Trout Unlimited
Wild Steelheaders United

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Dear Mr. Dixon,

Please accept the comments below on behalf of more than 4500 Trout Unlimited (TU) members in Washington State, 300,000 TU supporters nationwide and over 7,000 Wild Steelheaders United supporters. We appreciate the opportunity to comment on the Proposed Evaluation and Pending Determination (PEPD) of the Skagit River Steelhead Fishery Resource Management Plan (RMP). As required by the 4(d) Rule developed pursuant to the Endangered Species Act (ESA), NOAA has an obligation to evaluate whether the RMP meets the criteria under Limit 6 of the 4(d) Rule and whether implementation of the RMP will appreciably reduce the likelihood of survival and recovery of ESA-listed Puget Sound steelhead and Puget Sound Chinook salmon.

As set forth in the PEPD, NOAA's preliminary determination is that the RMP would not appreciably reduce the likelihood of survival and recovery of ESA-listed Puget Sound steelhead and salmon. TU believes that this preliminary determination is not substantiated by the analysis in the PEPD. Simple restatement of information found in the RMP is insufficient to meet legal requirements; rather, NOAA must analyze the sufficiency of the RMP 's standards and actions to ensure their consistency with ESA. Accordingly, we urge NOAA to remedy, through the required ESA Section 7 consultation, the RMP's shortcomings so that a final determination approving the fishery is well substantiated.

TU members are eager to return to the water and have an opportunity to fish for the Skagit's magnificent wild steelhead, but we want to do so in a well-structured and regulated fishery that is sustainable and does not undermine continuing efforts to increase the abundance, diversity, productivity and spatial distribution of wild steelhead in the Skagit Basin. We offer our comments with this goal in mind.

We feel the RMP and PEPD fall short in several areas. There are many assumptions used to justify that the RMP will not "appreciably reduce" the likelihood of recovery, which are not based on the most current science. Further, the RMP does not provide any analysis establishing that the proposed biological reference targets are adequate to avoid appreciably reducing the likelihood of recovering Skagit wild steelhead. Additionally, the RMP and PEPD do not adequately address risks inherent in pre-season run forecasts, fishing activities and other areas which could jeopardize recovery of Skagit wild steelhead. Lastly, while the RMP and PEPD do recognize the importance of conserving and rebuilding life history diversity within the Skagit steelhead management unit (SMU), they fall short in providing meaningful protections which would promote life history diversity and contribute toward recovery goals. We have provided detailed comments regarding these topics below and ask that NOAA include this information in their final determination.

NOAA's preliminary determination that the RMP will not "appreciably reduce" the likelihood of recovery is based on an acceptance of unsubstantiated assertions in the RMP and not on independent analysis applying the best available science.

The ESA requires that proposed actions, such as the Skagit steelhead fishery, not "appreciably reduce" the likelihood of survival and recovery of the listed species. Survival and recovery are vastly different. Survival refers to preventing a species from going extinct, while recovery refers to the point at which the species no longer needs the protections of the ESA. This recovery threshold is referred to as "viability". It has been determined, through a process that included the co-managers, that wild Skagit steelhead will reach the viability threshold when there are 44,619 steelhead returning to the basin -- more than five times the recent average annual run size of 7,000 to 9,000 fish. Given this substantial gap, we clearly should be erring on the side of caution when structuring the Skagit fishery.

The PEPD notes that the co-managers assert in the RMP that "substantial improvements in habitat capacity and productivity would be needed before the Skagit steelhead populations can approach [the viability threshold]. (p. 13). Building off this assumption, the co-managers propose in the RMP that "harvest management objectives should be based on the quantitative evaluation of current population productivity as defined by current habitat function and capacity." (p. 13), and then propose two interim measures to use to determine whether the likelihood of reaching viability would be appreciably reduced.

