

Kit Rawson and George Pess comments

- p. 7 Juvenile Chinook salmon rear throughout the river system. (What's the basis for this statement?)

Response: Revised to incorporate description of stream-type and ocean-type Chinook rearing locations from Stillaguamish Tribe.

- p. 7 Approximately 91-96% of Stillaguamish Chinook salmon smolts reside in freshwater habitat for less than one year and outmigrate as ocean-type, while the remaining 4-9% are streamtype that rear for one year in freshwater before outmigration (Griffith et al.2003). (This is from smolt trap?? What about different catchabilities of stream vs. ocean type?)

Response: Revised to 98-99% for ocean-type, 1-2% for stream-type according to smolt trap data from the Stillaguamish Tribe.

- p. 7 The majority (80%) of the North Fork Chinook salmon spawn in the middle and upper sections of the North Fork Stillaguamish, with limited numbers of fish using the larger tributaries Boulder, Squire, Deer, and French Creeks) for spawning. (What's this based on?)

Response: Added reference to Stillaguamish Tribe and WDFW unpublished spawner survey data.

- p. 7 North Fork Chinook salmon females typically lay 3,000 to 5,000 eggs in one or more nests (redds). (Is this and the rest of the paragraph general Chinook salmon life history or is it NF Stillaguamish specific? Either way the source should be cited.)

Response: Added reference to Stillaguamish Tribe unpublished broodstock records.

- p. 7 Sources for South Fork run timing information need to be documented where possible.

Response: Cited Chinook Technical Assessment (STAG 2000)

- p. 13 Historic estimates of Stillaguamish Chinook salmon abundance may well have exceeded 40,000 fish based on the capacity of the system estimated by habitat

modeling. (This number is, I believe, based on a WDF analysis from the 1960s that is briefly described in the STAG report, p. 21-22. Should also cite NWFSC spawner capacity analyses here as well as EDT historical conditions results.)

Response: Revised text to incorporate historical estimates of 25,000 North Fork Chinook and 21,000 South Fork Chinook (Mobrand Biometrics 2004).

- p. 13 Habitat modeling suggests that current populations are at about 8% of historical levels (Mobrand Biometrics 2004). (What does 8% mean. This should be expressed in terms of reference points on a spawner-recruit curve if it's based on EDT.)

Response: Revised to 7% based on EDT modeling (current/historic estimates).

- p. 13 Combined North and South Fork population adult escapement (fish that survive and return to their watershed of origin) is currently 1600-1700 fish (STAG 2000). (I couldn't easily find these numbers in the STAG report. I believe, however, that these are total escapement and not just NOR. See Appendix A to these notes for what I have for NF and SF Stillaguamish escapement numbers. Recent 8-yr. Average is 1,326 total, 936 NOR).

Response: Revised to include 96-03 average from A&P tables.

- p. 15 On average, 60 to 85% of the Chinook salmon production for the watershed is believed to be North Fork Chinook salmon (PFMC 1997). (Recent years 81% of escapement is NF, see these notes Appendix A.)

Response: Text revised to include updated data from A&P tables.

- p. 15 The escapement goal of 2,000 fish for the watershed has not been met since 1976. (Fig. 3 shows that 2000 has only been met twice since 1965. Need to see original WDF report (Ames and Phinney 1977) for the basis for the 2000 goal. Clearly either the system has not been able to produce that many fish for years or escapements have been seriously underestimated.)

Response: Revised text to include Ames and Phinney 1977 reference.

- p. 15 In addition, escapements since 1993 have not shown significant improvement, especially when the escapement of naturally produced fish is examined independently. (Fig. 3 seems to show continued increase. NOR information is not presented here, but it is available in A&P tables.)

Response: Revised text to "limited improvement, likely in response to significant reductions in harvest".

- p. 16 South Fork Chinook salmon can be found in Jim Creek, Pilchuck Creek, and the lower portion of the South Fork Stillaguamish. South Fork Chinook salmon are also infrequently found in Canyon Creek. (Is this spawners or all life stages? How do we know this information?)

Response: Original text moved to page 7 and revised.

- p. 16 Hatchery releases- South Fork: There should be a table showing releases into the South Fork area with stock origin. Most of this information is already in Appendix A of STAG-2000).

