Reservation Soils

Range Soils on Terraces and Dunes

Slope range: Nearly level to very steep
Native vegetation: Grasses, forbs, and shrubs
Elevation: 800 to 3,000 feet
Average annual precipitation: 9 to 15 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free period: 110 to 180 days
Parent material: Glacial outwash, eolian sand, and glacial lake sediment with a component of loess
Depth class: Moderately deep and very deep
Drainage class: Excessively drained, somewhat excessively drained, and well drained
Major uses: Livestock grazing, irrigated cropland, irrigated orchards at the lower elevations, non-irrigated cropland, and building site development.

Quincy-Skaha-Pogue

Very deep, excessively drained and somewhat excessively drained, nearly level to very steep soils that formed in glacial outwash and eolian sand with a component of loess; on terraces, terrace escarpments, alluvial fans, and dunes
Location: Along the Columbia and Okanogan Rivers, in the southern and western parts of the area
Slope range: 0 to 65 percent
Major vegetation: Needleandthread, bluebunch, wheatgrass, antelope bitterbrush, big sagebrush, and threetip sagebrush
Elevation: 800 to 2,000 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 140 to 180 days
Percentage of survey area: 7 percent
Major Uses: Livestock grazing, irrigated cropland and orchards, non-irrigated cropland, and building site development.


Orchards on Colville Reservation

Owhi-Ewall-Nespelem

Very deep and moderately deep, well drained and excessively drained, nearly level to very steep soils that formed in glacial outwash, eolian sand, and glacial lake sediment with a component of loess; on terraces, terrace escarpments, and dunes
Location: Mainly in the south-central and western parts of the area
Slope range: 0 to 60 percent
Major vegetation: Bluebunch wheatgrass, Idaho fescue, needleandthread, threetip sage-

brush, and antelope bitterbrush
Elevation: 1,200 to 3,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 110 to 150 days
Major Uses: Livestock grazing, nonirrigated cropland, and building site development
Range Soils on Glaciated Hills and Plateaus
Slope range: Nearly level to very steep
Native vegetation: Grasses, forbs, and shrubs
Elevation: 800 to 3,000 feet
Average annual precipitation: 9 to 16 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free period: 110 to 180 days
Parent material: Glacial till and material weathered from granitic rock and basalt with a mantle or component of loess and volcanic ash
Depth class: Very shallow to deep
Drainage class: Well drained
Major uses: Livestock grazing, non-irrigated cropland, wildlife habitat, and building site development.

Malott-Rock ***outcrop-Couleedam***

Deep and shallow, well drained, nearly level to very steep soils that formed in glacial till and colluvium derived from granitic rock with a mantle or component of loess, and Rock outcrop; on glaciated hills
Location in survey area: Along the Columbia and Okanogan Rivers, in the south-central and western parts of the area
Slope range: 0 to 70 percent
Major vegetation: Bluebunch wheatgrass, Sandberg bluegrass, needleandthread, Wyeth eriogonum, big sagebrush, threetip sagebrush, and antelope bitterbrush
Elevation: 800 to 2,200 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 140 to 180 days
Major Uses: Livestock grazing and wildlife habitat, and nonirrigated cropland on the Malott soils

Timentwa-Bakeoven

Deep and very shallow, well drained, nearly level to very steep soils that formed in basaltic glacial till and material weathered from basalt with a mantle or component of loess and volcanic ash; on glaciated plateaus
Location in survey area: Basalt plateau in the southwestern part of the area
Slope range: 0 to 65 percent


Blue Bunch Grass

Major vegetation: Bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, and threetip sagebrush
Elevation: 1,800 to 2,900 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 110 to 150 days
Percentage of survey area: 5 percent
Major Uses: Non-irrigated cropland and building site development on the Timentwa soils, and livestock grazing

Conconully-Rock ***Outcrop-Swakane***

Moderately deep and shallow, well drained, nearly level to very steep soils that formed in glacial till and material weathered from granitic rock with a component of loess and volcanic ash, and Rock outcrop; on glaciated hills
Location in survey area: Mainly in the south-central and western parts of the area
Slope range: 3 to 70 percent
Major vegetation: Bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, threetip sagebrush, antelope bitterbrush
Elevation: 1,400 to 3,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 110 to 150 days
Major Uses: Livestock grazing, and non-irrigated cropland on the Conconully soils.

Conconully soils are in foreground and on midslopes in background, Cumulic Haploxerolls are in center along the drainageway, and Swakane soils and Rock outcrop are on the steeper slopes in background.

Range Soils on Non-glaciated Hills

Slope range: Nearly level to very steep
Native vegetation: Grasses, forbs, and shrubs

Elevation: 1,400 to 3,200 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 110 to 150 days
Parent material: Material weathered from granitic rock with a component of loess
Depth class: Shallow and moderately deep
Drainage class: Well drained
Major uses: Livestock grazing and wildlife habitat, and non-irrigated cropland on the moderately deep soils.

Morical soils are on north-facing slopes in foreground, and Tyee and Ginnis soils are on south-facing slopes in background.

Tyee-Ginnis-Morical

Shallow and moderately deep, well drained, nearly level to very steep soils that formed in material weathered from granitic rock with a component of loess; on nonglaciated hills
Location in survey area: Mainly in the south-central part of the area
Slope range: 5 to 65 percent
Major vegetation: Bluebunch wheatgrass, Idaho fescue, arrowleaf balsamroot, silky lupine, threetip sagebrush, and antelope bitterbrush
Elevation: 1,400 to 3,200 feet
Average annual precipitation: 12 to 15 inches
Major Uses: Livestock grazing, non-irrigated cropland on the moderately deep soils, and wildlife habitat

Forest Soils on Terraces

Slope range: Nearly level to very steep
Native vegetation: Coniferous trees, grasses, forbs, and shrubs
Elevation: 1,300 to 4,800 feet
Average annual precipitation: 15 to 25 inches
Average annual air temperature: 42 to 48 degrees F
Frost-free period: 90 to 130 days
Parent material: Glacial lake sediment, glacial outwash, and glaciofluvial sediment with

a component or mantle of volcanic ash and loess
Depth class: Very deep
Drainage class: Moderately well drained, well drained, and somewhat excessively drained
Major uses: Timber production, livestock grazing, non-irrigated and irrigated cropland, and building site development

Phoebe-Garrison-Cedonia

Very deep, well drained, nearly level to very steep soils that formed in glacial lake sediment and glacial outwash with a component of loess and volcanic ash; on terraces and terrace escarpments
Location in survey area: Mainly along the Columbia and Sanpoil Rivers, in the eastern and southcentral parts of the area
Slope range: 0 to 65 percent
Major vegetation: Ponderosa pine, Douglas-fir, common snowberry, white spiraea, blue wildrye, and Idaho fescue
Elevation: 1,300 to 2,800 feet
Average annual precipitation: 15 to 18 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 130 days
Major Uses: Timber production, livestock grazing, non-irrigated cropland, irrigated cropland, and building site development

Wapal-Parmenter-Stapaloop

Very deep, somewhat excessively drained and well drained, nearly level to very steep soils that formed in glacial outwash and glaciofluvial sediment with a component or mantle of volcanic ash and loess; on terraces and terrace escarpments
Location in survey area: Terraces throughout the northern part of the area
Slope range: 0 to 65 percent
Major vegetation: Douglas-fir, ponderosa pine, western larch, pinegrass, common snowberry, and kinnikinnick
Elevation: 1,600 to 4,800 feet
Average annual precipitation: 15 to 25 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 90 to 120 days
Percentage of survey area: 3 percent
Major Uses: Timber production, livestock grazing, and building site development

Kiehl-Kewach-Martella

Very deep, moderately well drained and well drained, nearly level to very steep soils that formed in glacial lake sediment and glacial outwash with a mantle of volcanic ash and loess; on terraces and terrace escarpments
Location in survey area: Mainly on terraces in the northern and eastern parts of the area
Slope range: 0 to 65 percent
Major vegetation: Douglas-fir, ponderosa pine, western larch, grand fir, mallow ninebark,

pinegrass, common snowberry, and longtube twinflower
Elevation: 1,300 to 4,000 feet
Average annual precipitation: 15 to 25 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 120 days
Major Uses: Timber production, livestock grazing, non-irrigated cropland, building site development

Forest Soils on Glaciated Hills and Mountains

Slope range: Nearly level to very steep
Native vegetation: Coniferous trees, grasses, forbs, and shrubs
Elevation: 1,500 to 5,700 feet
Average annual precipitation: 14 to 25 inches
Average annual air temperature: 42 to 48 degrees F
Frost-free period: 90 to 130 days
Parent material: Glacial till and material weathered from granitic, metamorphic, and volcanic rock with a mantle or component of volcanic ash and loess
Depth class: Very deep to shallow
Drainage class: Well drained
Major uses: Timber production, livestock grazing, and wildlife habitat

Donavan-Republic-Vanbrunt

Moderately deep and very deep, well drained, nearly level to very steep soils that formed in glacial till and material weathered from granitic rock with a component of loess and volcanic ash; on glaciated hills and mountains
Location in survey area: Mainly in the west-central and northwestern parts of the area
Slope range: 3 to 65 percent
Major vegetation: Ponderosa pine, Douglas-fir on northerly aspects, common snowberry, antelope bitterbrush, pinegrass, bluebunch wheatgrass, and Idaho fescue
Elevation: 1,500 to 4,400 feet
Average annual precipitation: 14 to 20 inches
Average annual air temperature: 42 to 48 degrees F
Frost-free period: 90 to 130 days
Major Uses: Timber production, livestock grazing, and wildlife habitat

Douglas-fir

Raisio-Borgeau-Stevens

Moderately deep and very deep, well drained, nearly level to very steep soils that formed in glacial till and material weathered from metamorphic rock with a component of loess and volcanic ash; on glaciated hills and mountains
Location in survey area: Mainly in the extreme eastern and northeastern parts of the area
Slope range: 0 to 65 percent

Major vegetation: Widely spaced ponderosa pine, bluebunch wheatgrass, Idaho fescue, common snowberry, and rose
Elevation: 1,600 to 4,700 feet
Average annual precipitation: 15 to 22 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 130 days
Major Uses: Livestock grazing and wildlife habitat

Nevine-Merkel-Mineral

Moderately deep, well drained, gently sloping to very steep soils that formed in glacial till and material weathered from granitic rock with a mantle or component of volcanic ash and loess; on glaciated hills and mountains
Location in survey area: Dominantly in the northern half of the area
Slope range: 5 to 65 percent
Major vegetation: Douglas-fir, ponderosa pine, western larch, pinegrass, mallow ninebark, creambush oceanspray, and pachystima
Elevation: 2,000 to 5,300 feet
Average annual precipitation: 16 to 25 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 90 to 120 days
Major Uses: Timber production, livestock grazing, and wildlife habitat

Elbowlake-Oxerine-Aits

Moderately deep to very deep, well drained, nearly level to very steep soils that formed in glacial till and material weathered from metasedimentary and metamorphic rock with a mantle of volcanic ash and loess; on glaciated hills and mountains
Location in survey area: Mainly in the extreme northeastern and east-central parts of the area
Slope range: 0 to 65 percent
Major vegetation: Douglas-fir, western larch, grand fir, ponderosa pine, mallow ninebark, creambush oceanspray, pinegrass, and longtube twinflower
Elevation: 2,000 to 5,700 feet
Average annual precipitation: 18 to 25 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 120 days
Major Uses: Timber production, livestock grazing, and wildlife habitat


Common snowberry

Inkler-Baldknob-Thout

Very deep, shallow, and moderately deep, well drained, gently sloping to very steep soils that formed in glacial till and material weathered from volcanic rock with a component of volcanic ash and loess; on glaciated hills and mountains

Location in survey area: Mainly flanking both sides of the Sanpoil River Valley, in the north-central part of the area
Slope range: 5 to 70 percent
Major vegetation: Douglas-fir, ponderosa pine, pinegrass, bluebunch wheatgrass, Idaho fescue, common snowberry, and mallow ninebark
Elevation: 2,000 to 4,200 feet
Average annual precipitation: 15 to 25 inches
Average annual air temperature: 42 to 46 degrees F
Frost-free period: 90 to 120 days

Forest Soils on Nonglaciated Hills and Mountains

Slope range: Nearly level to very steep
Native vegetation: Coniferous trees, grasses, forbs, and shrubs
Elevation: 1,600 to 5,700 feet
Average annual precipitation: 14 to 25 inches
Average annual air temperature: 41 to 48 degrees F
Frost-free period: 90 to 130 days
Parent material: Material weathered from granitic, metamorphic, or volcanic rock with a component or mantle of volcanic ash and loess
Depth class: Shallow to very deep
Drainage class: Well drained
Major uses: Timber production, livestock grazing, and wildlife habitat

Spokane-Skanid-Dinkelman

Shallow to deep, well drained, gently sloping to very steep soils that formed in material weathered from granitic rock with a component of loess and volcanic ash; on nonglaciated hills and mountains
Location in survey area: Mainly in granitic areas in the south-central and southern parts of the area
Slope range: 5 to 65 percent
Major vegetation: Ponderosa pine, Douglas-fir, Idaho fescue, bluebunch wheatgrass, pinegrass, antelope bitterbrush, and common snowberry
Elevation: 1,700 to 4,200 feet
Average annual precipitation: 15 to 18 inches
Average annual air temperature: 42 to 48 degrees F
Frost-free period: 90 to 130 days
Major Uses: Timber production, livestock grazing, and wildlife habitat


Bitterbrush plant

Oxerine-Raisio-Rufus

Moderately deep and shallow, well drained, moderately sloping to very steep soils that formed in material weathered from metamorphic rock with a component or mantle of

volcanic ash and loess; on non-glaciated hills and mountains
Location in survey area: Mainly in the southeastern part of the area
Slope range: 5 to 65 percent
Major vegetation: Ponderosa pine, bluebunch wheatgrass, and Idaho fescue with Douglas-fir, mallow ninebark, creambush oceanspray, and pinegrass on the north-facing slopes
Elevation: 1,900 to 5,700 feet
Average annual precipitation: 15 to 25 inches
Average annual air temperature: 42 to 48 degrees F
Frost-free period: 90 to 130 days
Major Uses: Timber production, livestock grazing, and wildlife habitat

Inkler-Northstar-Johntom

Very deep, moderately deep, and shallow, well drained, gently sloping to very steep soils that formed in material weathered from volcanic rock with a component of loess and volcanic ash; on nonglaciated hills and mountains
Location in survey area: Mainly flanking the Sanpoil River Valley, in the south-central part of the area
Slope range: 5 to 65 percent
Major vegetation: Ponderosa pine, bluebunch wheatgrass, and Idaho fescue on southerly aspects and Douglas-fir, mallow ninebark, and pinegrass on northerly aspects
Elevation: 1,600 to 4,200 feet
Average annual precipitation: 14 to 25 inches
Average annual air temperature: 42 to 47 degrees F
Frost-free period: 90 to 130 days
Major Uses: Timber production, livestock grazing, and wildlife habitat

Northstar and Johntom soils are on the sparsely forested ridges and south-facing slopes, and Inkler soils are on the more densely forested north-facing slopes. Ralse soils are on the non-forested meadow in foreground.

Centralpeak-Ohscow-Mineral

Moderately deep and very deep, well drained, gently sloping to very steep soils that formed in material weathered from granitic rock with a mantle or component of volcanic ash and loess; on non-glaciated mountains
Location in survey area: Mainly in the south-central and eastern parts of the area
Slope range: 5 to 65 percent

Major vegetation: Douglas-fir, ponderosa pine, western larch, grand fir, mallow ninebark, creambush oceanspray, pinegrass, and longtube twinflower
Elevation: 2,000 to 5,300 feet
Average annual precipitation: 16 to 25 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 90 to 120 days
Major Uses: Timber production, livestock grazing, and wildlife habitat

Twinflower

Wellscreek-Wilmont-Henneway

Very deep and deep, well-drained, nearly level to very steep soils that formed in material weathered from metamorphic rock with a mantle or component of volcanic ash and loess; on nonglaciated hills and mountains
Location in survey area: Mainly in the east-central part of the area
Slope range: 0 to 65 percent
Major vegetation: Douglas-fir, western larch, grand fir, ponderosa pine, mallow ninebark, creambush oceanspray, pinegrass, and longtube twinflower
Elevation: 2,000 to 3,700 feet
Average annual precipitation: 18 to 25 inches
Average annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days
Major Uses: Timber production, livestock grazing, and wildlife habitat

Ninebark

Forest Soils on High Mountains

Slope range: 0 to 70 percent
Native vegetation: Coniferous trees, shrubs, forbs, and grasses
Elevation: 3,000 to 6,800 feet
Average annual precipitation: 20 to 35 inches
Average annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 100 days
Parent material: Glacial till, material weathered from granitic rock, and glacial outwash with a mantle of volcanic ash
Depth class: Moderately deep and very deep
Drainage class: Well drained
Major uses: Timber production, wildlife habitat, and limited livestock grazing

Manley-Resner-Moses

Moderately deep and very deep, well drained, gently sloping to very steep soils that formed in glacial till, material weathered from granitic rock, and glacial outwash with a mantle of volcanic ash; on high mountains

Location in survey area: Mainly in the northern part of the area

Slope range: 0 to 70 percent

Major vegetation: Subalpine fir, western larch, Douglas-fir, lodgepole pine, black mountain huckleberry, pachystima, longtube twinflower, and pinegrass

Elevation: 3,000 to 6,800 feet

Average annual precipitation: 20 to 35 inches

Average annual air temperature: 37 to 41 degrees F

Frost-free period: 70 to 100 days

Major Uses: Timber production, wildlife habitat, and limited livestock grazing

B

B: Watershed Management Units

Acreage by Resource Management Unit (RMU)

Source:
Hunner, Walter C. Confederated Tribes of the Colville Reservation, Department of Environmental Trust, Hydrology Report. 2014. 2015,Appendix D

Watershed Management Units

Acreage by Resource Management Unit (RMU)

Name	ID Number	Total Acres
Buffalo Lake/Swawilla Basin RMU	11	65,062
Buffalo Creek	06	4,988
Buffalo Lake	03	3,759
Coulee Dam	09	9,463
McGinnis Lake	05	2,416
Peter Dan Creek	07	10,202
Poker Joe Springs	01	12,147
Rebecca Lake	02	2,456
Seaton Grove	04	2,806
Swawilla Basin	08	16,825
Hall Creek RMU	1	115,443
Barnaby Creek	04	9,339
Cobbs Creek	06	2,053
Columbia River 01	01	1,527
Columbia River 02	02	3,307
Columbia River 03	03	3,141
Grizzly Creek	14	2,132
Johns Mountain Creek	16	3,167
Little Jim Creek	05	2,917
Lower Hall Creek	07	19,246
Lower Lynx Creek	10	6,707
North Fork Hall Creek	09	8,552
Onion Creek	08	2,877
Sitdown Creek	15	11,312
Sleepy Hollow	12	972
Stall Creek	11	3,184
Upper Hall Creek	13	11,133
Upper Lynx Creek	17	16,562
West Fork Hall Creek	18	7,315
Hell Gate RMU	5	62,924
Brody Creek	21	5,997
Columbia River 09	09	1,196
Columbia River 10	10	1,545

Name	ID Number	Total Acres
Columbia River 11	11	1,425
Columbia River 12	12	2,399
Columbia River 13	13	2,422
Columbia River 14	14	1,062
Columbia River 15	15	1,838
Columbia River 16	16	4,735
Columbia River 17	17	2,217
Columbia River 18	18	4,673
Cottonwood Creek	02	938
Hell Gate Canyon	22	1,990
Johnny-George	07	4,024
Louie Creek #2	06	834
North Fork Threemile Creek	04	3,885
Rattlesnake Draw	08	1,630
Redford Canyon	19	6,035
Sixmile Creek	01	7,692
South Fork Threemile Creek	05	3,852
Threemile Creek	03	299
Whitestone Creek	20	2,236
Kartar Valley RMU	14	131,380
Beaverhouse Creek	02	1,668
Columbia River 24	24	4,611
Columbia River 25	25	15,776
Coyote Creek #1	09	17,433
Goose Flats	13	19,529
Harrison Creek	08	5,129
Kartar Creek	06	13,825
Lost Creek #2	10	3,154
Nason Creek	05	8,614
No Name Creek	01	2,727
Omak Lake	12	28,861
Poison Oak Creek	03	2,537
Rattlesnake Creek	04	2,325
Smith Condon Creek	07	5,191
Little Nespelem River RMU	10	59,211
Joe Moses Creek	04	12,873

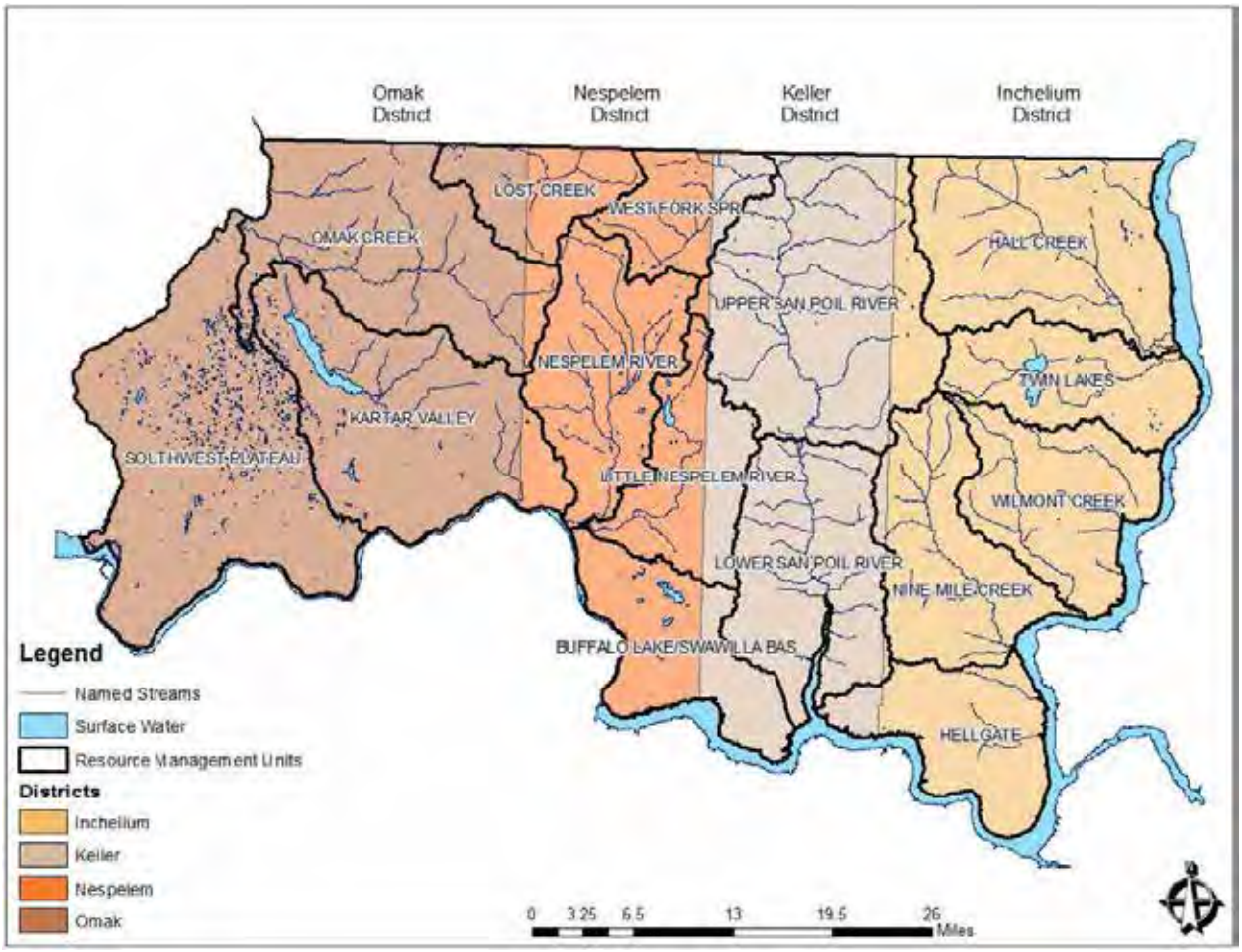
Name	ID Number	Total Acres
Lower Little Nespelem River	05	11,300
Owhi Creek	01	5,117
Owhi Lake	06	3,174
Poween Creek	03	2,766
Upper Little Nespelem River	02	23,981
Lost Creek RMU	12	42122
Haden Creek	06	6,571
Loony Creek	02	4,548
Lower Lost Creek	03	9,129
Moses Creek	04	9,407
Sheep Creek	01	1,600
South Fork Lost Creek	05	3,460
Upper Lost Creek	07	7,407
Lower Sanpoil River RMU	7	95,646
Alice Creek	06	2,033
Brush Creek	14	4,080
Cache Creek	17	5,042
Columbia River 19	19	2,519
Columbia River 20	20	480
Columbia River 21	21	614
Columbia River 22	22	1,817
Columbia River 23	23	3,945
Copper Creek	07	5,744
Cow Creek	04	776
Dick Creek	10	4,388
Empire Creek	15	3,106
Fortymile Creek	02	1,680
Iron Creek	03	5,917
Jack Creek	13	5,429
John Tom Creek	09	4,903
Lime Creek #1	16	2,910
Louie Creek #1	01	6,829
Lower Sanpoil River	24	9,219
Manila Creek	11	13,704
McAllister Creek	18	2,061

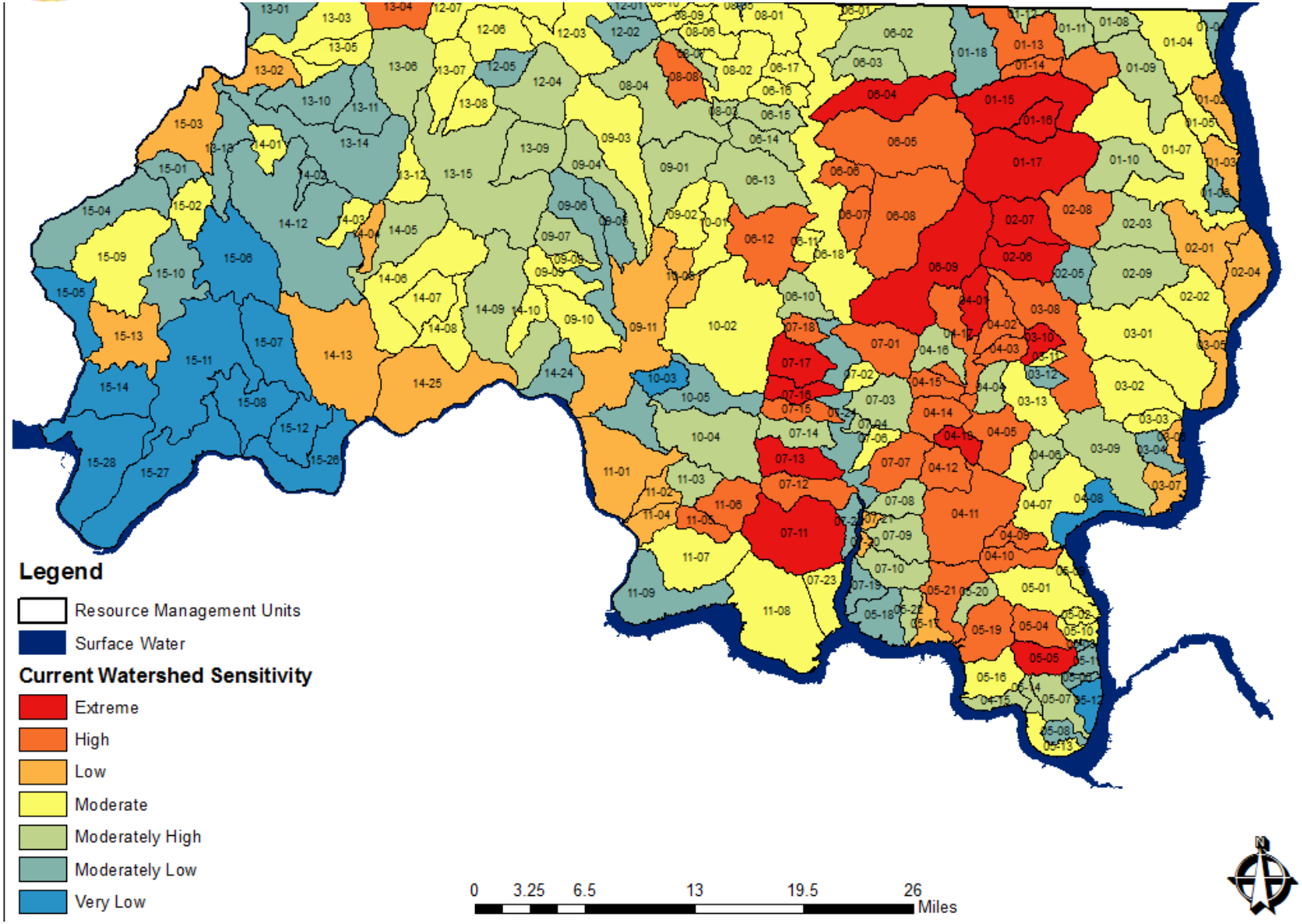
Name	ID Number	Total Acres
Meadow Creek	12	5,119
Silver Creek	08	3,331
Nespelem River RMU	9	84,669
Armstrong Creek	09	3,823
Kincaid Creek	02	4,727
Lower Nespelem River	11	20,932
Mill Creek #1	06	9,107
North Star Creek	04	7,756
Parmenter Creek	05	4,343
Peel Creek	08	1,310
Smith Creek	10	6,763
Stepstone Creek	03	12,544
Upper Nespelem River	01	9,035
Whitelaw Creek	07	4,329
Ninemile Creek RMU	4	80,585
Canteen Creek	09	2,420
Columbia River 08	08	4,207
Cook Creek	14	4,270
Fay Creek	04	2,837
Gibson Creek	03	2,250
Jerred Creek	06	3,146
Jones Creek	16	4,037
Klondyke Creek	01	3,438
Little Ninemile Creek	10	3,702
Lower Ninemile Creek	07	10,280
Middle Ninemile Creek	05	6,562
Olds Creek	13	2,229
Pollock Creek	15	2,586
Sclome Creek	12	4,211
South Fork Ninemile Creek	11	14,319
Upper Ninemile Creek	17	5,920
Wells Creek	02	4,171
Omak Creek RMU	13	122,111
Camp Seven Creek	12	3,499
Clark Creek	08	4,161