Given the importance of Skagit wild steelhead to the overall DPS and the vast gap between the current population size and the viability goal, we are surprised the PEPD simply accepts the co-managers assertion without analysis. Below we highlight two ways that populations of fish can increase their capacity without concurrent changes in freshwater habitat, and provide suggestions for how to incorporate those factors into the final PEPD.

First, the status and productivity of the population in the RMP is evaluated quantitatively via stock-recruit models (i.e., Ricker and Beverton-Holt results on pp. 13-17). Such models are commonly used to evaluate population productivity and identify inflection points that signify effects of density dependence on productivity, and in turn, to establish biological reference points in population size that would maximize long-term yield under current habitat conditions (p. 13). The co-managers apparently interpret those results as strong evidence that Skagit wild steelhead are at capacity.

We appreciate that the model results indicate the presence of negative density dependence at particular population levels, but, contrary to the assertion in the RMP, that does not indicate the population is fully utilizing the current habitat capacity in the Skagit Basin. For example, studies on Chinook salmon in the Snake River revealed strong negative density dependence even when populations were at low abundances in relatively pristine habitat. (Achord et al. 2003; Walters et al. 2013). Similarly, Atlas et al. (2015) found negative density dependence strengthened as abundance of steelhead declined to critically low levels due to poor marine survival, not declines in habitat quality.

Common amongst the studies was that the spawning distribution, and hence, distribution of offspring, contracted as the populations declined in size. Negative density dependence continued to occur, even when large amounts of suitable habitat was unoccupied, because competition occurs at local scales, such as the habitat unit or stream reach (Einum and Nislow 2005). On the other hand, stock-recruit models necessarily aggregate the effects of density dependence at the scale of an entire watershed, largely because local-scale data on juvenile density and distribution is not available (Finstad et al. 2013). As a result, evidence of density dependence does not necessarily mean the population is meeting or exceeding the potential for the habitats to support larger population sizes. The density dependence signals may well reflect the loss of diversity and spatial distribution in the population, parameters that are directly affected by harvest. Thus, the proposed Skagit fishery, if not sufficiently conservative, could limit the potential for wild steelhead to expand into under-seeded or unused habitats and thus appreciably reduce the likelihood of recovery. (Atlas et al. 2015).

Although reach-scale data on density dependence is not available for Skagit steelhead, there is a long-term data set on the spatial distribution of redds. As mentioned earlier, spatial clustering of redds is one of the key factors that could contribute to negative density dependent signals even when populations are at low levels (e.g., Walters et al. 2013). One way to expand the spatial distribution is to increase the number of spawning fish (Isaak and Thurow 2006; Walters et al. 2013; Flitcroft et al. 2014), with competition for patches of habitat presumably forcing fish into lesser used or unoccupied habitats. Skagit steelhead are not at critically low levels, but they are greatly reduced from their historical abundance (Gayeski et al. 2011) and the proposed RMP harvest strategy would reduce the largest run sizes of adults by 20% - 25%. Given the importance of additional spawners to increasing spatial distribution and maximizing the capacity of the habitat, NOAA should evaluate the effect of spawner distribution on the stock-recruit models, and whether the proposed harvest levels should be reduced from those proposed in the RMP in order to ensure that there is no appreciable reduction in the likelihood of reaching the viability threshold.

Second, there is no consideration of the importance of life history diversity, including spawn timing, and its potential effects on density dependence. There is often tremendous competition for resources very early in life after emergence, when smaller fish are weak swimmers and have difficulty dispersing from the vicinity of the redd, which can lead to strong negative density dependence (Einum et al. 2008). While expansion of spatial distribution to unused habitats can reduce local-scale density dependence, so can fine-scale differences in spawn timing and emergence. For example, Gharrett et al. (2013) found that a small stream contained two genetically distinct populations of pink salmon, one that entered earlier than the other and the two runs spawned about 2-4 weeks apart. The temporal difference in spawning reduced interactions and competition amongst offspring from the two groups because the earlier-emerging group developed more quickly, which enabled a density dependent population to pack more spawners into limited habitat and enhance its fitness (Gharrett et al. 2013).

