Stream Typing Error in Washington Water Type Maps for Watersheds of Hood Canal and the Southwest Olympic Peninsula

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Point No Point Treaty Council

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ABSTRACT

The Washington State Water Type maps were found to greatly under-estimate the occurrence of fish-bearing streams and other stream types in the Olympic Peninsula area. As a result, fish populations are susceptible to loss from forest practices and other land uses that destroy habitat. In six Hood Canal watersheds surveyed by the Point No Point Treaty Council, Water Type Maps under-estimated the miles of fish-bearing streams by 46 percent (14.9 miles). Surveys completed in 15 watersheds in Hood Canal and Southwest Washington by the Point No Point Treaty Council and Quinault Indian Nation, respectively, show that 54 percent (78.5 miles) of the verified fish-bearing streams were originally mis-typed as non-fish-bearing streams on the maps. Secondly, 53 percent (18.4 miles) of the Type 4 (non-fish-bearing) stream miles surveyed in seven Hood Canal watersheds were found to be fish-bearing streams. A combined total of 72 percent (65.5 miles) of Type 4 streams surveyed by both agencies in 16 watersheds were found to be fish-bearing. Finally, intensive surveys of five watersheds in the upper Hood Canal region indicates that the maps under-estimated the miles of verified Type 2 streams by 77 percent and Type 4 streams by 46 percent. A total of 75 percent of the total stream miles (Type 2, 3 and 4) in these upper Hood Canal watersheds were found to be mis-typed. As an interim measure to prevent fish habitat loss due to gross inaccuracies in the Water Type Maps, we recommend that all unverified Type 4 streams be automatically upgraded to Type 3, unless field inspection demonstrates that no fish are present and that the physical criteria for Type 3 stream classification are not met.

INTRODUCTION

The Washington State Department of Natural Resources (DNR) uses a water typing system to define waters of the state. Stream types range from Type 1 for larger rivers to Type 5 for small headwater streams (Washington State Forest Practices Board, 1993). DNR originally mapped water types using aerial photographs and topographic maps, with little field verification. However, incorrect water types can be changed based on site-specific information by submitting a Water Type Change Form for approval by Timber-Fish-Wildlife (TFW) representatives in the region.

The type of stream determines the level of protection afforded by county ordinances, Washington Forest Practice Regulations and the Washington Hydraulic Code. Under Forest Practice regulations, Type 1 to 3 streams are protected with riparian management zones that range from 25 to 100 feet, depending on stream type. Type 4 and 5 streams (small, non-fish-bearing) are not protected, with the exception of Riparian Leave Area rules that require some trees to be left along some Type 4 streams (Washington Forest Practices Board, 1993). Thus, accurate stream typing can be critically important to ensure at least some level of protection of fish habitat.

The Point No Point Treaty Council (PNPTC) routinely examines stream typing when reviewing proposed forest practice applications and other land uses in the tribes' Usual and Accustomed (U&A) hunting and fishing area. Through this review, it has become apparent that the maps are inaccurate in many cases. Studies conducted by the Quinault Indian Nation (Baxter and Mobbs, 1992 and 1993), found that water type maps grossly under-estimated the miles of fish-bearing streams in nine watersheds surveyed.

Based on these findings, the PNPTC's Port Gamble S'Klallam and Skokomish Fisheries Offices embarked on a systematic stream verification study in 1993. The purpose of the project is two-fold: to verify stream typing in selected watersheds to provide better fisheries protection and to gain a better understanding of the extent of the stream typing error in the Tribes' U&A.

METHODS

Seven watersheds were surveyed. Watersheds were selected for survey to obtain a sample of widely distributed independent drainages of Hood Canal. The Port Gamble S'Klallam Fisheries

Office surveyed Little Anderson, Seabeck, Big Anderson, Harding and McDonald Creek basins. The Skokomish Fisheries Office surveyed parts of the Tahuya River basin and the entire Eagle Creek basin. The majority of the field work was conducted between April 30 and June 25, 1993 by a trained survey crew of two persons stationed at each of the Fisheries Offices. In addition, between January and August, 1993, Port Gamble S'Klallam Fisheries permanent staff conducted stream typing in McDonald watershed and some stream typing in Seabeck and Big Anderson watersheds.

The methods used to verify stream types were based on field methods given in the Washington Forest Practices Board Manual (1993) and the criteria for defining each stream type given in the Forest Practice regulations (WAC 222-16-030). Usually the surveyors started at the top of a tributary and worked downstream, identifying the "breaks" between stream types. Streams were up-graded to Type 3 based on the presence of fish as determined by electro-shocking or observation. Streams were upgraded to Type 2 if the fish population was determined to be "substantial" (WAC 222-16-030), in accordance with a working definition of "substantial" developed by Point No Point Treaty Council (see Appendix A). Streams were also upgraded to Type 2, 3 or 4 if they met the physical criteria established for each type. For physical measurements, surveyors used a hip chain, measuring tape and clinometer. Average stream width and gradient were calculated based on measurements taken every 50 feet over a total stream length of 500 feet. A detailed description of methods used to verify each stream type is given in Appendix A.