Name	ID Number	Total Acres
Corkscrew Creek	13	5,839
Haley Creek	11	5,039
Lower Omak Creek	14	17,476
Mill Creek #2	05	3,840
Mission Creek	10	7,326
Okanogan 01	01	6,823
Okanogan 02	02	4,351
Stapaloop Creek	06	10,344
Swimptkin Creek	07	5,870
Trail Creek	09	6,818
Tunk Creek	04	5,760
Upper Omak Creek	15	25,770
Wanacut Creek	03	9,195
Southwest Plateau RMU	15	173,775
Cameron Lake	02	4,073
Chicken Creek	14	8,485
Columbia River 26	26	9,040
Columbia River 27	27	16,043
Columbia River 28	28	15,031
Dan Canyon	13	9,082
Felix Creek	01	3,436
Long Lake	07	8,731
Okanogan 03	03	9,707
Okanogan 04	04	11,833
Okanogan 05	05	6,072
Potholes	06	13,766
Salt Hill	10	8,673
Soap Lake	09	14,040
South Plateau	11	21,412
Stubblefield Point	12	5,984
Tumwater Creek	08	8,367
Twin Lakes RMU	2	61,491
Beaver Dam Creek	07	6,001
Columbia River 04	04	6,610
Cornstalk Creek	03	7,241
Granite Creek	06	5,927

Name	ID Number	Total Acres
Lower Stranger Creek	01	7,714
North Twin Lake	08	7,285
South Twin Lake	05	4,009
Stray Dog Canyon	02	6,153
Upper Stranger Creek	09	10,551
Upper Sanpoil River RMU	6	152,714
Anderson Creek	15	3,588
Bear Creek	14	4,251
Bridge Creek	09	19,496
Capoose Creek	10	3,836
Cub Creek	11	1,643
Deadhorse Creek	07	3,340
Nineteenmile Creek	17	2,807
North Nanamkin Creek	13	10,225
Seventeenmile Creek	02	13,418
South Nanamkin Creek	12	10,713
South Seventeenmile Creek	03	4,502
T34R32s36(now incl. w/USPR)		790
Thirteenmile Creek	01	1,081
Thirtymile Creek	08	15,941
Tigger Creek(T33R32s2)	16	2,883
Twentyfivemile Creek	06	3,038
Twentyonemile Creek	04	8,600
Twentythreemile Creek	05	19,496
Upper Sanpoil River	18	23,066
West Fork Sanpoil River RMU	8	41,135
Bungalow Creek	03	1,210
Deerhorn Creek	06	3,243
King Creek	07	2,039
Lime Creek #2	05	141
Lower Gold Creek	02	6,742
Lower West Fork Sanpoil River	01	7,077
Roaring Creek	09	1,,974
Strawberry Creek	08	4,296
Upper Gold Creek	04	12,962

Name	ID Number	Total Acres
Upper West Fork Sanpoil River	10	1,451
Wilmont Creek RMU	3	75,110
Columbia River 05	05	3,410
Columbia River 06	06	1,201
Columbia River 07	07	3,159
Coyote Creek #2	03	2,246
Dry Creek	10	2,215
Falls Creek	02	8,649
Little Wilmont Creek	13	5,937
Lower Wilmont Creek	09	11,916
Monaghan Creek	04	2,558
Nez Perce Creek	01	18,942
Rock Creek	11	762
Three Forks Creek	12	1,534
Upper Wilmont Creek	08	12,581


Omak District
Nespelem District
Keller District
Inchelium District
LOST CREEK
WEST FORK SPRI
OMAK CREEK
HALL CREEK
UPPER SAN POIL RIVER
NESPELEM RIVER
TWIN LAKES
KARTAR VALLEY
SOUTHWEST PLATEAU
LITTLE NESPELEM RIVER
WILMONT CREEK
LOWER SAN POIL RIVER
NINE MILE CREEK
BUFFALO LAKE/SWAWILLA BAS
HELL GATE
Legend
Named Streams
Surface Water
Resource Management Units
Districts
Inchelium
Keller
Nespelem
Omak
0 3.25 6.5 13 19.5 26
Miles

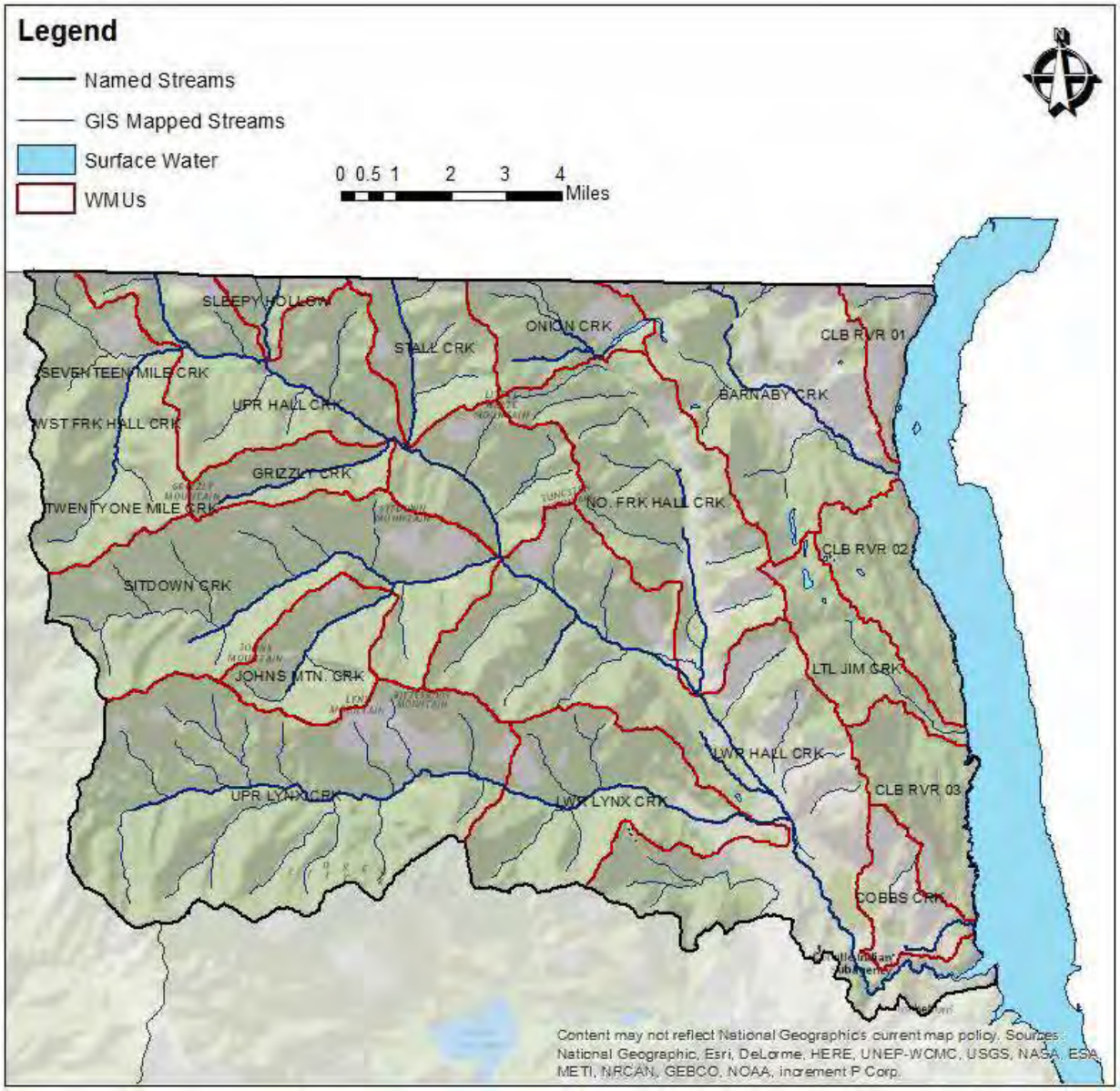


Current Managed Sensitivity Level for Watershed Management Units on the Colville Indian Reservation

Buffalo Lake/Swawilla Basin RMU

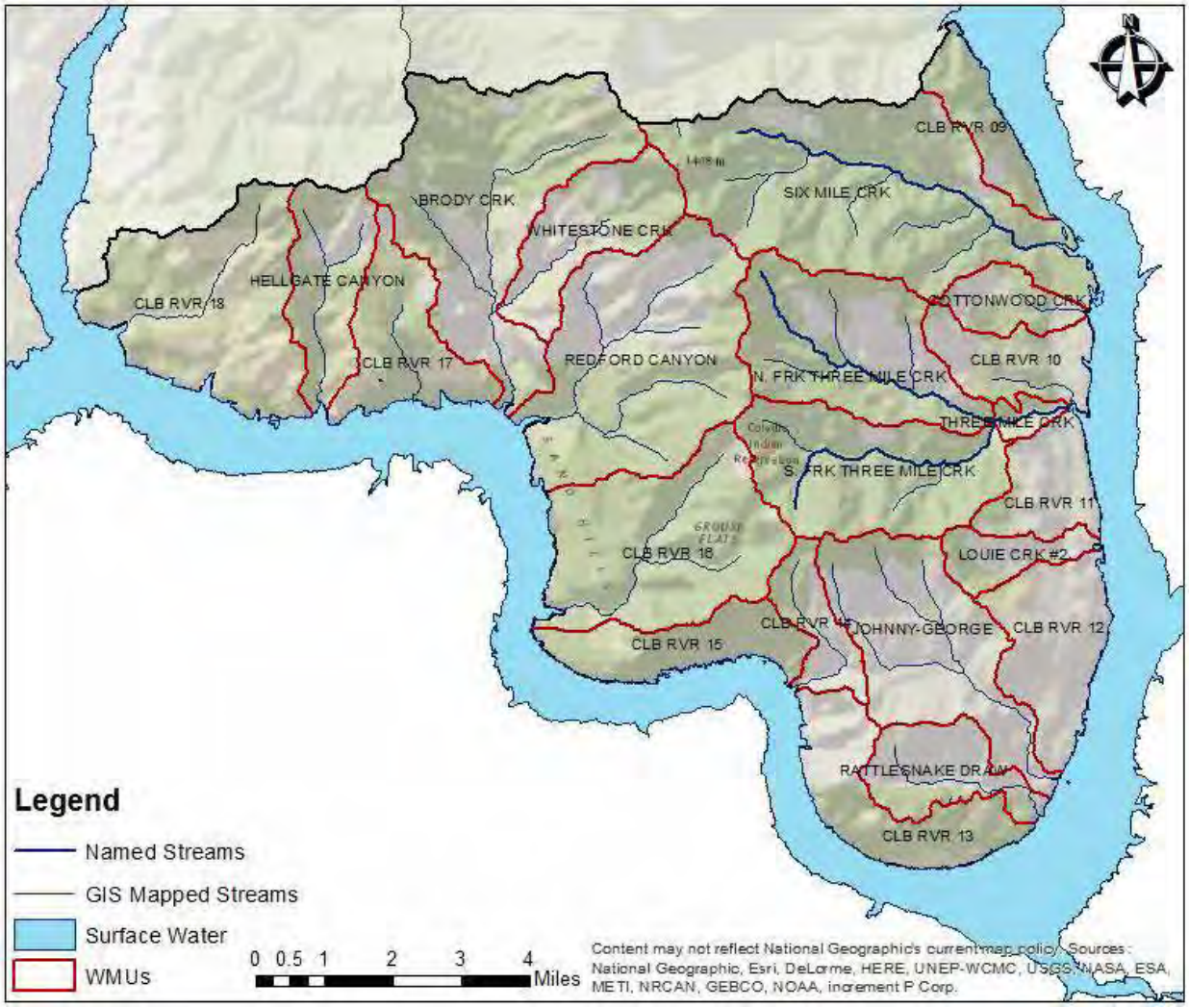
Buffalo Lake/Swawilla Basin RMU and Watershed Management Unit (WMUs) of the Colville Indian Reservation

Hall Creek RMU



Hall Creek Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Hell Gate RMU

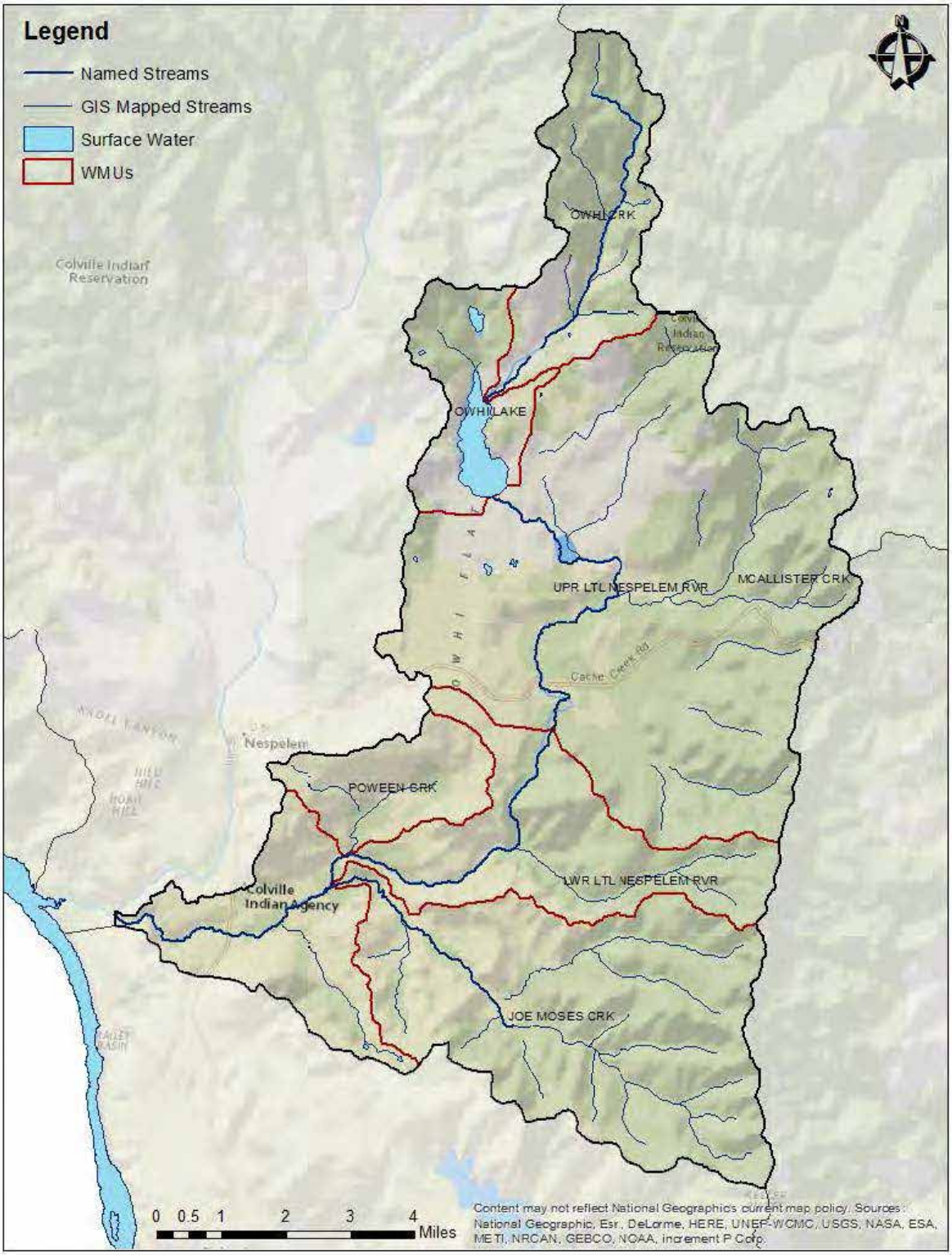


Hell Gate Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Kartar Valley RMU

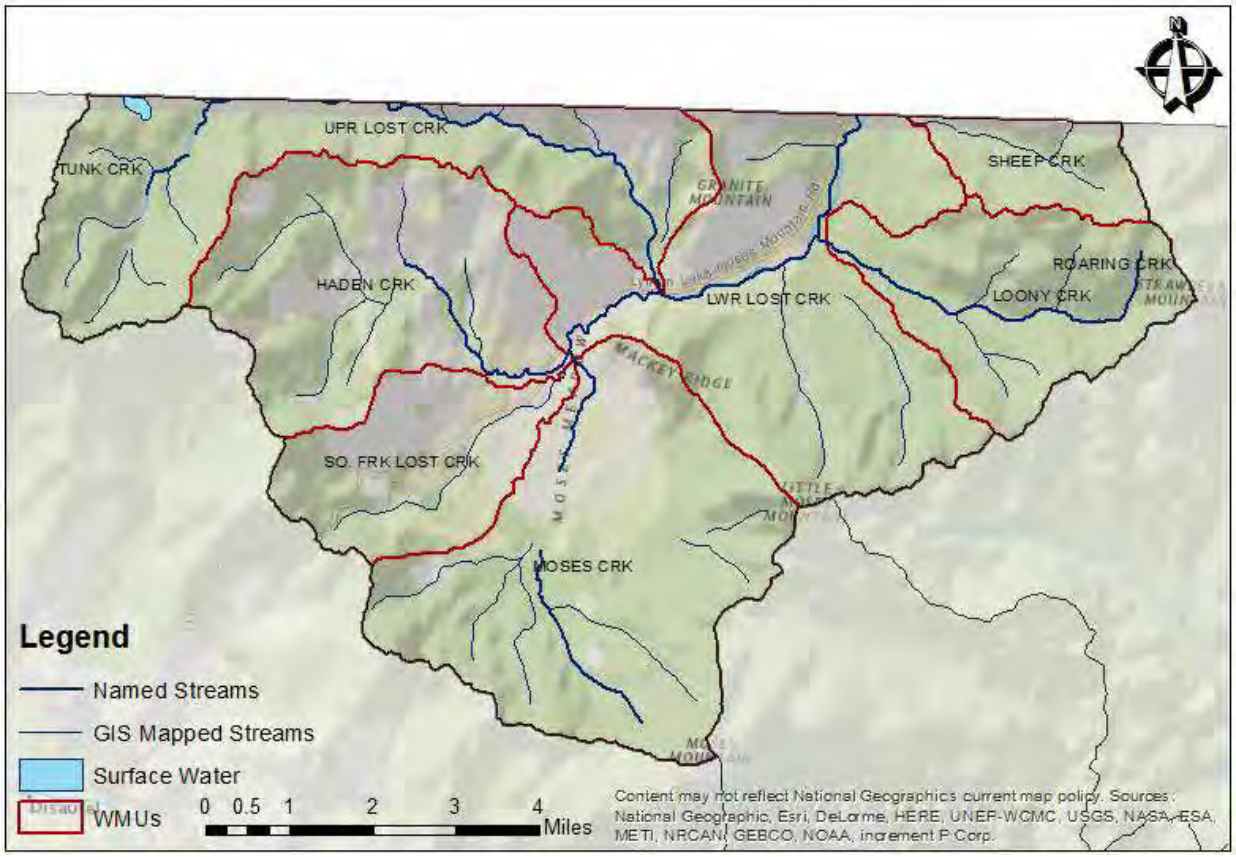
Kartar Valley Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Little Nespelem RMU



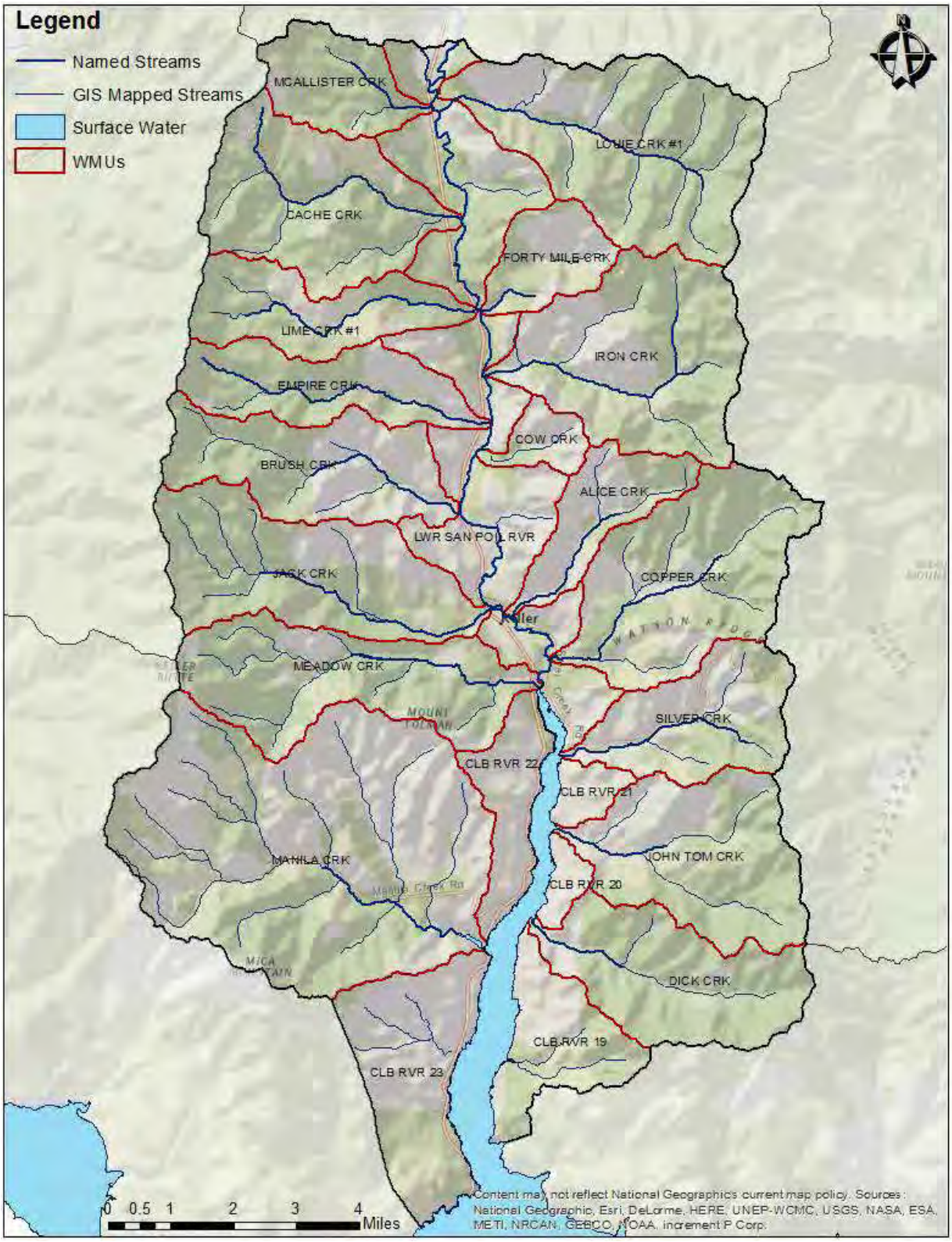
Little Nespelem River Resource Management Unit (RMU) and Watershed Units

Lost Creek RMU



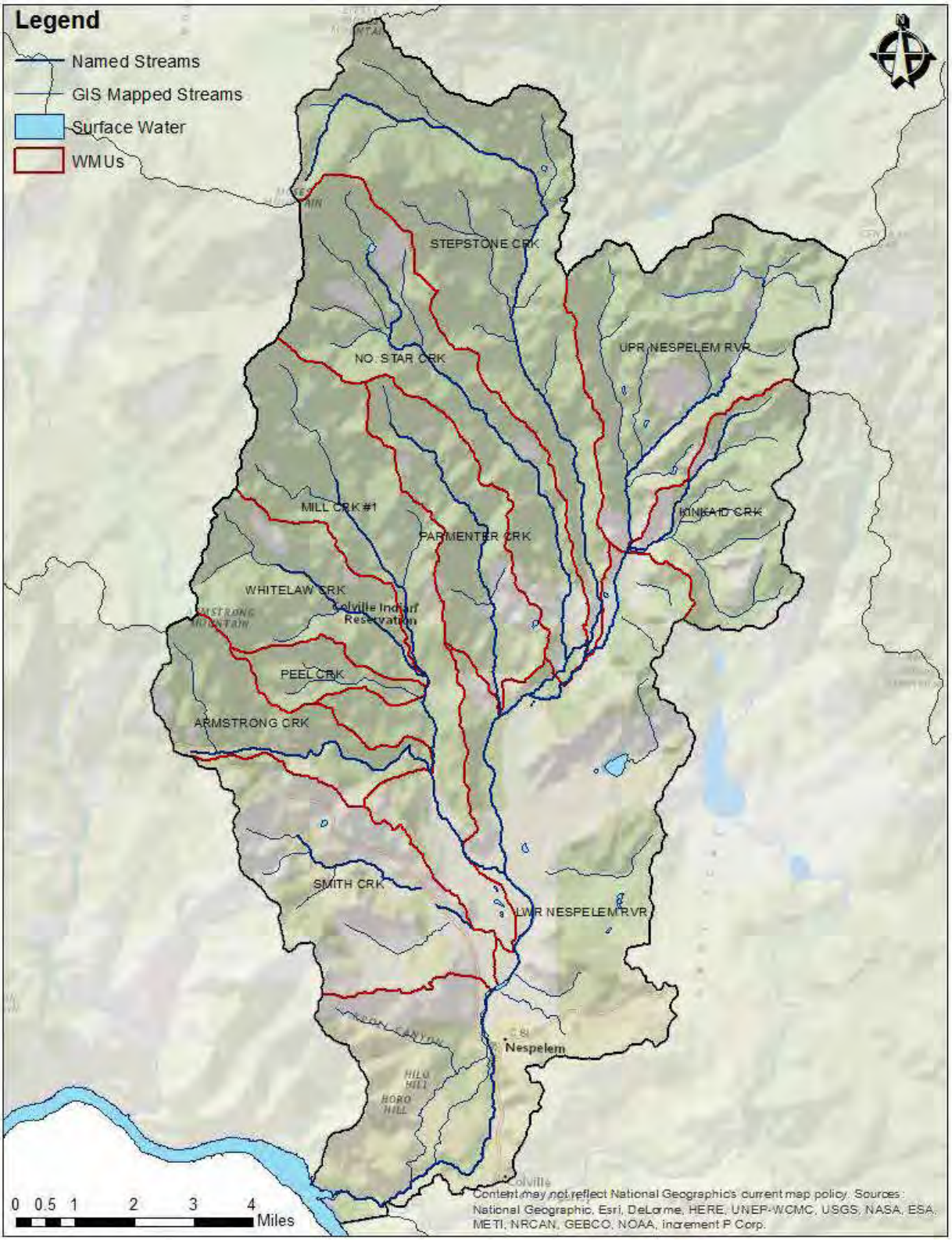
Lost Creek Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Lower Sanpoil RiverRMU



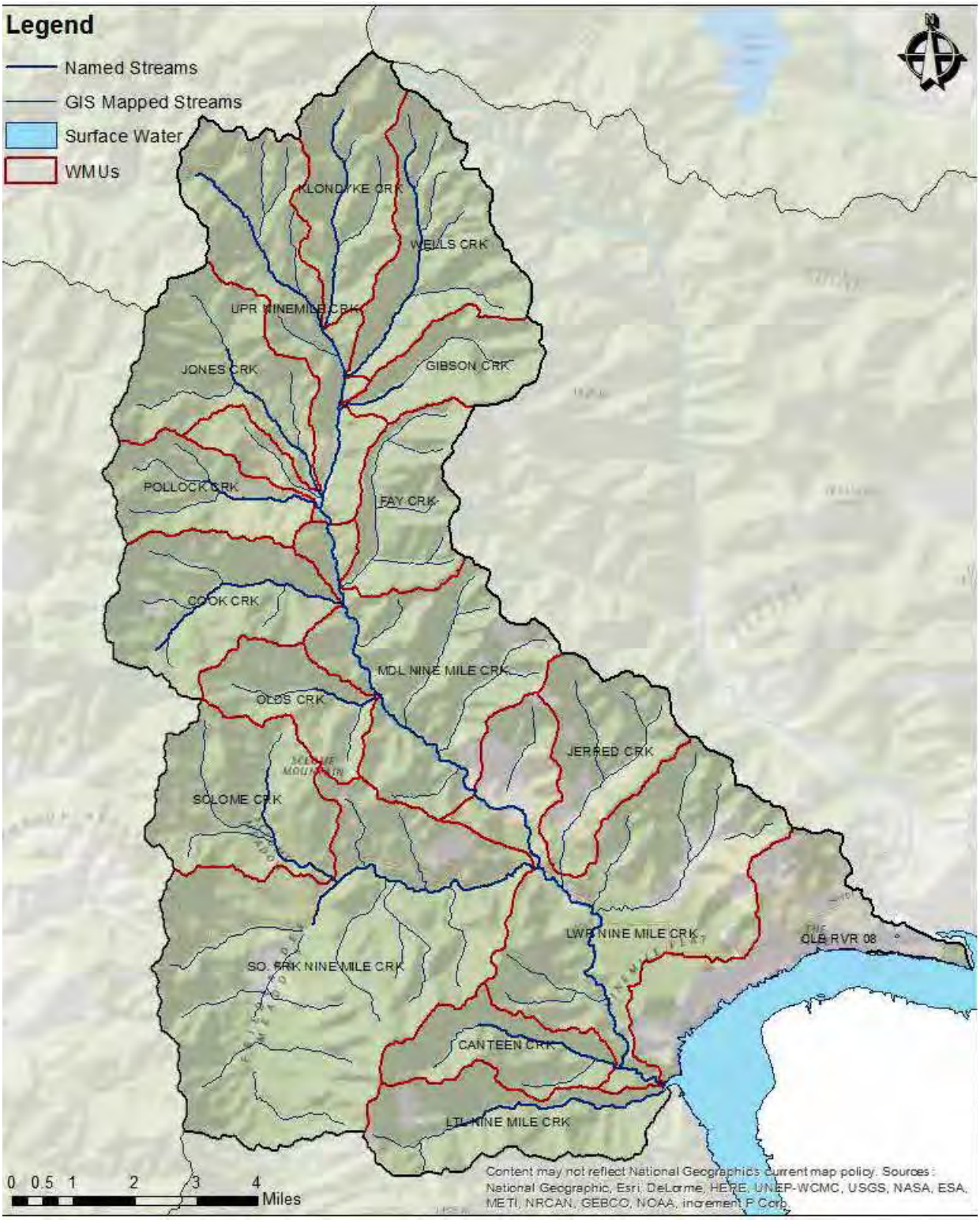
Lower Sanpoil River Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Nespelem RiverRMU



