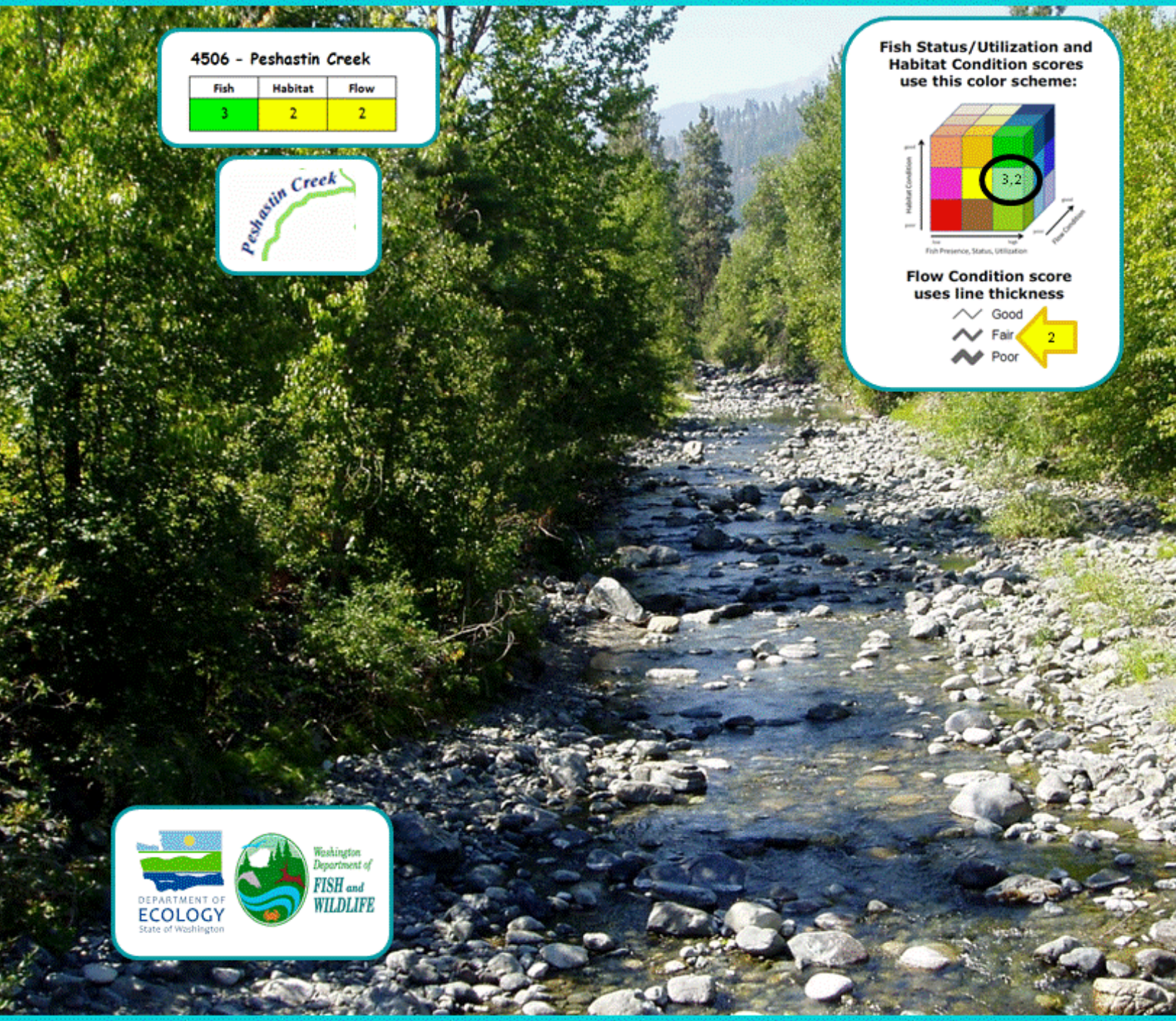
Columbia River Instream Atlas Project

Washington Department of Fish and Wildlife

Final Report – APPENDIX E

WRIA 45 WENATCHEE



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Columbia River Instream Atlas Project - Final Report Appendix E –WRIA 45 Wenatchee

September 23, 2011

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Final Report

Appendix E – WRIA 45 Wenatchee River

September 23, 2011

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1. Description

The Wenatchee subbasin is located in north-central Washington and lies entirely within Chelan County. The WRIA extends from the snowfields, glaciers and steep, forested Cascade Mountains, through orchards in the Wenatchee River Valley, to the shrub-steppe of the eastern watershed at the confluence of the Wenatchee and Columbia Rivers. About 90% of the approximately 854,000 acre subbasin is in public ownership. The remaining 10% is privately owned and is primarily within the valley bottoms. The subbasin consists of nine primary watersheds: Mission, Peshastin, Chumstick, Icicle, Chiwaukum, and Nason creeks, the Chiwawa, White, and Little

Wenatchee rivers, and two mainstem Wenatchee River "watersheds:" the lower and upper Wenatchee River (the upper river includes Lake Wenatchee). Spring Chinook, steelhead, and bull trout spawn and rear in the subbasin[1].

2. Reach Definitions

Most stream reaches in the Wenatchee basin were delineated using the 2002 Water Acquisition priorities stream reaches. Seven streams were added and upper reach extents included confluences of large tributaries and a barrier on Chiwaukum Creek. Most streams in the basin extend into public lands (Forest Service) and there are few, if any opportunities for stream flow augmentation beyond these boundaries. All streams downstream reaches begin at the stream mouths except for the mainstem Wenatchee River's middle and upper reaches. Reaches in the Wenatchee subbasin were defined largely on physical differences in the tributaries and not reliant on water diversions. This was based on the diversity of each stream as influences from smaller tributaries would change habitat and flow for the stream being evaluated. For example, Mission Creek extends to the Sand Creek confluence where the contribution of water into Mission Creek is substantial, therefore considerably changing the stream's habitat downstream. In some reaches, there was still an effort to use a physical location immediately upstream of the uppermost diversion point.

Table E-1 Reach Definitions

Stream Name	Code	Stream Reach Description
Wenatchee River (Reach 1)	4501	Mouth to middle of Leavenworth
Wenatchee River (Reach 2)	4502	Middle of Leavenworth to Tumwater Canyon / Campground
Wenatchee River (Reach 3)	4503	Tumwater Canyon / Campground to Lake Wenatchee
Mission Creek	4504	Mouth to Sand Creek
Brender Creek	4505	Mouth to Brisky Canyon Creek
Peshastin Creek	4506	Mouth to Ingalls Creek
Ingalls Creek	4507	Mouth to Ingalls Creek trailhead
Derby Canyon	4508	Mouth to North Fork Derby Canyon
Chumstick Creek	4509	Mouth to Little Chumstick Creek
Eagle Creek	4510	Mouth to Van Creek
Little Chumstick Creek	4511	Mouth to headwaters
Icicle Creek	4512	Mouth to Bridge Creek
Chiwaukum Creek	4513	Mouth to Barrier
Sand Creek	4514	Mouth to GIS RM 2
Skinney Creek	4515	Mouth to SW of Winton
Beaver Creek	4516	Mouth to Beaver Creek forks
Chiwawa River	4517	Mouth to Deep Creek

[1] Adapted from Northwest Power and Conservation Council 2005g and Upper Columbia Salmon Recovery Board 2007

3. WRIA Results

Fish Status and Utilization

TRT designation was not considered in this rating but is available on the spreadsheets for inclusion in future evaluations. See the Methods Appendix for additional information regarding the Fish Status/Utilization rating procedures.

Nine salmonid stocks utilize the Wenatchee River Basin. Of these, four stocks are Spring Chinook and their status is complicated. Historically WDFW has recognized four separate stocks of spring Chinook in the SaSI ratings and continue to do so. Recent genetic analysis suggests that the stocks may actually be one stock or an integration of several stocks. WDFW manage the stocks as one stock for fisheries even though they are separated in SaSI. All spring Chinook stocks are listed as Endangered under ESA. Chiwawa and Nason Creek Spring Chinook stock status are listed in SaSI as depressed where as Little Wenatchee and White River Spring Chinook are listed as critical. The weighting of spring Chinook stocks are handled differently in the Wenatchee River Basin compared to the other basins. Rather than tracking the stocks independently, it is assumed that if spring Chinook are found in a reach then all four stocks are present in that reach. This is based on combining SaSI status and fisheries management as well as the reach definitions utilized in this report. Nason Creek, Little Wenatchee, and White River are not evaluated in this project and are upstream of Chiwawa Creek (the most upstream defined reach in the project). Therefore presence of spring Chinook in tributaries below Chiwawa Creek could potentially be all four stocks.

The status of three of the remaining five stocks is not as complicated as the spring Chinook. Wenatchee Summer Chinook and Wenatchee Sockeye are not listed under ESA and are considered healthy where as Wenatchee Summer Steelhead are listed as endangered and depressed.