The upstream extent of a new stream type (stream type break) was recorded on a copy of the water type map. The uppermost location where fish were observed was also recorded by species on the map. Nearby trees were marked with flagging or aluminum tags. The ribbons and tags were labeled with the name of the Fisheries Office conducting the survey, the proposed water type and the date. Measurements were recorded on data forms. Proposed water type change forms, upgraded water type maps and supporting field data forms were sent to DNR and other TFW cooperators for concurrence. An example of water type change form, data form, and map is given in Appendix B.

Only parts of the Tahuya River watershed were surveyed due to its large area. Surveys in Eagle Creek and Tahuya River watersheds focused on surveying Type 4 streams for upgrade to Type 3. Surveys in other watersheds attempted to accurately classify Type 2, 3 and 4 streams.

Stream verification was also conducted by the Quinault Indian Nation and their results are synthesized in sections of this report. Their methods are consistent with PNPTC's methods and in accordance with the methods and criteria given in the Washington

Forest Practices Board Manual (1993) and Forest Practice regulations (WAC 222-16-030) (Baxter, 1993; Baxter and Mobbs, 1992).

Analysis of the error in stream typing was based on comparing streams of various types before and after verification using a variety of approaches as summarized below:

1) **Fish-bearing streams** - percent of verified fish-bearing stream miles (Type 2 and 3) that were incorrectly typed as non-fish-bearing on the original water type maps (Type 4 and 5) in PNPTC and Quinault U&A.

2) **Type 4 stream miles upgraded** - percent of Type 4 streams shown on original water type maps that are actually fish-bearing streams (Type 2 and 3) in PNPTC and Quinault U&As.

3) **Verification of stream Types 2 and 4** - percent of verified Type 2 and Type 4 stream miles that were incorrectly typed in five watersheds of upper Hood Canal.

4) **Watershed-wide error in stream typing** - percent of verified Types 2, 3 and 4 stream miles that were incorrectly typed in five watersheds in Upper Hood Canal.

Stream miles were measured with a map wheel on the water type maps. The map wheel appeared to provide reliable estimates of stream distance. For example, one mile measured ten times with the map wheel gave a measurement of 6.4, with a 95% confidence interval of 5.9-7.0.

RESULTS AND DISCUSSION

All proposed water type changes resulting from this study were approved by DNR after approval by TFW representatives in the region. Although the PNPTC "working definition" of a Type 2 stream (Appendix A) was not formally adopted by TFW representatives, the proposed Type 2 upgrades were approved based on site-specific information that generally supported the PNPTC working definition. The following discussion summarizes the findings for the Hood Canal region and in relation to recent studies completed by the Quinault Indian Nation (Baxter, 1993; Baxter and Mobbs, 1992).

Fish-bearing streams

In seven Hood Canal watersheds surveyed, 24.9 stream miles were up-graded from non-fishing bearing streams (Type 4 or 5) to fish-bearing streams (Type 2 or 3) (Table 1). Of the total miles of verified fish-bearing streams in the watersheds, 46 percent were originally typed as non-fish-bearing on the water type maps.

Table 1. Observed error in stream typing for fish-bearing streams surveyed in Hood Canal watersheds.

STREAM (W.R.I.A.)	+INCORRECT FISH-BEARING STREAM MILES	TOTAL VERIFIED FISH-BEARING STREAM MILES	% OF FISH BEARING MILES INCORRECT
SEABECK CK. (15.0400)	1.9	6.5	29
BIG ANDERSON CK. (15.0412)	4.3	9.7	44
HARDING CR. (15.0408)	0.3	.8	38
LITTLE ANDERSON CR. (15.0377)	4.9	6.7	73
MCDONALD CR. (16.0349)	1.7	2.2	77
EAGLE CR. (16.0246)	1.8	6.2	29
TAHUYA R. (16.0443)	10.0	*	*
TOTALS w/o Tahuya	14.9	32.1	46
TOTALS	24.9	*	*

+Incorrect fish-bearing stream miles denotes the number of stream miles upgraded from Type 4 and 5 to Type 2 or 3.

*Data is unavailable because only part of Tahuya was surveyed.

However, the error varied greatly among watersheds, with a low of 29 percent to a high of 77 percent of the stream miles mis-identified as non-fish-bearing. The error for the Tahuya watershed could not be determined since only parts of the watershed were surveyed.