Nespelem River Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Ninemile Creek RMU



Ninemile Creek Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

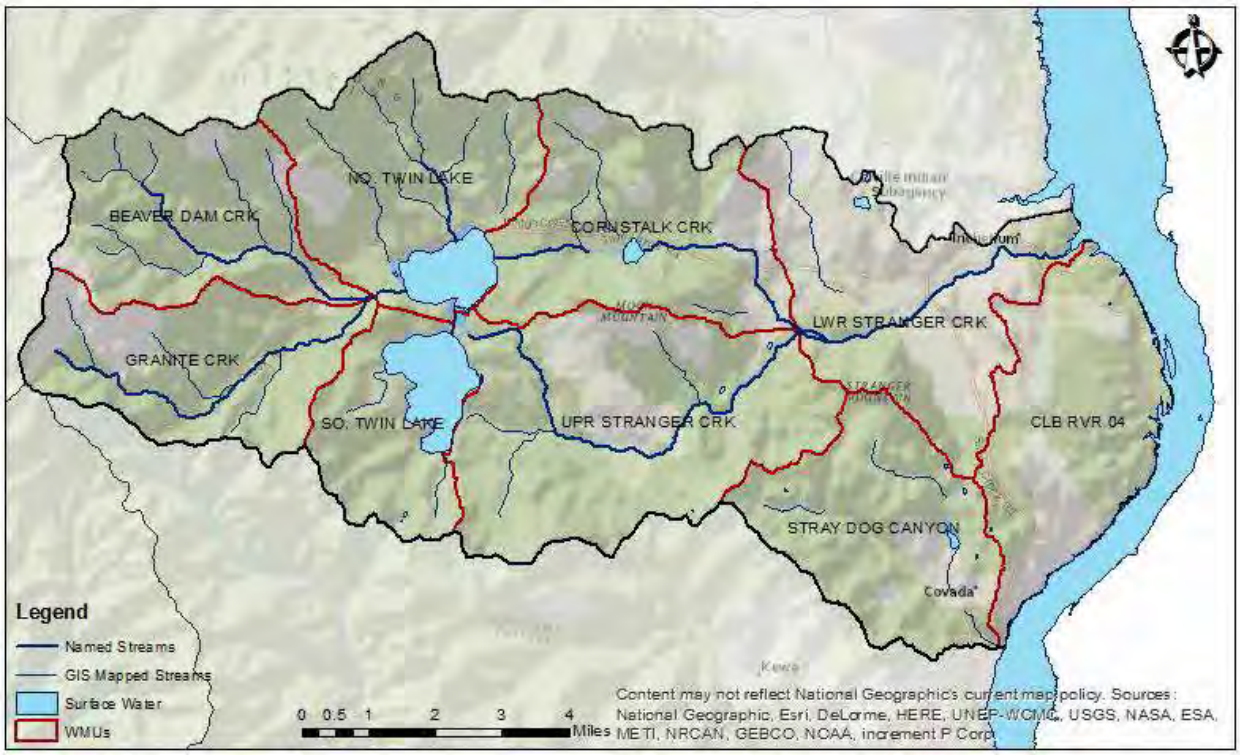
Omak Creek RMU

Omak Creek Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Southwest Plateau RMU

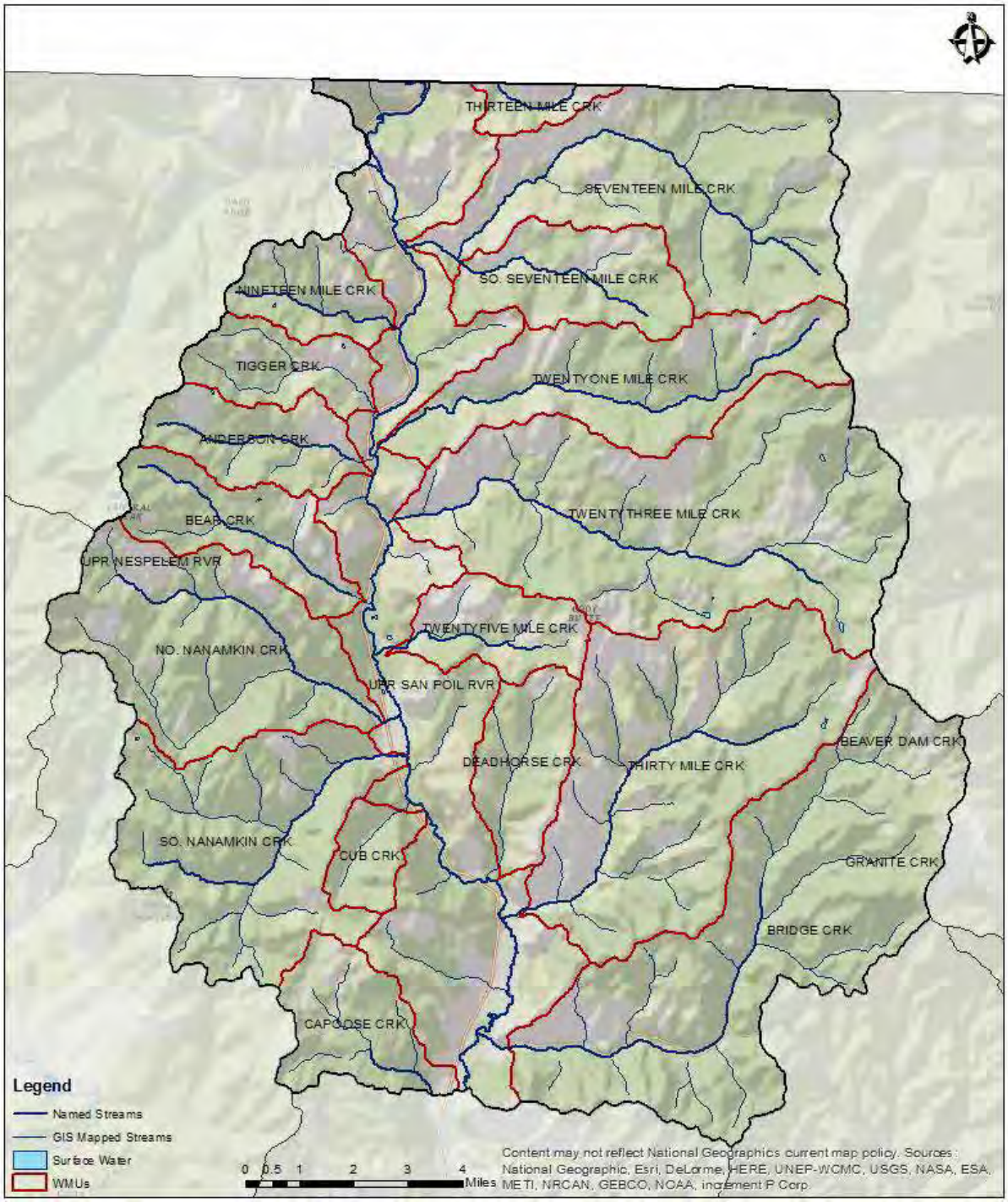
Southwest Plateau Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Twin Lakes RMU



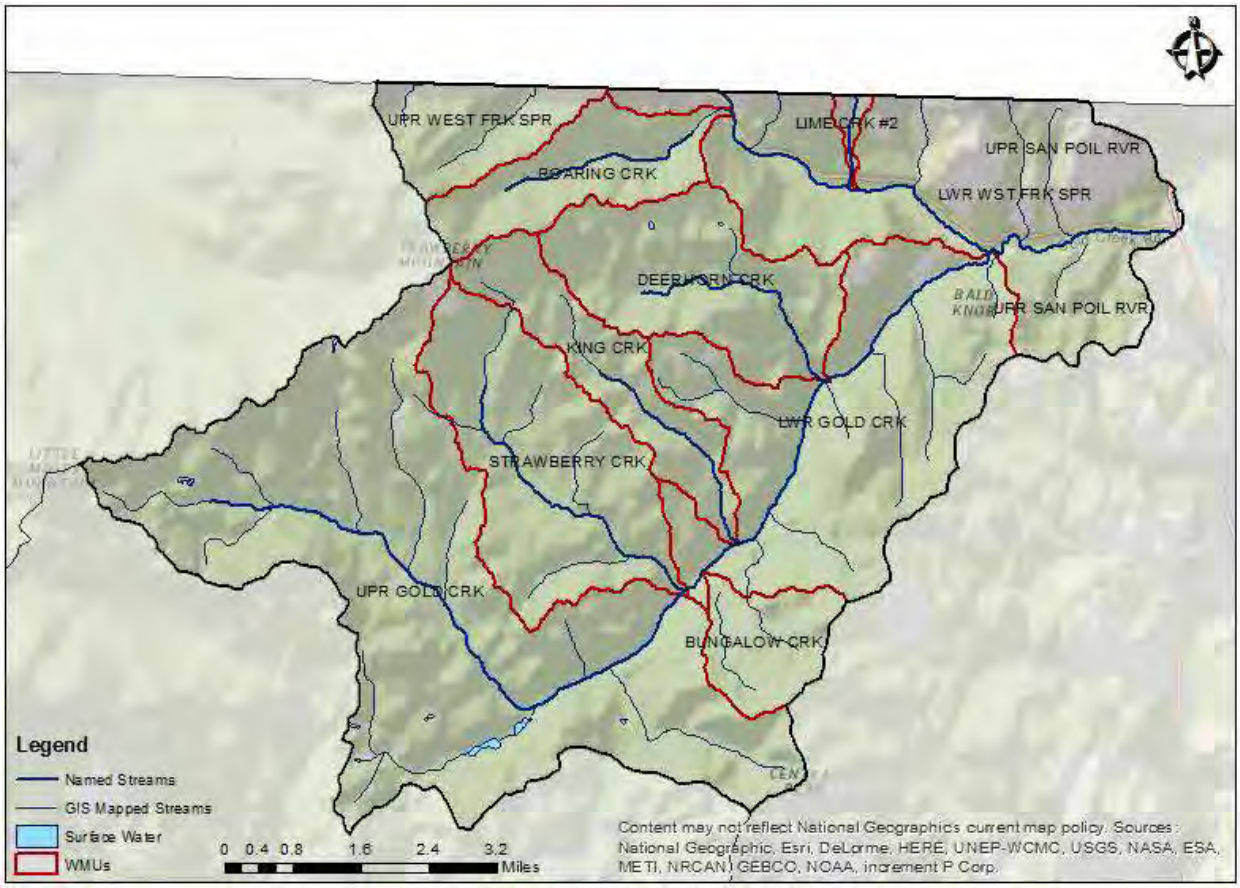
Twin Lakes Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Upper Sanpoil RiverRMU



Upper Sanpoil River Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

West Fork Sanpoil River RMU



West Fork Sanpoil River Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

Wilmont Creek RMU

Wilmont Creek Resource Management Unit (RMU) and Watershed Management Units (WMUs) of the Colville Indian Reservation

C

C: Criteria Air Pollutants

Source:
Air Emissions Inventory: Criteria Pollutants for the Confederated Tribes of the Colville Reservation, Washington State, Base Year 2011.
Prepared by Kris Ray, Air Quality Program
Office of Environmental Trust Confederated Tribes of the Colville Reservation
September 5, 2013.

Criteria Air Pollutants

Criteria pollutants are commonly found substances that EPA regulates by developing human health-based and/or environmentally-based permissible levels. The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants. The six criteria pollutants are ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, particulate matter, and lead. Primary standards set limits based on human health and secondary standards are intended to prevent environmental and property damage. The levels are set on a mass per volume basis, micrograms per cubic meter (µg/m3) where emissions for pollutants for an inventory are reported as tons per year.

- **Carbon monoxide (CO**) is a colorless, odorless gas that forms when carbon in fuels is not burned completely. Major contributors of carbon monoxide to the environment are motor vehicles and construction equipment which account for up to 75 percent of emissions. Other minor sources include industrial processes, wood burning stoves, and forest fires. The highest ambient air levels occur during inversion conditions when air pollution becomes trapped near the ground.

- **Lead (Pb)** is a metal found naturally in the environment and is used in manufacturing. Major sources of lead emissions are motor vehicles (such as cars and trucks) and industry. This emission inventory does not quantify lead at this time.

- **Nitrogen dioxide (NO_2)** is one of a group of highly reactive gasses known as nitrogen oxides. Nitrogen dioxide quickly forms from the emissions of cars, trucks and buses, power plants, and off-road equipment. In addition to contributing to the formation of ground-level ozone and fine particle pollution, nitrogen dioxide is linked with a number of adverse effects on the respiratory system. All areas in the U.S. meet the current (1971) NO2 standards.

- **Sulfur dioxide (SO_2)** is one of a group of highly reactive gasses known as oxides of sulfur. The largest sources of sulfur dioxide emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of sulfur dioxide emissions include industrial processes such as extracting metal from ore, and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment. Sulfur dioxide is linked to a number of adverse effects on the respiratory system.

- **Particulate matter (PM)**, also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. The Environmental Protection Agency is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. The agency groups particle pollution into two categories: inhalable coarse and fine particles. Inhalable coarse particles (PM10), are

found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Fine particles (PM2.5), such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources like forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

- **Ozone (O_3)** is a gas composed of three oxygen atoms. It is not usually emitted directly into the air, but at ground-level is created by a chemical reaction between oxides of nitrogen and volatile organic compounds in the presence of sunlight. Ozone has the same chemical structure whether it occurs miles above the earth or at ground-level and can be good or bad, depending on its location in the atmosphere. In the earth's lower atmosphere, ground-level ozone is considered bad. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents as well as natural sources emit nitrogen oxides and volatile organic compounds that help form ozone. Ground- level ozone is the primary constituent of smog. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant. Many urban areas tend to have high levels of ozone, but even rural areas can be subjected to increased ozone levels when wind carries ozone and pollutants that form it from hundreds of miles away.

Hazardous Air Pollutants (HAPs) are of particular interest because of their potential health effects and environmental consequences. The Environmental Protection Agency lists 188 compounds or chemicals as hazardous air pollutants including: benzene, methylene chloride, dioxin, asbestos, toluene and metals such as cadmium, mercury, chromium and lead compounds. Exposure at high enough concentrations or duration may lead to increased chances of cancer or other serious health problems.

D

D: Wildlife Priority Habitat

Source:
Center for Applied Research. *Integrated Management Plan Resource Assessment*, 2014.
Pacific Biodiversity Institute. *Wildlife Profiles*. Winthrop, CA. 2014

Wildlife Priority Habitat

Snags and Logs


Pileated Woodpecker

Trees die from a variety of causes including insect infestation, heart rot, root rot, fire, lightning, mechanical damage from logging operations, or when their tops are removed by wind. Standing dead trees commonly referred to as "snags" provide critical wildlife habitat. Approximately 72 species of wildlife in this region are dependent on snag habitat: primary excavators such as pileated woodpeckers who excavate nest holes, and secondary cavity users which occupy the snag after the hole is drilled or abandoned. Snags also provide habitat for insects, which aid in the decomposition process of the snag, providing food for insect eating wildlife.

The wildlife that utilizes a snag is determined by the condition of the snag (hard or soft, depending on decay), the location in relation to the surrounding plant community and the size of the snag (height and diameter). The pileated woodpecker selects tall snags greater than 20 inches in diameter capable of providing a nest at least 30 feet above the forest floor and located in a two-storied stand. Of further importance to the maintenance of a woodpecker population is the number of snags available across a forest community. For example, to meet the needs of snag utilizing species such as pileated woodpeckers at their maximum potential population in a ponderosa pine community, would require over two snags per acre, in varying diameters from 10 to over 20 inches. (Thomas, 1979).

Large snags that threaten to fall, causing injury to loggers or their equipment, are removed during timber harvest. An extensive forest road system allows increased access for firewood cutters to snags that would normally be difficult to access. The cumulative effects of timber harvest and firewood gathering increases the risk of compromising the viability of wildlife populations dependent on large snag habitat.

Snags and logs, both standing and on the ground, are otherwise known as coarse woody debris (CWD). Coarse woody debris has a high value to many species of wildlife in many life stages such as nesting, roosting, breeding and foraging. The size and decay class of snags determines the value for wildlife habitat. The ecological role of coarse woody debris to the forest includes maintenance of healthy soils, nutrient supply, and chemical composition of the forest floor. Decaying matter from coarse woody debris provides carbon stores and seed bed regeneration which depend highly on the soils of these environments. Microhabitat creation is another ecological process associated with coarse woody debris in the form of shade cover, humidity and moisture protection. These are important factors for maintaining forage for herbivores, small mammal prey species and amphibian populations. Forest structure associated with coarse woody debris provides wildlife corridors and connectivity, cover, and nesting/denning and foraging habitat for many forest

species. coarse woody debris in the form of woody structure in streams and water bodies similarly affects the hydrologic regime of a site providing canopy cover to regulate water temperatures, maintain streambank stability, and decrease water runoff.

Large logs and snags are the most valuable to wildlife. The benefits of snags and logs to wildlife include foraging habitat (owls, amphibians); prey habitat (flying squirrels, chipmunks); roosting habitat (bats, woodpeckers); resting habitat (fisher, marten); denning habitat (marten, black bear, lynx); cavity nesting habitat (woodpeckers and songbirds); and instream pool formation (salmonids and other aquatic species). Snags and trees for wildlife are very important to the diversity of primary and secondary cavity excavators; as many as 40% of all forest birds depend on tree cavities. They use various stages of decaying dead trees for nesting, roosting and foraging.

Snags and logs are often produced in pulses following stand-level disturbances such as fire. These pulses provide a short-term increase of nesting and foraging habitat for fire-dependent species such as black-backed woodpeckers and white headed woodpeckers. However these two species of woodpeckers show variations in their habitat preferences of snags. Black backed woodpeckers utilize higher elevation forests with high density, small diameter yet tall snags. Food and nesting potential is highest following a large-scale disturbance event. The white-headed woodpecker is associated with a mosaic of lower elevation, open canopy forest and large-diameter ponderosa pine trees adapted to frequent fire regimes. Their nesting and roosting trees are generally large, moderately decayed snags in burned areas, which offer increased food resources. Snags and logs can be created from “legacy trees”, which are large diameter trees that that will eventually die and become snags and logs.

Snag-dependent wildlife depends critically on having enough coarse woody debris in a wide variety of species, sizes and decay classes. Snag-dependent wildlife species may require larger reserves to compensate for habitat fragmentation in more heavily managed areas. Forestry operations such as clearcuts, non-restorative harvest regimes, firewood cutting and salvage logging after fire can have significant impacts on snag dependent species.

Streams

The quantity and quality of streams affect the distribution, composition and productivity of plant and animal communities associated with this habitat. Reduced or loss of stream flow may occur when a stream channel is deepened from downcutting that also results in a loss of water storage in stream banks and adjacent habitats. Changes in the timing of water flows can affect the availability of food and water in both instream and upland habitats that wildlife species depend on.

Instream Habitat

An increase in silt deposition on a stream floor decreases the number of insects that spend all or part of their life cycle in water. These macro-invertebrates are a food source for fish, birds, reptiles and amphibians, mammals such as bats, and other insects such as

the dragonfly. A reduction of these food sources results in declining fish populations, and in turn, affects wildlife such as river otter, mink, kingfisher, and mergansers, which rely on fish for a portion of their diet.

Instream habitat on the Reservation is being lost, primarily from livestock grazing practices in both forest and rangeland habitats, and road construction associated with timber harvest. Season-long grazing in the same location, year after year, has affected streambank stability in riparian and wet meadows by changing the composition of plants that hold the streambank in place. The result is accelerated down cutting and increased sediment accumulation in the stream from livestock trampling the streambanks.

Improperly designed forest roads, with poor drainage, erode and sometimes washout during storm events, depositing sediment into stream channels. Road locations adjacent to stream channels and extensive stream crossings have also contributed to sediment loading in streams.

Wetlands

Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetlands, wet meadows, springs and seeps often occur along streams and their headwaters, where the movement of water is slower (lentic) and soil depositional processes dominate the ecology. Isolated wetlands and wet meadows also occur where groundwater raises the water table above the ground. Although wetlands may be part of a riparian area, the ecology differs from that of the fast-moving (lotic) environment.

Floodplain and Wildlife Habitat

Wetland ecological functions include filtration, water storage, flood protection and wildlife habitat. These functions can withstand and ameliorate activities such as the use of machinery and livestock use.

Wetlands on forested and non-forested land, are important wildlife habitats, both seasonally and year round. They support a high diversity of wildlife species, some of which are also dependent upon adjacent habitats. In forested wetlands and treed shorelines, snags provide nesting habitat for cavity nesting waterfowl such as the goldeneye and wood duck. Snag habitat associated with wetlands can be lost as a result of forest practices, firewood gathering, agricultural conversion and housing development.

Shoreline and emergent aquatic vegetation provide waterfowl and shorebird nesting habitat in non-forested wetlands. Unregulated grazing in these areas has removed vegetation, affecting the amount of available nesting habitat and exposes nests to avian predation by birds such as ravens and provides easy access to nests by predators such as coyotes and skunks. Lost or degraded wetland habitats can result in the loss of species diversity and abundance.

Cliffs/Talus

Cliffs, talus and cave habitats provide a diverse array of microhabitats important to wildlife. Many species are either dependent on or use these habitats in north-central Washington, including bats, birds, bighorn sheep, wolverine, rodents, reptiles and communal snake dens. Threats to cliffs and talus include roads, traffic, energy development, climate change, recreational climbing and biking, mining, housing developments, loss of dispersal habitat, and snake den destruction.

Habitat elements of cliffs, talus and caves include structures such as terraces, overhangs, crevices, protection from predators, open views, flight bases, protection from weather and fire, lingering snowpack, and moderation of a cool, frost-free temperature regime. Cliffs, talus and caves tend to have fewer management threats compared with other natural resources partly because of their relative lack of commercial timber and sometimes due to their protection as culturally significant areas. However they may be threatened with home-building and wind energy development.

Talus habitat

Cliffs provide denning habitat, nesting habitat, escape habitat, and, at times, foraging habitat. Cliff habitats appear in various pitches, shapes and sizes. They may have single trees or clumps of trees scattered across their faces. They may have few ledges or many ledges. They may be accessible by wildlife that walk, crawl or fly, or they may only be accessible by those that fly. These habitats are seldom affected by other resources uses. However, disturbances can occur from forest practices, on or adjacent to the cliff face, or from quarrying rock from the face and by road construction across the face. Timber harvest, near or adjacent to nesting golden eagles, can result in nest abandonment.

Talus refers to a slope formed especially by an accumulation of rock rubble and boulders and is typically not the object of resource management unless the rock is mined as a rock quarry for road building or similar uses.

Aspen Stands

Quaking aspen is an important deciduous species that may be found in both uplands and riparian areas. Throughout the West, aspen is declining in abundance and quality. The cause of aspen decline is due to the combination of several factors including overgrazing by livestock and wildlife, fire suppression, conifer encroachment, home development and drought.

The primary reproductive strategy of aspen is colonial root suckering. Abundant wind-blown seeds have low germination rates unless they land in ideal habitats such as recently burned areas.

Aspen Habitat

Aspen stands provide important habitat for wildlife such as nesting and roosting habitat, stem structures and decay classes that are preferred by primary cavity excavators, forage, shade and thermal cover. Aspen leaf fall builds up the organic content of soils over time, providing the basis for a food web starting with soil microorganisms and arthropods. Aspen stands provide quality forage and browse, however continuous overgrazing can eliminate aspen stands.

The management of aspen requires controls on grazing and competition, while providing for the right type of disturbance (such as fire or flooding) to foster new populations.

On moist sites, aspen are an early successional species to conifers which eventually dominate the site.

Aspen are short lived deciduous trees, with a life expectancy of 80 to 100 years. They occur on moister upland sites and are an early successional species to conifers which eventually dominate the site.

Aspen are classified as a fire dependent species that require fire for regeneration of the stand. Stand replacing fires open the ground to full sunlight, removing competing vegetation such as conifers, and allow the aspen roots to sucker, producing thousands of shoots per acre, establishing a new stand. Young aspen are an important forage source for deer, moose and elk, and are readily eaten by livestock. Mature aspen stands provide shade and cover during the warm season. Aspen snags are an important nesting habitat for the Lewis woodpecker. Aspen stands also provide nest sites for songbirds and raptors.

The suppression of periodic fires from the landscape has resulted in the loss of aspen stands to decadence and replacement by coniferous trees. Unmanaged grazing and trampling by domestic livestock often results in the loss of regenerating aspen, especially near water sources. Some areas on the Reservation, formerly in aspen, have been converted to pasture lands or hay fields to take advantage of sub-irrigated soils.

Cottonwood Galleries

Black cottonwood is an important deciduous species found in riparian areas. Galleries of large cottonwood trees are declining in abundance and quality due to road building and use, past harvests, and habitat loss.

Cottonwoods occur in areas where both aquatic and terrestrial ecosystems mutually influence each other. Riparian areas are important for their high productivity and high biodiversity, due in part, to their high soil moisture, high fertility, and complex vegetation mosaics.

Cottonwood trees are valuable for many species of wildlife. Cottonwoods tend to occur in riparian areas and active channels adjacent to aquatic prey sources, where they provide large instream structures critical for fisheries. Large cottonwood trees may be favored for nesting, roosting and foraging by large raptors or great blue herons. Cottonwoods contribute to a broad prey base. Cottonwood stands provide important woody forage, horizontal and vertical cover for visual and protective screening and shading, and diverse understory vegetation.

Sedimentation, erosion and forest fragmentation from roads are one of the major causes of the decline of cottonwood galleries and other aquatic habitats after habitat loss.

The management of cottonwood galleries and riparian areas is based on the maintenance or enhancement of net proper function and condition within a watershed. For each stream reach within a watershed, proper function and condition is measured using a set of criteria for streambank morphology, sedimentation, turbidity, bank stability, temperature, and hydrologic flow regimes. The rankings are summed for the watershed as a whole, as well as to prioritize restoration activities along individual reaches within the watershed.

Riparian

Riparian areas are the central feature of watersheds. They include lands along permanently-flowing streams, ponds, lakes, wetlands, seeps, springs, and intermittent streams, where both aquatic and terrestrial ecosystems mutually influence each other. Riparian areas are important to a broad array of aquatic and terrestrial species. They have high productivity and high biodiversity, due in part, to their high soil moisture, high fertility, and complex vegetation mosaics.

The management of riparian areas is based on the maintenance or enhancement of net proper function and condition (PFC) of streams within a watershed. For each stream reach within a watershed, PFC is measured using a set of criteria for streambank morphology, sedimentation, turbidity, bank stability, temperature, and hydrologic flow regimes. PFC rankings determine whether a stream is stable, trending toward improvement, or declining. PFC is not the sole means of evaluating wetland integrity, nor is it a replacement for biological surveys, but it results in a measure of resiliency that is very effective in guiding management.

Riparian habitats are those adjacent to streams and rivers. They provide breeding and forage areas, hiding cover, wintering habitat and function as travel corridors for wildlife. Riparian habitats are connective links to other forest and range communities and the wildlife species that use them. Native vegetation (trees, shrubs, forbs and grasses) that comprise riparian habitat are suited to water saturated soils, either seasonally or year-round.

Riparian Habitat

Riparian willow communities are essential to willow flycatchers for breeding and rearing. Riparian communities provide beaver with food and the materials for dam and lodge building. Large down logs in riparian areas function as homes and food for insects that aid in the decomposition of the wood, which recycles nutrients back to the soil for use by living vegetation. Riparian habitats provide forage for game animals and birds, seasonally and year round. Deer eat the new growth of willow and cottonwood and the buds provide food for grouse during the winter.

The structure and function of riparian ecosystems on the Reservation has been impaired by human induced disturbance such as forest practices, livestock grazing, agricultural practices and urban development. Poor management of riparian habitats, especially when it results in the downcutting of stream channels, causing the loss of bank water storage and bank stabilizing vegetation, negatively affects the ability of riparian vegetation to persist. Roads are a major cause of decline of aquatic habitats and habitat loss. Roads contribute to sedimentation, erosion, and habitat fragmentation. Managing for proper function and condition of riparian areas provides benefits to hundreds of wildlife and plant species.

Shrub-Steppe

Shrub-steppe is a type of natural grassland with low rainfall. Shrub-steppes are distinguishable from deserts, which are too dry to support a noticeable cover of perennial grasses or other shrubs, while the shrub-steppe has sufficient moisture levels to support a cover of perennial grasses and/or shrubs. The dominance of winter precipitation, combined with either fine-textured or rocky soils, is the main reason for the dominance of shrub vegetation in this ecosystem. In eastern Washington, the soils are characterized by

loess and volcanic ash. Woody species of sagebrush (Artemisia spp.) are the most characteristic and widespread vegetation dominants in the intermountain lowlands can have a relatively long lifespan of nearly 100 years.

Shrub steppe habitat

Less than half of the original shrub-steppe remains in Washington and a large percentage of the remainder is in poor condition. Much of the native shrub-steppe and grassland habitat in the Columbia Plateau has been con- verted to agriculture, and much of the remaining habitat is heavily impacted by conversion to agriculture, over-grazing, non-native grasses, and changes in fire frequency. Management considerations for shrub-steppe include soil disturbance levels and the potential for weed invasion.

Wildlife species that use shrub-steppe include deer, elk, coyotes, badgers, bats, over 50 species of birds, and many rodents, reptiles, amphibians and invertebrates. Land birds of the Columbia Plateau vary their habitat preference by the dominant plant species. Species that prefer the grass component of shrub-steppe include Columbian Sharp-tailed grouse, long-billed curlew, burrowing owl, short-eared owl, vesper sparrow, lark sparrow, grasshopper sparrow and western meadowlark.A number of wildlife species associated with, or dependent on, sagebrush are found in this landscape and have suffered population declines (sharp-tailed and sage grouse, sage and Brewer 's sparrows, Washington ground squirrel) and may persist only in relatively isolated populations. The Washington Connected Landscapes Project determined that the Okanogan River valley provides crucial north-south connectivity habitat for species of arid lands.