Coho stock is a little more complicated because the endemic stock was extirpated from the Wenatchee Basin in the early 1900s. The federal ESA and Washington State SaSI do not recognize or address extinct or extirpated species. The present stock is a reintroduced hatchery stock associated with efforts by the Yakama Nation to bring Coho salmon back to the Wenatchee Basin. For this project Coho in the Wenatchee River Basin are considered as not listed under ESA with an unknown status.

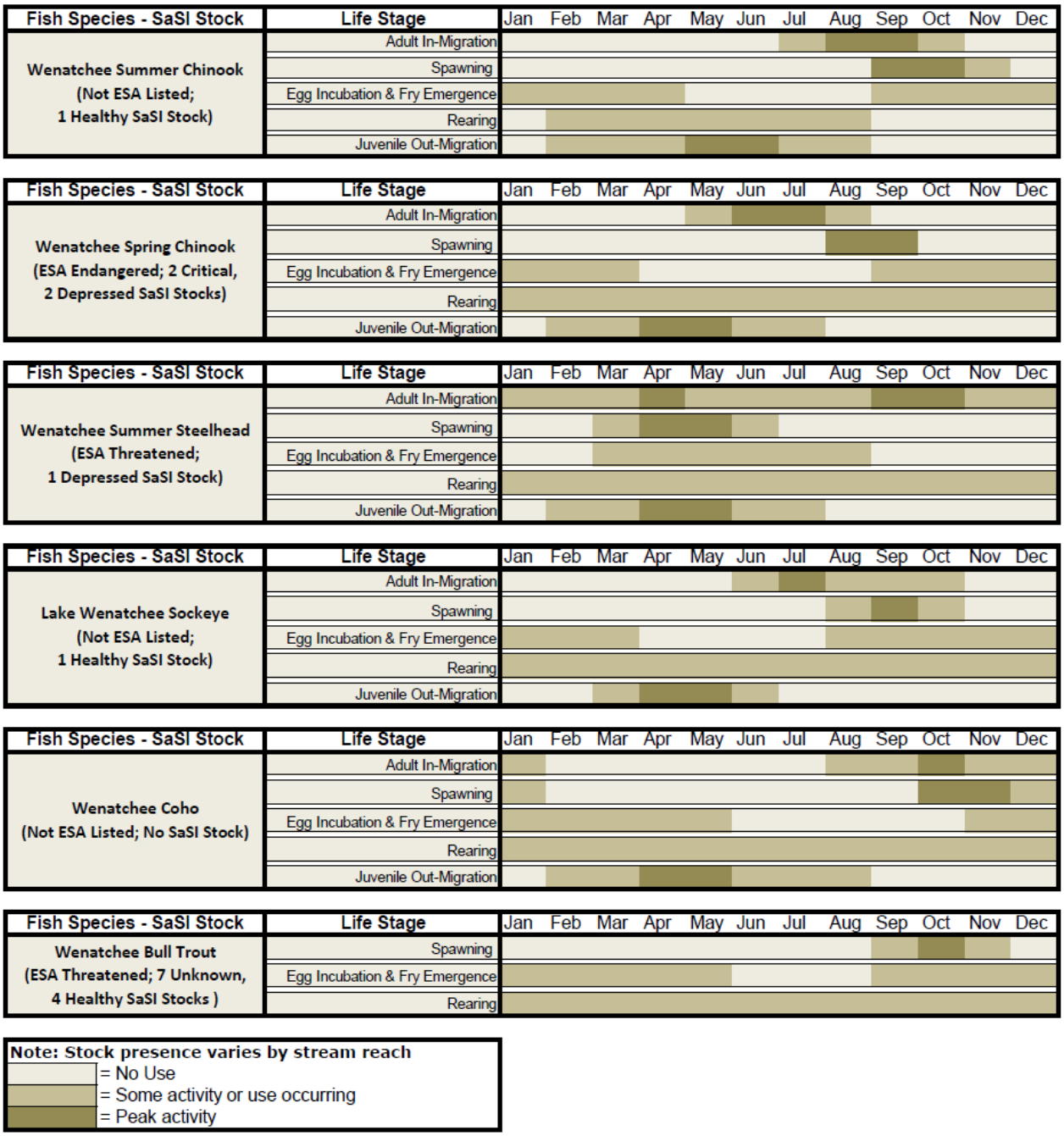
The remaining stock is bull trout. Like spring Chinook SaSI lists multiple bull trout stocks within the basin but even less is known about bull trout. Even though bull trout show site fidelity indicating a potential for multiple stocks, genetic analysis has not been completed to verify separate stocks. For this project bull trout stocks have been lumped into a single stock. The status for the single stock of bull trout is listed as threatened under ESA and status unknown.

The weighting factor (ESA and SaSI) for the each stock will remain the same within the basin whereas the life cycle stages and duration will change depending on the stream reach. Stock SaSI status and ESA listing will not be repeated for each stream reach.

Table E-2 SaSI Stock Name, Status, ESA Listing Unit, & Listing Status

SaSI Stock name	SaSI Status	ESA Unit Name	ESA Listing Status
Wenatchee Summer Chinook	Healthy	Upper Columbia River Summer and Fall Run Chinook	Not Warranted
Chiwawa Spring Chinook	Depressed	Upper Columbia River Spring Run Chinook	Endangered
Nason Creek Spring Chinook	Depressed		
Little Wenatchee Spring Chinook	Critical		
White River (Wenatchee) Spring Chinook	Critical		
Wenatchee Sockeye	Depressed	Lake Wenatchee Sockeye	Not Warranted
Wenatchee Summer Steelhead	Depressed	Upper Columbia Steelhead	Endangered
Ingalls Creek Bull Trout	Unknown	Upper Columbia River Bull Trout	Threatened
Icicle Creek Bull Trout/Dolly Varden	Unknown		
Chiwaukum Creek Bull Trout/Dolly Varden	Unknown		
Chiwawa Bull Trout/Dolly Varden	Unknown		
Chikamin Creek Bull Trout/Dolly Varden	Healthy		
Rock Creek Bull Trout	Healthy		
Phelps Creek Bull Trout	Healthy		
Nason Creek Bull Trout/Dolly Varden	Unknown		
Little Wenatchee Bull Trout/Dolly Varden	Unknown		
White (Wenatchee) Bull Trout/Dolly Varden	Unknown		
Panther Creek Bull Trout/Dolly Varden	Healthy		
Coho - SaSI stock not assigned	Unknown	n/a	n/a

Table E-3 Fish status & utilization periodicity for five life cycle stages.



Color / Bin Score
3 = High/Good
2 = Average / Fair
1 = Low / Poor

Table E-4 Fish status/utilization score & bin by stream reach.

Code	Reach Name	Prioritization Score	Normalized Score	Bin
4501	Wenatchee River (Reach 1)	466	0.80	3
4502	Wenatchee River (Reach 2)	578	0.99	3
4503	Wenatchee River (Reach 3)	586	1.00	3
4504	Mission Creek	335	0.57	2
4505	Brender Creek	335	0.57	2
4506	Peshastin Creek	521	0.89	3
4507	Ingalls Creek	541	0.92	3
4508	Derby Canyon	283	0.48	2
4509	Chumstick Creek	335	0.57	2
4510	Eagle Creek	335	0.57	2
4511	Little Chumstick Creek	56	0.10	1
4512	Icicle Creek	558	0.95	3
4513	Chiwaukum Creek	560	0.96	3
4514	Sand Creek	108	0.18	1
4515	Skinney Creek	335	0.57	2
4516	Beaver Creek	335	0.57	2
4517	Chiwawa River	569	0.97	3

Habitat Condition

Three main literature reviews were used as the starting point of habitat scoring within the Wenatchee basin. These consisted of the Wenatchee River Subbasin Plan, the 2001 Limiting Factors Analysis, and the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan.

Habitat condition scores within the Wenatchee basin were scored based on the six habitat attributes in Appendix A. This habitat scoring evaluation varied greatly from downstream tributaries when compared to the upstream or higher elevation area streams. In general, the larger streams rated higher scores of habitat condition and the upper Wenatchee basin high elevation streams with snowpack-based run-off having cooler, cleaner water. Smaller and lower elevation and streams are often over appropriated such as Mission Creek, tributary of the Wenatchee River near Cashmere, Washington. Therefore, the habitat scores calculated out as poor. Higher elevation streams scored higher as they normally had less agriculture land use and higher percentages of canopy cover.

Most evaluated streams rated as ‘fair’ habitat when the scoring was divided into thirds. In fact, 10 of the 17 streams scored fell into the ‘fair’ habitat score tier and only three calculated out as ‘good’ habitat scores, and four scored as ‘poor’ overall habitat conditions.