These results support the hypothesis that truncation of spawn timing, much like truncation of spatial distribution, can influence whether salmonids are fully utilizing habitat capacity. While redd surveys in the Skagit do not necessarily cover the entire spawning period, there is a lengthy record for the times when surveys are conducted. That data provides an opportunity for NOAA to evaluate, during the required ESA consultation, whether the RMP adequately accounts for life history diversity and, if not, identify specific actions that would foster the expression of life history diversity and include them in a "reasonable and prudent alternative".

The RMP is devoid of analysis establishing that the proposed biological reference targets are adequate to avoid appreciably reducing the likelihood of recovering Skagit wild steelhead.

The RMP proposes two biological reference targets, R_{MSY} and $R_{60,}$ purportedly to enable as adequate to meet the "recovery prong" of the ESA jeopardy standard. (p.13) R_{MSY} (2,127-3,912 fish) is purported to be a rebuilding threshold equal to the spawner levels that would maximize long-term yield under current habitat conditions. R_{60} (4,844-5,370 fish) is defined as the rebuilding threshold equal to 60% of the point on the spawner recruit function where less than one recruit is produced per spawner. The definitions imply that the goals facilitate "rebuilding" of the population, but both targets are dramatically lower than the viability goal of 44,619 fish and even fall below the interim escapement floor of 6,000 fish.

Nonetheless, the co-managers assert in the RMP that the targets will be used to "track progress of the Skagit steelhead populations to ensure that habitat productivity and capacity are examined on a regular basis and that sufficient spawners are available to recolonize underutilized habitat so as to not appreciably reduce the Skagit SMU's ability to reach viable function." (p. 13) Completely missing from the RMP and PEPD is an analysis demonstrating how these targets actually assure that the Skagit Management Unit's ability to reach viability would not be appreciably reduced by the proposed harvest. Prior to issuing a final determination approving the RMP, NOAA must independently analyze and determine that the RMP's interim rebuilding targets would not appreciably reduce the likelihood of achieving recovery (viability), or, alternatively, require more conservative interim targets that will not impede progress toward recovery.

In addition to the problematic targets themselves, the RMP is silent with respect to how the co-managers will determine future increases in habitat capacity that warrant higher escapement targets. The fact is that, today, the co-managers lack sufficient information to conclude that wild steelhead productivity is currently habitat constrained; as discussed above, spatial clustering and loss of population diversity are likely also constraining abundance and productivity. Given the relative lack of data on juvenile steelhead and that redd counts do not cover many of the under-used or unused habitats, it is unclear how the co-managers did or will conduct such surveys and analyses to determine if fish are indeed spawning in those places. In fact, for this to happen we would need to see a comparison of the number of spawners, the spatial distribution of those fish, measures of habitat quality, and subsequent models that compare the productivity of the populations before and after. Such monitoring is fundamental to adaptively managing salmonids, yet there is no mention of the topic in the list of performance indicators (pp. 21-22). Range of spawn timing is listed, but there is nothing about spatial distribution and a sample design that accounts for used v. unused v. underutilized habitat. This deficiency needs to be remedied through NOAA's consultation process.

NOAA must analyze the accuracy of the methods the co-managers propose to use to make pre-season estimates of run size, quantify the uncertainty around the estimates, and determine the sufficiency of the RMP's proposed harvest targets in light of that information.

Pre-season run-size forecasts determine allowable harvest in any given year, yet they are one of the weakest links in the harvest management chain. Pre-season run-size forecasts of steelhead and salmon are notoriously inaccurate and fraught with uncertainty, which is why forecasting models need to be regularly evaluated and updated (Haeseker et al. 2008; Peterman et al. 2016). Not surprisingly, the PEPD acknowledges this point and indicates co-managers will be evaluating their pre-season run forecasts during the fishery (p. 7).