Response: Text revised for clarification.

- p. 18 Habitat requirements: This is useful for general freshwater habitat requirements of Chinook salmon. It doesn't discuss nearshore and estuary habitat, though.

Response: Text revised to include estuary/nearshore habitat

- p. 24 Relationship of agricultural practices to salmon decline is not as well developed as the forestry discussion.

Response: Section revised/expanded with additional discussion on agricultural impacts.

- p. 24 Currently, Snohomish County has a human population of nearly 637,500 and is growing at an annual rate of 2.7%. (Is it possible to get the population for just the Stillaguamish watershed? Also, see Appendix B.)

Response: Stillaguamish population data provided by Snohomish County Planning and Development Services.

- p. 24 Continued population growth will place increasing pressure on hydrologic function, water quality and habitat quality through the residential development of forest and agricultural lands. (Does this mean that this plan will call for no more growth in the human population? If the plan envisions allowing for human population growth in a way that reduces or eliminates these impacts, then this statement should be removed.)

Response: This Plan does not recommend slowing population growth in the watershed. This paragraph describes the range of potential impacts from human population growth. Protection strategies to address/limit these impacts are addressed in Chapter 6.

- p. 25 A common objective of this regulatory framework is to protect freshwater habitat and water quality, which is intended to help salmon populations recover to sustainable and harvestable levels. (I thought that water quality regulations were designed with human health objectives in mind, as opposed to fish recovery objectives. The difference is important in my opinion. Since environmental regulations have been in place in the US human lifespan and health have improved but fish populations have not.)

Response: Relevant water quality regulations are described, including Clean Water Act and state water quality standards.

- p. 28 Habitat Limiting Factors: Spawning habitat is limited for Chinook in the Stillaguamish due to poor gravel stability and high fine sediment levels resulting from extensive landsliding and flooding in the watershed. Reference?

Response: Limited numbers of Chinook are observed spawning below major landslides in the basin (Gold Basin on SF and Steelhead Haven on the NF), presumably due to the impacts of fine sediment on these potential spawning areas (WDFW aerial spawner surveys, Stillaguamish Tribe unpublished data). While anecdotal evidence points to fine sediment limiting Chinook spawning habitat in the Stillaguamish, a study is underway that will investigate the impacts of fine sediment on Chinook habitat in the basin.

- p. 31 Chinook salmon fingerlings generally enter the estuary in the late winter or early spring and may reside in this environment until early fall. (Is this

Stillaguamish-specific information or general Chinook lore. Need a source.)

Response: Replaced with more specific text with references to Healy 1991 (general Chinook salmon info) and Beamer et al. 2003 (Skagit watershed).

- p. 33 Provide a reference for high water temperature in the estuary (Pess)

Response: Estuary/nearshore section text revised

- p. 34 Ramps and groins have a negative effect on sediment transport, (I'm not sure I know what a "negative effect on sediment transport" is. Concrete boat launching ramps and other hard structures that extend into the beach certainly block natural sediment transport process, which affects nearshore habitat to some distance away from the actual structure.

Response: Estuary/nearshore section text revised

- p. 39 Landslides - historical conditions. What I was looking for here was an assessment of what the landslide picture was like without human disturbance rather than how much is happening now due to human disturbance.

Response: Referenced Perkins and Collins 1997.

- p. 39 Landslides - factors for decline. Again a factor for decline in the VSP of the fish population would be something that has changed from the historical to the current period. So I'm a little confused as to why bank erosion is a factor for decline, when it seems that unconstrained floodplains would have more bank erosion than riprapped banks would. Also, formally, it is the increase in sediment load under the current condition of both natural and anthropogenic landslides as compared with the historic condition of natural landslides only, that could be a factor for decline. I'd like more information on what is known about the difference between historic and current sediment load, if possible.

Response: Referenced Perkins and Collins 1997.

p. 45-46 Water quality - There is research documenting non-lethal, but highly detrimental, effects on fish of chemical contamination of water. These issues are likely significant in the Stillaguamish and are important to highlight because water quality standards deal either with human health or direct fish mortality, but not with declines in fish abundance and productivity. I think water quality may be a very important factor in this basin, but that doesn't come out in this section.

