Thus, Ecology asked farmers to at least apply for water rights that would be approved later in time. But again, Ecology's legal position changed over time and now these pending applications may not ever be approved. This contributed to a patchwork where some land has more than enough water rights, and other land has none.

In addition, state water law has a relinquishment requirement, commonly known as "use it or lose it." Long standing water rights can be lost if a farmer does not use within a specified period of time all the water they are allotted. This limits the ability of farmers to conserve water as using less risks losing all-important rights. As farming has changed and farms consolidate their land base many farms are finding they may have more than enough water rights on one piece of land and none on another piece, but no way



State leaders' intention to turn water access and rights questions to the courts would stop current cooperative processes and habitat and fish recovery projects in the Nooksack basin. A decade or more of legal wrangling and fees would divert money and attention from progress being made.

of transferring rights between land parcels. These are some of the reasons why water law in our state must be updated to protect fish and farms.

State action threatens the future of farming

Unfortunately, rather than helping to correct the imbalances of the past, Ecology is now threatening to impose a new and dangerous legal process called adjudication on all water users. This legal process would only look at current water rights holders and leave many without any recourse to obtain the legal water they need. Further, the outcome of the legal proceedings could leave all farmers, even those with now fully legal water rights, without certainty about access to water. Farmers deal with uncertainty in market conditions and weather. But if they are not certain of the water needed to protect and grow their crops, they will most likely not be willing to invest in the future of the farm. This uncertainty in an economically fragile community such as farming will undoubtedly only accelerate the path toward further urban development.

Partnerships that work toward a better future

With all of these dire observations about fish and our farms, one might wonder what our hope for the future is. Fortunately, there are numerous examples in Whatcom and Skagit counties where groups are working together for a brighter future. Here are some examples of what that looks like:

Conservation Reserve Enhancement Program (CREP)

This program helps salmon and farms by paying them competitive rents to plant riparian habitat alongside streams and ditches. In Skagit County the Skagit Conservation District reports that since 2000, over 45 miles of stream had been restored including 718 acres. In Whatcom County an astounding 231 miles and 3,887 acres have been planted in this same time frame. This includes plantings of well over one million

trees and shrubs along fish bearing streams, ditches and wetlands. The Washington State Conservation Commission oversees CREP and reports on progress improving habitat and helping restore salmon and other fish species.

Fir Island Habitat Restoration

Skagit farmers have participated in a number of other significant enhancement projects, including the [Fir Island restoration project](#). This involved removing a dike and restoring 131 acres of tidal marsh and channels in areas that used to be farmland. The expanded estuary habitat was designed to support an estimated 65,000 salmon smolts.

Voluntary Stewardship Program

Skagit County participates in the Voluntary Stewardship Program and farmers have played a key role in protecting, maintaining, enhancing and even creating new habitat for fish. Other measures such as stream buffers help protect water and limit harmful increases in summer water temperatures.

Fish-friendly floodgates

Two long time floodgates in farm areas that were fish barriers were recently removed in the Nooksack river, leading to win/win scenarios for both fish and farms. Salmon habitat was restored, and drainage for farmland was improved. For more information on what that this looks like see the story about one of these floodgates, which includes a visit from Governor Inslee, at <https://www.farmersforreal.org/news/new-floodgates-installed-on-whatcom-county-farms-protect-fish-and-farmland>

Portage Bay Partnership

Increasing levels of fecal coliform bacteria led to the closure of the Portage Bay to harvesting shellfish in 2014 during the critical spring and fall shellfish harvesting seasons. As previous closures had pointed to farms as a primary cause of water contamination leading to closures, lawyers were summoned and it looked as if the issue would be addressed in a long, expensive court battle. But, Lummi Nation leaders chose to engage with farmers to help look for solutions instead of taking the legal option. Out of this challenge the Portage Bay Partnership was born between farmers and the Lummi Nation.



The 2017 Portage Bay Partnership between Whatcom farmers and the Lummi Nation contributed to the re-opening of the Lummi shellfish beds less than two years later. Cooperation averted expensive litigation and demonstrated to the state and community that partnerships like this are far more effective than litigation in resolving resource challenges. The state's actions would put a halt to the current cooperative and collaborative activities involving all stakeholders in Whatcom County and replace these negotiations with a very expensive legal process that would take decades and millions of dollars to resolve.

Rigorous testing over the next few years showed that the contamination was a result of a variety of sources within the local community, not just farms. Farmers worked at improving farm operations and local governments pitched in to address stormwater runoff, septic system contributions and others. Contamination coming across the border from Canada proved to also contribute and the Partnership helped bring attention to this with resulting reduction in this cross-border contamination. The results have led to the re-opening of the shellfish beds in 2017 in the spring season. Collaborative projects such as this are what lead to positive results that help the entire community.

Summary: A Call to Action

Food security, fish recovery, preserving an invaluable food and family legacy: these are the reasons why Washingtonians of all political views need to come together.

Fish require extensive, protected habitat and cool, clean water. Farms help provide that and viable farms can withstand pressure to convert the land to urban uses. But our farmland is disappearing at an alarming rate, driven by multiple pressures on farmers. They need our community support. Likewise, it was only a short two years ago when the sight of a mother orca carrying its dead baby for days reminded us of the severe threats to the orca's primary food source—salmon. These two iconic pieces of the Pacific Northwest can still be saved, but time is growing short.

The data shows that farms provide an effective barrier from the habitat loss and fish-killing pollution associated with urban encroachment into farming areas. Healthy partnerships and collaborative efforts to support both our fish and our farms are possible. We have shown how previous efforts such as CREP and the Portage Bay Partnership offer solutions, but more needs to be done. Legal battles over who has legal access to water isn't going to solve any of our issues. Previous attempts to do so in the Yakima Basin led to a contentious process that took 40 years to resolve. Our farms and fish don't have that long.

Environmental experts agree cooperative processes are needed. Philip Roni and Tim Beechie wrote the following in their 2013 book *Stream and Watershed Restoration: A Guide to Restoring Riverine Processes and Habitats*:

*Our purpose in [writing their book] is to help guide river and watershed restoration efforts toward actions that will have long-lasting positive effects ... and to ensure that when habitat improvement is undertaken, the site potential and watershed processes are considered. **We also emphasize the importance of recognizing socio-economic and political***

considerations involving landowners and other stakeholders, permit and land-use issues, and education and outreach to the general public to build support for restoration. Failure to consider these factors and involve stakeholders early on can prevent even the most worthwhile and feasible projects from being implemented.

Farmers are strong supporters of the environment and have demonstrated that support particularly in the last two decades as they have willingly participated in numerous efforts to improve habitat and restore salmon returns. Habitat is an essential element of healthy salmon runs. Other issues, such as exceptional levels of predation in the Salish Sea, must also be addressed. But we cannot hope to protect a future for fish if we don't protect a future for our farms. Both fish and farms are going to need the support of our community if they are to survive.

How does this happen? Our communities need to come together and provide support. Contentious legal processes such as adjudication will likely prove to be the tipping point in loss of farms and the resulting harm to salmon recovery. There is hope, and it is found in the collaborative, cooperative processes that our region's history has shown to be far preferable than court-enforced alternatives.

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