Most streams, except for three scored 'fair'-to-'poor' for floodplain connectivity, which distinguishes more channelized systems. Better scores, mostly in the 'good' range, were found for spawning, rearing, and passage conditions. 'Fair' to 'good' conditions were mainly scored for the other two indicators of off-channel habitat and riparian conditions.

Table E-5 Habitat condition score & bin by stream reach.

Color / Bin Score
3 = High/Good
2 = Average / Fair
1 = Low / Poor

Code	Reach Name	Prioritization Score	Bin
4501	Wenatchee River (Reach 1)	14	2
4502	Wenatchee River (Reach 2)	16	3
4503	Wenatchee River (Reach 3)	15	2
4504	Mission Creek	7	1
4505	Brender Creek	9	1
4506	Peshastin Creek	12	2
4507	Ingalls Creek	13	2
4508	Derby Canyon	9	1
4509	Chumstick Creek	11	2
4510	Eagle Creek	11	2
4511	Little Chumstick Creek	14	2
4512	Icicle Creek	15	2
4513	Chiwaukum Creek	16	3
4514	Sand Creek	8	1
4515	Skinney Creek	11	2
4516	Beaver Creek	15	2
4517	Chiwawa River	21	3

Flow Condition

Snowmelt is a primary source of late summer and fall stream flow in the Wenatchee Watershed. Variability in winter precipitation results in highly variable stream flow, especially in late summer and early fall (July-October). Water demand is highest during the period when stream flows are lowest. In 1983, regulations were established governing how water would be managed on the Wenatchee River, Mission Creek and Icicle Creek. The rule was adopted to protect stream flows, fisheries, and existing water rights. It also closed new allocations of water on Peshastin Creek between June 15 and Oct. 15. In 2007, amendments to that rule revised existing stream flow levels, set aside a reservation of 4 cubic feet per second for future use, and established a maximum amount of water that may be allocated from the Wenatchee River and its tributaries.

The hydrograph for the lower Wenatchee shows increasing flows through the spring, peaking in early June, then falling dramatically through the summer months. Many of Wenatchee's tributaries show unusual hydrographs, with peaks early in the year

dropping to very low flows from May through October (Mission, Peshastin, Chumstick, and Eagle Creeks). Mainstem Wenatchee River flows are typically above the WAC instream flow rules, with September being the most problematic month in drier years. Flows at the Mission and Peshastin Creek control points are below WAC instream flows during average water years in summer and fall months. Average year flows in Icicle Creek are above the WAC instream flow, with August and September being the most likely months for deficits in dry water years.

WRIA 45 is one basin that Ecology manages for instream flow conditions throughout the year (Table E-6). Water right permit holders who are subject to instream flows set in WAC can be regulated – shut off – when actual stream flows fall below the WAC values. WAC Instream flows are measured in the Wenatchee River at Monitor (USGS # 12462500), Peshastin (USGS # 12459000), and Plain (USGS # 12457000), in Mission Creek (ECY 45E070), Peshastin Creek (ECY Gage# 45F070), Icicle Creek (USGS # 12458000), and Nason Creek (not a stream evaluated for CRIA). Six of the 17 CRIA reaches do not have gauges.

Table E-6 Minimum Instream Flows set in Chapter 173-545 WAC

Time Period		Reach 4501 Wenatchee River at Monitor USGS Gage 12462500	Reach 4502 Wenatchee River at Peshastin USGS Gage 12459000	Reach 4503 Wenatchee River at Plain USGS Gage 12457000	Reach 4506 Peshastin Creek at Green Bridge Road ECY Gage 45F070	Reach 4512 Icicle Creek above Snow Creek near Leavenworth USGS Gage 12458000	Nason Creek* near mouth ECY Gage 45J070
Jan	1	1867	1933	550	53	267	120
	15	1867	1933	550	53	267	120
Feb	1	1867	1933	550	53	267	120
	15	2400	2800	550	120	566	160
Mar	1	2400	2800	550	120	518	160
	15	2400	2800	700	120	518	160
Apr	1	2400	2800	910	120	650	160
	15	2400	2800	1150	120	650	160
May	1	2400	2800	1500	120	650	160
	15	2400	2800	2000	120	650	160
Jun	1	2400	2800	2500	120	650	160
	15	1600	1933	2000	110	550	210
Jul	1	1600	1933	1500	110	550	210
	15	1600	1933	1200	110	550	210
Aug	1	1600	1933	880	80	400	180
	15	900	1400	700	80	343	180
Sep	1	900	1311	660	80	275	165
	15	1338	1311	620	80	275	165

Time Period		Reach 4501 Wenatchee River at Monitor USGS Gage 12462500	Reach 4502 Wenatchee River at Peshastin USGS Gage 12459000	Reach 4503 Wenatchee River at Plain USGS Gage 12457000	Reach 4506 Peshastin Creek at Green Bridge Road ECY Gage 45F070	Reach 4512 Icicle Creek above Snow Creek near Leavenworth USGS Gage 12458000	Nason Creek* near mouth ECY Gage 45J070
Oct	1	1723	1932	580	53	267	120
	15	2427	2672	520	53	267	120
Nov	1	2800	2900	550	53	267	120
	15	2800	2900	550	53	267	120
Dec	1	1867	1933	550	53	267	120
	15	1867	1933	550	53	267	120

* Nason Creek is not evaluated for CRIA.

Table E-7 Flow condition score & bin by stream reach

Code	Reach Name	Prioritization Score	Bin
4501	Wenatchee River (Reach 1)	4	3
4502	Wenatchee River (Reach 2)	3	3
4503	Wenatchee River (Reach 3)	4	3
4504	Mission Creek	27	1
4505	Brender Creek	20	1
4506	Peshastin Creek	9	2
4507	Ingalls Creek	8	2
4508	Derby Canyon	24	1
4509	Chumstick Creek	21	1
4510	Eagle Creek	28	1
4511	Little Chumstick Creek	9	2
4512	Icicle Creek	8	2
4513	Chiwaukum Creek	6	3
4514	Sand Creek	9	2
4515	Skinney Creek	24	1
4516	Beaver Creek	18	2
4517	Chiwawa River	6	3

Color / Bin Score
3 = High/Good
2 = Average / Fair
1 = Low / Poor

4. Reach Results

4501 - Wenatchee River (Reach 1):

Fish	Habitat	Flow
3	2	3

Fish Status/Utilization

The Wenatchee River (Reach 1) is rated 'high' for fish utilization. The four spring Chinook stocks, Wenatchee Sockeye, and bull trout utilize this reach for rearing and adult migration life cycle stages. In contrast Coho, Wenatchee Summer Chinook and Wenatchee Summer Steelhead use Wenatchee River (Reach 1) for spawning, rearing and adult migration.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Habitat available for fish in the Wenatchee River (Reach 1) is rated as 'fair.' The majority of this reach is suitable for salmonid spawning but only a moderate portion of the reach is suitable for juvenile rearing. Only 10 – 50 % of the length of this reach has available off-channel habitat and up to 50% of the floodplain connectivity has been lost. In addition, there is a moderate loss of riparian condition with 70 – 80% of native growth forms intact. And finally, fish passage conditions are somewhat impaired during low flows.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:Yes The minimum of monthly mean flows in this reach is 692 cfs in September and the peak is 8,315 cfs in May. Minimum flow is 21 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversions evaluated for this project represent 9 percent of the Mean Annual Flow; reaches with diversions more than 15% of Mean Annual Flow scored 'poor' for this scoring component. The instream flow rule is higher than Mean Annual Flow in 1 month of the year, on average.

Flow Scoring Detail is provided on Table E-10.

4502 - Wenatchee River (Reach 2)

Fish	Habitat	Flow
3	3	3

Fish Utilization

Wenatchee River (Reach 2) also ranks 'high' for Fish Status/Utilization but the stocks express additional life cycle stages in reach 2 as opposed to reach 1. Wenatchee spring Chinook, in addition to Wenatchee Summer Chinook, Wenatchee Steelhead and Coho spawn, rear, and migrate in this portion of the Wenatchee River. Wenatchee Sockeye and bull trout limit the life cycle stages to rearing and adult migration in this reach.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Wenatchee River (Reach 2) has a 'good' habitat rating. The majority of this reach is suitable for spawning and rearing with minor impediments to salmonid passage at low flows. Although off-channel habitat is limited to 10 – 50% of the reach, only up to 20% of the floodplain has been disconnected from surface flows. The riparian area associated with this reach maintains 70 – 80% intactness of native growth forms and a moderate loss in condition.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:Yes The minimum of monthly mean flows in this reach is 708 cfs in September and the peak is 7,771 cfs in May. Minimum flow is 23 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversions evaluated for this project represent less than 1 percent of the Mean Annual Flow; reaches with diversions less than 5% of Mean Annual Flow scored 'good' for this scoring component. The instream flow rule is higher than Mean Annual Flow in 1 month of the year, on average.

Flow Scoring Detail is provided on Table E-10.

