Level 2 Diagnosis and Project Inventory

Level 2 Diagnosis

Table 1 summarizes the protection and restoration priorities for Asotin Creek summer steelhead by Geographic Area (GA). The table is broken into 13 distinct GA's based on environmental homogeneity and geographic proximity. The mean habitat area for each GA is shown to indicate the impact mere size has on restoration potential and preservation value. The orange- and blue-shaded columns represent the ordinal rank of a particular GA in terms of, respectively, preservation value and restoration potential. The first pair of such columns represents *scaled* values, and the second represents *unscaled* values. Scaled protection value or restoration potential reflects habitat quality per mile of stream; unscaled values are an absolute estimate of the impact of habitat on fish performance regardless of stream size. The environmental parameters printed vertically under the heading "Key Qualitative Habitat Attributes" represent the specific environmental factors most responsible for depressing productivity in specific GA's. The darker the shading in an individual GA-by-attribute cell, the more the particular attribute is responsible for depressing current productivity from historical estimates. Therefore, in the absence of non-biological considerations to the contrary, an enhancement program should address darker shaded attributes first because the rate of steelhead production increase per degree of restoration is greater for such attributes than for those with lighter shading.

The following process was used to identify critical environmental attributes and their relative importance in depressing steelhead production in a given GA. The life stages with the largest decrease in productivity relative to historical conditions were first identified for every reach in every GA[1]. Historical values for each environmental attribute in turn were then substituted for current values, and species-specific EDT Rules were used estimate the increase in productivity this substitution would cause for each of the three limiting life stages. The shaded cells in Table 1 are thus based on a historical/current productivity differential. Explicitly, the lightest blue cells denote attributes that reduce life stage productivity 0.1 or less, the next darker shade represents attributes that depress productivity 0.1 to 0.2, and the darkest cells indicate attributes that depress productivity for a limiting life stage by more than 0.2. White cells represent attributes that have no impact on a limiting life stage in a particular GA, but which do have a non-zero impact in some other GA.

The interpretation of Table 1 must be colored by the fact that recent and ongoing enhancement projects have already been reflected in the environmental ratings assigned to the existing habitat. Therefore, the particular "problem attributes" listed in Table 1 represent *the environmental issues that remain* after the benefits of recent enhancement projects have had an effect. In all probability a different set of environmental attributes would be emphasized if this analysis had been performed on the subbasin 10-15 years ago, before implementation of the relatively recent projects that will be summarized in the next section. Different environmental factors would have been more problematic a decade ago simply because a large number of projects have targeted them and reduced their severity.

The distinction between scaled and unscaled restoration and preservation values in Table 1 is important because two GA's with equal restoration potential per square meter but different areas can differ greatly in absolute restoration potential. This fact is relevant because the largest GA (Lower NF Asotin) has more than 16 times the area of the smallest (Upper George Tribs).

The preservation value and restoration potential of the mainstem Snake and Columbia Rivers are not shown (and the ocean was assumed to afford equivalent habitat for both the Historical and Current populations). These omissions were deliberate, and were intended to focus attention on conditions inside the subbasin. Thus, the priorities in Table 1 are based solely on habitat within the subbasin.

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[1] This information is presented in the "Consumers Reports" portion of EDT Report 2.

Table 1 Key environmental factors limiting the production of summer steelhead in Asotin Creek by Geographic Area (EDT). Darker shaded environmental attributes indicate more severe impact.