Baxter and Mobbs (1992, 1993) obtained similar results in a study of nine watersheds surveyed in the Quinault Indian Nation's U&A, including the entire Johns River and eight other watersheds distributed in the southwest region of the Olympic Peninsula (Figure 1). They found that 63.6 of 113.9 of the fish-bearing stream miles, or 56%, had not been identified as fish-bearing on the water type maps. The combined results from the Point No Point Treaty Council and Quinault U&As, strongly suggest a high incidence of stream typing error in the region. Results from a total of 15 watersheds indicate that 78.5 stream miles, or 54 percent of the fish-bearing streams were inaccurately typed as non-fish-bearing waters in the Olympic Peninsula area (Table 2).

Table 2. Observed error in stream typing for fish-bearing waters surveyed in three areas of the Olympic Peninsula region.

GENERAL LOCATION OF WATERSHEDS SURVEYED	+INCORRECT FISH-BEARING STREAM MILES	TOTAL VERIFIED FISH-BEARING STREAM MILES	% OF FISH BEARING MILES INCORRECT
*HOOD CANAL	14.9	32.1	46
S.W. OLY. PENINSULA	37.3	69.1	54
JOHNS RIVER (S.W.)	26.3	44.8	59
TOTAL	78.5	146.0	54

+Incorrect fish-bearing stream miles denotes the stream miles upgraded from Type 4 or 5 (non-fish-bearing) to Type 2 or 3 (fish-bearing).

*Hood Canal data does not include Tahuya River watershed.