4503 - Wenatchee River (Reach 3)

Fish	Habitat	Flow
3	2	3

Fish Utilization

Wenatchee River (Reach 3) is the uppermost reach evaluated in the Lower Wenatchee subbasin. Fish Status/Utilization rates 'high' for this reach. Adults of all nine stocks

use this reach as a migration corridor. Bull trout is the only stock that does not spawn in this reach. All nine stocks utilize Wenatchee River (Reach 3) for rearing.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

The habitat rating for Wenatchee River (Reach 3) is 'good.' The majority of the reach is suitable for salmonid spawning and rearing with minor impediments to salmonid passage during low flows. Off channel habitat is only available along 10 – 50% of this reach whereas up to 50% of the floodplain connectivity has been lost. Seventy to 80% of the riparian native growth forms remain intact.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:Yes The minimum of monthly mean flows in this reach is 533 cfs in September and the peak is 5,708 cfs in June . Minimum flow is 24 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversions evaluated for this project represent less than 1 percent of the Mean Annual Flow; reaches with diversions less than 5% of Mean Annual Flow scored 'good' for this scoring component. The instream flow rule is higher than Mean Annual Flow in 1 month of the year, on average.

Flow Scoring Detail is provided on Table E-10.

4504 - Mission Creek

Fish	Habitat	Flow
2	1	1

Fish Utilization

Fish Status/Utilization for Mission Creek, a tributary of the Wenatchee River, rates 'average.' Wenatchee Sockeye stock is not present in this reach whereas the other eight stocks use the creek for juvenile rearing. Wenatchee Summer Steelhead and Coho utilize Mission Creek for all three life cycle stages.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

The habitat rating for Mission Creek is 'poor.' There is little to no off channel habitat, floodplain connectivity has been reduced to less than 50% and less than 70% of available native growth forms remain intact. In addition there are numerous artificial barriers that impede upstream and downstream salmonid migration at a broad range of flows. Mission Creek has a major reduction in suitable spawning habitat whereas only a moderate portion of the stream reach is suitable for salmonid rearing.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:No The minimum of monthly mean flows in this reach is 1 cfs in August and the peak is 44 cfs in March . Minimum flow is 4 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversion data used for this evaluation exceed the Mean Annual Flow.

Flow Scoring Detail is provided on Table E-10.

4505 - Brender Creek

Fish	Habitat	Flow
2	1	1

Fish Utilization

Brender Creek is a tributary to Mission Creek and the eight stocks that use Mission Creek are also found in Brender Creek. Wenatchee Summer Steelhead and Coho use this reach for spawning, rearing and adult migration life cycle stages. In contrast Wenatchee Spring Chinook, Wenatchee Summer Chinook, and bull trout utilize Brender Creek for rearing. Wenatchee Sockeye stock is not present in Brender Creek. As a result of the life cycle stages and duration of use expressed above, this reach has an 'average' Fish Status/Utilization rating.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Brender Creek rates 'poor' for salmonid habitat. Up to 50% of the floodplain connectivity has been lost along with 90% of the off channel habitat. The riparian condition has been severely reduced providing inadequate salmonid habitat. A moderate portion of the reach is suitable for salmonid spawning and rearing but numerous artificial barriers and /or riffles impede upstream and/or downstream salmonid migration at a broad range of flows.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:No The minimum of monthly mean flows in this reach is 1 cfs in November and the peak is 5 cfs in March . Minimum flow is 49 percent of the average; reaches with August flows between 33% and 66% of average scored 'fair' for this component of the flow element score. The hydrograph for this reach shows two peaks for this reach, in April-May and again in September. This might be linked to irrigation diversions in summer months.

Flow Scoring Detail is provided on Table E-10.

4506 - Peshastin Creek

Fish	Habitat	Flow
3	2	2

Fish Utilization

Fish Status/Utilization for Peshastin Creek is rated as 'high.' This tributary to the Wenatchee River supports the life cycle stages of eight stocks. Wenatchee Sockeye is the only stock not present. Wenatchee Spring Chinook, Wenatchee Summer Steelhead, and Coho express spawning, rearing, and adult migration life cycle stages in this creek, whereas bull trout express rearing and adult migration and Wenatchee Summer Chinook rearing.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Peshastin Creek has 10 – 50% of off channel habitat remaining but there has been a severe reduction in floodplain connectivity and riparian condition. The floodplain connectivity has been reduced to less than 50% remaining and the riparian condition to less than 70% of native growth form intact. In contrast a majority of the reach is suitable for salmonid spawning and rearing but a few artificial barriers and/or riffles exist that reduce upstream and/or downstream salmonid migration at low flows. As such, Peshastin Creek rates 'fair' for salmonid habitat.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:Yes The minimum of monthly mean flows in this reach is 15 cfs in August and the peak is 489 cfs in March . Minimum flow is 9 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversions evaluated for this project represent 3 percent of the Mean Annual Flow; reaches with diversions less than 5% of Mean Annual Flow scored 'good' for this scoring component. The instream flow rule is higher than Mean Annual Flow in 4 months of the year, on average.

Flow Scoring Detail is provided on Table E-10.

4507 - Ingalls Creek

Fish	Habitat	Flow
3	2	2

Fish Utilization

Ingalls Creek, a tributary to Peshastin Creek, is rated 'high' for fish utilization. Fish presence is reduced to seven stocks but those stocks express all three life cycle stages. Wenatchee Sockeye and Wenatchee Summer Chinook are not present.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Ingalls Creek has a 'fair' rating for salmonid habitat. Only minor impediments to upstream and/or downstream salmonid migration at low flows exist in this creek. A moderate portion of this reach is suitable for salmonid spawning and rearing. In contrast there has been a moderate reduction of off channel habitat, floodplain connectivity and riparian condition. This equates to 10 – 50% off channel habitat remaining, a loss of up to 50% of floodplain connectivity and only70 – 80% of native growth forms intact.

Additional habitat information is available on Table E-9.

Flow

Gauge:No Rule:No An NHD+ estimated 53 cfs Mean Annual Flow was used to score this reach. No diversion data are available in this reach.

Flow Scoring Detail is provided on Table E-10.

4508 - Derby Canyon

Fish	Habitat	Flow
2	1	1

Fish Utilization

Derby Canyon rates 'low' for fish utilization. This reach is a tributary to the mainstem Wenatchee River but late summer and winter irrigation limits use by salmonids. Bull trout, Coho, Wenatchee Summer Chinook and Wenatchee Spring Chinook stocks only express the juvenile rearing life cycle stage and the amount of time spent rearing may be limited by dewatering. Wenatchee Summer Steelhead is able to spawn, rear, and migrate in Derby Canyon whereas Wenatchee Sockeye is not present.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Numerous artificial barriers and/or riffles exist in Derby Canyon that impede upstream and/or downstream salmonid migration at a broad range of flows. In addition a majority of the reach is unsuitable for salmonid spawning. In contrast, a moderate portion of the stream is suitable for rearing. A moderate reduction in riparian condition and floodplain connectivity has occurred. Riparian condition has been reduced to 70 – 80% of native growth form intactness and floodplain connectivity up to 50% reduction. There is little to no off channel habitat remaining. These habitat conditions lead to a 'poor' salmonid habitat rating.

Additional habitat information is available on Table E-9.

Flow

Gauge:No Rule:No An NHD+ estimated 4 cfs Mean Annual Flow was used to score this reach. Diversions evaluated for this project represent 6 percent of the Mean Annual Flow; reaches with diversions between 5% and 15% of Mean Annual Flow scored 'fair' for this scoring component.

Flow Scoring Detail is provided on Table E-10.

4509 - Chumstick Creek

Fish	Habitat	Flow
2	2	1

Fish Utilization

Chumstick Creek is another primary tributary to the mainstem Wenatchee River. Some of the juveniles from Wenatchee Spring Chinook, and Wenatchee Summer Chinook that spawn in the mainstem move into Chumstick Creek to rear. Bull trout also rear in Chumstick Creek but spawning likely occurs in the headwaters outside the Chumstick reach used for this project. Coho and Wenatchee Summer Steelhead are the only two stocks to express all three life cycle stages in this reach. Wenatchee Sockeye stock is not present here. As a result of the limited expression of life cycle stages in this reach, Fish Status/Utilization is rated as 'average.'

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Salmonid habitat in the Chumstick Creek reach is rated as 'fair,' but bordering on 'poor.' Spawning and rearing habitat is suitable along a moderate portion of the reach whereas a few artificial barriers and/or riffles reduce upstream and/or downstream salmonid migration at low flows. The off channel habitat has been reduced to 10 – 50 % of the reach whereas the floodplain connectivity has been reduced up to 50%. Riparian condition has been severely reduced with less than 70% of the native growth form intact.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:No The minimum of monthly mean flows in this reach is 3 cfs in October and the peak is 34 cfs in April . Minimum flow is 23 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversions evaluated for this project represent 31 percent of the Mean Annual Flow; reaches with diversions more than 15% of Mean Annual Flow scored 'poor' for this scoring component.