		Key Qualitative Habitat Attributes																	
		Steelhead																	
Geographic Area	Habitat Area (sqm)	Scaled Preservation Benefit Rank	Scaled Restoration Benefit Rank	Unscaled Preservation Benefit Rank	Unscaled Restoration Benefit Rank	Flow High	Flow Flashy	Flow Low	Maximum Temperature	Bed Scour	Anthropogenic Confinement	Embeddedness	Fine Sediment	Turbidity	Benthic Productivity	Riparian Function	Woody Debris	Salmon Carcasses	Hatchery Fish Outplants
Upper Asotin (above Headgate Dam to forks)	96,711	2	1 (tie)	3	1														
Charlie (mouth to access limit)	71,674	4	4 (tie)	2	2														
Pintler (mouth to access limit)	56,810	11	10	13	3														
Lower George (mouth to Wormell)	95,587	9	12 (tie)	9	4														
Lower NF (mouth to SF of NF)	117,109	1	3	1	5														
Upper George (Wormell to access limit)	62,870	10	8	12	6														
Lower SF (mouth to Alder)	23,372	8	4 (tie)	6	7														
Lower Asotin (mouth to George)	85,282	7	1 (tie)	8	8														
NF Tribs (Lick, SF of NF, Middle Branch)	21,760	12 (tie)	4 (tie)	10	9														
Middle Asotin (George to Headgate Dam incl.)	67,111	6	12 (tie)	5	10														
Upper SF (Alder to access limit)	37,517	5	11	4	11														
Upper George Tribs (Wormell Heffelfinger Coombs)	7,152	12 (tie)	9	11	12														
Upper NF (SF of NF to access limit)	51,645	3	7	7	13														

Table 2 Loss of key habitat required by the steelhead life stages most severely depressed relative to historical performance.

Geographic Area	Severely Impacted Life Stages	Key Habitat Types for Life Stage			Percent Change in Key Habitat (Current - Historical)
Lower Asotin Creek (mouth to George)	Incubation	Tailouts	Riffles	Glides	119.2%
	Overwintering subyearlings	Pools			-0.3%
	Overwintering 1+ juveniles	Pools			-0.3%
Middle Asotin Creek (George to Headgate Dam inclusive)	Incubation	Tailouts	Riffles	Glides	27.9%
	Overwintering subyearlings	Pools			0.5%
	Overwintering 1+ juveniles	Pools			0.5%
	Yearling active rearing	Pools	Pocketwater	Beaver Ponds	3.1%
Upper Asotin (above Headgate Dam to forks)	Incubation	Tailouts	Riffles	Glides	19.3%
	Overwintering subyearlings	Pools			-5.1%
	Yearling active rearing	Pools	Pocketwater	Beaver Ponds	-1.7%
	Overwintering 1+ juveniles	Pools			-5.1%
Charlie Creek (mouth to access limit)	Incubation	Tailouts	Riffles	Glides	21.3%
	Fry Colonization	Backwater Pools	Riffles		-10.3%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-11.1%
Upper George Tribs (Wormell Heffelfinger Coombs)	Incubation	Tailouts	Riffles	Glides	-9.7%
	Fry Colonization	Backwater Pools	Riffles		-19.5%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-21.4%
	Overwintering juveniles (0+ & 1+)	Pools			-17.9%
Lower George Creek (mouth to Wormell)	Incubation	Tailouts	Riffles	Glides	27.3%
	Fry Colonization	Backwater Pools	Riffles		-8.7%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-19.7%
	Overwintering juveniles (0+ & 1+)	Pools			-6.1%
Upper George Creek (Wormell to access limit)	Incubation	Tailouts	Riffles	Glides	-0.5%
	Fry Colonization	Backwater Pools	Riffles		-11.8%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-15.3%
	Overwintering juveniles (0+ & 1+)	Pools			-7.8%
NF Asotin Tribs (Lick, SF of NF, Middle Branch)	Incubation	Tailouts	Riffles	Glides	41.0%
	Fry Colonization	Backwater Pools	Riffles		-3.9%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-13.6%
	Overwintering juveniles (0+ & 1+)	Pools			-2.3%
Lower NF Asotin Creek (mouth to SF of NF)	Incubation	Tailouts	Riffles	Glides	34.8%
	Fry Colonization	Backwater Pools	Riffles		-12.0%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-11.7%
	Overwintering juveniles (0+ & 1+)	Pools			-2.0%
	Yearling active rearing	Pools	Pocketwater	Beaver Ponds	2.3%
Upper NF Asotin Creek (SF of NF to access limit)	Incubation	Tailouts	Riffles	Glides	22.3%
	Fry Colonization	Backwater Pools	Riffles		-0.9%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-9.7%
	Overwintering juveniles	Pools			2.0%
	Yearling active rearing	Pools	Pocket water	Beaver Ponds	0.0%
Pintler Creek	Incubation	Tailouts	Riffles	Glides	-14.7%
	Overwintering juveniles	Pools			-18.1%
Lower SF Asotin Creek (mouth to Alder)	Incubation	Tailouts	Riffles	Glides	83.9%
	Fry Colonization	Backwater Pools	Riffles		-7.4%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-11.8%
Upper SF Asotin Creek (Alder to access limit)	Incubation	Tailouts	Riffles	Glides	48.5%
	Fry Colonization	Backwater Pools	Riffles		-6.8%
	Subyearling active rearing	Pools	Backwater Pools	Pocketwater	-10.9%