Shrub-steppe is a type of low rainfall natural grassland. Shrub-steppes are distinguishable from deserts, which are too dry to support a noticeable cover of perennial grasses or other shrubs, while the shrub-steppe has sufficient moisture levels to support a cover of perennial grasses and/or shrubs. The dominance of winter precipitation, combined with either fine-textured or rocky soils, is the main reason for the dominance of shrub vegetation in this ecosystem. In eastern Washington, the soils are characterized by loess and volcanic ash. Woody species of sagebrush (*Artemisia spp.*) are the most characteristic and widespread vegetation dominants in the intermountain lowlands can have a relatively long lifespan of nearly 100 years.

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Big Game Winter Range

Big Game Winter Range

Big game winter ranges are habitats that species such as deer, elk, and moose occupy during the winter and early spring seasons. Where these animals occur on winter range is generally related to the depth of snow, elevation, the direction the slope faces and snow interception by the crown cover of trees. High elevations and northerly facing slopes generally accumulate and retain snow early in the winter and later in the spring. South and west facing steep slopes tend to accumulate less snow due to sun and wind exposure. These areas are critical for big game, especially during severe winter conditions where southern slopes expose winter forage, provide ease of travel to escape predators, and sun exposure for heat retention.

Learned behavior is also a factor that often determines where, when and how individual animals or herds use winter ranges. Some animals return to the same area year after year, regardless of the quantity or quality of the habitat.

Effective winter ranges provide the food and shelter that big game animals need to survive during winters. The preferred foods of deer include shrubs, and litterfall (twigs and branches of Douglas fir, arboreal lichens) when shrubs are unavailable because of snow depth. Snow depths greater than 20 inches can cover forage plants and cause deer to expend more energy getting to the plant than it can gain by foraging on it. Elk are more efficient foragers, utilizing both shrubs and grasses. They are capable of pawing through 18+ inches of snow to search out grasses and they can forage on leader growth of shrubs that may be out of reach for deer. Snow depth greater than 24 inches tends to affect elk movement and foraging behavior.

Winter range

The quantity and quality of available food can affect the survival and productivity of these animals. Big game animals that enter the winter months in fair to poor condition, such as male deer or elk which have expended large amounts of energy during the breeding season, may succumb to starvation or predation due to the lack of adequate forage. The quantity and quality of available forage and snow depth can also affect pregnant does, reducing birth rates.

Shelter comes in three forms: thermal cover, which protects the animal from wind chill and the loss of radiant heat to the open sky, and can consist of ledges, shrub fields, or timber stands. Snow intercept cover occurs under timber stands with interlocking crowns (70% canopy closure with trees 40 feet or greater in height), and reduces the amount of snow reaching the forest floor, leaving forage exposed and allowing movement without excessive energy loss. Security cover can be either ledges, outcrops or vegetation that hide an animal from view, thus avoiding flight response, conserving energy needed to survive the winter.

Old Growth and Mature Forests

Old-growth and mature forest stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, these stands are over 150 years of age, with 10 tree diameter over 21 inches, and 1 - 3 snags per acre with 12-14 inch diameters. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Human-caused alterations to the stand will be absent or so slight that they do not affect the ecosystem's essential structures and functions.


Old Growth Forest

There are several wildlife species on the Reservation, such as the lynx, that depend on old growth and mature forests as critical habitat. This forest structure supports denning and foraging habitat, as well as travel corridors for these wildlife species.

Biodiversity Areas And Corridors

Biological diversity, or biodiversity, is a measure of the variety of life forms interacting within a given area. Habitat connectivity is a measure of the ability of organisms to move between core habitats through patches of different habitats. Biodiversity hotspots are special, sometimes unique, habitats that occur on CCT lands. Hotspots include old growth forests, riparian areas, lakes, wetlands, subalpine summits and parklands, cliffs and rock

outcrops, basalt lithosols, vernal pools, and alkaline playas. They may cover large areas or be very limited in extent.

Wildlife habitat needs are tied to habitat. CCT lands provide wildlife connectivity needs, both north-south from the Columbia River into Canada, and east-west, from the North Cascades to the Rockies. The Okanogan River provides crucial north-south connectivity habitat for species of arid lands.

To succeed at maintaining biodiversity and connectivity in managed landscapes, it is necessary to prioritize efforts in areas that provide habitats for multiple species. Management strategies that use a multiple-species approach are based on defining guilds of species that behave similarly in similar habitats. The goals for the conservation of diversity and connectivity begin with identification of key areas and these in turn can inform the type of activities that are emphasized. This requires quality habitat maps and monitoring of key species.

Game Reserves, Wilderness and Mitigation Lands

The completion of Grand Coulee and Chief Joseph hydropower facilities brought an end to a way of life and numerous cultural practices that had existed continuously in the area for thousands of years. Grand Coulee Dam, and subsequently Chief Joseph Dam, abruptly stopped the movement of salmon to the Upper Columbia and in addition destroyed critical habitat of terrestrial species including mule deer, sharp-tailed grouse, and other species important to the Native American Tribes in the region. Over 40,000 acres of critical low elevation wildlife habitat were lost.

Beginning in 1972, the Tribes began designating areas to protect wildlife during all or part of the year, and the first deer hunting season was established. The Hell Gate and Omak Lake game reserves were established (130,000 acres) as well as the Moses and Grizzly Mountain wilderness areas (8,000 acres). The Tribes created a Fish and Wildlife Department in 1976.

In 1980 the Northwest Power Planning Act was passed, requiring mitigation of fish and wildlife losses due to hydropower development. The first wildlife mitigation properties on the Reservation were purchased in 1993 and are managed by the Fish and Wildlife Department.

The mitigation lands are managed to provide protection, restoration, and enhancement of 62,300 acres of critical wildlife habitat. Many of the managed areas are located adjacent to or near the Columbia River (Lake Rufus Woods and Lake Roosevelt) and are surrounded by Reservation lands with habitats ranging from shrub-steppe to coniferous forests. These lands contain a wide diversity of vegetative types and habitats that can support a large variety of wildlife.

E

E: Fish and Wildlife Species

Sources:
Colville Tribes Fish and Wildlife Department
Washington State Department of Fish and Wildlife
U.S. Fish and Wildlife Service

Tribal Priority Wildlife Species			
Name	Priority Habitats	State	Fed.
Herpetiles			
Columbia Spotted Frog *Rana luteiventris*	Wetlands, wet meadows, springs and seeps	C	
Northern Leopard Frog *Rana pipiens*	Wetlands, wet meadows, springs and seeps	E	
Sagebrush Lizard *Sceloporus graciosus*	Shrub-steppe	C	
Short horned lizard *Phrynosoma douglasii*	Shrub-steppe	M	
Tiger salamander *Ambystoma tigrinum*	Wetlands, wet meadows, springs and seeps, shrub-steppe	SM	
Western Painted Turtle *Chrysemys picta*	Deep watered ponds and lakes, wetlands, wet meadows, springs and seeps		
Western rattlesnake *Crotalus viridis*	Shrub-steppe		
Western Toad *Bufo boreas*	Wetlands, wet meadows, springs and seeps, Douglas fir series	C	
Birds			
American white pelican *Sceloporus graciosus*	Deep watered ponds and lakes	E	
Bald eagle *Haliaeetus leucocephalus*	Deep watered ponds and lakes, mature forest/late successional (old growth)	S	FCo
Belted kingfisher *Megaceryle alcyon*	Instream, riparian		
Black capped chickadee *Poecile atricapillus*	Douglas fir series, snags and logs		
Black tern *Chlidonias niger*	wetlands, wet meadows, springs and seeps, deep watered ponds and lakes	SM	
Black-backed woodpecker *Picoides arcticus*	Snags and logs	C	
Blue grouse *Dendragapus obscurus*	Shrub-steppe		
Burrowing owl *Athene cunicularia*	Shrub-steppe	C	
Columbian Sharp-tailed Grouse *Tympanuchus phasianellus*	Shrub-steppe	T	
Common loon *Gavia immer*	Deep watered ponds and lakes	S	

Tribal Priority Wildlife Species			
Name	Priority Habitats	State	Fed.
Ferruginous hawk *Buteo regalis*	Shrub-steppe	T	
Flammulated owl *Otus flammeolus*	Eastside dry mixed conifer forests	C	
Golden eagle *Aquila chrysaetos*	Cliffs	C	
Great blue heron *Ardea herodias*	Deep watered ponds and lakes	SM	
Great gray owl *Strix nebulosa*	Mature forest/late successional (old growth)	M	
Greater Sage-grouse *Centrocercus urophasianus*	Shrub-steppe	T	C
Killdeer *Charadrius vociferus*	Dry uplands, fields, meadows and wetlands		
Lewis' Woodpecker *Melanerpes lewis*	Snags and logs	C	
Loggerhead shrike *Lanius ludovicianus*	Shrub-steppe	C	
Northern goshawk *Accipiter gentilis*	Mature forest/late successional (old growth)	C	
Osprey *Pandion haliaetus*	Deep watered ponds and lakes	SM	
Peregrine falcon *Falco peregrinus*	Cliffs, deep water ponds and lakes	S	FCo
Pileated woodpecker *Dryocopus pileatus*	Snags and logs, mature forest/late successional (old growth)	C	
Prairie falcon *Falco mexicanus*	Cliffs, shrub-steppe	SM	
Pygmy nuthatch *Sitta pygmaea*	Ponderosa Pine Series (old growth), snags and logs	SM	
Ruffed grouse *Bonasa umbellus*	Douglas fir series, aspen stands		
Sagbrush sparrow *Artemisiospiza nevadensis*	Shrub-steppe	C	
Sage thrasher *Oreoscoptes montanus*	Shrub-steppe	C	
Sandhill crane *Grus canadensis*	Eastside steppe, wetlands, wet meadows, springs and seeps	E	

Tribal Priority Wildlife Species			
Name	Priority Habitats	State	Fed.
Vaux's swift *Chaetura vauxi*	Mature forest/late successional (old growth)	C	
Western bluebird *Sialia mexicana*	Shrub-steppe, snags and logs	SM	
White-headed woodpecker *Picoides albolarvatus*	Ponderosa Pine Series, snags and logs	C	
Mammals			
American Badger *Taxidea taxus*	Shrub-steppe. eastside steppe	SM	
Beaver *Castor canadensis*	Riparian, deep water ponds and lakes		
Black Bear *Ursus americanus*	Shrub-steppe, subalpine fir series		
Bobcat *Lynx rufus*	Ponderosa pine series, subalpine fir series		
California Bighorn Sheep *Ovis canadensis*	Shrub-steppe		
Cascade red fox Vulpes vulpes	Douglas fir series	C	
Cougar *Puma concolor*	Ponderosa pine series		
Coyote Canus latrans	Shrub-steppe		
Fisher *Martes pennanti*	Mature forest/late successional (old growth)	E	C
Gray wolf *Canis lupus*	Big game winter range	E	E
Grizzly bear Ursus arctos	Douglas fir series	E	T
Lynx *Lynx canadensis*	Subalpine fir series	T	T
Mink *Neovison vison*	Deep watered ponds and lakes		
Moose *Alces alces*	Wetlands, wet meadows, springs and seeps		
Mule Deer *Odocoileus hemionus*	Shrub-steppe		
Pine Marten *Martes americana*	Mature forest/late successional (old growth)		

Tribal Priority Wildlife Species			
Name	Priority Habitats	State	Fed.
Preble's shrew *Sorex preblei*	Snags and logs	C	
River Otter *Lontra canadensis*	Instream		
Rocky Mountain Elk *Cervus elaphus*	Eastside steppe		
Snowshoe Hare *Lepus americanus*	Douglas fir series		
Townsend's big-eared bat *Corynorhinus townsendii*	Caves	C	
Washington ground squirrel *Urocitellus washingtoni*	Shrub-steppe	C	C
Weasel Spp. *Mustela*	Shrub-steppe, riparian		
Western gray squirrel *Sciurus griseus*	Conifer forest	T	
White-tailed jackrabbit *Lepus townsendii*	Shrub-steppe. eastside steppe	C	
Wolverine *Gulo gulo*	Subalpine fir series	C	
Source: Colville Tribes Fish and Wildlife Department *Source: Washington State Department of Fish and Wildlife* *U. S. Fish and Wildlife Service*			

State	Federal
C = Candidate	E = Endangered
SM = State Monitored	T = Threatened
SE = StateEndangered	C = Candidate
T = Threatened	FCo = Federal Species of Concern
S = Sensitive	

RESIDENT AND MIGRATORY GAME WILDLIFE			
GAME ANIMALS	Moni-tored	MIGRATORY GAME BIRDS	Moni-tored
Black Bear*		American Coot	X
Elk*	X	American Widgeon	X
Mountain Cottontail		Barrow's Goldeneye	X
Mule Deer*	X	Blue-Winged Teal	X
Snowshoe Hare		Bufflehead	X
White-Tailed Deer*	X	Canada Goose	X
Moose	X	Canvasback	X
GAME BIRDS		Cinnamon Teal	X
		Common Goldeneye	X
Blue Grouse*		Common Merganser	X
California Quail		Common Snipe	X
Chuckar*		Gadwall	X
Gray Partridge*		Greater Scaup	X
Ring-Necked Pheasant		Green-Winged Teal	X
Ruffed Grouse*		Harlequin Duck	X
Sharp-Tailed Grouse*	X	Hooded Merganser	X
Spruce Grouse		Lesser Scaup	X
Turkey		Mallard	X
		Oldsquaw	X
		Pintail	X
		Red-Breasted Merganser	X
		Redhead	X
		Ring-Necked Duck	X
		Ruddy Duck	X
		Shoveler	X
		Snow Goose	X
		Sora	X
		Virginia Rail	X
		White-Winged Scoter	X
		Wood Duck	X
* Game species with Colville Tribes management priority			
Source: Colville Tribes Fish and Wildlife Department.			

Resident Non-game Wildlife Species		
Non-Game Birds		
American Avocet	Cliff Swallow	Lark Sparrow
American Bittern	Common Crow	Lazuli Bunting
American Goldfinch	Common Flicker	Least Flycatcher
American Redstart	Common Loon	Least Sandpiper
Arctic Loon	Common Nighthawk	Lesser Yellowlegs
B-C Night Heron	Common Poorwill	Lewis' Woodpecker
Baird's Sandpiper	Common Raven	Lincoln's Sparrow
Band-Tailed Pigeon	Common Redpoll	Loggerhead Shrike
Bank Swallow	Common Yellowthroat	Long-Billed Curlew
Barn Swallow	Dark-Eyed Junco	Long-Billed Dowitcher
Belted Kingfisher	Dipper	Long-Billed Marsh Wren
Black Tern	Downy Woodpecker	Macgillivray's Warbler
Black-Backed Woodpecker	Dunlin	Mountain Bluebird
Black-Bellied Plover	Dusky Flycatcher	Mountain Quail
Black-Billed Magpie	Eared Greebe	Mountain Dove
Black-Capped Chickadee	Eastern Kingbird	Mtn. Chickadee
Black-Chinned Hummingbird	Evening Grosbeak	Nashville Warbler
Black-Headed Grosbeak	Forster's Tern	Northern Oriole
Blue Jay	Fox Sparrow	Northern Pharlope
Bobolink	Golden Crowned Kinglet	Northern Shrike
Bohemian Waxwing	Grasshoppers Sparrow	Northern Waterthrush
Bonaparte's Gull	Gray Catbird	Olive-Sided Flycatcher
Boreal Chickadee	Gray Jay	Orange-Crowned Warbler
Brewer's Blackbird	Gray-Crown Rosy Finch	Pectural Sandpiper
Brewer's Sparrow	Great Blue Heron	Pied-Billed Grebe
Brown Creeper	Greater Yellowlegs	Pileated Woodpecker
Brown-Headed Cowbird	Hairy Woodpecker	Pine Grosbeak
California Gull	Hammond's Flycatcher	Pine Siskin
Calliope Hummingbird	Hoary Redpoll	Pygmy Nuthatch
Canyon Wren	Horned Grebe	Red Crossbill
Cassin's Finch	Horned Lark	Red-Breasted Nuthatch
Cedar Waxwing	House Finch	Red-Eyed Vireo
Chestnut-Backed Chick	House Sparrow	Red-Necked Grebe
Chipping Sparrow	House Wren	Red-Winged Blackbird
Clark's Nutcracker	Indigo Bunting	Ring-Billed Gull

Resident Non-game Wildlife Species		
Clay-Colored Sparrow	Killdeer	Robin
Rock Dove	Tennesee Warbler	White Pelican
Rock Wren	Three-Toed Woodpecker	White-Br. Nuthatch
Rough-Winged Swallow	Townsend's Solitaire	White-Crowned Sparrow
Ruby-Crowned Kinglet	Townsend's Warbler	White-Throated Sparrow
Rufous Hummingbird	Tree Sparrow	White-Throated Swift
Rufous-Sided Towhee	Tree Swallow	White-Winged Crossbill
Rusty Blackbird	Varied Thrush	Williamson's Sapsucker
Sage Grouse	Vaux's Swift	Willow Flycatcher
Sage Sparrow	Veery	Wilson's Phalarope
Sage Thrasher	Vesper Sparrow	Wilson's Warbler
Sanderling	Violet-Green Swallow	Winter Wren
Sandhill Crane	Warbling Vireo	Yellow Breasted Chat
Savannah Sparrow	Water Pipit	Yellow Warbler
Say's Phoebe	Western Bluebird	Yellow-Bellied Sapsucker
Semipalmated Plover	Western Flycatcher	Yellow-Billed Cuckoo
Semipalmated Sandpiper	Western Grebe	Yellow-Headed.Blackbird
Snow Bunting	Western Kingbird	Yellow-Rumped Warbler
Solitary Vireo Solitary Sand-piper	Western Meadowlark	Starling
Song Sparrow	Western Sandpiper	
Spotted Sandpiper	Western Tanager	
Steller's Jay	Western Wood Peewee	
Stilt Sandpiper	Whistling Swan	
Swainson's Thrush	White Headed Woodpecker	
Raptors		
Bald Eagle	Great Horned Owl	Red-Tailed Hawk
Barn Owl	Kestrel	Rough-Legged Hawk
Barred Owl	Long-Eared Owl	Saw-Whet Owl
Burrowing Owl	Merlin	Screech Owl
Cooper's Hawk	Northern Harrier	Sharp-Shinned Hawk
Ferruginous Hawk	Osprey	Short-Eared Owl
Flammulated Owl	Peregrine Falcon	Snowy Owl
Golden Eagle	Prairie Falcon	Swainson's Hawk
Goshawk	Pygmy Owl	Turkey Vulture
Great Gray Owl		

Resident Non-game Wildlife Species		
Herpetiles	**Other**	
Common Garter	Mountain Goat	Big Brown Bat
Gopher Snake	Mountain Vole	Bighorn Sheep
Great Basin Spadefoot	Mt (Heather) Phenacomys	Boreal Red-Backed Vole
Leopard Frog	N. Flying Squirrel	Bushy-Tailed Woodrat
Long-Toed Salamander	N. Pocket Gopher	California Myotis
N.alligator Lizard	N. Water Shrew	Canada Lynx
Pacific Treefrog	Norway Rat	Columbian Gr. Squirrel
Painted Turtle	Pallid Bat	Deer Mouse
Red Legged Frog	Pika	Dusky Shrew
Rubber Boa	Porcupine	Feral Horse
Spotted Frog	Pygmy Shrew	Fringed Myotis
Tiger Salamander	Red Squirrel	Gold Mantled Squirrel
Wandering Garter	Sagebrush Vole	Gr.basin Pocket Mouse
Western Rattlesnake	Silver-Haired Bat	Gray Wolf
Western Skink	Small-Footed Myotis	Grizzly Bear
Western Toad	Townsend's Big-Eared Bat	Hoary Bat
Yellow Bellied Racer	Vagrant Shrew	House Mouse
	Water Vole (Richardson)	Least Chipmunk
Furbearers	Western Big-Eared Bat	Little Brown Myotis
Beaver	Western Harvest Mouse	Long-Eared Myotis
Bobcat	Western Jumping Mouse	Long-Legged Myotis
Fisher	White-Tailed Jackrabbit	Long-Tailed Vole
Long-Tailed Weasel	Wolverine	Masked Shrew
Marten	Yellow-Bellied Marmot	Meadow Vole
Mink	Yellowpine Chipmunk	Merriam Shrew
Muskrat	Yuma Myotis	Moose
Raccoon		
Red Fox	**Predators**	
River Otter	Mountain Lion	
Short-Tailed Weasel	Badger	
	Coyote	
	Striped Skunk	

Source: Colville Tribes Fish and Wildlife Department.

Fish Species Present on the Colville Reservation	
Native Species	
Chinook salmon: summer/fall run	*Oncorhynchus tshawytscha*
Chinook salmon: Upper Columbia River Spring Run	*Oncorhynchus tshawytscha*
Sockeye salmon	*Oncorhynchus nerka*
Redband Trout - Anadromous (steelhead)	*Oncorhynchus mykiss gairdnerii*
White sturgeon	*Acipensar transmontanus*
Redband Trout - Non anadromous	*Oncorhynchus mykiss gairdnerii*
Sockeye - landlocked (Kokanee)	*Oncorhynchus nerka*
Mountain whitefish	*Prosopium williamsoni*
Burbot	*Lota lota*
Chiselmouth	*Acrocheilus alutaceus*
Peamouth	*Mylocheilus caurinus*
Northern pikeminnow	*Ptychocheilus oregonensis*
Longnose dace	*Rhinichthys cataractae*
Speckled dace	*Rhinichthys osculus*
Redside shiner	*Richardsonius balteatus*
Longnose sucker	*Catostomus catostomus*
Bridgelip sucker	*Catostomus columbianus*
Largescale sucker	*Catostomus macrocheilus*
Prickley sculpin	*Cottus asper*
Mottled sculpin	*Cottus bairdii*
Slimy sculpin	*Cottus cognatus*
Shorthead sculpin	*Cottus confusus*
Torrent sculpin	*Cottus hubbsi*
Pacific lamprey	*Entosphenus tridentatus*
Brook lamprey	*Lampetra planeri*

Mountain Whitefish

Chiselmouth

White Sturgeon

Fish Species Present on the Colville Reservation	
Non-Native Species	
Carp	*Cyprinus carpio*
Tench	*Tinca tinca*
Brown bullhead	*Ameiurus nebulosus*
Black bullhead	*Ameiurus melas*
Yellow bullhead	*Ameiurus natalis*
Channel catfish	*Ictalurus punctatus*
Lake whitefish	*Coregonus clupeaformis*
Brown trout	*Salmo trutta*
Brook trout	*Salvelinus fontinalis*
Pumpkinseed	*Lepomis macrochirus*
Bluegill	*Lepomis gibbosus*
Smallmouth bass	*Micropterus dolomieu*
Largemouth bass	*Micropterus salmoides*
Black crappie	*Pomoxis nigromaculatus*
Yellow perch	*Perca flavescens*
Walleye	*Sander vitreus*
Three spine stickle back	*Gasterosteus aculeatus*
Golden shiner	*Notemigonus crysoleucas*
Rainbow trout (coastal)	*Oncorhynchus mykiss irideus*
Lake trout	*Salvelinus namaycush*
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*
Northern pike	*Esoc lucius*
Fathead minnow	*Pimephales promelas*
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*

Black Crappie

Walleye

Bluegill

Pumpkinseed

Fish Species That Are Rare or Unlikely to Occur on the Reservation		
Tiger muskellunge	*Esox masquinongy x Esox lucius*	Non Native
Goldfish	*Carassius auratus*	Non Native
Leopard dace	*Rhinichthys falcatus*	Native
Pygmy whitefish	*Prosopium coulterii*	Native
Lake chub	*Couesius plumbeus*	Native
Bull Trout	*Salvelinus confluentus*	Native
Coho salmon	*Oncorhynchus kisutch*	Native
Source: Colville Tribes Department of Fish and Wildlife		

Lake Chub

Leopard Dace

Tiger Muskellunge

Westslope Cutthroat Trout

Pygmy Whitefish

F

F: Plant Association Groups

Source:
Hunt, Jeremy, Bureau of Indian Affairs. *Forest Inventory Analysis. 2011 Review of the Colville Indian Reservation Commercial Forestlands*. 2011.

PLANT ASSOCIATION GROUPS AND HABITAT		
PLANT ASSOCIATION GROUPS	HABITAT TYPE	AREA ACRES
Ponderosa Pine – Grass (PPG)	Ponderosa Pine/bluebunch wheatgrass (PIPO/AGSP) ponderosa Pine/Idaho fescue (PIPO/FEID)	81,062
Ponderosa Pine – Bitter-brush (PPS)	Ponderosa Pine/bitterbrush (PIPO/PUTR) Ponderosa Pine/ricegrass (PIPO/ORHY) Cheatgrass (PIPO/PUTR/AGSP) Ponderosa Pine/bitterbrush/Idaho Fescue (PIPO/PUTR/FEID)	????
Douglas-fir – Cool, Dry (DFCD)	Douglas-fir/pinegrass (PSME/CARU) Douglas-fir/pinegrass/bearberry (PSME/CARU/ARUV) Douglas-fir/spirea (PSME/SPBEL)	76,257
Douglas-fir – Warm, Moist (DFWM)	Douglas-fir/snowberry (PSME/SYAL) Ponderosa Pine/snowberry (PIPO/SYAL)	164,107
Douglas-fir – Cool, Moist (DFCM)	Douglas-fir/oceanspray (PSME/HODI) Douglas-fir/ninebark/heartleaf arnica (PSME/PHMA/ARCO) Douglas-fir/ninebark-pachistima (PSME/PHMA-PAMY)	216,632
Grand Fir (GFRC)	Grand fir/twinflower (ABGR/LIBOL) Grand-fir/twinflower/Pacific Yew (ABGR/LIBOL-TABR) Grand-fir/fairy bells (ABGR/DIHO) Western Redcedar/twinflower (THPL/LIBOL)** Western Redcedar/wild sarsaparilla (THPL/ARNU3)	50,422
Subalpine Fir – Warm (SFW)	Subalpine fir/twinflower (ABLA2/LIBOL)	14,083
Subalpine Fir – Cold (SFC)	Subalpine fir/huckleberry (ABLA2/VACCI) Subalpine fir/pine grass (ABLA2/CARU) Subalpine fir/pachistima (ABLA2/PAMY)	57,855

PLANT ASSOCIATION GROUPS AND HABITAT		
PLANT ASSOCIATION GROUPS	HABITAT TYPE	AREA ACRES
Western Hemlock and Western Redcedar	Western Red-cedar/twinflower (THPL/LI- BOL)** Western Red-cedar/wild sarsaparilla (THPL/ARNU3) Western Hemlock Series (TSHE/)	??
TOTAL		660,418
*Basal area defines the area of a given section of land that is occupied by the cross-section of tree trunks and includes the complete diameter of every tree, including the bark.		
Hunt, Jeremy, Bureau of Indian Affairs. Forest Inventory Analysis. 2011 Review of the Colville Indian Reservation Commercial Forestlands. 2011.		

Ponderosa-snag

Plant Association Groups

Plant Association Groups (PAGs) provide an ecological classification of land units with similar vegetation types and plant growth environments that are named after the tree species that dominate them if left undisturbed. They provide a means to organize numerous forest stands into a more manageable number of identifiable units having relatively similar characteristics. PAGs are important in calculating the Annual Allowable Cut.

Ponderosa Pine PAGs

The forested area of the Reservation classified into the ponderosa pine PAGs is dominated by ponderosa pine with only minor amounts of Douglas-fir. The ponderosa pine PAGs are considered the lowest productivity forestlands. On wet soils where quaking aspen occurs, this indicates stands that may have historically been dominated by aspen which can be either a climax or a seral species depending on the site. The Ponderosa pine PAG includes a large part of the deer and elk winter range.

Bluebunch wheatgrass

Idaho fescue

Indian Ricegrass

Maintenance and stocking control is essential to the long-term health of ponderosa pine PAGs. Management is greatly influenced by the dry and warm conditions of this forest area. Brush and grass competition is a regeneration concern along with high seedling mortality due to low precipitation and high summer temperatures. Ponderosa pine regenerates naturally and is used for artificial regeneration, although small areas may support Douglas-fir.

Reintroduction of frequent low intensity ground fires in a carefully controlled program is desirable. Planned rotation ages are usually 120 years, but may exceed 140 years in the driest areas.

Ponderosa pine forest characteristics in 1900 were the result of frequent low intensity fires, caused by both lightning and aboriginal ignitions. The result was a forest mosaic of small to moderate sized even-aged patches. Stocking levels were low, creating very open stands.

By 2000, ponderosa pine PAGs were often choked with understory regeneration as the result of an extended period of fire exclusion. This has resulted in a proliferation of a number of bark beetle species. Whereas fire formerly thinned the stands from below, bark beetles are now thinning them from above, killing the most valuable trees first.

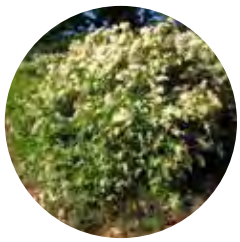
This is occurring despite repeated entries that have removed high-risk trees and reduced the amount of old-growth to low levels. Plentiful ladder fuels, mistletoe brooms and dead and down material increase the probability of catastrophic fire.

Mistletoe, which was formerly a localized problem, is now widespread with understory trees being rapidly infected by the overstory of older trees. The cumulative effects of dwarf mistletoe and dense stands make the larger ponderosa pine more susceptible to beetles.

Large stumps left from previous logging are increasingly subject to annosus root rot (Heterobasidion annosum), which can spread to living tree roots. Annosus root rot can be spread by root contact and by loging.

Douglas-fir PAGs

Douglas fir has a broad ecological amplitude and occurs in many different types of forest conditions. Douglas fir often occurs within other forest types as "mixed conifer".

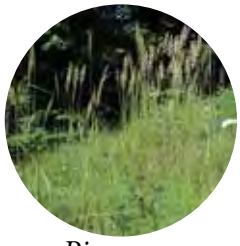


Oceanspray

Douglas fir forests in Eastern Washington have been altered by fire suppression, livestock grazing, and logging practices over the past century. This has altered species composition and selectively removed large diameter trees and old growth. Smaller trees have become more dense increasing forest susceptibility to severe wildfire and risks of widespread insect and disease outbreaks. The effects of logging includes increased risk of flooding, erosion, sediment delivery to streams, debris flows, and rain-on-snow events.