Flow Scoring Detail is provided on Table E-10.

4510 - Eagle Creek

Fish	Habitat	Flow
2	2	1

Fish Status/Utilization

Eagle Creek is a tributary to Chumstick Creek and similar Fish Status/Utilization carries into the Eagle Creek reach. Wenatchee Spring Chinook, Wenatchee Summer Chinook and bull trout only utilize this reach for rearing where as Eagle Creek is outside Wenatchee Sockeye range. In contrast Coho and Wenatchee Summer Steelhead are able to express all three life cycle stages in this reach. Eagle Creek also rated 'average' for fish utilization.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Eagle Creek salmonid habitat is rated as 'fair,' bordering on 'poor.' The lowest scoring attribute is passage conditions with numerous artificial barriers and/or riffles within the reach that impede upstream and/or downstream migration. A moderated portion of the reach is suitable for salmonid spawning and rearing. Moderate reduction has occurred in off channel habitat, floodplain connectivity, and riparian condition. The reach has off channel habitat that comprises only 10 – 50% of the reach length, up to 50% of floodplain surface water connectivity is lost and 70 – 80% intactness of native growth forms remain.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:No Spotty gauge data make this a very difficult reach to evaluate. Minimum flow in this reach nears 0 in July-October and the peak is 11 cfs in March . Minimum flow is 3 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversions evaluated for this project represent 64 percent of the Mean Annual Flow; reaches

with diversions more than 15% of Mean Annual Flow scored 'poor' for this scoring component.

Flow Scoring Detail is provided on Table E-10.

4511 - Little Chumstick Creek

Fish	Habitat	Flow
1	2	2

Fish Utilization

Little Chumstick Creek is a small tributary of Chumstick Creek. Due to reach size, location and/or irrigational dewatering, this reach supports very few stocks and life cycle stages. Because of this, Fish Status/Utilization rates as 'low.' Three stocks utilize this reach for rearing only. Those stocks are bull trout, Coho, and Wenatchee Summer Steelhead. The other six stocks are not present in Little Chumstick Creek.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

The Salmonid habitat rating for Little Chumstick Creek is 'fair.' Salmonid passage is adequate for migration except at extremely low flows but spawning and rearing habitat suitability is limited to a moderate portion of the reach. Riparian conditions consist of moderately high level of woody vegetation and more than 80% of the native growth forms intact. Off channel habitat is limited to 10 – 50% of the reach length whereas floodplain connectivity is limited to less than 50 %.

Additional habitat information is available on Table E-9.

Flow

Gauge:No Rule:No An NHD+ estimated 12 cfs Mean Annual Flow was used to score this reach. Mean August flow estimate is 32.8% of the MAF, which yields a 'poor' score for this attribute. No diversion data are available in this reach. In spite of low flows and high variability, this reach bins "fair" in relation to other reaches in the WRIA.

Flow Scoring Detail is provided on Table E-10.

4512 - Icicle Creek

Fish	Habitat	Flow
3	2	2

Fish Utilization

Fish Status/Utilization for Icicle Creek is rated 'high.' This reach is a tributary to the mainstem Wenatchee River that supports life cycle stages of all nine stocks. Wenatchee Spring Chinook, Wenatchee Summer Chinook, Wenatchee Steelhead, Wenatchee Sockeye and Coho utilize Icicle Creek for spawning, rearing and adult migration. The other stock, bull trout, expresses rearing and adult migration life cycle stages.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Salmonid habitat at Icicle Creek is rated as 'good.' The majority of Icicle Creek is suitable for spawning and rearing with only minor impediments to salmonid passage at low flows. In contrast, the off channel habitat has been reduced to 10 – 50 % of the reach and the floodplain connectivity by up to 50%. Riparian condition has been moderately reduced with 70 - 80% of the native growth forms intact.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:Yes The minimum monthly mean flow in this reach is 143 cfs in September and the peak is 1,579 cfs in May. Minimum flow is 24 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component of the flow element score. Diversion data used for this evaluation exceed the Mean Annual Flow. The instream flow rule is higher than minimum Mean Annual Flow in 11 months of the year, but during average flows, instream flow rules are met.

Flow Scoring Detail is provided on Table E-10.

4513 - Chiwaukum Creek

Fish	Habitat	Flow
3	3	3

Fish Utilization

Chiwaukum also has a 'high' Fish Status/Utilization rating. The difference between Chiwaukum Creek and Icicle Creek is that Wenatchee Sockeye stock is not present and bull trout express all three life cycle stages. The other seven stocks also express all three life cycle stages.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

The overall rating of salmonid habitat for Chiwaukum Creek is 'good.' Off channel habitat exists along 50 – 80% of the reach length, and 80% of the surface water connectivity to the floodplain remains. In addition, a majority of the reach is suitable for spawning and rearing. Riparian condition may be one of the week points for salmonid habitat. Woody vegetation is moderately low and 70 – 80% of native growth forms are intact. Another week point may be passage conditions. A few artificial barriers and/or riffles reduce upstream and/or downstream salmonid migration at low flows.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:No The minimum monthly mean flow in this reach is 21 cfs in September and the peak is 281 cfs in June. August flow is 37 percent of the average; reaches with August flows between 33% and 66% of average scored 'fair' for this component of the flow element score. No diversion data are available in this reach.

Flow Scoring Detail is provided on Table E-10.

4514 - Sand Creek

Fish	Habitat	Flow
1	1	2

Fish Utilization

Sand creek is a tributary to Mission Creek and rates 'low' for fish utilization. Wenatchee Summer Steelhead and bull trout are the only stocks found in Sand Creek. Bull trout utilize this reach for juvenile rearing. In contrast, Wenatchee Summer Steelhead expresses all three life cycle stages.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Available salmonid habitat in Sand Creek is rated as 'poor.' Off channel habitat, floodplain connectivity, spawning suitability, and passage conditions received the lowest marks possible. Sand Creek has little or no off channel habitat with less than 50% of floodplain connectivity remaining. In addition the reach has had a major reduction in suitable spawning habitat and numerous artificial barriers and/or riffles within the reach that impede upstream and/or downstream migration at a broad range of flows. A moderate amount of suitable rearing habitat is available and moderate reduction of riparian condition has occurred.

Additional habitat information is available on Table E-9.

Flow

Gauge:No Rule:No An NHD+ estimated 6 cfs Mean Annual Flow was used to score this reach. Estimated mean August flow is 23% of MAF, yielding a 'poor' score for this attribute. No diversion data are available in this reach.

Flow Scoring Detail is provided on Table E-10.

4515 - Skinney Creek

Fish	Habitat	Flow
2	2	1

Fish Utilization

Skinney Creek, a tributary to the Chiwaukum Creek, has a rating of 'average' for fish utilization. Wenatchee Sockeye is not present in the creek whereas Coho and Wenatchee Summer Steelhead express spawning, rearing and migration behavior. Bull trout Wenatchee Summer Chinook and Wenatchee Spring Chinook use this stream for rearing.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Skinney Creek rates 'fair' for salmonid habitat. The reach has had a moderate reduction in spawning and rearing habitat and a few artificial barriers and/or ripples reduce upstream and/or downstream salmonid migration at low flows. In addition the reach has had a reduction of 20 – 30% of riparian condition and contains 10 – 50% of the off channel habitat along the reach. In contrast the floodplain connectivity has been severely reduced (greater than 50%).

Additional habitat information is available on Table E-9.

Flow

Gauge:No Rule:No An NHD+ estimated 4 cfs Mean Annual Flow was used to score this reach. Diversions evaluated for this project represent 13 percent of the Mean Annual Flow; reaches with diversions between 5% and 15% of Mean Annual Flow scored 'fair' for this scoring component. Still, the low overall flow volume tips this reach into the 'poor' bin.

Flow Scoring Detail is provided on Table E-10.

4516 - Beaver Creek

Fish	Habitat	Flow
2	2	2

Fish Utilization

Beaver Creek is a tributary to the mainstem Wenatchee River. This creek is rated as 'average' for fish utilization. Coho and Wenatchee summer steelhead express all three life cycle behaviors, whereas Wenatchee Spring Chinook, bull trout, and Wenatchee Summer Chinook only express juvenile rearing. Wenatchee Sockeye stock is not present in the creek.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Salmonid habitat in Beaver Creek is rated as 'good.' This creek has had a moderately low reduction in riparian condition with 80% or more of the native growth forms intact. The majority of Beaver Creek is suitable for spawning and rearing. In contrast, off channel habitat is limited to 10 – 50% of the length with up to 50% of surface water connectivity lost. A few artificial barriers and/or ripples reduce upstream and/or downstream salmonid migration at low flows.

Additional habitat information is available on Table E-9.