Finally, the information in Table 1 relates to summer steelhead specifically, and can be generalized to spring chinook only to a limited degree. The differences in spawn timing and the fact spring chinook spawners require larger streams than steelhead imply that different portions of the same drainage will have somewhat different value to summer steelhead and spring chinook. A sense of the magnitude and nature of these interspecific differences can be gleaned from Table 3, which clearly indicates that larger, lower gradient reaches are more important to chinook than steelhead and vice versa. It is nevertheless true that juvenile steelhead and spring chinook residing in the same reach will almost always benefit from the same enhancement measures, and that an enhancement program driven by steelhead needs will still confer considerable benefits on spring chinook. Such "collateral benefit" will be especially pronounced when the correction of problems -- such as sediment loading -- in headwater reaches preferred by steelhead propagates downstream to key spring chinook areas.

Table 3 Preservation Value and Restoration Potential for summer steelhead and spring chinook in the Asotin Subbasin. Yellow areas are similar across species; blue are dissimilar.

	STEELHEAD				SPRING CHINOOK			
Geographic Area	Protection		Restoration		Protection		Restoration	
	Category/rank		Category/rank		Category/rank		Category/rank	
Charley (mouth to access limit)	B	2	A	2	C	8	C	7
Lower NF (mouth to SF of NF)	A	1	A	5	A	1	B	5
Upper Asotin (above Headgate Dam to forks)	C	3	A	1	B	2	B	3
Lower George (mouth to Wormell)	D	9	A	4	C	7	A	2
Lower SF (mouth to Alder)	D	6	B	7	B	5	B	6
Middle Asotin (George to Headgate Dam incl.)	D	5	C	10	B	4	B	4
Pintler (mouth to access limit)	E	13	A	3	E	10	C	10
Upper SF (Alder to access limit)	C	4	C	11	B	3	C	7
Lower Asotin (mouth to George)	D	8	B	8	C	6	A	1
Upper George (Wormell to access limit)	E	12	B	6	C	9	C	9
NF Tribs (Lick, SF of NF, Middle Branch)	E	10	C	9				
Upper NF (SF of NF to access limit)	D	7	E	13				
Upper George Tribs (Wormell Heffelfinger Coombs)	E	11	D	12				

<u>Changes in Habitat Quality by Geographic Area: Identification of Key Geographic Areas</u>

In the case of steelhead, the same three areas appear in the top five areas for both preservation and restoration: <u>Lower NF Asotin Cr</u>, <u>Charlie Cr</u>, and <u>Upper Asotin Cr</u>. These particular areas merit the highest consideration in any comprehensive steelhead habitat program for Asotin Creek. The remaining pair of GA's in the top five for preservation value is <u>Upper SF Asotin Cr</u> and <u>Middle Asotin Cr</u>, and the remaining pair in the top five for restoration potential is <u>Pintler Cr</u> and <u>Lower George Cr</u>.