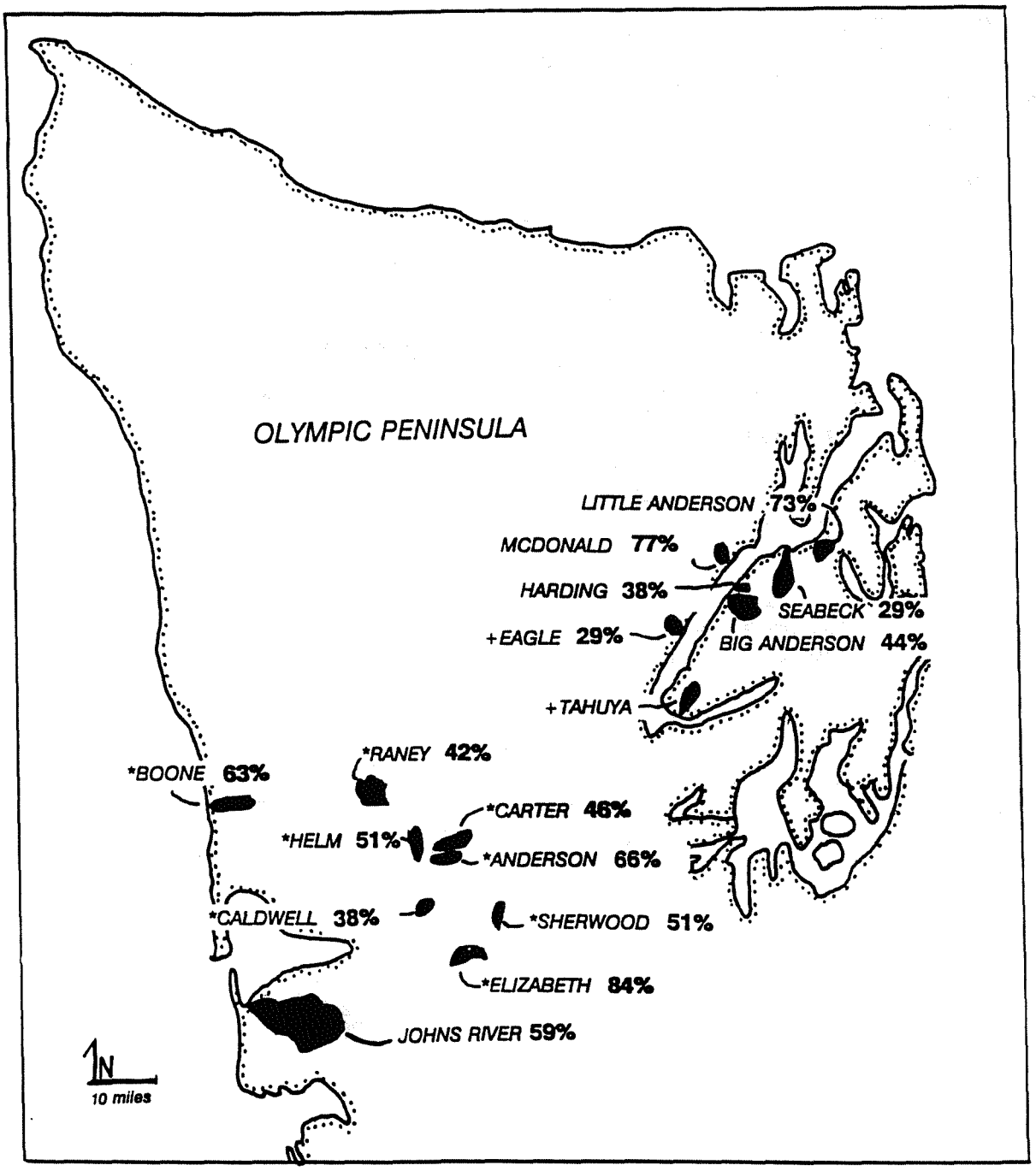

Figure 1. Percent of verified fish-bearing stream miles that were incorrectly typed as non-fish-bearing in 16 watersheds surveyed by Port Gamble S'Klallam Fisheries, Skokomish Fisheries (+), and the Quinault Indian Nation's Department of Environmental Protection (*). The Tahuya watershed was only partially surveyed and so results are not available.

Type 4 stream miles upgraded to fish-bearing

In our experience conducting routine field review of land use proposals, many of the type 4 streams and a lesser number of smaller type 5 streams shown on water type maps were found to be fish-bearing. In order to provide an estimate of the potential magnitude of error involving Type 4 streams, this section of the report focuses specifically on the percent of Type 4 streams miles shown on the water type maps that were found to be fish-bearing.

Fifty three percent of the total miles of Type 4 streams in Hood Canal's surveyed watersheds were upgraded to Type 2 or 3 (Table 3). In the Johns River watershed of the Quinault U&A, Baxter and Mobbs (1993) found that 81 percent of the Type 4 streams in the watershed were actually fish-bearing. In eight other watersheds of the Quinault U&A, they found that 85 percent of the Type 4 streams were fish-bearing (Bruce Baxter, pers. comm.) A combined total of 72 percent (65.5 miles) of the Type 4 stream miles in 16 watersheds surveyed in the Olympic region were upgraded to fish-bearing streams.

The higher percentage of Type 4 stream typing error found in the SW Olympic Peninsula compared to Hood Canal watersheds may be due to the relatively better habitat conditions for fish occurring in in the SW coastal areas, where headwater streams generally have higher summer flows and lower gradients than those in Hood Canal watersheds. Hood Canal streams are also less remote and more accessible, increasing the likelihood that more stream typing errors have already been corrected.

In addition, Skokomish Fisheries selected four independent small tributaries of lower Hood Canal as likely mis-typed streams by evaluating water type maps. Field verification of these streams resulted in upgrading a total of 94 percent of the Type 4 stream miles to fish-bearing (Type 3) in these basins (3.4 of 3.6 Type 4 stream miles upgraded). Although the selection of streams was biased, these findings demonstrate that mis-typed streams can often be identified by carefully examining water type maps and the depiction of stream length, gradient and topography.

Table 3. Observed error in stream typing for Type 4 stream miles that were upgraded to fish-bearing streams in watersheds of the Olympic Peninsula.

STREAM (W.R.I.A.)	T4 STREAM MILES BEFORE VERIFICATION	T4 STREAM MILES UPGRADED	% OF TYPE 4 STREAM MILES UPGRADED (TYPE 2 OR 3)
SEABECK CR. (15.0400)	2.3	.7	30
BIG ANDERSON CR. (15.0412)	4.6	3.3	72
HARDING CR. (15.0408)	0.9	.2	22
LITTLE ANDERSON CR. (15.0377)	4.6	4.6	100
MCDONALD CR. (15.0349)	1.4	1.4	100
EAGLE CR. (16.0246)	.5	.2	40
TAHUYA R. (16.0443)	20.6	8.0	39
HOOD CANAL TOTAL	34.9	18.4	53
JOHNS RIVER	23.6	19.0	81
S.W. OLYMPIC	33.0	28.1	85
COMBINED TOTAL	91.5	65.5	72

Stream Types 2 and 4

In addition to verifying actual miles of Type 3 streams, an effort was made by Port Gamble S'Klallam Fisheries to verify miles of Type 2 and Type 4 streams in upper Hood Canal watersheds (Tables 4 and 5). The only stream types not verified were Type 5 streams, which being the smallest streams, are difficult and time-consuming to survey. Results show that a total of 77 percent of verified Type 2 stream miles had been incorrectly classified as a Type 3 or 4 streams on the original water type maps. (All Type 2 upgrades were approved through the TFW process based on site-specific criteria). A total of 46 percent of the verified Type 4 stream miles had been incorrectly classified as Type 5 streams. Thus, error in the water type maps is not restricted to an under-estimate of Type 3 streams discussed previously, but appears to represent a consistent under-estimate across stream types 2, 3 and 4.