Flow

Gauge:No Rule:No An NHD+ estimated 5 cfs Mean Annual Flow was used to score this reach. Diversions evaluated for this project represent 12 percent of the Mean Annual Flow; reaches with diversions between 5% and 15% of Mean Annual Flow scored 'fair' for this scoring component.

Flow Scoring Detail is provided on Table E-10.

4517 - Chiwawa River

Fish	Habitat	Flow
3	3	3

Fish Utilization

Chiwawa River is a tributary to the mainstem Wenatchee River and rates 'high' for fish utilization. Seven stocks use the river for spawning, rearing and adult migration behavior. In contrast bull trout express rearing and adult migration. Wenatchee Sockeye stock is not present in this reach.

Fish Status/Utilization scoring detail is available on Table E-8.

Habitat

Salmonid habitat in Chiwawa River is rated as 'good.' It is the only defined reach in the basin to have virtually undisturbed conditions in three categories evaluated in this project. These categories are riparian condition, rearing suitability and passage conditions. The riparian corridor has a good mix of tall and short vegetation. The reach has a good mix of pools and riffles with high numbers of large woody debris. Salmonids are able to migrate up and downstream without impediments. Although spawning suitability, floodplain connectivity and off channel habitat are not pristine, conditions are still good. Off channel habitat exists along 50 – 80% of the reach. Only up to 20% of surface water connection has been lost and a majority of the reach is suitable for spawning.

Additional habitat information is available on Table E-9.

Flow

Gauge:Yes Rule:No The minimum of monthly mean flows in this reach is 142 cfs in September and the peak is 1,689 cfs in June . Minimum flow is 26 percent of the average; reaches with August flows less than 33% of average scored 'poor' for this component attribute. Diversions evaluated for this project represent 12 percent of the Mean Annual Flow; reaches with diversions between 5% and 15% of Mean Annual Flow scored 'fair' for this scoring component. The reach bins high, or 'good' because overall flow volumes are high compared to other reaches in this WRIA.

Flow Scoring Detail is provided on Table E-10.

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Color / Bin Score
3 = High/Good
2 = Average / Fair
1 = Low / Poor

5. Scoring Sheets

Table E-8 Fish Scoring Sheet

Code	Reach Name	Reach Score & Bin	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4501	Wenatchee River (Reach 1)	466	33	32	36	36	49	48	48	50	33	35	33	33
4502	Wenatchee River (Reach 2)	578	47	46	50	36	49	48	48	64	47	49	47	47
4503	Wenatchee River (Reach 3)	586	48	47	51	36	49	48	48	65	48	50	48	48
4504	Mission Creek	335	29	28	31	31	31	29	26	28	24	26	26	26
4505	Brender Creek	335	29	28	31	31	31	29	26	28	24	26	26	26
4506	Peshastin Creek	521	43	42	45	31	45	46	43	59	41	43	43	40
4507	Ingalls Creek	541	46	44	47	33	47	45	42	58	44	46	46	43
4508	Derby Canyon	283	22	23	29	29	29	29	23	23	19	19	19	19
4509	Chumstick Creek	335	29	28	31	31	31	29	26	28	24	26	26	26
4510	Eagle Creek	335	29	28	31	31	31	29	26	28	24	26	26	26
4511	Little Chumstick Creek	56	3	3	3	8	8	8	8	3	3	3	3	3
4512	Icicle Creek	558	46	45	48	33	46	48	46	63	46	48	46	43
4513	Chiwaukum Creek	560	47	46	49	35	48	46	44	60	46	48	47	44
4514	Sand Creek	108	9	9	12	12	12	12	9	9	6	6	6	6
4515	Skinney Creek	335	29	28	31	31	31	29	26	28	24	26	26	26
4516	Beaver Creek	335	29	28	31	31	31	29	26	28	24	26	26	26
4517	Chiwawa River	569	47	46	49	35	48	46	47	63	46	48	47	47
Monthly Totals			565	551	605	510	616	598	562	685	523	551	541	529

Note: Reach names link to workbook tabs

Table E-7 (continued)

SaSI Stocks in the Wenatchee Basin	SaSI Stock Rating	Weight Factor**
Wenatchee Summer Chinook - 1768	Healthy	1
Chiwawa Spring Chinook - 1776	Depressed	2
Nason Creek Spring Chinook - 1784	Depressed	2
Little Wenatchee Spring Chinook - 1792	Critical	3
White River Spring Chinook - 1800	Critical	3
Wenatchee Summer Steelhead - 6896	Depressed	2
Wenatchee Sockeye - 5800	Healthy	1
Ingalls Creek Bull Trout - 8564	Unknown	2
Icicle Creek Bull Trout - 8576	Unknown	
Chiwaukum Creek Bull Trout - 8588	Unknown	
Chiwawa River Bull Trout - 8600	Unknown	
Chickamin Creek Bull Trout- 8612	Healthy	
Rock Creek Bull Trout - 8624	Healthy	
Phelps Creek Bull Trout - 8636	Healthy	
Nason Creek Bull Trout - 8648	Unknown	
Little Wenatchee River Bull Trout - 8660	Unknown	
White River Bull Trout - 8672	Unknown	
Panther Creek Bull Trout - 8684	Healthy	
Coho- SaSI stock not assigned	Unknown	2

** Weighting Factor Values by SaSI Stock Status:	Weight
Healthy	1
Depressed	2
Unknown	2
Critical	3

Weighting Factor for Federally Listed Species:	ESA Weight Factor
Assign additional weight to stocks that are listed as Threatened or Endangered under the ESA? (yes=1; no=0)	1
Assign additional weight to reaches within Interior Columbia TRT-designated spawning areas (MaSAs or MiSAs)? (yes=1; no=0)	0

Color / Bin Score
3 = High/Good
2 = Average / Fair
1 = Low / Poor

Table E-9 Habitat Scoring Sheet

Code	Reach Name	Total Score	Off Channel Habitat (OCHs)	Flood-plain Connec-tivity	Riparian Cond-ition	Spawning Suita-bility	Rearing Suita-bility	Passage Condi-tion
4501	Wenatchee River (Reach 1)	14	2	2	2	3	2	3
4502	Wenatchee River (Reach 2)	16	2	3	2	3	3	3
4503	Wenatchee River (Reach 3)	15	2	2	2	3	3	3
4504	Mission Creek	7	1	1	1	1	2	1
4505	Brender Creek	9	1	2	1	2	2	1
4506	Peshastin Creek	12	2	1	1	3	3	2
4507	Ingalls Creek	13	2	2	2	2	2	3
4508	Derby Canyon	9	1	2	2	1	2	1
4509	Chumstick Creek	11	2	2	1	2	2	2
4510	Eagle Creek	11	2	2	2	2	2	1
4511	Little Chumstick Creek	14	2	2	3	2	2	3
4512	Icicle Creek	15	2	2	2	3	3	3
4513	Chiwaukum Creek	16	3	3	2	3	3	2
4514	Sand Creek	8	1	1	2	1	2	1
4515	Skinney Creek	11	2	1	2	2	2	2
4516	Beaver Creek	15	2	2	3	3	3	2
4517	Chiwawa River	21	3	3	4	3	4	4

Color / Bin Score
3 = High/Good
2 = Average / Fair
1 = Low / Poor

Table E-10 Flow Scoring Sheet

Code	Reach Name	GOOD is HIGH BIN	POOR is HIGH; GOOD is LOW >>>>>>>>>>>>>>>>>>> Sum scores (A:D) * E	A % of Mo Avg Below Rule	B Qi Deviation	C No. Claims	D August Deviation from Mean Annual Flow	E Flow Volume Factor
4501	Wenatchee River (Reach 1)	3	4	1	2	3	2	0.5
4502	Wenatchee River (Reach 2)	3	3	1	1	2	2	0.5
4503	Wenatchee River (Reach 3)	3	4	1	1	3	2	0.5
4504	Mission Creek	1	27		3	3	3	3.0
4505	Brender Creek	1	20		1	3	1	4.0
4506	Peshastin Creek	2	9	2	1	3	3	1.0
4507	Ingalls Creek	2	8		0	1	3	2.0
4508	Derby Canyon	1	24		2	1	3	4.0
4509	Chumstick Creek	1	21		3	1	3	3.0
4510	Eagle Creek	1	28		3	1	3	4.0
4511	Little Chumstick Creek	2	9				3	3.0
4512	Icicle Creek	2	8	1	3	2	2	1.0
4513	Chiwaukum Creek	3	6		0	1	2	2.0
4514	Sand Creek	2	9				3	3.0
4515	Skinney Creek	1	24		2	1	3	4.0
4516	Beaver Creek	2	18		2	1	3	3.0
4517	Chiwawa River	3	6		2	2	2	1.0

6. Maps

Figure E-1 Assessed Stream Reaches

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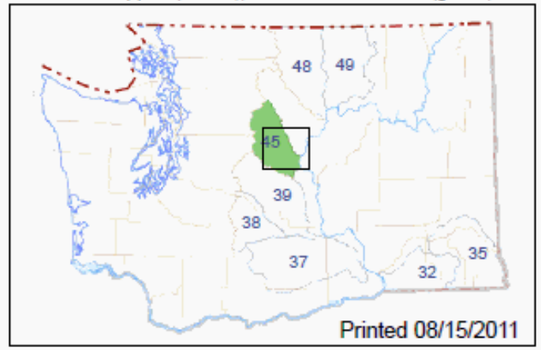
Wenatchee River Basin
WRIA 45
Assessed Stream Reaches colored for visual reference

• — Assessed Stream Reach upper extents

Continuation of Assessed Streams to Headwaters

Location of all project WRIAs (blue), location of the area mapped (boxed), and featured WRIAs (green).