Pachistima

The long-term viability of healthy Douglas fir forests depends on maintenance of a range of different stand ages in each of the different forest types, with old growth taking the most time to develop. The two most important management considerations common to all types of old forests are: (1) the presence of large old trees and snags and (2) mosaic patterns of small structural patches rather than uniform stands (spatial heterogeneity).



Pinegrass

Management of fire-prone stands of Douglas fir requires an understanding of fire regimes and fuel conditions that determine the expected fire behavior. Long-term forest management goals need to consider the historical range of variability of the dominant ecological process. Douglas fir stands tend to have a patchy size and age distribution due to the effects of a mixed severity fire regime. The natural mosaic pattern of forest stands maintains resilience to disease. Long term forest protection includes maintaining functional wildlife and hydrologic functions.

Shiny leaf spirea

Douglas-fir PAGs encompasses the bulk of commercial forestland on the Reservation and include Douglas-fir, ponderosa pine, western larch, lodgepole pine, and quaking aspen. The lower elevation areas in these PAGs provide deer and elk winter range.

Bearberry

Snowberry

Brush and grass competition is a regeneration concern, along with high seedling mortality due to low precipitation and late summer drought. Seed tree, shelterwood or clearcut harvesting methods are most commonly used for regeneration. Ponderosa pine is favored for natural or artificial regeneration followed by western larch in cooler, more moist areas, Douglas-fir, and lodgepole pine. Shifting to more disease resistant seral species such as ponderosa pine and western larch, combined with stocking control promotes forest health in these PAGs. Reintroduction of frequent, low intensity ground fires in a carefully controlled program is desirable on those areas not supporting lodgepole pine. Rotation ages vary from 80 years for lodgepole pine to 120 years for ponderosa pine and western larch.

Fire history indicates slightly less frequent fires of slightly higher intensity than in the drier ponderosa pine PAGs and has created a large mosaic of patches burned by surface fires or crowning fires. Fire-resistant tree species were favored, with regeneration occurring in the fire-created openings and fire induced thinning occurring elsewhere. Individual stands within the complex mosaic were largely even-aged. All the common forest pests, while present, were usually at endemic levels.

With fire control starting in the early 1900's, the natural thinning and stand replacement function in these PAGs no longer occurred to any level of significance. The introduction of selection logging along with fire control no longer opened up stands sufficiently to favor establishment of shade intolerant tree species. Additionally, the fire benefits of duff reduction and the continual culling of fire-sensitive tree species such as Douglas-fir was eliminated. The result has been a massive conversion to a condition of overstocked Douglas-fir understories.

Ninebark

Armillaria and laminated root disease, which formerly were endemic, have exploded in the presence of their preferred host, Douglas-fir. Bark beetles in epidemic proportions are due to the overstocked conditions, while mistletoe has spread under multi-canopy conditions.

Grand Fir PAG

Grand fir is a highly productive forest type with high vegetative diversity, but stands seldom reach climax due to fire. Douglas-fir is a common associate.

Grand fir management requires managing fire and fuels. Fire regimes vary from frequent low-severity fire in dry, lower elevations to high-severity fire at higher elevations. Where grand fir is present, many forests are moving toward a denser cover of grand fir, with increased susceptibility to severe wildfire.
The grand fir PAG has the greatest diversity of tree and understory plant species. Tree species include grand fir, Douglas-fir, western larch, ponderosa pine, lodgepole pine, Engelmann spruce, western redcedar (in moister soils), Sitka alder, paper birch, and quaking aspen. Lands in this PAG provide deer and elk summer range, hiding and thermal cover.

Fairybells

Pacific yew

Historically, grand fir stands were nearly indistinguishable from the Douglas-fir stands except for lush understory vegetation and an increased component of Douglas-fir resulting from infrequent fires. Grand fir was well represented only in the most humid or protected locations.

This PAG, located on soils more moist than those found on Douglas-fir PAGs, sometimes occupies suitable aspects or sheltered positions within the Douglas-fir zone. Natural fires are less frequent in the grand fir PAG than the Douglas-fir PAGs and even more so in the wettest locations. In most cases, recurring fires prevent the growth of thin barked, shallow rooted grand fir trees in favor of fire resistant western larch.

Western larch and ponderosa pine (in warmer areas) are favored for natural or artificial regeneration, followed by Douglas-fir, lodgepole pine, and grand fir. Rotation ages vary from 80 years for lodgepole pine to 120 years for western larch and ponderosa pine.

Fire exclusion and selection logging have allowed the development of understories of the most shade tolerant species such as grand fir and Douglas-fir, resulting in chronic overstocking, multi-level stands, and large numbers of host trees for a variety of forest pests and diseases. Annosum root rot in grand fir is a serious problem along with various heart rot fungi. Armillaria and laminated root rots attack both grand fir and Douglas-fir.

Dwarf mistletoe in Douglas-fir and western larch reacts dramatically when closed stands are opened up, and the understories are soon infected in multi-story stands. Spruce budworm and tussock moth become epidemic and the combination of all of the

above plus chronic overstocking can be expected to create future bark beetle problems. Fuel buildup and large quantities of ladder fuels, combined with the fire-sensitive grand firs, insure that any fire in the future will cause serious damage.

Subalpine Fir PAGs

Subalpine forest associations on CCT lands are described in the ecology guides for adjacent National Forests. Climax stands are dominated by Englemann spruce and subalpine fir, however many stands are dominated by seral lodgepole pine. At lower elevations, Douglas fir and western larch may be present.

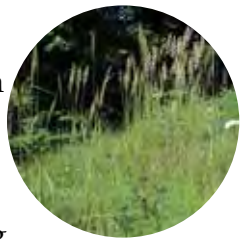
Subalpine forests have fire regimes that are low frequency and high severity. Most subalpine forests are within their historic range of variability and do not have an ecological need for fuel reduction. Subalpine forests are characterized by large mosaic stands from past fires with large numbers of logs.

These PAGs include subalpine fir, Douglas-fir, western larch, lodgepole pine, Engelmann spruce, Sitka alder, quaking aspen, and paper birch. Subalpine fir stands are found only in limited areas on the Reservation. These areas provide cover for deer and elk during the summer season along with forage in disturbed areas.

Huckleberry

Located in the highest elevations or coldest areas, lands in these PAGs have the lowest fire frequency. The longer period between fires, plus generally favorable climatic conditions, allowed for higher fuel accumulations than in most forest areas of the Reservation. Fires, when they occur, are more likely to be stand replacement with lodgepole pine and western larch regenerating. In some areas even-aged fire-resistant old-growth western larch stands developed. Western larch is favored for natural or artificial regeneration, followed by Douglas-fir, Engelmann spruce (wetter soils), and lodgepole pine. Planned rotation ages are generally 80 to 120 years.

Pachistima



Pinegrass

Fire suppression and selection logging have allowed many old-growth western larch stands to develop understories of shade tolerant subalpine fir, Engelmann spruce or Douglas-fir, with each successive selection harvest decreasing the amount of western larch remaining in the overstory. Armillaria, laminated, and annosum root rots are damaging the shade tolerant species. Douglas-fir and western larch mistletoe infections have become prevalent in the partially harvested overstories, and understories are becoming infected. Spruce budworm and tussock moth are now present in the host species (Douglas-fir and subalpine fir) and are expected to cause significant future losses.

Western Hemlock and Western Red-cedar PAGs

Western hemlock and western red-cedar often occur together and tend to occur in similar habitats.

There are six upland plant associations in the western hemlock forest series on lands adjacent to CCT lands, that also occur sporadically on the eastern edge of the Reservation at lower elevations. Western hemlock is highly tolerant of shade and soil moisture, but not fire.

Mature stands of western hemlock are rare. Wherever mature stands remain, the stand structure is critically important for species associated with late-successional forests, such as northern goshawks. Goshawks use mature and old forests for breeding and foraging and will occupy nest sites for decades if stand conditions persist.

Twinflower

Western hemlock stands are often a patchy mosaic of different ages and high shrub diversity. The type of logging and post-harvest fire has a strong influence on the abundance and diversity of shrub regeneration. Stands adjacent to riparian areas provide important hydrologic and wildlife connectivity functions that protect stream integrity.

Wild sasparilla

Well-developed stands of western red-cedar are often found along streams. Climax stands of western red-cedar have high vegetation diversity, large amounts of down wood and large snags. Western red-cedar is highly tolerant of shade and soil moisture, but not fire. Stands have a mixed-severity fire regime characterized by infrequent (>100 years) creeping ground fires. Because most stands are within their historic range of variability, there is not much ecological justification for fuel reduction activities except in for structure protection in the Urban Interface.

Western red-cedar stands have high vegetation and wildlife diversity due to the relatively cool, shady environment with abundant moisture. Older red-cedar stands provide habitat for species associated with late-successional forests, such as northern goshawks. Goshawks prefer stands older than 140 years, with tall trees and closed canopies. Goshawks use mature and old forests for breeding and foraging and will occupy nest sites for decades if stand conditions persist.

G

G: Culturally Significant Plants

Source:
Moerman, Daniel E. *Native American Ethnobotany,*
Timber Press, Portland - London, 1998
Turner, Nancy, Bouchard, Randy, and Kennedy, Dorothy, *Ethnobotany of the Okanogan-Colville Indians of British Columbia and Washington*, 1947.

CULTURALLY SIGNIFICANT PLANTS (examples and their uses)		
COMMON NAME	*SCIENTIFIC NAME*	SIGNIFICANCE
American Red Raspberry ]	*Rubus idaeus*	Decoction of the branches taken for diarrhea and as a physic or taken for heartburn. Also a laxative. Berries dried, frozen or eaten fresh.
Big Sagebrush	*Artemisia tridentate*	Decoction taken for colds, tonsillitis and sore throats. Infusions taken for colds and sore throats. Bark used as tinder and wood used for fuel. Wood used for smoking hides. Used to make saddle blankets.
Bitterroot	*Lewisia rediviva* 	Poultice of raw roots applied to sores. Raw roots eaten for poison ivy rashes. Dried or fresh roots eaten for diabetes.. Fresh or dried roots steamed or boiled and eaten. A cash crop Traded with other tribes for salmon and other items
Blue Huckleberry	*Vaccinium membranaceum*	Berries eaten fresh, dried or canned for future use.
Broadleaf cattail 	*Typha latifolia*	Cottony fluff used as a dressing for wounds and diapers. Cottony fruiting heads used as "insoles" for moccasins. Leaves woven into mats and used for door coverings, sweat houses and "A-frame" type shelters. Young fruiting heads boiled, roasted and eaten.

CULTURALLY SIGNIFICANT PLANTS (examples and their uses)		
COMMON NAME	*SCIENTIFIC NAME*	SIGNIFICANCE
Camas	*Camassia quamash*	The bulbs were pit cooked, dried, and stored for future use. Baked and used for foods. 
Canby's Licoriceroot	*Ligusticum canbyi* 	Roots burned and smoke used to revive singers from a trance, considered ceremonially dead. Also used to revive a person possessed by the "bluejay spirit." Used as a good general internal medicine. Roots mixed with tobacco or rolled in cigarettes to give the smoke a pleasant menthol taste.
Columbian Hawthorn	*Crategus columbiana*	Eaten fresh or mashed.
Common chokecherry 	*Prunus virginiana*	Decoction of wood, branches and bark taken for diarrhea, colds, cough medicine, dermatological aid. Mashed seeds taken as a stomach medicine. Berries stored for winter use. A seasonal indicator – ripened berries indicated that the spring salmon were coming up the river to spawn.
Common Cow Parsnip	*Heracleum maximum*	Used as a dermatological aid for hair and scalp problems. Heated poultice of roots applied to sore backs. Decoction of roots taken as a tonic. Flower stalks and leaf stems peeled and eaten fresh.
Common juniper	*Juniperus communis*	Infusion used for colds, tuberculosis and as a tonic before entering the sweat house. Used as a wash for sore eyes. Berries eaten for kidney disorders. Used in the sweat house during the winter. Decoction used as a wash to protect a person from evil influences.

CULTURALLY SIGNIFICANT PLANTS (examples and their uses)		
COMMON NAME	*SCIENTIFIC NAME*	SIGNIFICANCE
Common Yarrow 	*Achillea millefolium*	Infusion taken for headaches, diarrhea, for colds and stomachaches. Decoctions used as a bath for arthritis or rheumatic pains, as a physic, cold remedy, as a laxative and used for chapped hands, pimples, rashes and insect bites. Used as a wash for sore eyes. Leaves and stems used in smudges to keep mosquitos away.
Devil's Club	*Oplopanas horridus*	Infusion of roots and stems taken for dry coughs and for consumption. Used as a blood purifier and for stomach troubles and indigestion.
Dwarf Blueberry	*Vaccinium cespitosum*	Berries eaten fresh, dried or canned for future use. Forage for domestic sheep.
Fernleaf Biscuitroot	*Lomatium dissectum* 	Used for arthritis to "change the blood" to adapt to the summer's heat. Poultice used for open cuts, sores, boils or bruises and sore backs. Strong infusion or decoction considered poisonous. Used as a tuberculosis remedy. Rubbed on cattle to kill lice. Young shoots eaten raw. Root pounded and steeped and used to make a poison fish.
Indian Hemp	*Apocynum cannabinum*	Decoction of roots taken during monthly periods to become permanently sterile. Stems twisted and rolled into twine. Inner ark used for making rope and twine. Inner bark used for making nets and snares.
Kinnikinnick Bearberry	*Arctostaphylos uva-ursi*	Used as an antihemorrhagic, eye medicine, kidney aid and dermatologic aid.
Louisiana Sagewort	*Artemisia ludoviciana*	Infusion of plant taken and splashed on the body during sweat bathing to "clear his wind", and as a strengthener for hunters to be able to walk long distances.
Paper Birch	*Betula papyrifera*	Bark used to make baskets and canoes and cradles. Brown inner bark used to make a brown dye.

CULTURALLY SIGNIFICANT PLANTS (examples and their uses)		
COMMON NAME	*SCIENTIFIC NAME*	SIGNIFICANCE
Red Ossier Dogwood	*Cornus sericea* 	Decoctions used for blood medicines, cold remedies and to relieve congestion, contraception, skin sores and rashes, dandruff, gastrointestinal and gynecological aids, heart medicine or any kind of sickness. Berries used as food. Branches used to make fish traps. Leaves and inner barks mixed with other plants to smoke.
Saskatoon Serviceberry	*Amelanchier alnifolia*	cold remedy, contraceptive and tonic.
Smooth Sumac	*Rhus glabra*	Decoction of branches with seeds used for itchy scalp conditions and as bathing water for frost-bitten limbs. Milky latex used as a salve on sores. Infusion of bark and or roots taken and applied externally to the chest for "tight chest".
Snowbrush Ceanothus	*Ceanothus velutinus*	Decoction used as a cleansing solution in the sweat house. Used as a hair wash for dandruff, to bathe babies to prevent diaper rash. Infusion of branches to wash sores and eczema. Poultice of dried, powdered leaves mixed with pitch and used as a salve for sores. Poultice of dried, powdered leaves used as a "baby powder".
Stinging Nettle	*Urtica dioica*	Fresh plant used to beat skin after "sweathousing" and for rheumatic and arthritis pain. New growths dipped in boiling water and eaten as greens. Used to make a tea during "sweathousing" and used to "wash" the skin and hair. Used to combat witchcraft and jinxes.
Tarragon or Wormwood 	*Artemisia dracunculus*	Poultice of leaves applied to forehead for headaches. Leaves used in a steam bath for rheumatic or arthritic pain, or used in diapers for diaper rash and skin rawness. Leaves used as sanitary napkins. Branches with leaves used as spreaders to dry salmon and as an insect repellent. Stopped flies from laying eggs in stored salmon.

CULTURALLY SIGNIFICANT PLANTS (examples and their uses)		
COMMON NAME	*SCIENTIFIC NAME*	SIGNIFICANCE
Thimbleberry	*Rubus parviflorus*	Decoction of the roots taken by young people with pimples and blackheads. Infusion of the roots taken for stomach ailments. Utah Honeysuckle
Wax currant	*Ribes cereum* 	Inner bark used for an infusion for eye medicine. A forage berry for grouse and pheasant. Berries eaten fresh. The Sanpoil and Nespelem only ate the currants growing along the Columbia River. Berries from the hills were not eaten.
Western Red Cedar 	*Thuja plicata*	Infusion of boughs used for arthritis and rheumatism. Used as a hair wash for dandruff and scalp "germs". Bark used for weaving baskets. Logs used for A-frames. Used to make canoes and paddles, bows and arrows and dip net frames.
Woodland strawberry	*Fragaria vesca virginiana*	Leaf powder used for disinfectant and oral aid and antidiarrheal. Berries eaten fresh.

Source: Ethanobotony of the Okanogan-Colville Indians of British Columbia and Washington and Native American Ethnobotany

H

H: Noxious Weeds

Source:
North Wind Resource Consulting, Colville Integrated Weed Management Plan for the Colville Reservation, 2015.

BABY'S BREATH (*Gypsophila paniculata*)

Description

Baby's breath is a much-branched perennial herb growing up to 2.5 feet (0.75 meters) in height. The plant has a large, deep taproot that allows it to grow well in dry and poor soil conditions. Baby's breath has branched clusters of many small flowers. Flowers have 5 white petals and 10 stamens. Leaves are opposite, narrow, and are covered with a dense bloom of hairs on both sides. Stems are upright or ascending at the base and single to many in number. Flowers form capsules that contain small black seeds, 0.06 to 0.08 inches (1.5 to 2.0 mm) long. Seeds are black, with two to five contained in capsules, and resemble pepper. The seeds can germinate in 10 to 15 days and plants grow rapidly. Each plant can produce 10,000 or more seeds, which are spread when the branches dry, break off and are moved in the wind similar to Russian thistle and kochia.

Baby's Breath

Origin and Distribution

Baby's Breath is a perennial herb native to Europe and Asia. It was introduced as a garden ornamental in the late 1800's. It is now widespread across Canada and the northern US. It has been observed growing in a variety of habitats.

COMMON BUGLOSS (*Anchusa officinalis*)

Description

Common bugloss is a perennial herb that can flower its first year but typically starts out as a basal rosette of leaves. Flowers are blue to purple, with white throats and 5 equal lobes. Flowers clusters form cymes or helicoid clusters (like a spiral or helix). As they mature, coils unfurl and straighten out. Each flower produces four nutlets, with each nutlet containing one seed. Average seed production is in excess of 900 seeds per plant. Common bugloss has a deep taproot and can reach 1 to 2 feet tall. The entire plant is covered in coarse hairs.

Common Bugloss

Common bugloss has basal and alternate stem leaves. Lower leaves are narrow, oblong, and slightly pointed. Its leaves decrease in size going up the stem and upper leaves are thin and sessile (no petiole).

Origin and Distribution

Common bugloss was first reported in Washington State in Spokane County. It is common in the Enterprise region of Stevens County and occasionally elsewhere in the southern 2/3 of the county. There are also large infestations in northern Spokane County.

COMMON TANSY (*Tanacetum vulgare*)

Description

Common tansy is an aromatic and oily perennial that grows from 1 to 6 feet tall. The stems grow in a cluster, causing the plant to have a bush appearance. Small, golden flower heads form many flattopped clusters at the tops of the plants. Flower heads are button shaped. Leaves alternate on the stem and are deeply divided into numerous narrow, individual leaflets with toothed edges. The plant is rhizomatous so flowering stems can grow from severed roots. It spreads vegetatively forming new plants from even small root fragments. It also spreads easily by seeds.

Common Tansy

Origin and Distribution

Native to Europe and Asia, tansy was brought to the U.S. by early colonists for culinary, medicinal and ornamental uses. The plants contain alkaloids that are toxic to both humans and livestock if consumed in large quantities. It is rich in volatile oils which were often used as a wash to treat roundworm, rheumatism, fevers and digestive problems.

COMMON TEASEL (*Dipsacus fullonum*)

Description

Common Teasel

Common teasel is a taprooted, monocarpic plant that grows as a biennial or short-lived perennial that dies after it flowers. They develop a stout, fleshy taproot in the rosette stage that can be more than 2 feet long and 1 inch in diameter at the crown. Dense flowerheads, up to 4 inches tall, occur individually at the tips of leafless flower stems and opposite side branches. Bracts at its base are linear, more or less prickly, curved upward and unequal in length. Flowers bloom in 2 rings and are generally pale purple to dark pink. Basal leaves are oblanceolate with wavy margins and typically die early in the second season. Leaves have spines on the underside of the midvein and smaller spines on bases on the upper leaf surface. The stem leaves are opposite and prickly, especially on the lower side of the leaf midvein. The second year flower stems grow 0.5-2 meters tall, are striate-angled and increasingly prickly going upward. Stems are pithy or hollow and have opposite branching. Fruits are dry achenes and about 0.12 to 0.31 inches (3-8 mm) long and typically have 8 pale ribs. Teasel grows in open, sunny habitats that range from wet to dry levels. Optimal conditions seem to be mesic habitats. Roadsides and heavily disturbed areas are the most common habitats of teasel. Teasel sometimes occurs in high quality prairies, savannas, seeps, and sedge meadows. Both species have become severe threats to northern Illinois natural areas.

Origin and Distribution

The common and cut-leaved teasels are European plants introduced to North America in the 1700's. Teasel is currently used in horticultural plantings and dried flower arrangements.

DALMATIAN TOADFLAX (*Linaria dalmatica ssp. dalmatica*)

Description

Dalmatian toadflax

Linaria dalmatica ssp. dalmatica is most common in the western United States and has a tolerance to low temperatures and coarse soils. It is is an erect, short-lived, perennial herb, 0.8 to 1.5 m tall which spreads by horizontal or creeping rootstocks and by seed. Leaves are broad, 2-5 cm long, ovate to ovatelanceolate, 1-2.5 cm long and are alternate, generally clasping but crowded. Flowers are born in loose, elongate, terminal racemes. The corolla is strongly two-lipped and 14-24 mm long, excluding the 9-17 mm spur. The upper lip is 10-15 mm long. The lower lip is 5-11 mm long with a well-developed palate closing off the throat. The palate is densely white to orange bearded. Flowers are bright yellow. Toadflax typically flowers from May to August, but can be seen flowering into fall. It produces egg-shaped to nearly round capsulate fruits 4-10 mm long by 4-8 mm wide. Seeds are sharply angular, slightly winged, and 1-2 mm long. A mature plant can produce up to 500,000 seeds annually, and they can remain dormant for up to ten years. Dalmatian toadflax produces seed from July to October. Dalmatian toadflax is most commonly found along roadsides, fences, range lands, croplands, clear cuts, and pastures. Disturbed or cultivated ground is a prime candidate for colonization particularly post-fire areas. Dalmatian toadflax is a persistent, aggressive invader capable of forming colonies through adventitious buds from creeping root systems. These colonies can push out native grasses and other perennials, thereby altering the species composition of natural communities.

Dalmatian Toadflax Rosettes

Origin and Distribution

Dalmatian toadflax occurs from the Dalmatian coast of the former Yugoslavia to Romania, Bulgaria, Albania, Greece, Crete, Turkey, Azerbaijan, Syria, Iran, and Iraq. Dalmatian toadflax is found in at least 15 states and six Canadian provinces. The species was introduced as an ornamental from Europe, and has rapidly invaded dry rangeland (Zouhar 2001). Once established, high seed production and the ability for vegetative reproduction allow for rapid spread and high persistence It relies upon insects for pollination. The two most important pollinators are bumblebees and halictid bees

DIFFUSE KNAPWEED (*Centaurea diffusa*) and SPOTTED KNAPWEED *(Centaurea stoebe)*

Description

Knapweeds are highly competitive herbs of the aster (sunflower) family (Asteraceae). The plants first form low rosettes and may remain in this form for one to several years. After they reach a threshold size they will bolt, flower, set seed, and then die. Thus they may behave as annuals, biennials or short-lived perennials, bolting in their first, second, third, or later summer, respectively. Plants of this type are often called semelparous perennials or short-lived monocarpic perennials. The spotted knapweed is named for the spots formed by black margins on the flower bract tips.

Diffuse Knapweed

Diffuse knapweed stems are upright, 10-60 cm (4-24 in) tall from a deep taproot, highly branched, angled, with short, stiff hairs on the angles (Allred and Lee 1996). There are two types of leaves. The long, deciduous basal leaves, which form the rosette, are stalked and divided into narrow, hairy segments, 3-8 cm (1-3 in) long, and 1-3 cm (0.4-1 in) wide.

The stem, or cauline, leaves, which are alternately arranged on the stems, are smaller, less divided, stalkless, and become bract-like near the flower clusters. Flower heads are broadly urn-shaped, 1.5-2.0 cm (0.6-0.8 in) tall, solitary or in clusters of 2-3 at the ends of the branches. The heads contain two types of flowers, ray flowers around the edges surrounding tubular disk flowers. The petals are white, rose-purple, to lavender. Mature seeds are formed by mid-August. A single diffuse knapweed plant can produce up to 18,000 seeds. Seed remains viable in the soil five years or more, so infestations may occur a number of years after vegetative plants have been eliminated. Laboratory germination tests showed up to and sometimes greater than 95% seed viability.

Spotted knapweed is a biennial or short-lived perennial that reproduces solely by seeds. The seeds are brownish, less than 1/4-inch long, notched on one side of the base, with a short tuft of bristles at the tip. The seeds may germinate from spring through early fall. Seedlings emerging in the fall often overwinter as a rosette of leaves, resuming growth again in the spring competing for moisture and nutrients. The plant grows 2 to 4-feet tall and bears alternate, pale green leaves that are 1 to 3-inches long. Leaf margins of the lower leaves are divided and smooth while the surface of the leaf is rough. The upper leaves

are linear in shape. Stems are erect and rough, with slender branches. Numerous flowers are produced from early July through August. Flowers are pink to light purple and are borne on tips of terminal or axillary stems. The flower petals are surrounded by stiff, black-tipped bracts, giving the flower head a spotted appearance. Spotted knapweed can be distinguished most easily from Russian knapweed on the basis of floral characteristics. Russian knapweed, a long-lived perennial of the same genus, has smaller flowers and does not have black mottling on the flower bracts.

Origin and Distribution

Spotted knapweed

Centaurea diffusa is a native of Asia minor, the Balkans, and the southern portion of the former Soviet Union, especially the Ukraine and Crimea Diffuse knapweed is also common in Romania, the former Yugoslavia, northern Italy, Turkey, Greece, Bulgaria, Syria, and the eastern shore of the Mediterranean. Diffuse knapweed is found on plains, rangelands, and forested benchlands, particularly on rugged terrain that is not well suited for cultivation. In the United States, Centaurea diffusa is generally found on light, dry, porous soils. Diffuse knapweed has a northern limit of 53ºN Latitude, and has been observed at elevations up to 7,000 feet. Diffuse knapweed can thrive in semi-arid and arid conditions which allow it to be a serious problem in the western United States and the arid southwestern interior of Canada, especially British Columbia . The density of a diffuse knapweed stand is often correlated with the level of soil disturbance. Additionally, diffuse knapweed prefers open habitats to shaded areas. Centaurea diffusa is not common on cultivated lands or irrigated pasture because it cannot tolerate cultivation or excessive moisture.

Spotted knapweed is found in precipitation zones receiving 8 to 80-inches of rain annually and at elevations up to and over 10,000-feet. It prefers well-drained, light-textured soils that receive summer rainfall. Spotted knapweed can be found in open forests dominated by ponderosa pine and Douglas fir, and prairie habitats dominated by Idaho fescue, bluebunch wheatgrass, and needle-and-thread grass. Spotted knapweed is capable of invading well managed rangelands as well as disturbed areas but does not compete well with vigorously growing grass in moist areas. In seasonally dry areas, spotted knapweed's taproot allows it to access water from deep in the soil, beyond the reach of more shallowly rooted species. Diffuse knapweed and spotted knapweed infestations have been found primarily along highways, waterways, railroad tracks, pipelines, and recently installed utility lines in the western part of the United States. The infestations can largely be traced to seed or hay brought in from other states, especially Montana and Minnesota, where large areas have been infested with knapweed.

DODDER (*Cuscuta and Grammica sp.*)

Description


Dodder

Dodder is a parasitic annual plant that infests many crops, ornamentals, native plants, and weeds. More than 150 species occur worldwide, although dodder is most prevalent in the Americas. Dodder has slender, twining or threadlike stems that vary from pale green to yellow or bright orange; the bright stems can be readily seen against the foliage of the host plants. Native dodder can be leafless or have small, scalelike, triangular leaves about 1/16 inch long. The bellshaped flowers are cream colored and about 1/8 inch long; they usually occur in clusters but occasionally are borne singly. Each flower produces a seed capsule with 2 to 3 seeds. Seeds have rough coats and vary in size depending on species but generally are about 1/16 inch in diameter. Seedlings are yellowish, threadlike, rootless, leafless stems.

FIELD BINDWEED (*Convolvulus arvensis*)

Description


Field Bindweed

Field bindweed is a member of the Convolvulaceae (bindweed) family. Common names are morning glory, creeping jenny, European bindweed, perennial morning glory, small-flowered morning glory, cornbind, ropebind, withywind, bearwind, Jack-runin- the-country, devil's garters, and hedge bells. Bindweed is a prostrate or twining, pubescent, perennial herb with a deep taproot and rhizomes. The leaves are alternate, simple, and net-veined. The blades have palmate major veins and are ovate to oblong with entire margins and a truncate to hastate base. The flowers are per-

fect and axillary with one to four in a group and two bracts below each flower. The petals are funnel-shaped, 0.6- 1.2 inches wide and long, white to pinkish or purple. The flower parts are in fives and the fruit is a capsule with two to four three-angled, chocolate-brown seeds.

Origin and Distribution

Field bindweed is found wild throughout Europe, Siberia, China, Persia, India, and Chile. It is widespread in North America where it has been introduced. This species probably arrived in the United States from Europe in seeds and/or ballast from ships. In the United States, field bindweed's range extends from California, throughout the Pacific Northwest, the Intermountain region, the Great Plains, south into Arizona and Texas, in all states east of the Mississippi River, and is adventitious in Hawaii. Field bindweed occurs in the southern provinces of Canada from the East Coast across the plains to the West Coast.