Table 4. Observed error in water type maps for Type 2 streams surveyed in upper Hood Canal watersheds.

STREAM (W.R.I.A.)	+INCORRECT T2 STREAM MILES	TOTAL VERIFIED T2 MILES	% OF T2 STREAMS MISTYPED
SEABECK CR. (15.0400)	1.8	2.8	64
BIG ANDERSON CR. (15.0412)	1.6	2.1	76
HARDING CR. (15.0408)	0.7	.7	100
LITTLE ANDERSON CR. (15.0377)	1.1	1.3	85
MCDONALD CR. (16.0349)	0.6	.6	100
TOTALS	5.8	7.5	77

+Incorrect T2 stream miles denotes the stream miles upgraded from Type 3 or 4 to Type 2.

Table 5. Observed error in water type maps for Type 4 streams surveyed in upper Hood Canal watersheds.

STREAM (W.R.I.A.)	+INCORRECT T4 STREAM MILES	TOTAL VERIFIED T4 MILES	% OF T4 STREAMS MISTYPED
SEABECK CR. (15.0400)	5.3	8.5	62
BIG ANDERSON CR. (15.0412)	2.0	7.3	27
HARDING CR. (15.0408)	1.6	2.4	67
LITTLE ANDERSON CR. (15.0377)	3.7	9.4	39
MCDONALD CR. (16.0349)	2.0	3.8	53
TOTALS	14.6	31.4	46

+Incorrect T4 stream miles denotes the miles upgraded from Type 5 to Type 4.

Watershed-wide error in stream typing

Verification of stream types 2, 3 and 4 conducted in the five watersheds surveyed by Port Gamble S'Klallam Fisheries allows an estimate of the total error in stream typing for each watershed, with the exception of Type 5 streams (Table 6). Results show that a total of 33.4 miles of stream were upgraded to Type 2, 3 or 4 in these watersheds. Seventy five percent of the total verified stream miles (Type 2 to Type 4 waters) in the watersheds were originally typed incorrectly on the water type maps and were upgraded.

Table 6. Observed error in stream typing for total stream miles of Type 2, 3 and 4 streams in watersheds of upper Hood Canal.

STREAM (W.R.I.A.)	+INCORRECT TOTAL STREAM MILES	TOTAL STREAM MILES	% OF TOTAL STREAM MILES INCORRECT
SEABECK CK. (15.0400)	9.0	13.1	69
BIG ANDERSON CK. (15.0412)	7.9	12.8	62
HARDING CR. (15.0408)	2.5	3.1	81
LITTLE ANDERSON CR. (15.0377)	9.7	11.3	86
MCDONALD CR. (16.0349)	4.3	4.4	98
TOTALS	33.4	44.7	75

+Incorrect total stream miles indicates the total miles of Types 3, 4 and 5 streams that were upgraded to Types 2,3 and 4 in the watershed.

CONCLUSION AND RECOMMENDATIONS

The Washington State Water Type maps were found to greatly under-estimate the occurrence of fish-bearing streams and other stream types in watersheds of the Olympic Peninsula area. As a result, fish populations are susceptible to loss from forest practices and other land uses that destroy habitat. In seven Hood Canal watersheds surveyed, 24.9 miles of stream were upgraded to fish-bearing. In six of these watersheds that were completely surveyed, the Water Type Maps under-estimated the miles of fish-bearing streams by 46 percent (14.9 miles). Of a combined total

of 15 watersheds surveyed in the Olympic Peninsula region by the Quinault Indian Nation and Point No Point Treaty Council, 54 percent (78.5 miles) of the verified fish-bearing streams were originally mis-typed as non-fish-bearing streams on the maps.

Fifty three percent of the Type 4 stream miles surveyed in seven Hood Canal watersheds were up-graded to fish-bearing streams. Of a combined total of 91.5 miles of Type 4 stream surveyed by the Point No Point Treaty Council and Quinault Indian Nation in 16 watersheds, 72 percent (65.5 miles) were found to be Type 2 or 3 fish-bearing streams. In addition, extensive surveys of five watersheds conducted in the upper Hood Canal region indicates that the maps under-estimated the miles of verified Type 2 streams by 77 percent and Type 4 streams by 46 percent. A total of 75 percent of the total stream miles (Type 2, 3 and 4) in the upper Hood Canal watersheds surveyed were found to be mis-typed. In summary, water type maps were found to be largely inaccurate, grossly under-estimating stream types across a broad geographic region.