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WRIA 45 Wenatchee River Basin - Priority Streams

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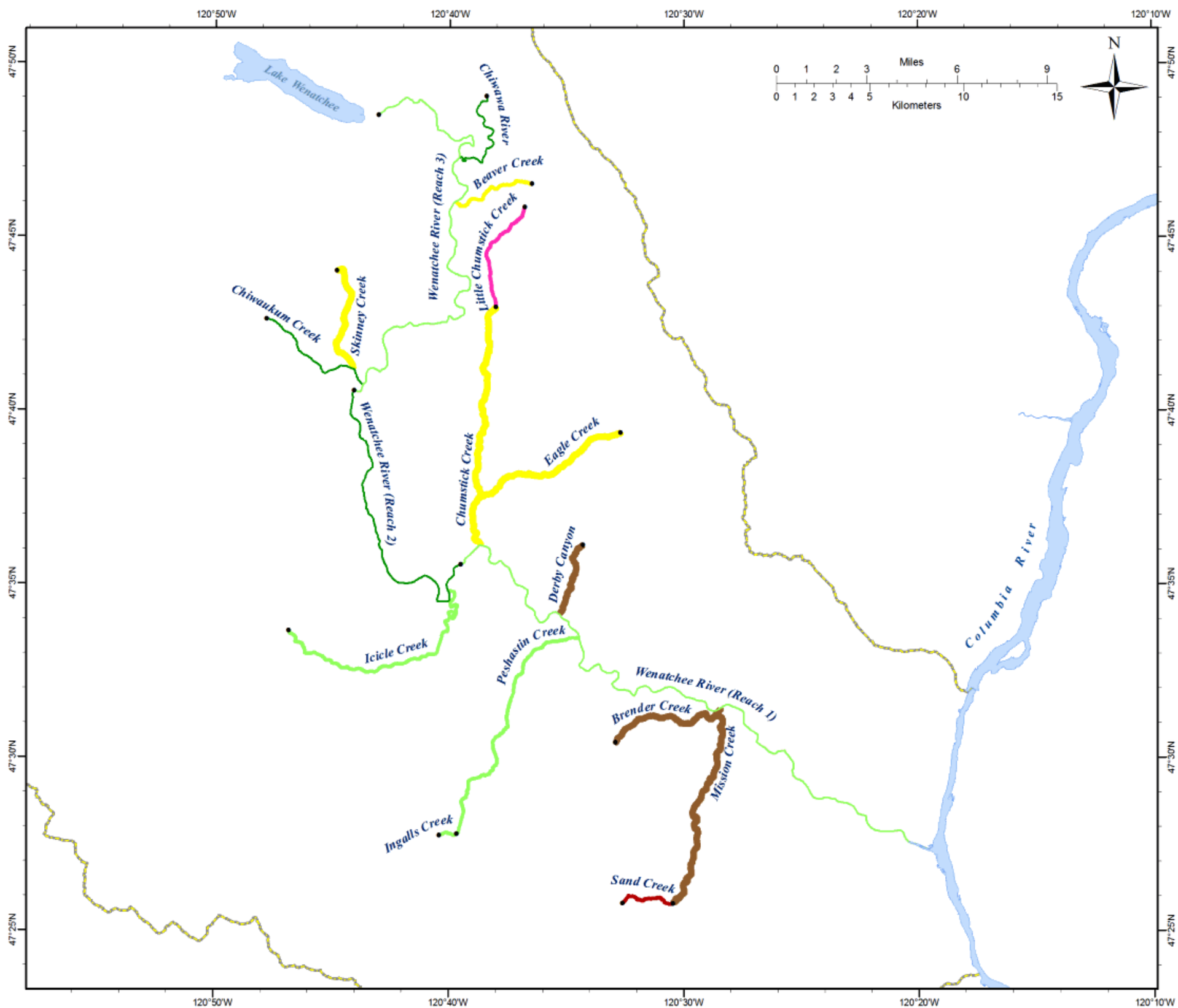
Figure E-2 CRIA Scoring
Fish, Habitat, Flow Combined



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State of Washington

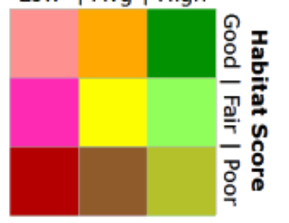
Washington Department of FISH and WILDLIFE

Wenatchee River Basin
WRIA 45
Combined Prioritization Scores for Fish, Habitat, and Flow

Fish Status/Utilization and Habitat Condition scores use this color scheme:

Fish Score
Low | Avg | High

Habitat Score
Good | Fair | Poor



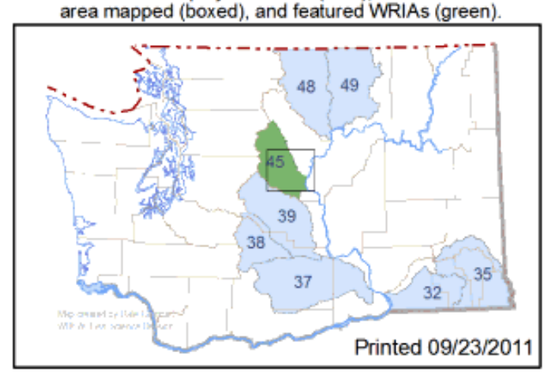
Flow Condition score uses line thickness

- Good
- Fair
- Poor

• — Assessed Stream Reach upper extents

WRIA Boundary

Location of all project WRIAs (blue), location of the area mapped (boxed), and featured WRIAs (green).



WRIA 45 - Wenatchee River Basin - Fish, Habitat, and Flow

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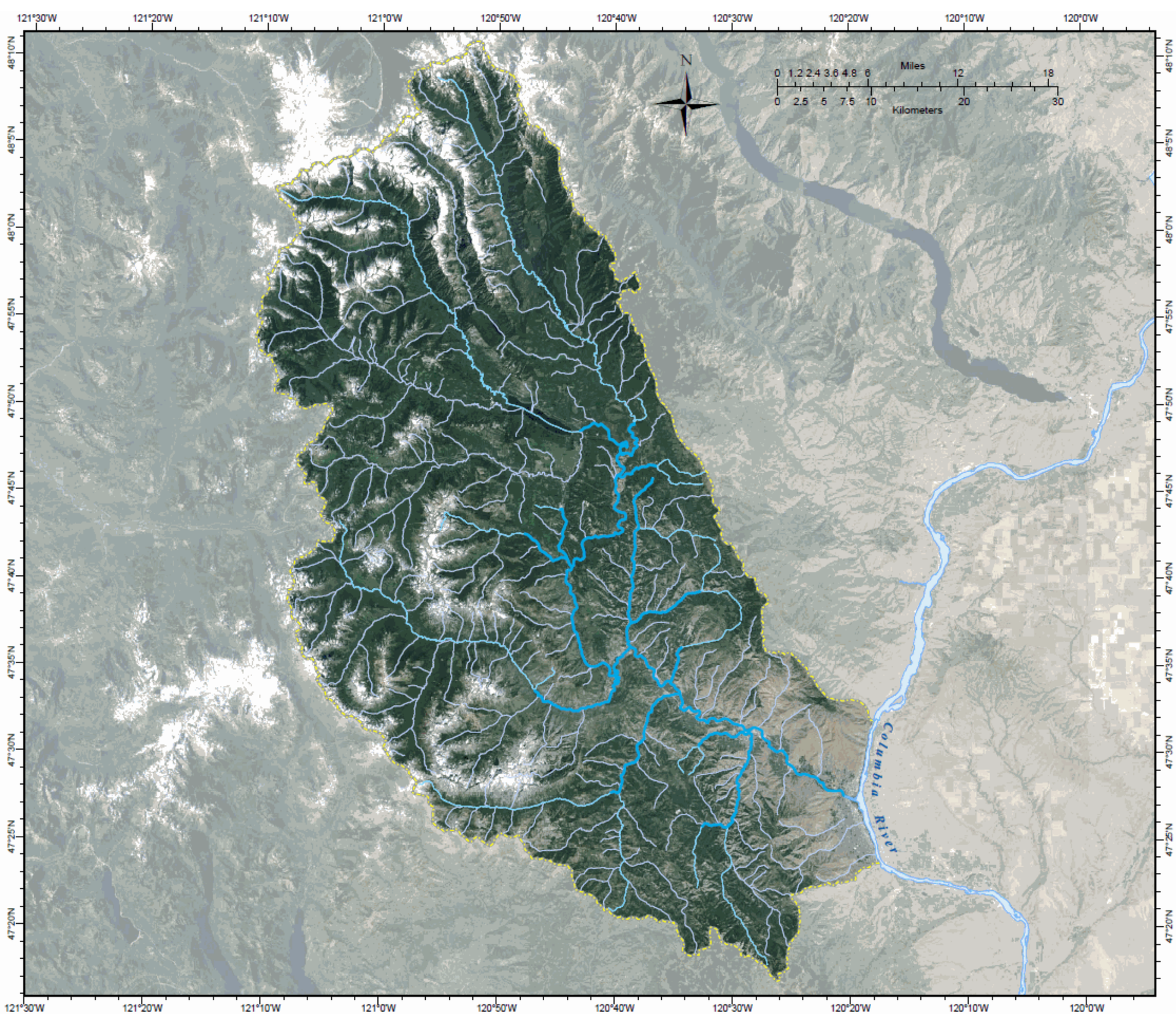
Figure E-3 2001 Statewide 1m Orthophoto