Response: Section revised to include results of Snohomish County and Stillaguamish Tribe water quality monitoring.

p. 46-50 Harvest Management - This section should also discuss that reduced harvest rates apparently have coincided with reduced productivity so that escapements have remained fairly constant.

Response: Relationship between reduced exploitation rates and resulting increases in escapements described on p. 49, last paragraph.

p. 51 The current tribal natural stock restoration program contributes an estimated one-third of the returning adults to the spawning habitat within the North Fork of the Stillaguamish River. (Is this consistent with A&P Tables. The NOR and hatchery origin natural escapement data should be in this plan somewhere as a reference.)

Response: Consistent with A&P tables (included as an appendix)

p. 51 The potential hazards from hatchery production are listed accurately. However, the risks from many of these has been reduced in the hatchery and harvest management plans.

Response: Paragraph revised with additional references.

p. 59 Properly functioning conditions (PFC) have been modeled by EDT for the Stillaguamish watershed. These results are shown in chapter 5. The estimated Chinook salmon populations levels associated with PFC are robust and generally achieve the Shared Strategy population target levels. (This answers the question of what will it take to achieve the planning

targets, at least in terms of habitat conditions, but not actions.)

Response: Added sentence describing relationship between 10-year habitat restoration actions and additional 11-50 year actions to achieving PFC and population targets.

- p. 63 Integration: The plan shall address water quality and salmon recovery issues in an integrated manner, consistent with the intent of the 1990 Watershed Action Plan and the origins of the SIRC. (It would be good to mention the water quality related origin of the SIRC in the beginning of the document.)

Response: Origin of SIRC (Stillaguamish Watershed Action Plan, with emphasis on water quality) added on p. 2

- p. 64 The benefits of individual habitat management actions have been modeled using EDT to generate estimated Chinook population gains that will result in achieving 30% of the TRT planning targets. (Is this 30% of the way from current to the target or 30% from 0 to the target? I think it's the latter, and since we are at 8% now it represents a fairly big move anyway.)

Response: 10-year goal will achieve 30% increase from 0 to the population planning targets.

- p. 66-70 Harvest Strategy.

Note: Section has been extensively revised with input from Kit Rawson

The overall goal of the harvest management plan is to place a larger portion of Puget Sound Chinook runs towards escapement rather than harvest. (This isn't accurate. It implies that a harvest rate of .49 is acceptable. The harvest strategy goal is stated in the plan, and it is approximately "that harvest related mortality will not impede the ability of populations to grow towards recovery targets when other factors have changed to allow this."

Response: Included in p. 66, 1st paragraph and 1st bullet.

...was chosen by the co-managers because model runs indicated a high (93%) probability of recovery, while not severely restricting Washington-based fisheries.

(The probability of recovery depends on habitat actions; harvest management alone will not accomplish recovery, as the harvest management plan itself states. I believe the probability of reaching the UEL at the RER is 80%. The effect on Washington fisheries was not a consideration in deriving the RER.)

Response: Included in p. 68, 2nd bullet.

Lower threshold escapement levels are an additional tool used by fishery managers to regulate commercial and recreational fisheries. (This doesn't say how the lower threshold is used. The driving rate is further reduced if the low escapement threshold is likely to be reached, thus providing a safety valve.)

Response: Included in p. 69, 3rd paragraph.

(The harvest management plan discussion also needs to mention the fact that the RER can be exceeded if fisheries regulated by the US/Canada treaty are sufficiently high. This could cause the rates to go high enough so as to affect the recovery potential, but the comanagers have no authority, beyond the limits in the 1998 annex of the treaty, to affect this. This is a key point that could affect all recovery plans.)

(I also suggest that the Stillaguamish management Unit Profile, in Appendix A of the Comanagers' Plan, be attached to this recovery plan as an appendix. There is more information there.)

Response: Puget Sound Indian Tribes and WDFW 2004 referenced in the harvest strategy.

- p. 71 Hatchery Strategy. If the chinook are an indicator stock, do you visually tag all the hatchery chinook? In not, why? (Pess)

Response: Added paragraph for clarification.

- p. 71 Hatchery Strategy. Performance standard 2 says to increase the abundance and 3 says to maintain it. Which is it?