We believe that the high stream typing error found in surveyed watersheds distributed in the Puget Sound and coastal regions is probably typical of what would be expected throughout western Washington. The surveyed watersheds are similar to others in the Pacific Northwest that serve as nurseries for resident and sea-run cutthroat trout, rainbow trout, steelhead and salmon that live in many of the smaller and steeper gradient streams and tributaries. The assessments reported here suggest that Water Type Maps under-estimate the miles of fish-bearing streams in Western Washington streams by approximately 50 percent. These mis-identified streams are classified as Type 4 or 5 (non-fishing-bearing) and receive little or no protection under state regulations. These small tributary streams provide critical salmon rearing and spawning habitat and regulate the flow of wood, water and sediment to downstream areas.

The systematic approach to stream type verification used in this study benefits the tribes, public and landowners by reducing habitat destruction caused by error in Water Type Maps and reducing conflict and delay caused by the last minute revision of timber sale plans after field review indicates errors in stream typing. However, the Tribes do not have the financial ability to correct all water type maps in their U&A. Because the results of this study show that 53 percent of the type 4 stream miles were actually fish-bearing streams, we feel that there is sufficient reason to recommend that all unverified Type 4 streams in the Point No Point Treaty Council's U&A be automatically upgraded to Type 3, unless field inspection demonstrates that no fish are present and that the physical criteria for Type 3 stream classification are not met. With this approach, resource managers will be erring on the side of protection of public resources.

ACKNOWLEDGEMENTS

Funding was provided by the Point No Point Treaty Council, with additional support from Port Gamble S'Klallam Tribe. We thank Bruce Baxter for his knowledgeable assistance in developing the project, and training field surveyors. We appreciate the assistance of Carol Bernthal and Steve Moddemeyer in financial and logistical planning. Sincere thanks to reviewers of the manuscript. Any success of this effort is in large part due to the excellent work of field surveyors Renee Vigil, Shelly Spaulding-Clark, George Sparks and Dennis Fulton.

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APPENDIX A. Detailed description of methods used to verify each stream type, including PNPTC's proposed working definition of "substantial population" for Type 2 classification.

PROPOSED CRITERIA AND METHODOLOGY FOR STREAM CLASSIFICATION

TYPE 2

1. Lakes, ponds > 1 acre.
Aerial photos will be used to identify and measure sizes.

2. Average stream width (ordinary high water) > 20′, < 4% gradient.
Field observation using an average of ten measurements taken at 50 foot intervals measured immediately below the proposed type break and aerial photograph and/or topographic map evaluation to determine if entire channel downstream of measured segment meets physical criteria.

3. Off channel water connected to salmonid stream by <5% gradient.
Field observation to confirm potential habitat and measurement of access gradient.

4. Are used by substantial numbers of anadromous fish.
Please see attached letter from Carol Bernthal, PNPTC, January 3, 1994 that explains our working definition of "substantial numbers".

TYPE 3

1. Lakes, ponds< 1 acre
Aerial photos will be used to measure sizes.

2. Average stream width (ordinary high water) >5′, <12% gradient, no downstream falls >10′ vertical feet.
Average of ten measurements taken at 50 foot intervals immediately below the proposed type break. To qualify for an upgrade, channel downstream of measured segment must meet gradient and passage requirements and will be evaluated using topographic maps and direct walking. Artificial barriers (culverts) that can be removed to restore fish passage will not be considered an impassible barrier and will be noted on data sheets.

3. Streams used by "significant numbers" of fish.
"Significant" has been defined as observation of one fish (indicating presence of a population). Electroshocking and visual observation will be used. Upstream extent of fish observation will be marked and type break will set upstream at obvious unsuitable habitat or natural barrier. If fish are found in segments which do not meet the physical criteria, an average of 10 measurements will be taken at 50 foot intervals immediately below the type break.

TYPE 4

1. Average stream width (ordinary high water) > 2′.
Average of ten measurements at 50' measured intervals immediately below the proposed type break. A minimum of five measurements will be used for short segments. Downstream of measured segment must meet width criteria based on field observation.

Point No Point Treaty Council

Port Gamble S'Klallam • Lower Elwha S'Klallam • Jamestown S'Klallam • Skokomish

January 3, 1994

Jim Springer
DNR, Olympic Region
R.R. 1, Box 1375
Forks, WA 98376

Dear Mr. Springer,

Type 2 streams are defined as those used by "substantial numbers of anadromous or resident fish for spawning, rearing or migration". They are used by "highly significant" fish populations (WAC 222-16-030).

The Point No Point Treaty Council recognizes that the definition of "substantial numbers" or "highly significant" has never been adequately addressed. However, given the at-risk status of many naturally spawning salmon stocks in the Pacific Northwest and the increased emphasis on collecting on-the-ground information on fish populations and habitat, we think it is time to propose a working definition, as follows.