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State of Washington

Washington Department of FISH and WILDLIFE

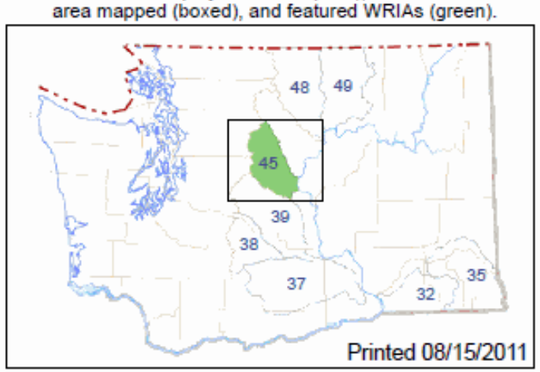
Wenatchee River Basin
WRIA 45
2009 Statewide 1m Orthophoto

Stream Distinctions

- Assessed Reaches
- Headwaters of Assessed Reaches
- Other Named Streams

WRIA Boundary

Location of all project WRIAs (blue), location of the area mapped (boxed), and featured WRIAs (green).



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WRIA 45 Wenatchee River Basin - Orthophoto

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Figure E-4 2001 National Land Cover Database

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Washington Department of FISH and WILDLIFE

Wenatchee River Basin

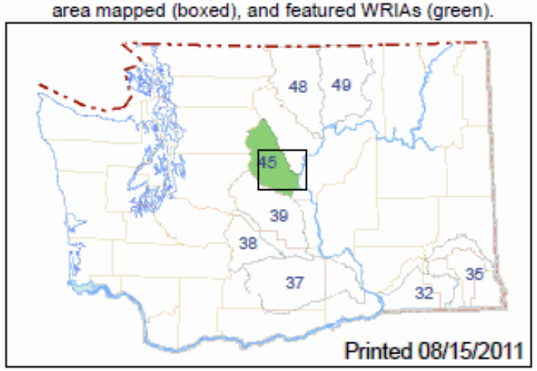
WRIA 45
2001 National
Land Cover Database

Land Cover and Use

- Snow and Ice
- Developed
- Barren
- Forest
- Scrub
- Grasslands
- Agriculture
- Riparian

Assessed Stream Reaches with upper extents marked

Location of all project WRIAs (blue), location of the area mapped (boxed), and featured WRIAs (green).



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WRIA 45 Wenatchee River Basin - NLCD

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Figure E-5 Stream Gauge Identification and Land Management

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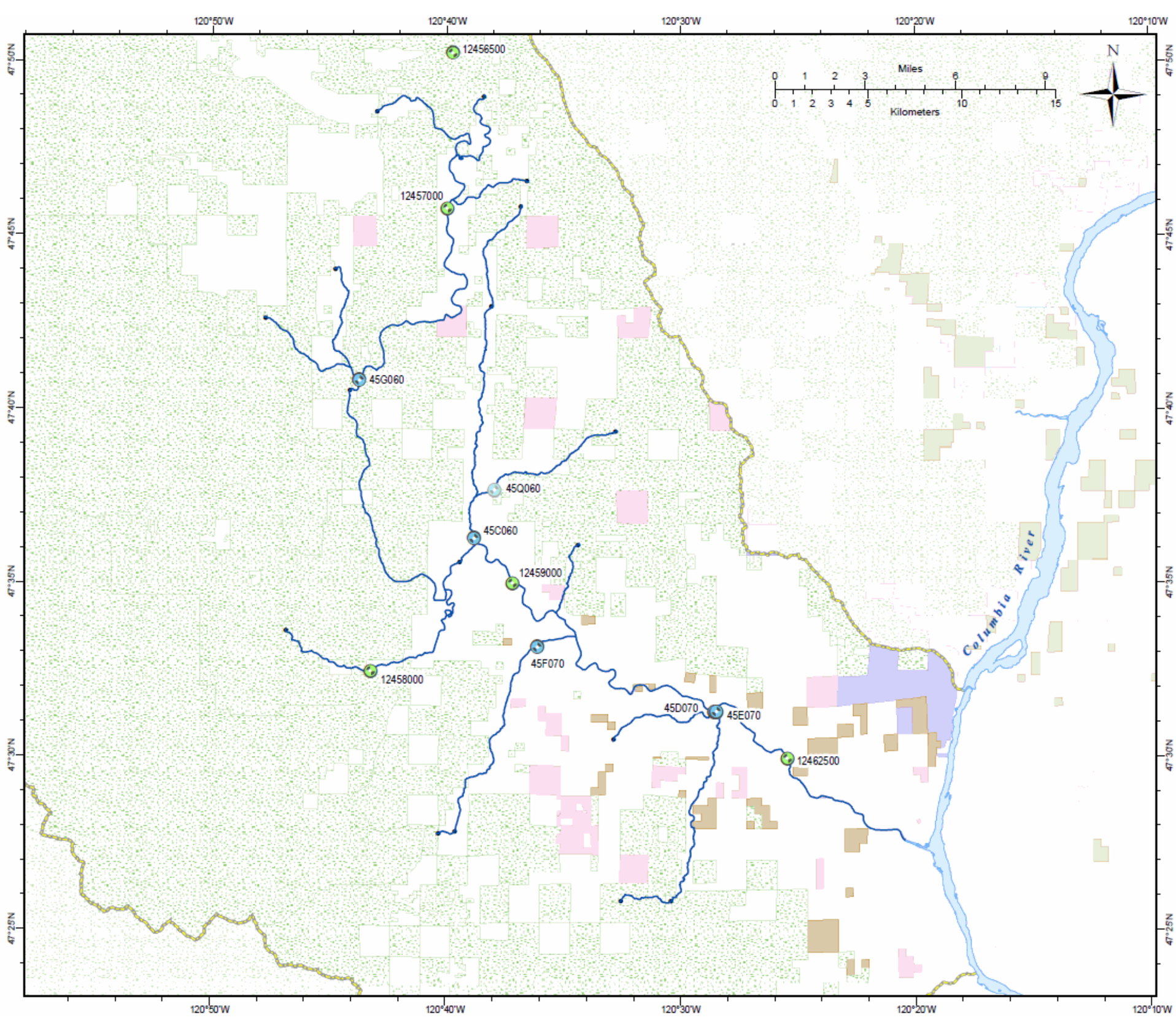
Wenatchee River Basin
WRIA 45
Stream Gauge Identification and Land Management

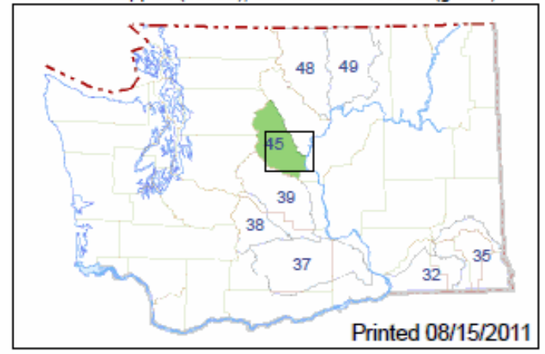


Stream Gauges by Agency
- WA DOE
- WA DOE (limited data)
- USBR
- USGS
- USGS (limited data)

Generalized Land Management
- Tribal
- US Bureau of Land Mgmt.
- US Bureau of Reclamation
- US Forest Service
- WA Dept. Fish & Wildlife
- WA Dept. Natural Resources

Assessed Stream Reaches with upper extents marked

Location of all project WRIAs (blue), location of the area mapped (boxed), and featured WRIAs (green).



Printed 08/15/2011

WRIA 45 Wenatchee River Basin - Gauges, Lands