Unfortunately, neither the RMP nor PEPD address the accuracy of the co-managers' pre-season forecast methods and the uncertainty around those estimates. This is a critical omission because the co-managers' ability to adequately constrain harvest depends on having accurate estimates with well-defined bounds of uncertainty (ISAB 2005). There is seemingly ample data to draw from in the Skagit regarding the accuracy of past pre-season run-size forecasts. NOAA should use that data to evaluate the accuracy of co-managers' pre-season run-size estimate methodology and the level of uncertainty in the forecasts. For example, NOAA should evaluate the RMP's proposed harvest rates in light of the recent ten-year pre-season Skagit run-size forecasts to determine how many of the years the forecasts would have resulted in over-harvest, or opening a fishery when it should be closed. Prior to making a final determination approving the fishery, NOAA must conduct this essential analysis and adjust harvest rates as necessary to ensure that the fishery does not appreciably reduce the likelihood of survival and recovery of the Skagit SMU.

<u>The RMP and PEPD acknowledge the importance of conserving population diversity, including early returning winter steelhead, summer steelhead and kelts, but the RMP's provisions to protect sensitive life histories are inadequate or absent altogether.</u>

Rebuilding and sustaining diverse life histories will contribute to the overall productivity of the population which will serve two important functions. First, it will increase the resiliency of the wild steelhead population to environmental factors such as poor freshwater and marine survival and a changing climate, thereby increasing the likelihood of the population and DPS meeting recovery goals. Second, it will increase the abundance of the wild population which, given the abundance-based tiered harvest management strategy, will provide more consistent and lengthy fishing seasons.

Historically a significant proportion of the Skagit's wild steelhead population made entry into the river in December and January with spawning documented beginning in early February, a month prior to the current start of Skagit spawning surveys in early March (Pflug et. al. 2013). These early fish represent the most depleted portion of the run as a result of past hatchery and fishery management practices. The two most likely sources of depletion being interactions with early returning hatchery fish on the spawning grounds (Pflug et. al. 2013) and high harvest rates directed at early timed, unmarked hatchery origin fish in a mixed stock fishery (WDFW catch record card data). Run timing is a component of diversity and contributes to the resiliency of the wild population, and harvest can exert strong selective pressures on the timing of return and spawning, in turn influencing productivity (Tillotson 2017). The RMP acknowledges the importance of these fish and the need to conserve them, yet does not include adequate provisions to protect them. For example, the RMP proposes to allow harvest gill net fisheries beginning in December in the vicinity of Nookachamps Creek which the RMP identifies as a population of concern. Furthermore, early returning and spawning wild winter steelhead have been documented in numerous lower river tributaries and the mainstem beginning in December. Opening harvest fisheries during this time is not consistent with protecting or recovering this life history.

The RMP does not contain adequate measures to protect and rebuild early returning steelhead. The RMP would permit a treaty harvest fishery starting in December and last through the bulk of the return window. The RMP asserts, and the PEPD repeats the assertion without analysis, that this action is protective of the early returning fish because "treaty fisheries would not target early returns but rather be implemented to access steelhead across the entire adult winter steelhead return period." (PEPD, pg. 18). The fact that the treaty fishery is not going to target just the early returning fish provides no assurance that the fishery will protect early returning fish. This logic is particularly odd given that the

RMP would not open the sport fishery – which is going to be catch-and-release -- until February 1st and only upstream of the Dalles bridge, in order to protect early returning fish. We believe both fisheries should open after February 1 to rebuild the depleted early returning component of the population.