1. **Primary habitat for any naturally spawning anadromous fish species within a watershed. Primary habitat determined by best professional judgement of state or tribal fishery biologists and based on field assessment of juvenile or adult fish population and stream habitat characteristics.**

<u>or</u>

2. **Freshwater distribution of any naturally spawning anadromous fish species known to be in <u>depressed</u> or <u>critical</u> condition based on the Washington State Salmon and Steelhead Stock Inventory (SASSI current version) or other relevant scientific reports.**

As a case in point, we are submitting a water type upgrade to a type 2 for a portion of the mainstem of Donavon Creek (upgrade form enclosed). Peter Bahls, fishery biologist with Port Gamble S'Klallam Fisheries, reports that based on recent field surveys, this stream reach appears to be the primary coho habitat in the watershed. Naturally spawning coho adults and their redds were observed throughout the reach. He reports that Donavon Creek appears to have fair quality spawning and rearing habitat throughout much of the proposed upgrade area. This coho stock is also listed in SASSI as a "depressed" stock. Thus, in his professional opinion, the proposed upgrade area meets both working definitions for use by "substantial numbers of anadromous fish" and would be accurately classified as a Type 2 stream.

Sincerely,

Carol Berthal

Carol Berthal
Habitat Coordinator

cc Randy Johnson, WDF
Tim Rymer, WDW
Joanne Schuett-Haines, DOE
Jerry Gorseline, WEC

Port Gamble S'Klallam Fisheries Office • 31974 Little Boston Road • Kingston, Washington 98346 • (206) 297-4792

APPENDIX B. Example of DNR's Water Type Change Form, PNPTC's field data form, and PNPTC's final corrected stream type map for a watershed.

[_____] Date Mailed *

MAILED FEB. 4, 1994 FROM PORT GAMBLE SKLALLAM FISHERIES TO ALL TFW REPRESE

WATER TYPE CHANGE

LOCATION OF PROPOSED CHANGE:

Begins in S 9 T 24 R 2 (E/W)

Ends in S 34 T 24 R 2 (E/W)

Water Body BIG ANDERSON & HARDING CK. WRIA# 15 County KITSAP

REASON FOR UPGRADE ✓ or DOWNGRADE ___ (must meet WAC 222-16-020/030):

[✓] Physical characteristics T4, some T3
[✓] Presence of fish T3, T2 (substantial populations)
[ ] Water quality/use

Evaluation Method and Results (required for all) PNPTC 1993 STREAM MPING PROTECT. METHODS FOLLOW FIELD METHODS IN FOREST PRACTICES BOARD MANUAL (SECTIONS 2, 3). SEE ATTACHED METHODS + DATA SHEETS.

IF YOU DISAGREE WITH THE PROPOSED CHANGE (or believe it is incomplete) call the initiator immediately to resolve any differences. The process can not be completed until the disagreement is resolved. (See note 1 below)

Initiator: PETER BAHLS Organization: PORT GAMBLE SKLALLAM FISHERIES phone: 297-4792

For initiators use only -

List the representatives concurring with the change:

	individual's name (required)	concurrence or resolution date	no response	nonconcurrence
DNR	LAURIE COX			
WDW	STEVE KALINOWSKI			
WDF	DORIS SMALL			
DOE	BOB PENHALE			
TRIBE	PETER BAHLS	2/3/94		

LANDOWNER(S) POPE RESOURCES + MULTIPLE OWNERSHIPS -Contacted yes___ no ✓
Notification is strongly urged (but not required)

Note:
1. If the change involves a pending FPA, contact DNR prior to FPA due date to ensur water protection at the higher level.
2. A map showing the color coded change must accompany this form (Type 1-blue, 2 green, 3-red, 4-yellow, 5-purple).

[_____] Date Mailed *

WATER TYPE CHANGE

LOCATION OF PROPOSED CHANGE:

Begins in S_____T_____R_____(E/W)

Ends in S_____T_____R_____(E/W)

Water Body _____ WRIA# _____ County _____

REASON FOR UPGRADE ___ or DOWNGRADE ___ (must meet WAC 222-16-020/030):

[ ] Physical characteristics
[ ] Presence of fish
[ ] Water quality/use

Evaluation Method and Results (required for all)_____

_____

_____

IF YOU DISAGREE WITH THE PROPOSED CHANGE (or believe it is incomplete) call the initiator immediately to resolve any differences. The process can not be completed until the disagreement is resolved. (See note 1 below)

Initiator:_____ Organization:_____ phone:_____

For initiators use only -

List the representatives concurring with the change:

	individual's name (required)	concurrence or resolution date	no response	nonconcurrence
DNR	_____	_____	_____	_____
WDW	_____	_____	_____	_____
WDF	_____	_____	_____	_____
DOE	_____	_____	_____	_____
TRIBE	_____	_____	_____	_____

LANDOWNER(S) _____ -Contacted yes____ no____
Notification is strongly urged (but not required)

Note:
1. If the change involves a pending FPA, contact DNR prior to FPA due date to ensur water protection at the higher level.
2. A map showing the color coded change must accompany this form (Type 1-blue, 2 green, 3-red, 4-yellow, 5-purple).