HOARY ALYSSUM (*Berteroa incana*)

Description

Hoary Alyssum

Annual to short-lived perennial herb growing erect. Hoary alyssum is an annual with the basal rosettes appearing in early spring. The plant then bolts and produces a cluster of white flowers in late spring through the summer. The flowers cross-pollinate and produce hairy seed pods that are then dispersed. The leaves are alternate, 2-5 cm long, 0.5-1 cm wide, broadest toward the middle to occasionally oval-shaped, the apex is obtuse to sharply pointed, and entire. Flowers are racemose, and the sepals are equal. The petals are white, with have two deep clefts, about 3 mm long, more than 2 times longer than the sepals; short filaments flanked on each side by a short semicircular gland, anthers oblong; ovary with 2-6 ovules per locule; style elongate, persistent. Silicle fruit oval-shaped, slightly flattened parallel to the septum, 5-8 mm long, 3-4 mm wide, star-shaped and hairy, often only slightly; seeds 3-6 per locule, brown, roundish, 1.5-2 mm long, narrowly winged pods with star shaped hairs.

Hoary alyssum can out-compete beneficial plants when areas are environmentally stressed. Livestock are noted to become intoxicated after eating green or dried plants. Hoary alyssum in noted to retain its toxicity for up to nine months.

Origin and Distribution

This Native European Plant is noted to be distributed from Nova Scotia to Minnesota and from New Jersey though West Virginia, Ohio, Indiana, Illinois, to Missouri. Hoary alyssum was first collected in Washington in 1969 in Pend Oreille County. Currently it is noted in Ferry, Okanogan, Pend Oreille, Spokane, and Stevens Counties.

HOUNDSTONGUE (*Cynoglossum officinale*)

Description

Houndstongue

Houndstongue (Cynoglossum officinale) is a member of the Boraginaceae (borage) family. Common names include hound's-tongue, bourraches, common houndstongue, and gypsy-flower. Houndstongue is a biennial to short-lived perennial plant that flowers from May through July. This soft, hairy plant forms a low growing rosette of leaves in its first year and then bolts in the second year to form a plant one to three feet tall. The dull reddish-purple flowers are 0.44 inch wide, originating on the upper part of the stem, and appearing from May through July. Each flower produces four nutlets (seeds). The seeds are covered with short, hooked prickles. These burred seeds, which easily attach to passing animals, have contributed to the quick and widespread distribution of this weed.

Houndstounge

Origin and Distribution

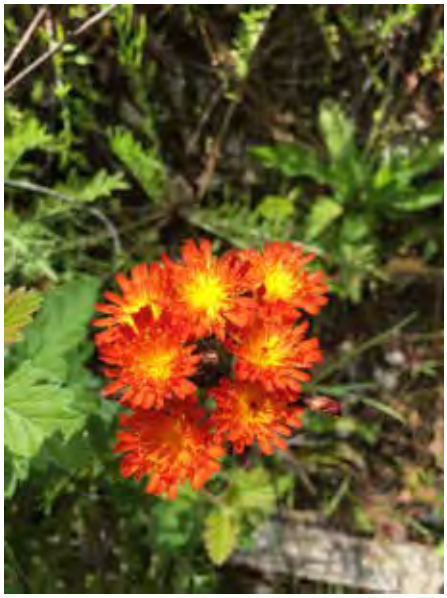
Houndstongue is a native of Eurasia and is widespread throughout the United States. It has become an invasive weed of rangelands in the United States and Canada (USACE 2002). It was probably introduced into North America in the middle of the 19th Century as a contaminant of cereal. This colonizer of disturbed areas now occurs in all Canadian provinces and most of the mainland United States, with the highest densities in the northwestern states. Hybridization of houndstongue has been reported in Europe, but not in North America.

HAWKWEEDS (*Hieracium sp.*)

Description

Yellow hawkweed

Hawkweeds are prolific seed producers, weedy and capable of hybridizing with many exotic and possibly native species. Hawkweeds are aggressive competitors of pasture, range and native plant species. Hawkweed species are perennial herbaceous plants that have flower-heads of ray (ligulate) flowers and have a milky latex in their stems. Most non-native hawkweed species have yellow flowers. Generally hawkweed flower heads are positioned on short stems in spreading clusters, each one about 0.5 inches to 0.8 inches in diameter. Flower heads have yellow ray (ligulate) flowers. Flower head base is covered in bracts of unequal size, the outer ones spreading and bristly. Individuals have basal and stem leaves. Basal leaves may have stalks (petioles) and are narrow to narrowly oval with smooth or rounded teeth or lobed margins, up to 11.8 inches long. Leaf faces may be covered with bristled hairs that have hooked tips. Stem leaves generally do not have stalks. Hawkweed species typically have one upright stem that is branched toward the top. Stems have hairs that are stiff or bristly and hair tips that are often hooked. Seeds are small, about 0.1 inches long with 5 to 10 ribs, reddish brown in color. Seeds have a feathery pappus attached to one end to aid in dispersal.



Orange hawkweed

Origin and Distribution

Hawkweed species primarily originated in Europe. Distribution is wide spread due to seeds being dispersed by wind. Individuals can be found in open fields, meadows, forest clearings, pastures and mesic habitats.

JAPANESE KNOTWEED (*Polygonum cuspidatum*)

Description

Japanese knotweed is an herbaceous perennial that forms large clumps three to ten-feet high. It is fully dioecious and can reproduce by seed and by large rhizomes, which may reach a length of 20 feet. The stout stems are hollow and bamboo-like, extend from an erect base and are simple or little branched and glabrous with thinly membranous sheaths. The petioled leaves are four to six inches long and generally ovate with an abrupt point (Figure 9). The whitish flowers are borne in open, drooping panicles. The approximately 1/8-inch long fruits are brown, shiny, triangular achenes.

Japanese knotweed

Origin and Distribution

As its name indicates, Japanese knotweed is a native of Japan. However, it has become naturalized in North America, where it is found from Newfoundland and many parts of the northeastern United States, and westward to California and the Pacific Northwest. This species was introduced to England in 1825 as an ornamental. Japanese knotweed was subsequently introduced to the United States for use in ornamental hedges and erosion control. An escaped ornamental, Japanese knotweed is often found in waste places, neglected gardens, roadsides, and along stream banks.

JOINTED GOATGRASS (*Aegilops cylindrica*)

Description

Jointed goatgrass is a winter annual grass vegetatively similar to wheat in the seedling stage. Plants have upright stems that branch at the base, growing to around 2.5 feet tall. It has a narrow, non-spreading spike of flowers with the appearance of a series of joints being stacked upon top of each other. Each joint has 2 to 6 small flowers. Leaves are alternately arranged with long hairs on margins and sheaths. Leaf blades are flat and 1/8 to 1/4 inch wide. Hollow stems grow to around 2.5 feet tall and are tipped with slender, cylindrical seed heads. Seed heads (spikes) are cylindric and narrow that break apart to spread seed during the summer months.

Jointed Goatgrass

Jointed goatgrass spreads exclusively by seed and is highly competitive in relation to winter wheat. Most commonly, goatgrass is found in winter wheat fields or other cereal grain fields, fence rows, roadsides, and waste areas. Goatgrass also infests rangelands surrounding wheatgrowing areas and land in the Conservation Reserve Program throughout the western United States.

Origin and Distribution

Jointed goatgrass is native to western Asia and southeastern Europe that was introduced into North America as a contaminant in winter wheat seed.

KOCHIA (*Kochia scoparia*)

Description

Kochia is a member of the Chenopodiaceae Family (Goosefoot Family). Some other common names include summer-cypress, common kochia, and burning bush.

Kochia

Kochia is an annual forb that reproduces by seed. The stems are erect, round, slender, pale green, much branched, and one to six-feet high. The bright green leaves are alternate, simple, narrow, hairy, numerous and are attached directly to the stem. The small green flowers lack petals and are inconspicuous in the axils of upper leaves. Seeds are about 1/16-inch long, wedge-shaped, dull brown, and slightly ribbed. Roots generally penetrate to depths of six to eight-feet. Roots can extend laterally up to 22-feet. Kochia is drought tolerant but is not tolerant of spring flooding.

Kochia is highly adaptable and very drought tolerant. It can spread rapidly but will not flower and set seed if the mean temperature is less than 60° F. Kochia has a wide tolerance of soil types and has even adapted to salty soils. It is found on pasture, rangeland, roadsides, ditch banks, wastelands, and cultivated fields.

Like many other species of the Chenopodiaceae family, kochia becomes a tumbleweed when mature. An abscission zone develops at the base of the stem in autumn allowing the stem to break when winds reach velocities of 25 miles per hour. Kochia overwinters as seeds that germinate very early in spring because of their frost tolerance. Kochia grows very rapidly through spring and summer. It flowers in late summer and sets seed.

Kochia typically produces around 14,600 seeds per plant. Seeds are dispersed in autumn when the plant becomes a tumbleweed. Laboratory studies report germination rates of 76 percent or better over a temperature range of 39 to 106° F, but seeds buried in the soil have five percent viability after one year and zero percent after two years.

Origin and Distribution

Kochia is native to Eurasia, southern and eastern Russia. It was introduced to North America from Europe and has naturalized across the northern half of the United States

and is spreading westward. It occurs in Washington, Oregon, Montana, and Idaho and is increasing its distribution in those states. Kochia was considered a rare plant in North Dakota and Kansas in the late 1920s, but with the drought during the 1930s it became abundant.

Kochia can be found in cultivated and non-cultivated fields, roadsides, and waste places throughout its distribution, up to 8,500-feet. In autumn, the plants may become red and later turn brown, breaking away from the root, and tumbling over the ground scattering large amounts of seed.

LEAFY SPURGE (*Euphorbia esula*) and MYRTLE SPURGE (*Euphoria myrsinites*)

Description

Leafy Spurge and Myrtle Spurge

Leafy spurge is a member of the Euphorbiaceae (spurge) family. The plant is characterized by white milky latex found in all plant parts that can cause blisters and dermatitis in humans, cattle, and horses. It is a perennial, erect, branching herb growing two to 3.5 feet tall that spreads both by seed and creeping roots. Leafy spurge has smooth stems and showy yellow flower bracts. Stems frequently occur in clusters from a vertical root that can extend 20 feet underground. The leaves are small (four inches long), and oval to lance-shaped. They are somewhat frosted, and slightly wavy along the margin. The flowers are very small and are supported in greenish-yellow structures surrounded by yellow bracts. Clusters of these yellowish green, heart-shaped bracts open in late May or early June. The actual flowers do not develop until mid-June. When the ripe seed capsules are touched, they rupture, spreading seeds as far as 15 feet. Leafy spurge also reproduces by vegetative root buds.

Myrtle spurge is a perennial forb with decumbent (spreading low to the ground) fleshy trailing stems. In early spring, new stems emerge from a central taproot. Mature plants are 4- 6 inches tall spreading up to 18 inches laterally. Leaves are alternately arranged in close spirals around the stems, fleshy, and blue-green in color. The flowers, appearing in early spring, are inconspicuous and surrounded by a showy yellow green bract. Leaves,

stems, and roots all exude a milky, irritating sap when broken. Myrtle splurge can inhabit disturbed ground crowding out native habitat for deer and other wildlife. It also poses dangers to children and adults who come in contact with its caustic latex sap. It causes nausea, vomiting, and diarrhea when ingested. Myrtle spurge prefers well-drained dry to moist soils with partial shade to full sun. This plant is an escaped ornamental that inhabits disrupted areas and waste places. It is primarily found in municipal areas and near wild lands.

Origin and Distribution

Both leafy spurge and myrtle spurge came to America from Eurasia, possibly in contaminated seed or as an ornamental species. Leafy spurge occurs across much of the northern United States, including extensive infestations reported in Montana, North Dakota, Nebraska, South Dakota, and Wyoming. Myrtle spurge is known to occur in most western states including Washington, Oregon, California, Colorado and Utah.

PHRAGMITES (*Phragmites sp.*)

Description

Phragmites, or common reed, is a perennial grass often associated with wetlands. Phragmites has a thick stalk that can reach 13 ft (4 m) under optimal conditions. This height is usually not seen until 5-8 years after establishment. The long, flat leaves spread out widely from the stem and are relatively broad, gradually narrowing to a fine tip. The terminal flower cluster consists of numerous perfect flowers. These flowers, purplish at first, gain long, white silky hairs around them by maturity, creating the large, plumelike flower cluster that persists through winter. Phragmites most often spreads vegetatively by stout, creeping rhizomes. Fragments of these rhizomes are viable if they have at least two or three nodes and are 8 in. (20 cm) long.

Phragmites

Origin and Distribution

Phragmites is native to North America and is found worldwide, primarily in lowland temperate regions. Phragmites can occupy upland sites with seeps, or grow in brackish or fresh water several feet deep.

PUNCTUREVINE (*Tribulus terrestris*)

Description


Puncturevine

Puncturevine is a member of the Zygophyllaceae family (caltrop). Common names include goathead, puncture vine, bullhead, Mexican sandbur, Texas sandbur, and caltrop. The plant is a prostrate, herbaceous annual that reproduces by seeds. Puncturevine has a simple taproot that branches into a network of fine rootlets. The stems are prostrate and radiate from the root crown to form a mat that can often grow 1 to 6 feet long. Puncturevine stems are green to reddish or brownish in color, and very hairy. The leaves are pinnately compound, opposite, and also hairy. The small yellow flowers occur from June to September. The flowers are ¼ to ½ inches wide with five petals. The seed coat of puncturevine is extremely durable. The seeds generally last from 3 to 7 years. Under the right conditions the seeds are viable after 20 years. Each fruit, or burr, separates into five segments with two to four seeds in each segment. Each seed has a varying degree of dormancy and sprouts when conditions are favorable. Seed dispersal is by animals and rubber-tired vehicles.

Origin and Distribution

The native range for puncturevine is Eurasia and Africa. The seed pods of the plant probably contaminated the wool of sheep imported from the Mediterranean region. Puncturevine was first reported in California in 1903, possibly mixed with soil slated for railroad construction. Puncturevine is most commonly found in dry, sandy areas. It grows on irrigation ditches and in waste lots.

REED CANARYGRASS (*Phalaris arundinacea*)

Description

Reed canarygrass is a perennial, cool-season, rhizomatous plant in the grass family (Poaceae/Gramineae). Its creeping rhizomes often form a thick sod layer, which can exclude all other plants. Its upright stems grow to 2 meters tall from the rhizomes, and its flat leaf blades measure up to 0.5 m long by 2 cm wide. Reed canarygrass has open sheaths, hollow stems, small clasping auricles and membranous ligules. Its panicles (inflorescences) are compact and resemble spikes when immature, but become open and slightly spreading at anthesis. When in full bloom (May to June), the inflorescences change in color from pale green to dark purplish, becoming straw colored when fruits have developed and dispersed.

Reed Canarygrass

Origin and Distribution

Reed canarygrass is native to Eurasia. There is some debate as to whether Reed canarygrass is truly native to the greater interior mountain west and the Pacific Northwest region.

RUSH SKELETONWEED (*Chondrilla juncea*)

Description

Rush skeletonweed is a perennial ranging in size from 1 to 5 feet tall. Its long slender taproot can grow up to 7 feet deep. Plants begin as a basal rosette of leaves and then grow 1 to 6 branching flowering stems. Plants will exude a latex sap from injured surfaces. Flowerheads 1/2 inch in diameter and grow in leaf axils and stem tips, single or in clusters. Flowerheads have usually 11 (7 – 15) yellow ray flowers. Green bracts occur at base of flower head in a

Rush Skeletonweed

single row followed by a single row of smaller bracts. Basal leaves are lobed with lobes pointing back towards the leaf base. Leaves on branching stems are few, narrow and may have entire (smooth) edges. Stem bases have coarse, downward pointing brown hairs and are hairless toward the tips. Stems are highly branched and have few leaves. Seeds 0.1 inch (3 mm) with ribbed surface and white bristles (pappus) on one end that aid with wind dispersal. Rush skeletonweed is a long-lived perennial plant of the sunflower family and has the capacity to invade relatively undisturbed perennial plant communities and has a "dandelion-like" seed that spreads on the wind, resulting in wide-spread infestations that may be hard to detect. Soil disturbance aids establishment and the extensive and deep root system makes rush skeletonweed difficult to control. Flowering and seed production occur from mid-July through.

Origin and Distribution

Rush skeletonweed is native to Eurasia and thrives in well-drained, sandy textured or rocky soils, along roadsides, in rangelands, pastures, and grain fields. It dominates millions of acres of western rangelands and under favorable conditions may develop extremely high densities.

RUSSIAN KNAPWEED (*Acroptilon repens*)

Description

Russian Knapweed

Acroptilon repens is a perennial herbaceous plant of the aster (sunflower) family (Asteraceae). It is characterized by its extensive root system, low seed production, and persistence. Russian knapweed spreads through creeping horizontal roots and seed. The stems of Acroptilon repens are erect, thin, stiff, corymbosely branched, 45-90 cm (18 to 36 in) tall, and when young are covered with soft, short, gray hair. Lower stem leaves are narrowly oblong to linear-lanceolate, and deeply lobed. The upper leaves are oblong, toothed, and become progressively smaller. Rosette leaves are oblanceolate, irregularly pinnately lobed or almost entire, 5-10 cm long, and 1-2.5 cm broad. The flower heads of Russian knapweed are urn-shaped, solitary, 15-17 mm high, and composed of disk flowers only. Flowers are

numerous, all tubular and are pink or purple, turning straw colored at maturity. Achenes (seeds) are 2-3 mm long, oval and compressed (Watson 1980) and are grayish or ivory, with long white bristles (pappus) . Acroptilon repens has a well-developed root system, which functions as the major means of propagation and spreading. The roots of Acroptilon repens can extend more than 7 meters below the soil surface with 2-2.5 meters of growth occurring the first year and 5-7 meters in the second year The roots are easily recognizable by their black or dark brown color and presence of small alternately arranged, scale leaves which support buds in their axils.

Origin and Distribution

Russian knapweed was introduced into Canada around 1900 as a contaminant of alfalfa seed from Turkestan. Russian knapweed introduction into the United States is also thought to be the result of impure Turkestan alfalfa seed and possibly sugar beet seed. It occurs most often in the semi-arid portions of the western United States and adjacent Canada. Infestations have been reported in South Dakota, Minnesota, and Virginia, with the worst-infestations in Montana, California, Idaho, Oregon, and Washington.

ST. JOHNSWORT (*Hypericum perforatum*)

Description

St. Johnswort is an upright perennial herbaceous plant which typically grows 1 to 2.5 feet in height. It has tap roots and short rhizomes and its stems are freely branched. Flowers are yellow, star-like and have 5 petals with tiny black dots on the margins. Flowers occur in clusters at the ends of stems with 25 to 100 flowers per cluster. Leaves are oppositely arranged on stems, narrow, lance shaped and 1 to 2 inches long. They are oppositely stalkless and have pointed tips. Each leaf is spotted with tiny translucent or purplish-black dots. Stems are reddish, single or multiple, smooth, somewhat two-edged, woody at the base, and branching out toward the top of the plant. Flowers form capsules that contain small (1 mm) dark brown seeds.

St. Johnswort

St. Johnswort spreads both by underground and above-ground creeping stems and by seed. It is a vigorous competitor in pastures, rangelands, and natural areas. St. Johnswort is well adapted to a variety of temperate climates and soil types. It prefers poor soils

and full sun, and can be found primarily in meadows, dry pastures, rangelands, roadsides, and empty fields. However, it has the capability to invade healthy rangelands. St. Johnswort seedlings will readily establish in disturbed situations that include roadsides, overgrazed pastures, or open rangeland where native or forage species do not offer any competition.

Origin and Distribution

St. Johnswort is native to all of Europe, North Africa, and Asia except for the Arctic regions. The plant was introduced to the Americas.

TREE OF HEAVEN (*Ailanthus altissima*)

Description

Tree of Heaven

Tree-of-heaven has a slightly rough pale gray bark with lightly colored striations giving the appearance of "reptile-like skin" on more mature trees. Stems are chunky and yellowish to reddish brown in color. This species has large alternate, pinnately compound leaves containing 13 to 40 or more leaflets; individual leaves (leaflets) are three to five inches long and one to two inches wide, each with characteristic glandular "teeth" or bumps located at the base of each leaflet. The leaflets are lanceolate and leaflet margins are smooth (i.e. entire; without serrations). The base of the leaflets has one to two protruding bumps on the leaflet margin also known as glandular teeth. The lateral bud is not enclosed by the shield-shaped leaf scar. There may be two or more leaf glands per leaflet. Leaf scars are shield-shaped with the lateral bud not enclosed by the scar. Bundle scars are in a curved line and number about nine. Terminal bud is lacking and the lateral buds are small (1/16 of an inch), solitary, brown colored with brown soft hairs. Seed on the tree is formed in a single-celled, one- to one-and-a-half-inch twisted samara. There is one seed per samara. These single-seeded samaras are wind dispersed and have been documented as traveling a wind-carried distance of 299 feet. The samaras or schizocarps grow in groups or clusters on the tree. The whole cluster rarely falls to the ground. When ready, individual samaras or samaras in smaller groupings fall to the ground assisted by gravity and/or the action of wind

Origin and Distribution

It is native to China and was brought to the United States in the late 1700s as a horticultural specimen and shade tree.

YELLOW STARTHISTLE (*Centaurea solstitialis*)

Description

Yellow starthistle, Centaurea solstitialis, is a pubescent winter annual, germinating in the fall and overwintering as a rosette. It has a long taproot and stiff, upright stems that branch from the base. Lower leaves are 2 to 3 inches long and deeply lobed. Older leaves are short, 0.5 to 1 inch, and narrow. In the spring, seven or eight lobed leaves emerge to form a basal rosette, which later can have up to 26 leaves. The rosettes tend to grow close to the ground in open places, but grow more upright at high densities.

Yellow starthistle

The small tubular florets produce two types of seed: plumed, light-colored seeds, and plumeless, darker colored seeds. Florets in the center of the head produce seeds with a ring of fine, white, thin bristles (plume). The outer circle of florets produce plumeless seeds. In general, the plants mature by late summer, and by September and October, the plants dry out, lose leaves, and turn to silvery-grey skeletons with white cottony terminal heads. In some places and under certain conditions, yellow starthistle survives over the winter, regrows in the spring, and dries out by early summer (June).

Origin and Distribution

Yellow starthistle thrives in areas with hot, dry summers and well-drained soils, especially where fire, over-grazing, road construction, or other causes have seriously disturbed the vegetation. It is believed to have originated along the Mediterranean region. It has spread throughout Europe as far as the Asian steppes, but does not persist in cold northerly areas, as a lack of heat appears to be a limiting factor.

Although presumably native to Europe, yellow starthistle was introduced into western U.S. ports as a seed contaminant in imported alfalfa seed from Chile. The earliest specimens collected here were at Oakland, CA in 1869, Vacaville, CA in 1887, and Seattle, WA,

in 1898. It is now a widely distributed weed in the western United States, primarily of rangelands but also of alfalfa and cereal grains, orchards, vineyards, roadsides, and recreational lands.

Yellow starthistle is established in 23 of the 48 contiguous states. It is a particular problem in California, where over 10 million acres are infested, and is increasing in Idaho, Oregon, and Washington.

No individual method will control yellow starthistle in a single treatment; diligence and persistence will be required over a number of years to subdue this weed. The treatment methods described in this section will help you to design an integrated program that will suit the circumstances of your particular situation.

CANADA THISTLE (*Cirsium arvense*)

Description

Canada Thistle

Cirsium arvense is an erect perennial rhizomatous thistle, usually 0.5 - 1.0 m tall, distinguished from all other thistles by 1) creeping horizontal lateral roots; 2) dense clonal growth; and 3) small dioecious (male and female flowers on separate plants) flowerheads. Four varieties are recognized: var. vestitum Wimm. & Grab. (leaves gray-tomentose below); var. integrifolium Wimm. & Grab. (leaves glabrous below, thin, flat, and entire or shallowly pinnatifid); var. arvense (leaves glabrous below, thin, flat, and shallowly to deeply pinnatifid); var. horridum Wimm. and Grab. (leaves glabrous below, thick and wavy, with many marginal spines). The most common variety of the species in North America is horridum. All varieties are interfertile, and one plant of var. integrifolium produced seedlings of all four varieties. Within each variety there are numerous genotypes, which vary in appearance and in response to management activities. Additionally, Cirsium arvense changes morphology in response to environmental conditions.

In Washington State, overwintering Canada thistle roots develop new underground roots and shoots in January and begin to elongate in February. Shoots emerge March - May when mean weekly temperatures reach 50 C. Rosette formation follows, with a period of active vertical growth (about 3 cm/day) in mid-to-late June. Flowering is from June to August in the U.S., and June to September in Canada, when days are 14 to 18 hours long.

Cirsium arvense threatens natural communities by directly competing with and displacing native vegetation, decreasing species diversity, and changing the structure and composition of some habitats. Cirsium arvense spreads primarily by vegetative growth of its roots. The root system can be extensive, growing horizontally as much as 6 m in one season. Most patches spread at the rate of 1-2 m/year. Most Cirsium arvense roots can be found directly below the above-ground shoots, with little extension beyond the border of a patch. Horizontal roots grow within 15-30 cm of the soil surface, and typically grow in a straight line for 60-90 cm, then bend down and grow vertically. Cirsium arvense readily propagates from stem and root fragments and thus plowing or other soil disturbance can increase thistle densities.

Origin and Distribution

Cirsium arvense is native to southeastern Europe and the eastern Mediterranean) and possibly to northern Europe, western Asia and northern Africa. It now has a near global distribution between 37 and 58-59 degrees N in the northern hemisphere, and at latitudes greater than 37 degrees S in the southern hemisphere exclusive of Antarctica. Canada thistle is widely scattered throughout CIR with infestation of greatest density in moister sites, e.g., riparian areas along streams, bodies of water and springs.

MUSK THISTLE (*Carduus nutans*) and SCOTCH THISTLE (*Onopordum acanthium)*

Description

Musk thistle is a member of the Asteraceae (Aster family, Thistle tribe) Family. Some common names include nodding plumeless thistle, nodding thistle, plumeless thistle, and chardon penche.

Musk thistle is an introduced biennial, winter annual which reproduces solely by seed. The first year's growth is a large, compact rosette from a large, fleshy, corky taproot. The second year stem is erect, spiny, 2 to 6-feet tall and branched at the top. The leaves are alternate, deeply cut or lobed with five points per lobe, very spiny, 3 to 6-inches long and extend (clasp) down the stem. The waxy leaves are dark green, with a light green midrib, and mostly white margins. The large, showy flowers are terminal, flat, nodding, 1.5 to 2.5-inches

Musk Thistle

broad, deep rose to violet in color, and surrounded by numerous, lance-shaped, spine-tipped bracts. Blooms appear in late May and June and set seed in June or July. Musk thistle is commonly found in pastures, roadsides, and waste places. It prefers moist, bottom land soil, but can also be found on drier uplands.

Scotch thistle is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny ribbon-like leaf material or "wings" that extend to the base of the flower heads.

Leaves, which are armed with sharp, yellow spines, are up to 2 feet long and 1 foot wide. Upper and lower leaf surfaces are covered with a thick mat of cotton-like or woolly hairs, which give the foliage a gray-green appearance. Plants flower in midsummer. The globe-shaped flower heads are borne in groups of 2 or 3 on branch tips. Flower heads are up to 2 inches in diameter, with long, stiff, needle-like bracts at the base. Flowers range from dark pink to lavender. Plants produce 8,400 to 40,000 seeds. Seeds are dispersed locally by wind; humans, water, livestock, and wildlife are involved in longer-distance dispersal.

Origin and Distribution

Musk thistle and Scotch thistle are native of Europe and western Asia.
The Mediterranean region is the developmental center for the genus, with most Onopordum species occurring in Mediterranean or sub-Mediterranean regions. They were introduced into the United States in the early 1800s as an ornamental species.

WILD FOUR-O'CLOCK (*Mirabilis nyctaginea*)

Description

Wild four-o'clock is a tap rooted perennial which can reach to four feet tall. Plants are deeply rooted with thick, black roots, and sometimes producing a semi-woody crown. Leaves are opposite up to four inches long and three inches wide, and are heart- or eggshaped. Leaves are smooth and waxy. The stems are oppositely branched and usually smooth with bluish to whitish waxy bloom on their surfaces.


Wild Four-O'Clock

The flowers are borne in clusters of three to five on short hairy stalks near the top of the plant. Flowers are about 10 mm in diameter but have no petals. Instead flowers consist of five showy pink to red or lavender sepals with a whorl of bracts at the base. Fruits are prominently fiveribbed, warty, somewhat hairy, grayish brown in color and from 3 to 6 mm long. Dispersal is only by seed. Seed are hard, elongated nutlets which are spread primarily by falling to the ground below the parent plant.

Wild four-o'clock is found in a wide range of habitats, including perennial crops such as orchards and alfalfa fields, waste areas and along roadsides, railroad lines, woodlands, pastures, riparian areas, and dry meadows and rangelands.

Origin and Distribution

Wild four-o'clock is native east of the Rocky Mountains, from Montana to Mexico, and east to Wisconsin and Alabama.