Similarly, the RMP simply states that tribal fisheries will be conducted so as not to target summer steelhead and kelts but provides no specific prescriptions for how that might occur, and this is a significant omission. There is evidence to indicate that summer steelhead are a genetically distinct subpopulation which cannot quickly be generated from sympatric winter steelhead populations (Prince et. al. 2017). Summer steelhead were historically present in numerous tributaries throughout the Skagit Basin and have a return timing similar to Chinook salmon and late returning winter steelhead, of which the Skagit has many. The distribution of summer steelhead throughout the Skagit River and their potential long residency in the mainstem make them uniquely susceptible to harvest fisheries targeting other species. While there is little known about Skagit summer steelhead, they clearly are not abundant so even small amounts of harvest could have significant negative impacts to this unique population segment. NOAA should identify specific actions that would reduce the likelihood of encountering wild summer steelhead in harvest fisheries. This could include restrictions on netting in areas where encounters with summer run steelhead are likely, i.e. tributary mouths, implementing net size restrictions that would target larger salmon or switch to selective fishing methods so that non-target fish could be released alive.

The RMP does not contain specific actions to ensure that sport fishing encounter rates are low enough to avoid appreciably reducing the likelihood of survival and recovery of wild Skagit River steelhead.

Anglers are better than ever at catching steelhead and it is reasonable to assume that catch rates on the Skagit will be similar to other popular steelhead fisheries in Washington. Anglers were estimated to have caught 4,580 wild steelhead in the Hoh River in the 2014-2015 winter season. The escapement estimate for 2015 was 3171 meaning that anglers encountered 144% of the escapement, or that each fish was caught on average 1.4 times, and this is an underestimate (Bentley 2016). The vast majority of fish were encountered in a three-month time period, the same length as the proposed bounds for the Skagit sport fishery.

We modeled a variety of encounter rates at different escapement sizes to see how often anglers could be expected to catch enough fish to hit the maximum exploitation rates (fig 1). At a moderate catch rate estimation of 140% of escapement, again this was noted to be an underestimate in the Hoh River, impact limits would be reached annually under the proposed harvest schedule when escapements are below 8,000. Above escapements of 8,000 the fishery would remain open annually at the same encounter rate, but barely. At a slightly higher encounter rate of 150% of an 8,000 fish escapement, the fishery would reach its impact limit annually. When we examine WDFW's data for Skagit wild steelhead we see that escapements over 8,000 fish have been relatively uncommon since 1978, only having been reached a few times during the 1980's and the recent population surge over the past few years (fig 2). Rather the most common escapement values have fallen within the 4,000 – 8,000 fish range.

Hitting impact rates on an annual basis is not good for several reasons. First, the fishery will close early if impact rates are reached which is not consistent with fishery goals. Second, it maximizes our impact on the wild steelhead population on an annual basis and increases risk. There is significant error in run-size forecasting and when that is considered with the proposed tiered impact rates it creates a situation where run sizes will be over forecasted and subject to a much higher impact rate than they should be based on their actual run size. For example, with the RMP's proposed impact rates a run forecast of 6500 fish would be allowed a total impact of 20%, or 1300 fish. If that run only came in at 5500 the impact of 1300 fish would be used even though it should only have an impact rate of 10%, or 550 fish. This creates a situation where the run could be significantly overfished.

Regulations have been used successfully in many Pacific Coast steelhead fisheries to reduce encounter rates on wild steelhead thereby minimizing fishery impacts. The types of regulations that should be considered include: (1) no power boats; (2) no fishing from boats; (3) time and/or area closures; (4) limited guided angler days; and (4) gear restrictions. NOAA should work with WDFW to identify specific measures to ensure that encounters are appropriately limited.

Conclusion

Fishing for winter steelhead on the Skagit River is rich in tradition and an opportunity cherished by steelhead anglers, including many TU members. The loss of the fishery since 2010 has been sorely felt and disheartening. Today, because of the recent rebound in the Skagit's wild steelhead population, we have a very rare opportunity to reestablish both a tribal and sport fishery targeting wild steelhead.

This opportunity should be seized by the co-managers and NOAA by using the best available science and fresh thinking to develop a sustainable fishery that could be a model for other wild steelhead rivers up and down the coast. This is not the time to reestablish a Skagit steelhead fishery that looks like steelhead fisheries of the past. Our experience in Puget Sound is that the proposed approach will neither allow for the recovery of wild steelhead nor provide sustainable fishing opportunity.