For spring chinook, three geographic areas appear in the top five for both restoration and preservation: the <u>Lower NF</u>, <u>Upper Asotin</u> and <u>Middle Asotin</u>. Rounding out the top five for spring chinook protection are the <u>Upper SF</u> and the <u>Lower SF</u>, while the remaining pair for restoration are the <u>Lower Asotin</u> and <u>Lower George</u>.

It is appropriate to note that the Asotin Subbasin Planning Assessment identified the following GA's (in blue text in Table 1) as "high priority" restoration areas: Lower SF Asotin, Lower NF Asotin, Lower George, Upper Asotin and Charlie Creek. All of these, with the exception of Lower George, were also identified as priority for protection. These areas were chosen as prime targets for restoration because of the high scaled restoration rankings for steelhead, spring chinook or both, consideration of empirical data and the results of previous planning and assessment efforts. The subbasin assessment did not prioritize GA's within this group in light of the approximate nature of some of the environmental data used in the EDT analysis.

The major difference between the top five restoration areas targeted by the assessment and the unscaled EDT analysis is the exclusion of Lower Asotin, Middle Asotin and Pintler, and the inclusion of Lower SF Asotin. The decision to exclude Lower and Middle Asotin was based on the fact that the EDT analysis identified them as key restoration reaches only for spring chinook, as well as the fact that these areas are the most intensively developed in the watershed. The degree of development in these reaches makes it very unlikely that a meaningful degree of historical habitat quality can be restored. Pintler Creek was omitted because the scaled results that the assessment conclusions relied heavily on ranked it very low for restoration value. Finally, Lower SF Asotin was included because it is clearly[2] one of the areas with highest steelhead and spring chinook restoration potential on a scaled basis -- that is to say, this relatively small geographic area is clearly in the top five in terms of restoration potential per mile.

Although the top five restoration areas from the EDT analysis and the Asotin Assessment are clearly vital to the restoration of a significant measure of historical production, they are not by any means the whole story. The top five areas for restoration from the EDT analysis account for 22%, 69% and 43% of the total intra-Asotin restoration potential for life history diversity, productivity and mean abundance, respectively. Figures for the top five restoration areas from the Asotin Assessment are similar: the proportion of total Subbasin restoration potential represented by the Assessment areas is 21%, 63% and 35% for life history diversity, productivity and equilibrium abundance. Therefore, the top five geographic areas from the EDT analysis and the Asotin assessment are similar in their potential effects and are distinguished from the remaining eight areas mainly by their superior productivity potential. The implication of the latter point is that a habitat program restricted only to either of the top five restoration areas would increase productivity much more than abundance.

Critical Environmental Attributes in Key Geographic Areas

The specific environmental conditions most responsible for depressed steelhead production in Asotin Creek are similar among the top five restoration areas from EDT and the Assessment, and throughout the Subbasin generally. Although maximum temperature, salmon carcasses, benthic production, anthropogenic confinement, hatchery fish outplants and several flow parameters (low flow, high flow and flow flashiness) depress productivity slightly in some GA's, none of these factors rises to the highest level of severity in any area. On the other hand, woody debris and riparian function receive the highest rating for severity in, respectively, all GA's and all areas but one. Of the remaining attributes receiving at least one "most severe" rating, the incidence is quite similar between the top five EDT and Assessment reaches and the entire subbasin. The precise frequency with which environmental attributes are rated most severe is shown in Figure 1 for the subbasin as a whole and for the top five restoration reaches from the EDT analysis and the Assessment. Table 4 compares numerical productivity differentials among critical attributes across all GA's both in terms of the maximum impact for limiting life stages and in terms of the average impact. From this comparison, it is evident that the most important limiting environmental attributes in the Asotin Subbasin are turbidity, embeddedness, fine sediment, riparian function, bed scour and woody debris.