WRIA 175 STREAM Big [illegible] DATE 6/10/93

SURVEYORS [illegible] / Porter

SECTION STREAM #	BEGINS IN T	R-W/E	S	ENDS IN T	R-W/E	S	OLD TYPE	NEW TYPE	REASON (PO, SC, PH, FL)	FISH SP. 1	ABUND (L, M, H)	FISH SP. 2	ABUND (L, M, H)	1	OBSERVATION (Y, N)	TOPO GRADIENT (%)	AERIAL PHOTO (Y, N)	CATALOG (Y, N)	REMOVE (Y, N)	BARRIER HEIGHT (")	FLOW (N, L, M, H)	VISIB. (L, M, H)
4	24	2-W	15	24	2-W	14	4	3	FI	CT	M	CR	M		Y	/	/	/	/	/	H	H
5	24	2-W	27	24	2-W	22	4	3	FI	CT	M	CRAPPIE 1" / LONG JUVS	LES		Y	/	/	/	/	/	M	H
-		-			-																	

STREAM #	1	2	3	4	5	6	7	8	9	10	AVERAGE		NOTES
4	5.4	6.2	10.9	10	14.6	6	4.3	4.9			7.5	W	UP BREAK AT
	2	1	3	2	3	1	2	1	5	2	2.2	G	
# 5												W	UP BREAK AT
												G	
#												W	UP BREAK AT
												G	

#4. made [illegible]

#5. [illegible]

SECTION STREAM #	BEGINS IN T	R-W/E	S	ENDS IN T	R-W/E	S	OLD TYPE	NEW TYPE	REASON (PO, SC, PH, FL)	FISH SP. 1	ABUND (L, M, H)	FISH SP. 2	ABUND (L, M, H)	1	OBSERVATION (Y, N)	TOPO GRADIENT (%)	AERIAL PHOTO (Y, N)	CATALOG (Y, N)	REMOVE (Y, N)	BARRIER HEIGHT (")	FLOW (N)
-		-			-																
		-			-																
		-			-																

STREAM #	1	2	3	4	5	6	7	8	9	10	AVERAGE		NOTES
												W	UP BREAK AT
												G	
#												W	UP BREAK AT
												G	
#												W	UP BREAK AT
												G	

WRIA ____ STREAM _____ DATE ___/___/___

SURVEYORS _____

REACH STREAM #	BEGINS IN T R-W/E S	ENDS IN T R-W/E S	OLD TYPE #	NEW TYPE #	REASON (PO, SC, PH, FI)	FISH SP. 1 (CO, CH, ST)	ASSUMED (L, M, H)	FISH SP. 2	ASSUND (L, M, H)	OBSERVATION (Y, N)	TOPO GRADIENT (%)	AERIAL PHOTO (Y, N)	CATALOG (Y, N)	REMOVE (Y, N)	BY BARRICL HEIGHT (")	FLOW (N, L, M, H)	VISIB. (L, M, H)
	-	-															
	-	-															
	-	-															

REACH #	1	2	3	4	5	6	7	8	9	10	AVERAGE		NOTES
												W	UP BREAK AT
												G	
#												W	UP BREAK AT
												G	
#												W	UP BREAK AT
												G	

REACH STREAM #	BEGINS IN T R-W/E S	ENDS IN T R-W/E S	OLD TYPE #	NEW TYPE #	REASON (PO, SC, PH, FI)	FISH SP. 1	ASSUMED (L, M, H)	FISH SP. 2	ASSUND (L, M, H)	OBSERVATION (Y, N)	TOPO GRADIENT (%)	AERIAL PHOTO (Y, N)	CATALOG (Y, N)	REMOVE (Y, N)	BY BARRICL HEIGHT (")	FLOW (N, L, M, H)
-	-	-														
-	-	-														
	-	-														

STREAM #	1	2	3	4	5	6	7	8	9	10	AVERAGE		NOTES
												W	UP BREAK AT
												G	
#												W	UP BREAK AT
												G	
#												W	UP BREAK AT
												G	


PORT GAMBLE S'KLALLAM FISHERIES
STREAM UPGRADES 1993
BIG ANDERSON CK
HARDING CK
Teklu Point
Nellita
HARDING CK
Anderson Cove
Holly
HOLLY POND
HINTZVILLE PONDS
BRUSHPICKER PONDS
Hintzville
Three Fingers Pond & Holland Ponds
SHICKES POND
BROCKY POND
ERICKSON BEAVER POND
POPE BURN POND
Marsh
Pit
CT
CR