I

I: Range Unit Acreage

Source:
The Land Operations/Range Program
Confederated Tribes of the Colville Reservation

Range Unit Acreage by Land Ownership				
Range Unit	Total Acres	Tribal Acres	Allotment Acres	Fee Acres
1	44,952	43,792.24	-	1,134.77
2	24,708	24,708.00	-	-
3	51,345	48,110.27	595.60	2,639.13
4	30,776	28,824.80	221.59	1,729.61
5	54,925	52,953.19	439.40	1,532.41
6	17,583	11,392.03	3,590.45	2,600.53
8	28,766	23,084.72	1,199.54	4,481.74
9	19,390	19,331.83	-	58.17
10	14,693	13,934.84	599.47	158.68
11	21,764	21,265.60	-	498.40
12	20,828	20,619.72	-	208.28
15	7,760	7,160.15	-	599.85
16	12,701	12,701.00	-	-
17	30,397	29,038.25	1,100.37	258.37
18	29,624	27,813.97	619.14	1,190.88
19	78,595	74,995.35	1,178.93	2,420.73
21	86,394	73,011.57	1,762.44	11,619.99
22	16,289	15,529.93	319.26	439.80
25	19,210	15,863.62	1,075.76	2,270.62
26	10,029	7,269.02	2,639.63	120.35
29	8,725	1,900.31	2,490.12	4,334.58
30	13,432	11,542.12	1,410.36	479.52
31	12,086	9,725.60	1,640.07	720.33
32	4,260	2,729.81	1,530.19	-
33	3,177	1,747.03	679.88	750.09
35	12,180	11,279.90	660.16	239.95
36	4,699	3,579.70	159.77	959.54
36A	1,243	263.14	539.96	439.90
39	2,930	2,590.12	-	339.88
39A	367	206.99	160.01	-
40	6,016	5,756.11	-	259.89

Range Unit Acreage by Land Ownership				
Range Unit	Total Acres	Tribal Acres	Allotment Acres	Fee Acres
42	43,496	41,321.20	500.20	1,674.60
43	1,670	1,069.97	600.03	-
43A	974	944.00	30.00	-
45	8,733	5,822.29	1,390.29	1,520.42
48	28,121	26,025.99	618.66	1,476.35
50	6,351	6,150.94	80.02	120.03
52	10,767	10,647.49	119.51	-
54	13,460	6,501.18	899.13	6,059.69
55	1,788	1,788.00	-	-
56	1,715	275.09	1,239.95	199.97
59	4,360	2,502.64	257.24	1,600.12
59A	2,900	2,644.80	75.11	180.09
63	2,118	627.99	1,240.09	249.92
66	5,353	3,172.72	290.29	1,900.32
67	15,486	13,195.62	769.65	1,520.73
69	30,538	22,469.86	2,070.48	5,997.66
71	20,574	17,251.30	1,843.43	1,479.27
73	10,102	8,901.88	140.42	1,059.70
76	41,815	35,944.17	2,400.18	3,470.65
78	32,633	28,912.84	107.69	3,622.26
80	18,790	17,576.17	30.06	1,183.77
81	7,639	7,079.06	280.35	279.59
82	475	475.00	-	-
83	4,134	2,313.80	1,200.10	620.10
84	25,900	25,071.20	374.26	453.25
85	6,306	4,276.10	295.12	1,734.78
86	856	636.01	58.04	168.12
# Units	**Total Acres**	**Tribal**	**Allot-ment**	**Fee**
58	1,036,898	916,318.23	41,522.40	79,057.37

Range Unit Acreage by Land Ownership				
Range Unit	Total Acres	Tribal Acres	Allotment Acres	Fee Acres
	47 units were in rotation in 2005	1,036,898.00	Sum of all lands	

Source: The Land Operations/Range Program
Confederated Tribes of the Colville Reservation

J

J: Common Range Plants

Other Plants Encountered on the Colville Reservation during the 2012-2014 Range Surveys

Source:
North Wind Resource Consulting, Colville Reservation Range Inventory, 2012. 2013.

Top Ten Forbs, Grasses, and Shrubs

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
AGGL	Agoseris glauca	Pale agoseris	Native perennial forb
BASA3	Balsamorhiza sagittata	Arrowleaf balsamroot	Native perennial forb
CAMA5	Calochortus macro-carpus	Sagebrush mariposa lily	Native perennial forb
CATH4	Castilleja thompsonii	Thompson's Indian paintbrush	Native perennial forb
ERHE2	Eriogonum heracleoi-des	Parsnipflower buck-wheat	Native perennial forb
ERNI2	Eriogonum niveum	Snow buckwheat	Native perennial forb
GAAR	Gaillardia aristata	Blanketflower	Native perennial forb
LERE7	Lewisia rediviva	Bitter root	Native perennial forb
LUSE4	Lupinus sericeus	Silky lupine	Native perennial forb
PHLO2	Phlox longifolia	Longleaf phlox	Native perennial subshrub
ACHY	Achnatherum hy-menoides	Indian ricegrass	Native perennial grass
ACTH7	Achnatherum thurbe-rianum	Thurber's needlegrass	Native perennial grass
CARU	Calamagrostis rubes-cens	Pinegrass	Native perennial grass
ELEL5	Elymus elymoides	Squirreltail	Native perennial grass
FEID	Festuca idahoensis	Idaho fescue	Native perennial grass
HECO26	Hesperostipa comata	Needle and thread	Native perennial grass
LECI4	Leymus cinereus	Basin Wildrye	Native perennial grass
POCU3	Poa cusickii	Cusick's bluegrass	Native perennial grass
POSE	Poa secunda	Sandberg bluegrass	Native perennial grass
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Native perennial grass
AMAL2	Amelanchier alnifolia	Saskatoon service-berry	Native perennial shrub
ARTRW8	Artemisia tridentata ssp. wyomingensis	Wyoming big sage-brush	Native perennial shrub
CHVI8	Chrysothamnus visci-diflorus	Green rabbitbrush	Native perennial shrub
ARTR4	Artemisia tripartita	Threetip sagebrush	Native perennial shrub
PUTR2	Purshia tridentata	Antelope bitterbrush	Native perennial shrub
RICE	Ribes cereum	Wax currant	Native perennial shrub
ROWO	Rosa woodsii	Woods' rose	Native perennial shrub

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
SPBE2	Spiraea betulifolia	White spirea	Native perennial shrub
SYAL	Symphoricarpos albus	Snowberry	Native perennial shrub
HODI	Holodiscus discolor	Oceanspray	Native perennial shrub

Photographs of each of these common species are found on the following pages. Other species encountered on the Colville Reservation during the 2012-2014 Range Surveys are found on the pages following the photographs. All photographs except those indicated below by North Wind Resource Consulting, LLC;
ACTH7 by Sheri Hagwood;
CARU, ELEL, POCU3, POSE, AMAL2, CHVI8, ARTR4, PUTR2, RICE SPBE2, SYAL by Matt Lavin;
HODI by Growiser.net;
HECO26 by Sally and Andy Wasowski;
LECI4 by Ralph Maughan.

Antelope bitterbrush
Purshia tridentata

Arrowleaf balsamroot
Balsamorhiza sagittata

Basin Wildrye
Leymus cinereus

Bitter root
Lewisia rediviva

Blanketflower
Gaillardia aristata

Bluebunch wheatgrass
Pseudoroegneria spicata

Cusick's bluegrass
Poa cusickii

Green rabbitbrush
Chrysothamnus viscidiflorus

Idaho fescue
Festuca idahoensis

Indian ricegrass
Achnatherum hymenoides

Longleaf phlox
Phlox longifolia

Needle and thread
Hesperostipa comata

Oceanspray
Holodiscus discolor

Pale agoseris
Agoseris glauca

Parsnipflower buckwheat
Eriogonum heracleoides

Pinegrass
Calamagrostis rubescens

Sagebrush mariposa lily
Calochortus macrocarpus

Sandberg bluegrass
Poa secunda

Saskatoon serviceberry
Amelanchier alnifolia

Silky lupine
Lupinus sericeus

Snow buckwheat
Eriogonum niveum

Snowberry
Symphoricarpos albus

Squirreltail
Elymus elymoides

Thompson's Indian paintbrush
Castilleja thompsonii

Threetip sagebrush
Artemisia tripartita

Thurber's needlegrass
Achnatherum thurberianum

Wax currant
Ribes cereum

White spirea
Spiraea betulifolia

Woods' rose
Rosa woodsii

Wyoming big sagebrush
Artemisia tridentata ssp. wyomingensis

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
COLI2	*Collomia linearis*	Tiny Trumpet	Native annual forb
COPA3	*Collinsia parviflora*	Maiden blue eyed Mary	Native annual forb
CRPTP2	*Cryptantha ptero-carya var. pterocarya*	Wingnut cryptantha	Native annual forb
	Epilobium minutum	Chaparral willowherb	Native annual forb
GAYOP	*Gayophytum spp.*	Groundsmoke	Native annual forb
HOUM	*Holosteum umbella-tum*	Jagged chickweed	Native annual forb
ORLU	*Orobanche ludovici-ana*	Sand broomrape	Native annual forb
PLPA2	*Plantago patagonica*	Wolly plantain	Native annual forb
PODO4	*Polygonum douglasii*	Douglas' knotweed	Native annual forb
ACCO4	*Aconitum columbia-num*	Columbian monkshood	Native perennial forb
ACMI2	*Achillea millefolium*	Common yarrow	Native perennial forb
ACRU2	*Actaea rubra*	Red baneberry	Native perennial forb
ADBI	*Adenocaulon bicolor*	American trailplant	Native perennial forb
AGGL	*Agoseris glauca*	Pale agoseris	Native perennial forb
AGUR	*Agastache urticifolia*	Nettleleaf giant hyssop	Native perennial forb
ALAC4	*Allium acuminatum*	Tapertip onion	Native perennial forb
ANMA	*Anaaphalis margari-taceae*	Western pearly everlasting	Native perennial forb
ANMI3	*Antennaria micro-phylla*	Littleleaf pussytoes	Native perennial forb
ANRO2	*Antennaria rosea*	Rosy pussytoes	Native perennial forb
APAN2	*Apocynum androsae-mifolium*	Spreading dogbane	Native perennial forb
AQFL	*Aquilegia flavescens*	Yellow columbine	Native perennial forb
ARCO5	*Arenaria congesta*	Ballhead sandwort	Native perennial forb
ARCO9	*Arnica cordifolia*	Heartleaf arnica	Native perennial forb
ARDR4	*Artemisia dracunculus*	Tarragon	Native perennial forb
ARHO2	*Arabis holbellii*	Holboell's rockcress	Native perennial forb
ASCA11	*Astragalus canadensis*	Canadian milkvetch	Native perennial forb
ASMI9	*Astragalus miser*	Timber milkvetch	Native perennial forb
ASPU9	*Astragalus purshii*	Woollypod milkvetch	Native perennial forb
ASTRA	*Astragalus spp.*	Milkvetch	Native perennial forb

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
CARO2	*Campanula rotundifolia*	Bluebell bellflower	Native perennial forb
CASTI2	*Castilleja spp.*	Indian paintbrush	Native perennial forb
CHANA2	*Chamerion angustifolium var. angustifolium*	Fireweed	Native perennial forb
CHDO	*Chaenactis douglasii*	Douglas' dustymaiden	Native perennial forb
CHUM	*Chimaphila umbellata*	Pipsissewa	Native perennial forb
CIUN	*Cirsium undulatum*	Wavyleaf thistle	Native perennial forb
CLPU	*Clarkia pulchella*	Pinkfairies	Native perennial forb
CLUN2	*Clintonia uniflora*	Bride's bonnet	Native perennial forb
COOC	*Coptis occidentalis*	Idaho goldthread	Native perennial forb
COUM	*Comandra umbellata*	Bastard toadflax	Native perennial forb
CRAC2	*Crepis acuminata*	Tapertip hawksbeard	Native perennial forb
CRAT	*Crepis atribarba*	Slender hawksbeard	Native perennial forb
CYFR2	*Cystopteris fragilis*	Brittle bladderfern	Native perennial forb
DEME	*Delphinium menziesii*	Menzies' larkspur	Native perennial forb
EQLA	*Equisetum laevigatum*	Smooth horsetail	Native perennial forb
ERCO5	*Erigeron corymbosus*	Longleaf fleabane	Native perennial forb
ERIGE2	*Erigeron spp.*	Fleabane	Native perennial forb
ERLI	*Erigeron linearis*	Desert yellow fleabane	Native perennial forb
ERPU2	*Erigeron pumilus*	Shaggy fleabane	Native perennial forb
ERUM	*Eriogonum umbellatum*	Sulphur-flower buckwheat	Native perennial forb
FRVE	*Fragaria vesca*	Woodland strawberry	Native perennial forb
GATR3	*Galium triflorum*	Fragrant bedstraw	Native perennial forb
GETR	*Geum triflorum*	Old man's whiskers	Native perennial forb
GEVI2	*Geranium viscosissimum*	Sticky purple geranium	Native perennial forb
GOOB2	*Goodyera oblongifolia*	Western rattlesnake plantain	Native perennial forb
HECY2	*Heuchera cylindrica*	Roundleaf alumroot	Native perennial forb
HEMA80	*Heracleum maximum*	Common cowparsnip	Native perennial forb
HIAL2	*Hieracium albiflorum*	White hawkweed	Native perennial forb
HYCA4	*Hydrophyllum capitatum*	Ballhead waterleaf	Native perennial forb
IPCO5	*Ipomopsis congesta*	Ballhead ipomopsis	Native perennial subshrub

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
IRMI	*Iris missouriensis*	Rocky Mountain iris	Native perennial forb
LIBO3	*Linnaea borealis*	Twinflower	Native perennial forb
LILE3	*Linum lewisii*	Lewis flax	Native perennial forb
LIRU4	*Lithospermum ruderale*	Western stoneseed	Native perennial forb
LODI	*Lomatium dissectum*	Fernleaf biscuitroot	Native perennial forb
LOMA3	*Lomatium macrocarpum*	Bigseed biscutroot	Native perennial forb
MACA2	*Machaeranthera canescens*	Hoary tansyaster	Native perennial forb
MARAR	*Maianthemum racemosum ssp. Racemosum*	False Solomon's Seal	Native perennial forb
MAST4	*Maianthemum stellatum*	Starry false lily of the valley	Native perennial forb
MEOB	*Mertensia oblongifolia*	Oblongleaf bluebells	Native perennial forb
MIPE	*Mitella pentandra*	Fivestamen miterwort	Native perennial forb
ORSE	*Orthilia secunda*	Sidebells wintergreen	Native perennial forb
OSBE	*Osmorhiza berteroi*	Sweetcicely	Native perennial forb
OSOC	*Osmorhiza occidentalis*	Western sweetroot	Native perennial forb
PEFRS3	*Penstemon fruticosus var. scouleri*	Littleleaf bush penstemon	Native perennial forb
PEGA3	*Perideridia gairdneri*	Gardner's yampah	Native perennial forb
PHHA	*Phacelia hastata*	Silverleaf phacelia	Native perennial forb
PHHO	*Phlox hoodii*	Hood's phlox	Native perennial forb
PHMU3	*Phlox multiflora*	Flowery phlox	Native perennial forb
PHSP	*Phlox speciosa*	Showy phlox	Native perennial forb
PODI2	*Potentilla diversifolia*	Mountain-meadow cinquefoil	Native perennial forb
POGR9	*Potentilla gracilis*	Slender cinquefoil	Native perennial forb
POGL9	*Potentilla glandulosa*	Sticky cinquefoil	Native perennial forb
PRTR4	*Prosartes trachycarpa*	Roughfruit fairybells	Native perennial forb
PTAQ	*Pteridium aquilinum*	Western brackenfern	Native perennial forb
RUPA6	*Rumex paucifolius*	Alpine sheep sorrel	Native perennial forb
SEIN2	*Senecio integerrimus*	Lambstongue ragwort	Native perennial forb
SELA	*Sedum lanceolatum*	Lanceleaf stonecrop	Native perennial forb

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
SEST2	*Sedum stenopetalum*	Wormleaf stonecrop	Native perennial forb
SETR	*Senecio triangularis*	Arrowleaf ragwort	Native perennial forb
SIDR	*Silene drummondii*	Drummond's campion	Native perennial forb
SIID	*Sisyrinchium idahoense*	Idaho blue-eyed grass	Native perennial forb
SOMI2	*Solidago missouriensis*	Missouri goldenrod	Native perennial forb
STAM2	*Streptopus amplexifolius*	Claspleaf twistedstalk	Native perennial forb
SYMPH4	*Symphyotrichum spp.*	Aster	Native perennial forb
THOC	*Thalictrum occidentale*	Western Meadow-rue	Native perennial forb
TITRU	*Tiarella trifoliata var. unifoliata*	Oneleaf foamflower	Native perennial forb
TOLY	*Tonestus lyallii*	Lyall's goldenweed	Native perennial forb
VEAM2	*Veronica americana*	American speedwell	Native perennial forb
VIAM	*Vicia americana*	American vetch	Native perennial forb
VIGL	*Viola glabella*	Pioneer violet	Native perennial forb
ZIPA2	*Zigadenus paniculatis*	Foothill deathcamas	Native perennial forb
ZIVE	*Zigadenus venenosus*	Meadow deathcamas	Native perennial forb
ARABI2	*Arabis spp.*	Rockcress	Native perennial forb
ARENA	*Arenaria spp.*	Sandwort	Native perennial forb
HACKE	*Hackelia spp.*	Stickseed	Native perennial subshrub
LIPU11	*Linanthus pungens*	Granite prickly phlox	Native perennial subshrub
AGCR	*Agropyron cristatum*	Crested wheatgrass	Introduced perennial graminoid
VUOC	*Vulpia octoflora*	Sixweeks fescue	Native annual grass
CACO11	*Carex concinnoides*	Northwestern sedge	Native perennial graminoid
CAMO	*Calamagrostis montanensis*	Plains reedgrass	Native perennial graminoid
CAREX	*Carex spp.*	Sedge	Native perennial graminoid
CARO5	*Carex rossii*	Ross' sedge	Native perennial graminoid
CAVA3	*Carex vallicola*	Valley sedge	Native perennial graminoid

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
JUNCU	*Juncus spp.*	Rush	Native perennial gram-inoid
PHPR3	*Phleum pratense*	Timothy	Native perennial gram-inoid
AGSC5	*Agrostis scabra*	Rough bentgrass	Native perennial grass
ARPUL	*Aristida purpurea var. longiseta*	Fendler threeawn	Native perennial grass
BRIN2	*Bromus inermus*	Smooth brome	Native perennial grass
DAGL	*Dactylis glomerata*	Orchardgrass	Native perennial grass
DISP	*Distichlis spicata*	Saltgrass	Native perennial grass
ELGL	*Elymus glaucus*	Blue wildrye	Native perennial grass
ELTR7	*Elymus trachycaulus*	Slender wheatgrass	Native perennial grass
FEOC	*Festuca occidentalis*	Western fescue	Native perennial grass
HOJU	*Hordeum jubatum*	Foxtail barley	Native perennial grass
KOMA	*Koeleria macrantha*	Prairie Junegrass	Native perennial grass
POFE	*Poa fendleriana*	Muttongrass	Native perennial grass
POPR	*Poa pratensis*	Kentucky bluegrass	Native perennial grass
THIN6	*Thinopyrum interme-dium*	Intermediate wheatgrass	Native perennial grass
ALVIS	*Alnus viridis ssp. sinuata*	Sitka alder	Native perennial shrub
ARUV	*Arctostaphylos uva-ursi*	Kinnikinnick	Native perennial shrub
CEVE	*Ceanothus veluthinus*	Snowbrush ceanothus	Native perennial shrub
ERNA10	*Ericameria nauseosa*	Rubber rabbitbrush	Native perennial shrub
LOUT2	*Lonicera utahensis*	Utah honeysuckle	Native perennial shrub
MARE11	*Mahonia repens*	Oregon-grape	Native perennial shrub
OPFR	*Opuntia fragilis*	Brittle pricklypear	Native perennial shrub
PAMY	*Paxistima myrsinites*	Oregon boxleaf	Native perennial shrub
PHCA11	*Physocarpus capitatus*	Pacific ninebark	Native perennial shrub
PHLE4	*Philadelphus lewisii*	Lewis' mock orange	Native perennial shrub
PHMA5	*Physocarpus malva-ceus*	Mallow ninebark	Native perennial shrub
PRVI	*Prunus virginiana*	Chokecherry	Native perennial shrub
RILA	*Ribes lacustre*	Prickly currant	Native perennial shrub
RUID	*Rubus idaeus*	American red raspberry	Native perennial shrub
RUPA	*Rubus parviflorus*	Thimbleberry	Native perennial shrub

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
SALIX	*Salix spp.*	Willow	Native perennial shrub
SARA2	*Sambucus racemosa*	Red elderberry	Native perennial shrub
SASC	*Salix scouleriana*	Scouler's willow	Native perennial shrub
SHCA	*Shepherdia canadensis*	Russet buffaloberry	Native perennial shrub
VAME	*Vaccinium membranaceum*	Thinleaf huckleberry	Native perennial shrub
VASC	*Vaccinium scoparium*	Grouse whortleberry	Native perennial shrub
VIED	*Viburnum edule*	Squashberry	Native perennial shrub
TECA2	*Tetradymia canescens*	Spineless horsebrush	Native perennial subshrub
ABLA	*Abies lasiocarpa*	Subalpine fir	Native perennial tree
ACGL	*Acer glabrum*	Rocky Mountain maple	Native perennial tree
CRDO2	*Crataegus douglasii*	Black hawthorn	Native perennial tree
LAOC	*Larix occidentalis*	Western larch	Native perennial tree
PICO	*Pinus contorta*	Lodgepole pine	Native perennial tree
PIEN	*Picea engelmannii*	Engelmann spruce	Native perennial tree
PIPO	*Pinus ponderosa*	Ponderosa pine	Native perennial tree
POTR5	*Populus tremuloides*	Quaking aspen	Native perennial tree
PSME	*Pseudotsuga menziesii*	Douglas-fir	Native perennial tree
SEWA	*Selaginella wallacei*	Wallace's spikemoss	Native perennial moss
AMAL	*Amaranthus albus*	Prostrate pigweed	Introduced annual forb
ARAB3	*Artemisia absinthium*	Absinth wormwood	Native perennial shrub
BRAR5	*Bromus arvensis*	Field brome	Introduced annual graminoid
BRTE	*Bromus tectorum*	Cheatgrass	Introduced annual graminoid
CEDI3	*Centaurea diffusa*	Diffuse knapweed	Introduced annual forb
DESO2	*Descurainia sophia*	Herb sophia	Introduced annual forb
DIAR	*Dianthus armeria*	Deptford pink	Introduced annual forb
HYPE	*Hypericum perforatum*	Common St. Johnswort	Introduced perennial forb
LASE	*Lactuca serriola*	Prickly lettuce	Native annual forb
LIDAD	*Linaria dalmatica spp. dalmatica*	Dalmatian toadflax	Introduced perennial forb
MEOF	*Melilotus officinalis*	Sweetclover	Introduced perennial forb
POAR8	*Potentilla argentea*	Silver cinquefoil	Introduced perennial forb
POAV	*Polygonum aviculare*	Prostrate knotweed	Introduced perennial forb

USDA Plant Symbol	Scientific Name	Common Name	Nativity, Duration, and Growth habit
POBU	*Poa bulbosa*	Bulbous bluegrass	Introduced perennial graminoid
RUCR	*Rumex crispus*	Curly dock	Introduced perennial forb
SIAL2	*Sisymbrium altissi-mum*	Tall tumblemustard	Introduced annual forb
SOLAN	*Solanum sp.*	Nightshade	Introduced perennial forb
SOOL	*Sonchus oleraceus*	Common sowthistle	Introduced annual forb
TAOF	*Taraxacum officinale*	Dandelion	Introduced perennial forb
TRDU	*Tragopogon dubius*	Yellow salsify	Introduced annual forb
VETH	*Verbascum thapsus*	Common mullein	Introduced biennial forb

Source: North Wind Resource Consulting, Colville Reservation Range Inventory, 2012. 2013.

K

K: Traditional Cultural Properties

Source:
Confederated Tribes of the Colville Reservation History and Archaeology Program.
Cultural Resource Management Plan. 2006.
History / Archaeology Tribal Historic Preservation Office

Traditional Cultural Properties

Spiritual Areas

These include religious areas and sacred places that can include relatively extensive landforms and topographic features. They can be places of prayer and personal reflection or places where power is sought. They can include places where deities have resided or still reside, where important lessons were learned or instructions given, and where pivotal events occurred. These places can also include places of pilgrimage or where specific past events are reenacted or celebrated. Identification of these kinds of resources is often more dependent on people's understanding than on the physical things found at the place itself.

Places Associated with Stories, Legends, and other Oral Histories

These include places referenced in stories, legends and other parts of oral history. They can include "legendary" interpretations of landscape features. They include places where people understand that important things happened in the past. They can also include places where historical events occurred in the more recent past and places with Indian names. Indian names for places do not always refer to "legendary" associations. Often these names refer to resource locations, old villages, or native interpretations of local landforms. Physical "markers" such as archaeological deposits indicating these locations are often not readily visible. Instead, these places derive their importance from oral history and are identified mainly by asking those who know about them.

Legend of Steamboat Rock

Animal, Mineral, and Plant Resource Gathering Areas

These places include locations where plants have been gathered, animals hunted, and minerals collected. They are distinguished here from the more archaeological "procurement locations" described below because they are reported ethnographically rather than identified primarily as physical remains. Some places reported ethnographically do however include material remains or extant resources. These can be found on the ground once they are identified through interviews. Since tribal members today remember details about who used these resources and have described these places as well as how they were used, we maintain a better understanding of these resources than had they only been recorded as archaeological sites.

Cultural Resources

Burials

Burials include places where human remains are already known or assumed to be present, as well as places inadvertently discovered during cultural resource inventory work or project implementation. They are especially sensitive and require specific actions when discovered. They must be taken into account, whenever present, in planning a project. Native American burials and grave goods are specifically protected under both Federal and Tribal law.

Cairns, Rock Alignments, Talus Pits, and Features

These sites include visible arrangements of rock and stone either in the form of markers (cairns) or as excavations or pits. Previous studies have shown that talus pits and cairns may be associated with burials. These features are grouped here because they are usually apparent on the ground and thus easily identified by pedestrian archaeological survey, they have some minimal architecture, and because they are usually spatially discrete (not extending over large areas or limited to the boundaries of talus slopes).

Rock Alignment

Caves and Rock Shelters

Caves and rock shelters can be important places for protection from the weather. They sometimes contain rock images (especially pictographs) and storage features that may date back hundreds or thousands of years.

Pictograph

Rock Image

These locations include pictographs or petroglyphs. They include rock images, glyphs, and painted rocks. Some of these locations are still used and visited by tribal members for traditional purposes.

Sites, Villages, Camps, Habitations and Features

These sites include archaeological properties where people have lived or camped. They include what archaeologists call "ephemeral occupations" indicating sites that were only briefly occupied. They also include individual house pits and depressions that may have been occupied for longer periods. Obviously, since it includes large village sites as well as individual house locations, this category represents large and small sites. It also represents sites that are obvious on the ground surface as well as occupations that can only be identified by excavation. These sites are numerous and well documented, especially where water is available. Many have been partially excavated along the Columbia River as part of the mitigation efforts for the reservoirs.

Buried Archaeological Site

Culturally Modified Trees

Culturally modified or "peeled" trees are known to date back at least to the middle 1800s (Gibbs 1877 cited in Gough 1990: 89. On the Colville Reservation, modified trees include "dendroglyphs" or trees carved with images or words and trees that have had cambium layers removed for various purposes including for food.

Pre Contact Trails

These are the physical remains of trails and routes used prior to European contact.

Isolates

This category is made up of individual or small groups of items that are not clearly associated with other, larger, archaeological sites. The professional judgment of a cultural resource professional is required to distinguish isolates from sites based on artifact density, nearby known sites, geomorphology, erosional exposures and other factors. Individual artifacts, for example a single isolated projectile point (arrowhead), should always be designated isolated occurrences.

Historic Resources

Residences

These places include abandoned homesteads, associated outbuildings, foundations, and related features such as corrals or gardens.

Nespelem 1900

Transportation

These include wagon roads, railroad grades, bridges, ferries, and various transportation related facilities. It cam be important to remember that modern roads and highways are often built over wagon roads that were themselves built over pre-contact trails.

Keller Ferry

Agriculture

Agriculture sites include old orchards and developed or cleared fields. Many such sites were established where irrigation water was available and may exhibit abandoned or in-use irrigation features.

Logging and Forestry

Sites associated with logging include mills and railroad grades (often only observable as berms today) as well as places where logging machinery was stored or abandoned and workers camps. This category also includes fire lookouts. Some of these lookouts, including the large metal lookout on top of Moses Mountain, were built in the 1930s.

Mining

Mining sites include places that are not fully developed such as adits or prospects that may not be as easily observed as more developed mines. Most mine sites on tribal lands include just traces of mining activity, but these places can also exhibit isolated cabins and even small mining towns.

Federal

These places include federal installations of all kinds including historic forts, agency and sub-agency buildings, government schools, health clinics, and hydropower related facilities.

Churches

Most church-related structures and sites are similar in terms of their use of buildings and structures. Churches and church related facilities including schools are included in this category.

Cemeteries

For burials interred in the latter twentieth century, this category includes individually marked graves.

Indian school Nespelem

L

L: OGE Threshold

Source:
Cemter for Applied Research, 2017

OGE Threshold Analysis
Methodology and Results

The OGE Threshold Analysis described below conforms to the Open Ground Equivalency (OGE) analysis methodology outlined in the 2014 Confederated Tribes of the Colville Reservation Hydrology Report (page 398-407). Applicable low-end and high-end thresholds for each Watershed Management Unit across the Reservation were extracted directly from the above-referenced report to serve as a basis for analysis. In this analysis, actual 1990-2014 harvest data and actual 2000-2014 fire data were cross-referenced with the WMU-specific thresholds extracted from the Hydrology Report. The results of the exercise were then used to determine where (i.e., in which WMU's) the thresholds were exceeded at some point during the 1990-2014 period, due to timber harvesting or the combination of timber harvesting and wildfire events.

To conform to the methodology presented in the Hydrology Report, certain assumptions were necessary due to data limitations and data reporting inconsistencies. Overall, the effect of these assumptions on the results of the OGE Threshold Analysis is minimal (this statement was evidenced by varying these assumptions over multiple analysis scenarios). A detailed explanation and justification for employing these assumptions is provided below.

SELECTION OF OGE RATINGS FOR HARVESTED ACRES

Treatment	OGE Rating
Regeneration	0.9
Intermediate	0.4
Salvage	0.1

The information in the table above was extracted from page 407 of the 2014 Confederated Tribes of the Colville Reservation Hydrology Report. Actual harvest acreage data received by the Center for the period 1990 to 2014 was categorized as either Regeneration, Intermediate, or Salvage. The OGE Rating of 0.9 for Regeneration acres was taken directly from the Hydrology Report. The OGE Rating of 0.4 for Intermediate acres is expressed as an average of the actual OGE Ratings for all harvest treatments that could be characterized as intermediate treatments in the Hydrology Report. The OGE Rating of 0.1 for Salvage acres was also taken directly from the Hydrology Report. The OGE Ratings shown in the table above were applied directly to the harvest data received by the Center for Applied Research.

SELECTION OF OGE RATINGS FOR BURNED ACRES

The OGE Ratings for Burned Acres were determined using two separate methodologies based on fires occurring on the Reservation between 2000 and 2014. Both of these methodologies were utilized to approximate the OGE Rating for an average acre of burned land on the Reservation. This analysis was necessary because the assignment of an appropriate OGE Rating for a given burned acre is dependent upon the intensity of the fire that burned the acre, however, "fire intensity" is not a way in which the BIA typically categorizes the fires in its database.