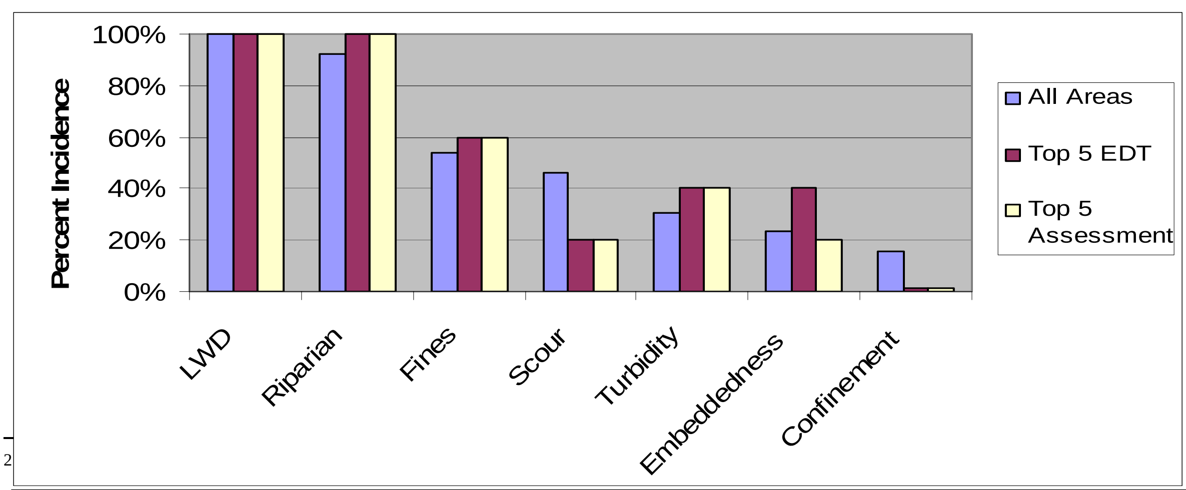

Figure 1 Comparison of the frequency with which environmental attributes are rated most severe for the top five restoration areas from the EDT analysis, for the top five restoration areas from the Asotin Subbasin Assessment, and for all geographic areas.

Table 4 Maximum and mean impact of all critical environmental attributes across all Geographic Areas.

	Historical-Current Productivity Differential	
Critical Attribute	Maximum across all Geographic Areas	Average across all Geographic Areas
Benthic Production	0.04	0.01
Flow High	0.04	0.01
Hatchery Fish Outplants	0.06	0.01
Flow Flashiness	0.06	0.01
Maximum Temperature	0.09	0.01
Low Flow	0.09	0.02
Salmon Carcases	0.16	0.02
Anthropogenic Confinement	0.43	0.09
Turbidity	1.07	0.28
Embeddedness	1.60	0.36
Fine Sediment	1.82	0.39
Riparian Function	1.85	0.43
Bed Scour	2.17	0.49
Woody Debris	2.24	0.67

Changes in Habitat Quantity by Geographic Area: Role of Key Habitat Loss

While Table 1 summarizes changes in habitat quality from historical times to the present, Table 2 summarizes quantitative changes in habitat. Specifically, Table 2 identifies the life stages with the lowest productivity rates relative to historical estimates, it identifies key habitat types for these life stages, and it shows the relative loss or gain in key habitat by GA.

Several conclusions can be drawn from Table 2. The first is that the suite of limiting life stages is quite similar throughout the Subbasin. Incubation is a key life stage in every geographic area in the drainage, overwintering is key in ten of thirteen areas, and fry colonization and subyearling active rearing are key in nine of thirteen. Adult life stages (spawner, pre-spawning migrant or holding) are not key in any GA. A related conclusion is that a lack of key habitat does not appear to be responsible for much of the loss of production potential. Indeed, the sheer area of spawning habitat in the subbasin under current conditions has increased in most areas. To be sure, this quantitative increase entails an even more pronounced decrease in quality -- the substitution of low quality glides for high quality pool tailouts and riffles – but a simple decrease in the area of spawning habitat does not play a significant role in depressing current production potential.