While we applaud the co-managers efforts to develop the RMP, the RMP looks too much like fisheries of the past in several critical respects and needs to be improved before it meets ESA requirements and receives final approval from NOAA. The major shortcomings in the proposed plan are discussed above. Fortunately, NOAA has the opportunity, through the mandatory consultation process required by Section 7 of the ESA, to remedy those shortcomings. Specifically, NOAA, in consultation with the co-managers, should develop a "reasonable and prudent alternative" that contains additional measures necessary to have both a tribal and sport fishery that do not jeopardize the recovery of the Skagit SMU and provide sustainable fisheries.

We look forward to working with the co-managers and NOAA to achieve that outcome. Thank you for considering our comments.

Sincerely,

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Washington Council of Trout Unlimited

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Figures

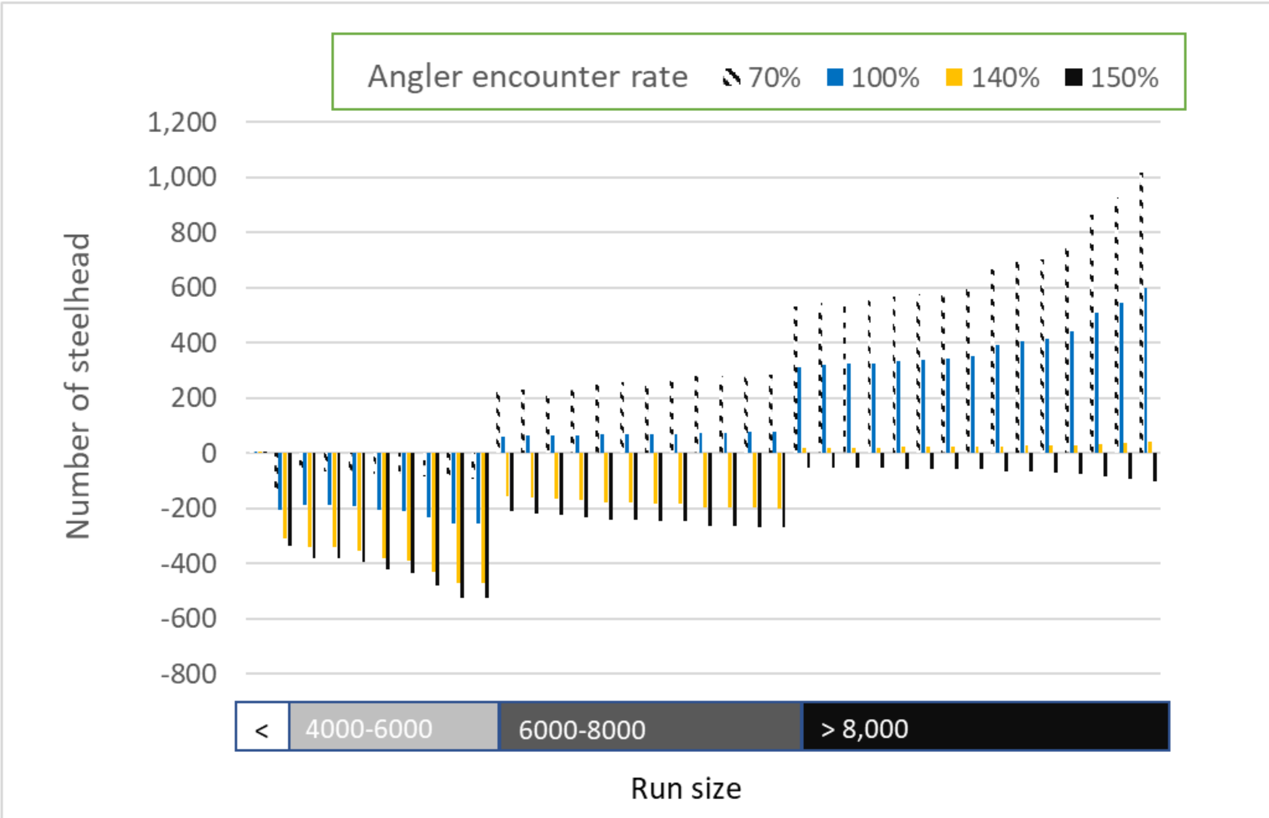

Figure 1. Zero represents the maximum allowable impact rate at the harvest schedule proposed in the RMP. Negative values indicate fishing seasons where impact rates would be exceeded during a sport fishery and positive values indicate years in which impacts would still be available at the end of the season.

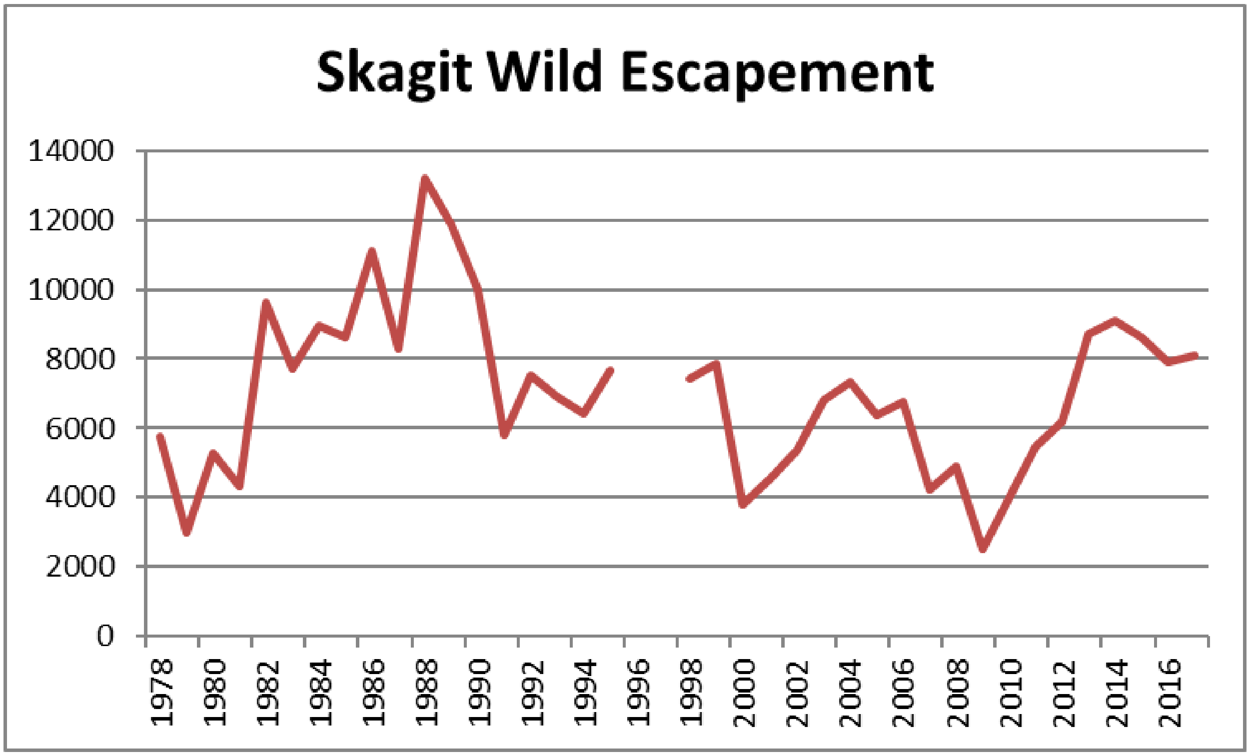

Figure 2. Skagit Wild Steelhead escapement. Source WDFW Score online database, accessed Jan 5th, 2018.

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