Note: Revised paragraph for clarification.

- p. 71 Hatchery Strategy. Based on the NOAA Fisheries and co-managers assessment of population declines and habitat degradation, the Stillaguamish Chinook populations would likely further decline and go extinct without the intervention of the natural stock restoration program. (Should cite a reference for this assertion.)

Note: Added NMFS 1999 as reference.

- p. 72 Hatchery Strategy. (Should also cite a reference for the risks. Some of this material is repeated form an earlier section.)

Response: This repeated material was deleted. Risks are described on p. 51.

- p. 72 Hatchery Strategy. Improve genetic integrity. What is "genetic integrity"?

Response: Replaced with "genetic fitness".

- p. 73 Hatchery Strategy. ...for the Harvey Creek Hatchery program. (This is a little confusing because I don't think Harvey Creek has been mentioned yet.)

Response: Harvey Creek hatchery is first mentioned on p. 51

- p. 73 Hatchery Strategy. The HGMP may or may not call for immediate changes in hatchery practices or production objectives. (This is confusing. Above it says the HGMP is done, so what does it say?)

Response: Paragraph added for clarification.

- p. 73 Hatchery Strategy. NOAA Fisheries is expected to review the co-managers' Hatchery Management Plan, of which the HGMP is an integral part, with respect to conservation criteria established by the ESA's 4(d) rule. (Right, but we need to know what it says for the purpose of this review of the recovery plan. Can a copy of the HGMP be provided to the TRT?)

Response: HGMP is a 200-page document and is still under review by NOAA.

- p. 74-76 Integrated Strategy. (The section on integration includes part of the written material and 2 of 4 or 5 graphs included in a document that Curt Kraemer and I wrote

for the Stillaguamish group to use as background for writing a section on integrating the h's. It also includes a couple of other paragraphs from other people. As a result, it doesn't flow very well.)

Response: This section has been replaced with revisions by Kip Killebrew.

p. 74-76 **Integrated strategy.** It seems to me that you already have the environmental variables to estimate freshwater survival data to tag and release the number of smolts to attempt to meet outmigration goals? (Pess)

Response: The paragraph this comment refers to has been deleted.

p. 75 **Integrated Strategy.** The natural origin recruit escapement goal for the North Fork Stillaguamish is 700 fish per year for four consecutive years. (This is very confusing. It doesn't match the "old" goal of 2000, it doesn't match the current harvest management plan, and it doesn't seem to be related to the recovery target in any way. I don't think it is the 10-year goal - a 30% increase. Obviously this is a part of the hatchery management plan and is a trigger for changes in the hatchery program. But stated as it is here, it's very confusing.)

Response: The reference to the 700 NOS target is now included in the hatchery strategy on p. 72

p. 78 **Habitat Projects.** These criteria designate the best locations for habitat protection or restoration projects throughout the Stillaguamish watershed. ("Best" in what sense? Increase in VSP per dollar spent, faster time for increase in VSP, or what?)

Response: Text has been revised to clarify.

p. 78-86 **Habitat Projects.** There is information under each category describing how that category affects the Chinook salmon life cycle. Some of this information is repeated from the earlier section on limiting factors and some of it is new. For example, I don't think the importance of the estuary to a particular size of fish was noted in the earlier section. All this information should be together in one place, preferably in the earlier section on limiting factors. The fact that the actions are organized by limiting

factors makes it easy for the reader to refer to the earlier section for information on the importance of the factor.

Response: Repeated text under each limiting factor deleted

- p. 86 **Hydrology Project Types:** What are forest protection strategies to restore hydrologic maturity? (Pess)

Response: Bullet deleted. Forest protection strategies are described in Chapter 6 - Habitat Protection Strategy

- p. 96-97 **Anticipated Results.** From these graphs it appears that a non-standard Beverton-Holt S-R curve is being used. Is that documented in the Mobernd Biometrics reference?)

Response: Figures revised.

- p. 143 **Research and Data Gaps.** Forgot to include the following: Temperature impacts in the lower river on chinook survival and fecundity; Proportion of hydrologic change due to natural v. anthropogenic causes. (Pess)

Response: Added to list of research and data needs.