By contrast, the lack of pool habitat, and habitat features related to pools, such as tailouts and backwater pools, do seem to be significant. In almost every GA, the quantity of key habitat for life stages requiring some type of pool habitat has decreased. Clearly, an enhancement program that significantly increased the area of pools, tailouts and backwater pools would benefit steelhead production both in terms of supplying needed habitat for certain life stages (fry colonization, juvenile overwintering, subyearling rearing) and improving the quality of habitat for others (spawning and incubation).

Project Inventory

Since 1996, a total of 581 fish habitat-related projects have been implemented in the Asotin Subbasin (5 are incomplete at present). Of this number, 451 affected habitat directly, while 55 dealt with administration, 48 addressed public education and information, 14 consisted of project evaluation and 13 involved equipment.

These projects are quite diverse, both in kind and (especially) in scale (see Appendix XX). In very general terms, 60% of the projects addressed upland issues, 23.9% were riparian restoration projects, 13.3% were instream projects and 2.7% consisted of monitoring activities. Table 5 analyzes the focus of these projects in slightly greater detail. Table 5 shows that over 60% of recent projects have targeted sedimentation, at least in part. Approximately a quarter of projects have targeted water quality and/or riparian function, and slightly over 15% have attempted to increase the quantity of instream habitat.

Table 5 General focus of projects implemented in the Asotin Subbasin since 1996 expressed in terms of the proportion of the total number of projects with direct habitat impacts.

General Focus of Project	Proportion of Projects
Geomorphic instability and insufficient instream habitat	16.3%
Sedimentation	32.9%
Sedimentation and agriculture development	21.5%
Water quality	0.5%
Water quality and riparian function	22.9%
Water quality and sedimentation	1.2%
Water quality, agriculture development and sedimentation	2.4%
Water quality, sedimentation, riparian function and agriculture development	2.2%

The actual activities these projects entail are extremely diverse and are summarized in Appendix XX. At this point it is sufficient simply to describe the range of activities, which, in alphabetical order, include: direct seeding, erosion control (critical area planting, grassed waterways, conservation cover), drip irrigation, instream habitat construction/bioengineering, pond construction, establishment of permanent grasses/pastures/haylands, pipeline installation, reforestation/tree planting, sediment basin construction/repair/maintenance, spring development, terrace construction and building water gaps and windbreaks.

It is to some degree instructive to analyze the "fit" between the current diagnosis and these projects. Useful guidance for future enhancement actions can be found by examining the degree to which recent projects have targeted the key GA's and critical attributes in within key GA's.
It is, however, possible to make too much of such a comparison. This is so partly because of the temporal disjunction between projects and diagnosis mentioned earlier. To reiterate, most of the projects were conceived a decade or more ago, when the diagnostic picture was probably quite different. The projects analyzed here may well have fit the diagnosis for 1984 quite well. The point is not to become locked into a static picture of environmental needs in the subbasin, but to update the diagnosis and "treatments" to highlight the work that remains to be done. Put another way, it is important to know when a specific treatment has outlived it usefulness.

Yet another difficulty in assessing the congruence between recent projects and the diagnosis is that it is difficult to quantify the effectiveness of a particular project and the relative effectiveness across projects. This difficulty lies not just in the inability to determine whether the project actually "worked", but in determining precisely which attributes were impacted, effectively or not. An illustration of the latter difficulty can be seen in the analysis of riparian projects, specifically of tree planting projects. Such a project potentially affects a fair number of environmental attributes. In this analysis, beneficial effects on fine sediment, riparian function, maximum and minimum temperature, turbidity and woody debris were assumed. The same is true of almost every other kind of project: multiple environmental attributes are at least potentially affected. Therefore the number of attributes assumed to be affected by the 451 projects with direct impacts on habitat is much larger then the number of projects. In this case, there are 2,808 "hits" – impacted attributes in specific areas – for 451 projects.

The geographic congruence between the current diagnosis and the last nine years' projects is shown in Table 6. The information in Table 6 shows that recent projects have been widely distributed and have disproportionately targeted GA's with high restoration potential. All geographic areas but one – the Upper NF Asotin – have received at least some attention. Over 60% of recent projects have targeted the Pintler Creek, lower George Creek and the upper Asotin Creek GA's. This (very approximate) allocation of effort is roughly consistent with the current diagnosis, as Pintler Cr, lower George and the upper Asotin areas are ranked 3, 4 and 1, respectively, on the unscaled list of priority restoration areas. In the future, however, considerably more effort should be directed toward the Charlie Creek, Lower NF Asotin and lower SF Asotin GA's.

Table 6 Approximate allocation of effort by Geographic Area among fish habitat projects implemented in Asotin Creek since 1996.

Geographic Area	Unscaled Preservation Value	Unscaled Restoration Potential	Projects	% Total Projects
Pintler (mouth to access limit)	13	3	192	37.2%
Upper Asotin (above Headgate Dam to forks)	3	1	87	16.9%
Lower George (mouth to Wormell)	9	4	77	14.9%
Middle Asotin (George to Headgate Dam incl.)	5	10	44	8.5%
Charley (mouth to access limit)	2	2	36	7.0%
Lower SF (mouth to Alder)	6	7	26	5.0%
Upper George (Wormell to access limit)	12	6	22	4.3%
Lower Asotin (mouth to George)	8	8	21	4.1%
NF Tribs (Lick, SF of NF, Middle Branch)	10	9	4	0.8%
Upper George Tribs (Wormell Heffelfinger Coombs)	11	12	3	0.6%
Lower NF (mouth to SF of NF)	1	5	3	0.6%
Upper SF (Alder to access limit)	4	11	1	0.2%
Upper NF (SF of NF to access limit)	7	13	0	0.0%
TOTAL			516	100.0%

Table 7 Allocation of habitat restoration effort, expressed in terms of "hits", across geographic areas and critical environmental attributes for projects implemented in Asotin Creek since 1996.

	Quantity of Habitat				Quality of Habitat							
Geographic Area	Channel Length	Minimum Channel Width	Primary Pools	Pool Tailouts	Temperature	BedScour	Embeddedness	Fine Sediment	Turbidity	Riparian Function	WoodyDebris	**Total by Geographic Area**
Charley (mouth to access limit)	6	4	4	4	35	1	7	36	36	36	35	**204**
Lower Asotin (mouth to George)	2	2	2	2	2	6	21	21	21	8	2	**89**
Lower George (mouth to Wormell)	2	2	2	2	2	6	21	21	21	8	2	**89**
Lower NF (mouth to SF of NF)	11	9	9	9	17	43	74	80	80	60	17	**409**
Lower SF (mouth to Alder)	6	5	5	5	15	9	17	26	26	24	15	**153**
Middle Asotin (George to Headgate Dam incl.)	20	13	13	13	24	8	40	44	44	32	24	**275**
NF Tribs (Lick, SF of NF, Middle Branch)	1	0	0	0	3	1	2	4	4	4	3	**22**
Pintler (mouth to access limit)	13	3	3	3	16	95	189	192	192	111	16	**833**
Upper Asotin (above Headgate Dam to forks)	44	31	31	31	59	25	72	87	87	84	59	**610**
Upper George (Wormell to access limit)	10	0	0	0	10	2	22	22	22	12	10	**110**
Upper George Tribs (Wormell Heffelfinger Coombs)	0	0	0	0	0	0	3	3	3	0	0	**9**
Upper NF (SF of NF to access limit)	0	0	0	0	0	0	0	0	0	0	0	**0**
Upper SF (Alder to access limit)	0	0	0	0	0	1	1	1	1	1	0	**5**
Total by Environmental Attribute	**115**	**69**	**69**	**69**	**183**	**197**	**469**	**537**	**537**	**380**	**183**	**2808**