COMPOSITE ACRE - Scenario 1

Fire Regime Group of Average Burned Acre (n=1,602)

Fire Regime Group		Percentage	Acreage	Fire Intensity	OGE Rating
I	0-35 Years - Low	16.80%	0.17	Light	0.2
II	0-35 Years - Stand Replacement	17.29%	0.17	Moderate	0.6
III	35-100 Years - Mixed	60.31%	0.60	Moderate	0.5
IV	35-100 Years - Stand Replacement	5.58%	0.06	High	0.8
V	Over 200 Years - Stand Replacement	0.02%	0.00	High	0.9
		100.0%			
				Effective OGE Rating *(weighted average)*	**0.48**

Method 1 – Scenario 1

The first of the two methodologies uses Fire Regime Group as an indicator of fire intensity. Fire intensity ratings (light, moderate, high, and severe) and their respective OGE Ratings were assigned to each of the Fire Regime Groups. The proportion of the burned acreage associated with each Fire Regime Group to the total burned acreage associated with all five Regime Groups was used to create a singular, prototypical OGE Rating that could be applied to a burned acre of land anywhere within the Reservation boundaries. An OGE Rating of 0.48 resulted from this methodology.

Method 2 – Scenario 2

The second of the two methodologies uses FBPS Fuel Model Group as an indicator of fire intensity. Fire intensity ratings (light, moderate, high, and severe) and their respective OGE Ratings were assigned to each of the FBPS Fuel Model Groups. Here again, the proportion of the burned acreage associated with each Fuel Model Group to the total burned acreage associated with all Fuel Model Groups — that characterize actual recorded fires on the Reservation between 2000 and 2014 — was used to create a singular, prototypical OGE Rating that could be applied to a burned acre of land anywhere within the Reservation boundaries. An OGE Rating of 0.81 resulted from this methodology.

COMPOSITE ACRE - Scenario 2

Fuel Composition of Average Burned Acre (n=203)

FBPS	Fuel Model Group	Percentage	Acreage	Fire Intensity	OGE Rating
1	Short Grass (1 foot)	0.20%	0.00	Light	0.2
2	Timber (grass and understory)	12.33%	0.12	Light	0.2
3	Tall grass (2.5 feet)	0.07%	0.00	Moderate	0.5
5	Brush (2 feet)	0.53%	0.01	Light	0.2
8	Closed timber litter	0.19%	0.00	Moderate	0.6
10	Timber (litter and understory)	0.04%	0.00	High	0.9
11	Light logging slash	0.26%	0.00	Light	0.2
12	Medium logging slash	86.38%	0.86	High	0.9
		100.0%			
				Effective OGE Rating *(weighted average)*	**0.81**

RESULTS: OVERVIEW

The OGE Ratings determined for use in each scenario described above were applied to the total burned acres for each WMU as recorded between 2000 and 2014 and the harvest acres as recorded between 1990 and 2014 to estimate the total "current" OGE acres for each WMU. The resulting OGE acres for each WMU were then compared to the High End and Low End OGE Thresholds described in the Hydrology Report (page 398-405).

A 70% hydrologic recovery rate was assigned to all harvest activities occurring before the beginning of 1996. Imposing this assumption means that all OGE acres created before 1996 are 70% recovered, or, in other words, reduced to 30% of their original footprint. This assumption is grounded in the 2014 Confederated Tribes of the Colville Reservation Hydrology Report (page 393-394) where it is stated that the recovery rate for the average mix of treatments is about 70% recovery in 15 to 20 years. To provide a conservative estimate of the legacy effect of forest treatments that occurred between 1996 and 2014 on beginning-of-2015 OGE conditions, it is further assumed that WMUs affected by fire and harvest activities between 1996 and 2014 do not recover over time in terms of hydrologic function.

Based on the hydrologic recovery assumptions described above, the contributory effect of pre-2000 harvest activities on contemporary OGE conditions is minimal. This is largely due to the fact that heavily harvested WMUs in the 1990-1999 planning period did not undergo additional harvesting at significant levels during the 2000-2014 period. The table below illustrates the legacy effect of 1990-1999 harvest activities on 2015 OGE conditions as compared to the legacy effect of 2000-2014 harvest activities on 2015 OGE conditions. The net effect on OGE of harvest activities occurring between 1990 and 1999 was to push one WMU (i.e., Swimptkin Creek) over the high end OGE threshold.

Disturbed WMUs by OGE Threshold				
Timber Harvest Excluding the Impact of Fire				
	1990 to 2015		2000 to 2014	
Characteristic	# of WMUs	% of Total	# of WMUs	% of Total
Below Low End Threshold	141	67.5	95	45.5
Between Thresholds	6	2.9%	7	3.3%
Above High End Threshold	12	5.7%	11	5.3%
0% to 25%	11	5.3%	10	4.8%
25% to 50%	1	0.5%	1	0.5%
50% to 75%	0	0.0%	0	0.0%
75% to 100%	0	0.0%	0	0.0%
More than 100%	0	0.0%	0	0.0%
Total Treated WMUs	**159** (76.1%)	**out of 209**	**113** (54.1%)	**out of 209**

The remaining tables and figures presented here in Appendix L focus on the 2000-2014 planning period. The cumulative impact of harvest activities that occurred between 1990 and 1999 are not included in these results.

RESULTS: SCENARIO 1 DETAIL

SCENARIO 1

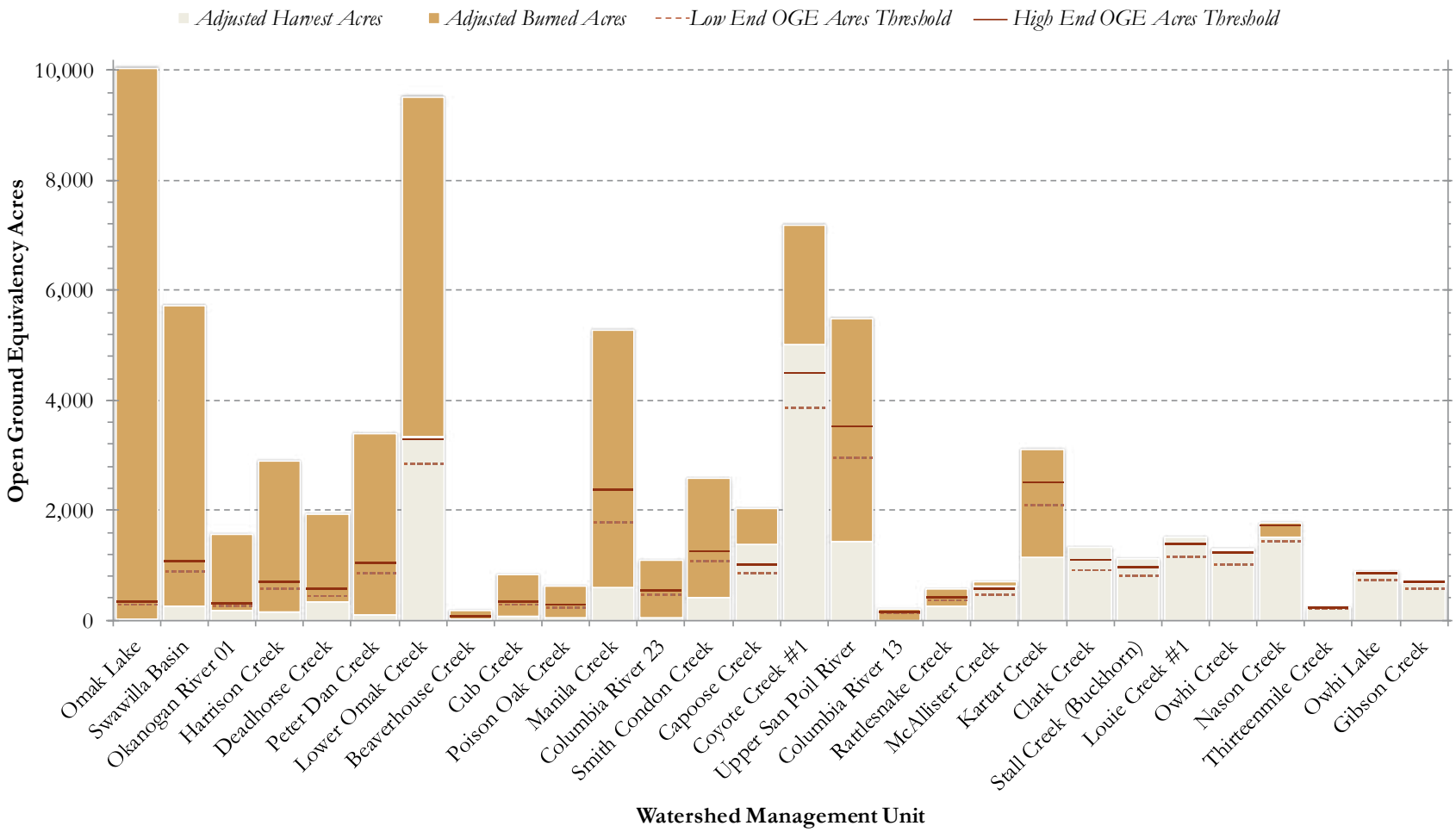
OGE Acres from Fire and Harvest (Scenario 1) for Select WMUs*

WMU Name	WMU ID	Exceedance Level	Low End OGE Acres Threshold	High End OGE Acres Threshold	Adjusted Harvest Acres**	Adjusted Burned Acres	Total Acres
Omak Lake	14-12	3161.40%	257	308	29	10,016	28,861
Swawilla Basin	11-08	445.06%	876	1,052	250	5,484	16,825
Okanogan River 01	13-01	429.42%	244	293	177	1,375	6,823
Harrison Creek	14-08	328.70%	561	673	139	2,746	5,129
Deadhorse Creek	06-07	254.04%	433	542	322	1,597	3,340
Peter Dan Creek	11-07	232.29%	850	1,020	92	3,298	10,202
Lower Omak Creek	13-14	189.08%	2,818	3,287	3,353	6,149	17,476
Beaverhouse Creek	14-02	168.91%	54	65	9	166	1,668
Cub Creek	06-11	161.52%	260	312	62	754	1,643
Poison Oak Creek	14-03	142.40%	211	254	40	576	2,537
Manila Creek	07-11	125.14%	1,761	2,348	602	4,684	13,704
Columbia River 23	07-23	110.05%	438	525	40	1,062	3,945
Smith Condon Creek	14-07	108.59%	1,059	1,236	398	2,180	5,191
Capoose Creek	06-10	101.16%	839	1,007	1,391	634	3,836
Coyote Creek #1	14-09	60.39%	3,841	4,481	5,026	2,161	17,433
Upper San Poil River	06-18	55.98%	2,934	3,521	1,423	4,069	23,066
Columbia River 13	05-13	54.92%	106	127	0	197	2,422
Rattlesnake Creek	14-04	37.48%	349	407	248	311	2,325
McAllister Creek	07-18	25.72%	462	554	611	85	2,061
Kartar Creek	14-06	24.00%	2,080	2,495	1,153	1,941	13,825
Clark Creek	13-08	21.41%	903	1,083	1,315	0	4,161
Stall Creek (Buckhorn)	01-11	16.80%	796	955	1,115	0	3,184
Louie Creek #1	07-01	10.89%	1,138	1,365	1,514	0	6,829
Owhi Creek	10-01	6.05%	1,011	1,213	1,286	1	5,117
Nason Creek	14-05	3.61%	1,418	1,702	1,522	242	8,614
Thirteenmile Creek	06-01	2.56%	178	213	218	0	1,081
Owhi Lake	10-06	2.20%	717	837	851	4	3,174
Gibson Creek	04-03	1.17%	563	675	683	0	2,250

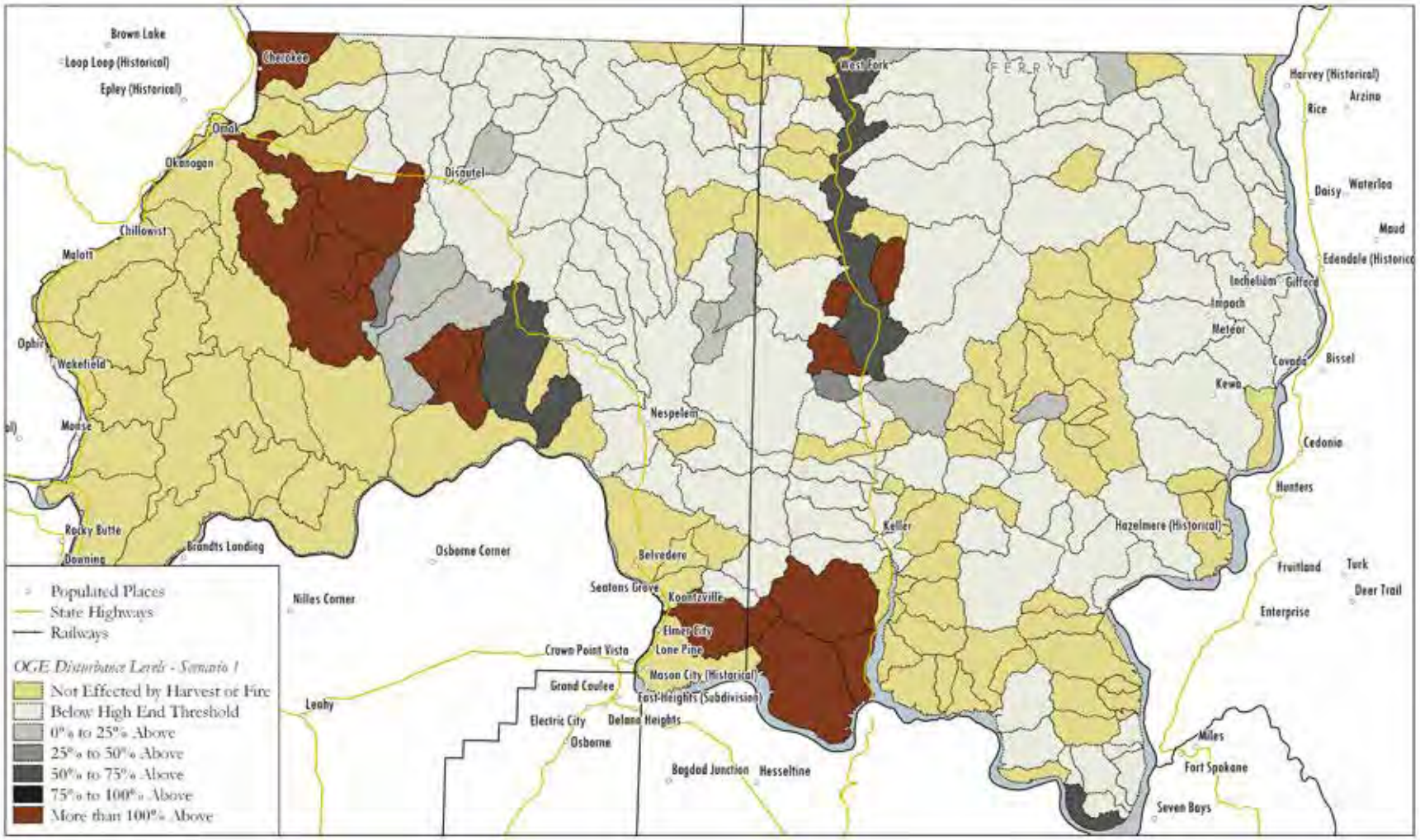
*WMUs where the High End OGE Threshold level was exceed.

**Formatted text represents WMUs where the High End OGE Threshold was exceeded due to harvest treatments.

Watershed Management Units Where the High End OGE Threshold was Exceeded Based on Scenario 1 Assumptions



WMUs by OGE Threshold Exceedance Level Under Scenario 1
2000-2014



RESULTS: SCENARIO 2 DETAIL

SCENARIO 2

OGE Acres from Fire and Harvest (Scenario 2) for Select WMUs*

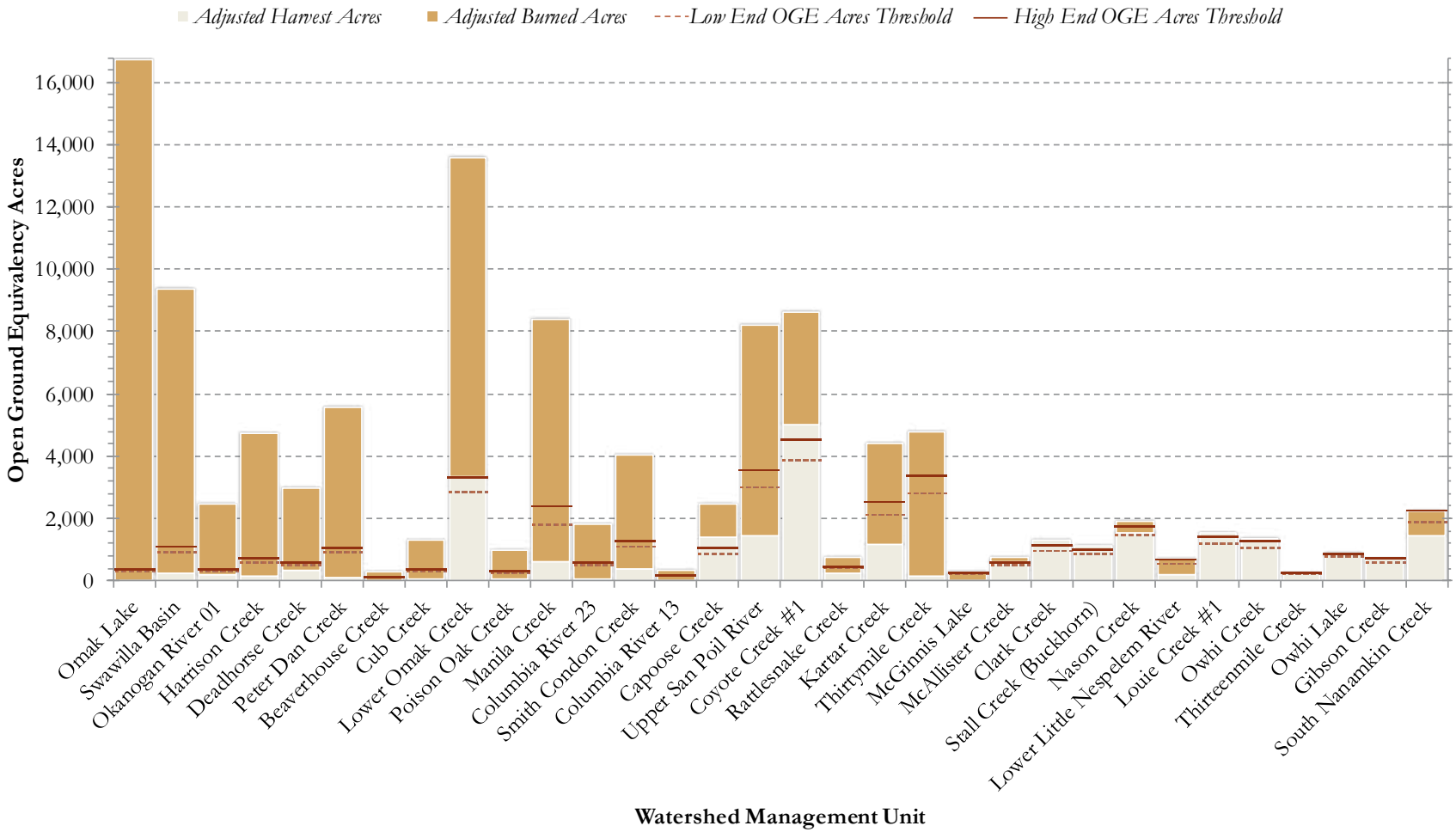
WMU Name	WMU ID	Exceedance Level	Low End OGE Acres Threshold	High End OGE Acres Threshold	Adjusted Harvest Acres**	Adjusted Burned Acres	Total Acres
Omak Lake	14-12	5327.49%	257	308	29	16,688	28,861
Swawilla Basin	11-08	792.28%	876	1,052	250	9,137	16,825
Okanogan River 01	13-01	741.92%	244	293	177	2,290	6,823
Harrison Creek	14-08	600.47%	561	673	139	4,575	5,129
Deadhorse Creek	06-07	450.25%	433	542	322	2,660	3,340
Peter Dan Creek	11-07	447.65%	850	1,020	92	5,494	10,202
Beaverhouse Creek	14-02	339.26%	54	65	9	277	1,668
Cub Creek	06-11	322.49%	260	312	62	1,256	1,643
Lower Omak Creek	13-14	313.68%	2,818	3,287	3,353	10,244	17,476
Poison Oak Creek	14-03	293.42%	211	254	40	959	2,537
Manila Creek	07-11	258.02%	1,761	2,348	602	7,804	13,704
Columbia River 23	07-23	244.84%	438	525	40	1,770	3,945
Smith Condon Creek	14-07	226.08%	1,059	1,236	398	3,632	5,191
Columbia River 13	05-13	158.08%	106	127	0	328	2,422
Capoose Creek	06-10	143.13%	839	1,007	1,391	1,057	3,836
Upper San Poil River	06-18	132.96%	2,934	3,521	1,423	6,780	23,066
Coyote Creek #1	14-09	92.51%	3,841	4,481	5,026	3,601	17,433
Rattlesnake Creek	14-04	88.40%	349	407	248	518	2,325
Kartar Creek	14-06	75.82%	2,080	2,495	1,153	3,234	13,825
Thirtymile Creek	06-08	43.74%	2,782	3,339	159	4,641	15,941
McGinnis Lake	11-05	36.85%	179	224	14	293	2,416
McAllister Creek	07-18	35.97%	462	554	611	142	2,061
Clark Creek	13-08	21.41%	903	1,083	1,315	0	4,161
Stall Creek (Buckhorn)	01-11	16.80%	796	955	1,115	0	3,184
Nason Creek	14-05	13.06%	1,418	1,702	1,522	402	8,614
Lower Little Nespelem River	10-05	11.53%	509	611	170	511	11,300
Louie Creek #1	07-01	10.89%	1,138	1,365	1,514	0	6,829
Owhi Creek	10-01	6.08%	1,011	1,213	1,286	1	5,117
Thirteenmile Creek	06-01	2.56%	178	213	218	0	1,081
Owhi Lake	10-06	2.55%	717	837	851	7	3,174
Gibson Creek	04-03	1.17%	563	675	683	0	2,250
South Nanamkin Creek	06-12	0.65%	1,839	2,207	1,451	770	10,713

*WMUs where the High End OGE Threshold level was exceed.

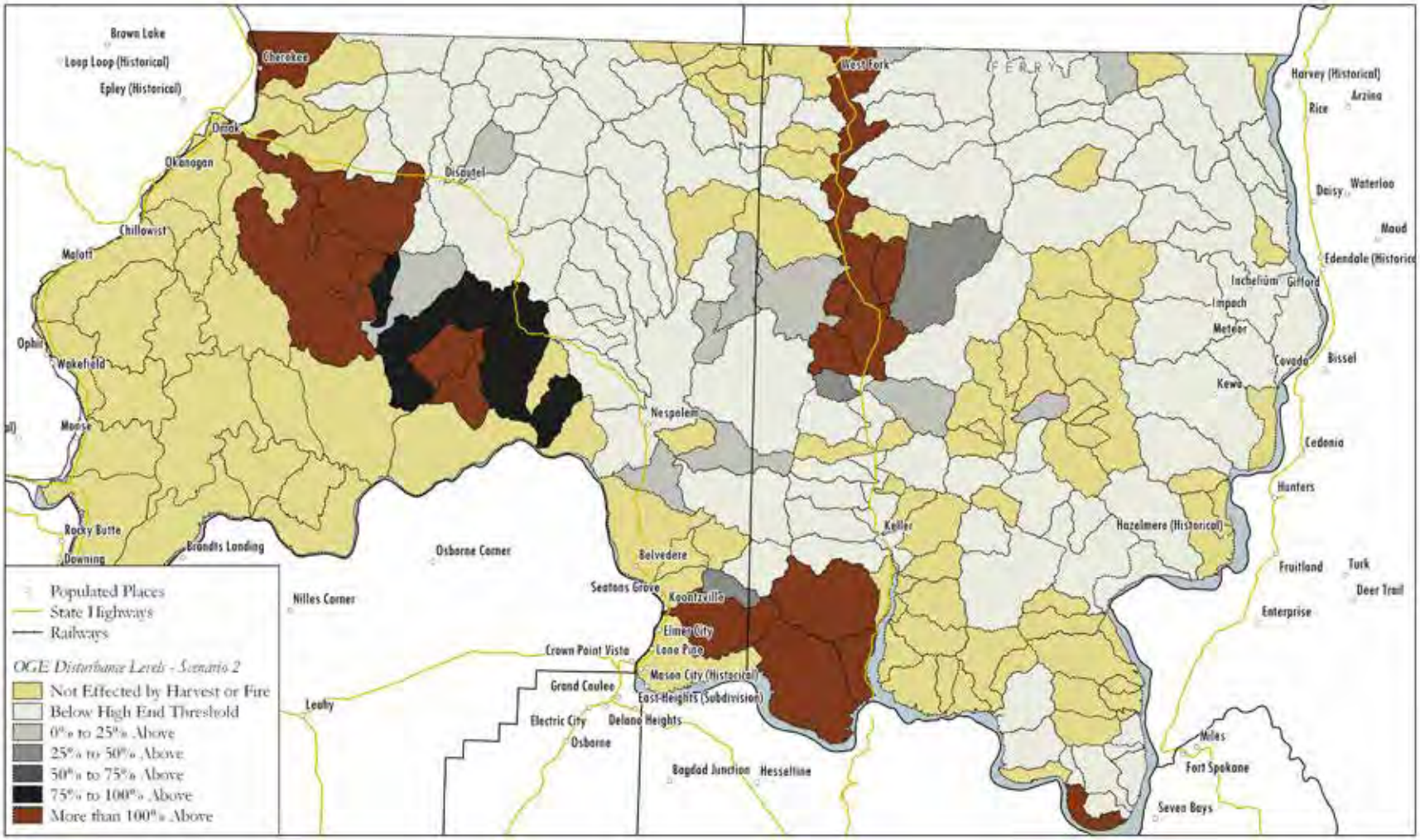
**Formatted text represents WMUs where the High End OGE Threshold was exceeded due to harvest treatments.

As shown in the table above, assuming all burned acres on the Reservation can be characterized by an OGE Rating of 0.81 (Scenario 2), 32 WMUs exceeded the High End OGE Threshold between 2000 and 2014. Of these 32 WMUs, 11 exceeded the High End OGE Threshold as a result of harvest treatments. The remaining 21 were in exceedance due to fire activity. The results of Scenario 2 are further illustrated in the chart on the following page.

Watershed Management Units Where the High End OGE Threshold was Exceeded
Based on Scenario 2 Assumptions



WMUs by OGE Threshold Exceedance Level Under Scenario 2
2000-2014



M

M: Tribal Natural Resource Codes

Source:
Tribal Natural Resource Codes, Confederated Tribes of the Colville Reservation

Natural Resource Codes

The Tribes' Natural Resource Codes are periodically reviewed and updated to address changing conditions and advances in environmental science and resource management practices. The current codes are posted on the Tribes' website (www.colvilletribes.com). The codes also assign enforcement authority to specific tribal departments such as Environmental Trust, Planning, Parks & Recreation and Fish & Wildlife.

Fish, Wildlife and Recreation (Chapter 4-1)

The Tribes regulate the harvest of wildlife resources within the aboriginal territory of the Colville Tribes. In regulating wildlife and recreation resources of the Reservation, tribal members are afforded the greatest possible freedom to use and enjoy these resources, consistent with the preservation and improvement of these resources for future generations. Wildlife found on the Reservation may be taken only at such times, in such places, and in such a manner as provided by tribal law. Enforcement of this chapter is primarily the responsibility of police officers, and other tribal law enforcement personnel.

Cultural Resources Protection (Chapter 4-4)

The Cultural Resources Protection chapter reasserts requirements of federal laws affecting historical and archeological resources and the requirement that the Tribes be notified of any federal actions such as the review and permitting of proposed projects. The Tribes must be consulted and in some cases, a project cannot proceed without consent of the Tribes. The Tribes have the authority to nominate sites on the Reservation for inclusion in the National Register of Archaeological and Historic Sites. The ordinance details the powers and duties of the History and Archaeology Program. Damaging or adversely impacting significant resources are prohibited acts. Permits are required if projects or actions adversely affect archaeological resources or historic properties. Criminal and civil penalties are identified for prohibited acts. Chapter 4-4 discusses survey, inventory and registering archaeological and historic properties. Any applicant or permittee aggrieved by any decision made under this Chapter, may petition the Council for a hearing to review such decision.

On-Site Wastewater Treatment and Disposal (Chapter 4-5)

The economy, health, safety and welfare of the people residing and doing business within the Colville Indian Reservation are affected by the construction and utilization of on-site wastewater treatment and disposal systems (i.e. septic tank systems) servicing both Indian and non-Indian people on trust and fee land within the Colville Reservation.

Inadequate treatment and disposal of wastewater can contaminate and degrade water resources on which many people depend for domestic, agricultural, industrial, business, recreational and other uses. The existence of shallow groundwater, unacceptable soil percolation rates, steep slopes, shallow bedrock, silt and clay strata throughout much of the Colville Reservation together with anticipated population growth and business development on the Reservation require uniform planning, standards and permitting procedures in order to protect the quality of Reservation waters for current and future intended uses.

The Environmental Trust Department administers this Chapter. Fees may be charged for permits and administration services provided under this Chapter in accordance with a fee schedule proposed by the Environmental Trust Department and adopted by the Tribal Council.

Mining Practices Water Quality (Chapter 4-6)

Exploration and mining of minerals on the Reservation can have irreversible impacts on water quality. This chapter requires that preventative measures and best management practices are used in mining operations to manage non-point sources of water pollution and that lands affected by mining operations are properly reclaimed. Enforcement of the provisions of this chapter is the responsibility of the Environmental Trust Department.

Forest Practices (Chapter 4-7)

This chapter provides for sustainable forest management practices that integrate protections for water quality and quantity, fish and wildlife, soils, vegetation, cultural resources, recreation and scenic beauty. Applications are required for any proposed projects that have some potential for damaging a Reservation resource or adversely impacting the health, safety or welfare of the Reservation population. These include forest practices utilizing heavy equipment for timber harvesting, road construction and maintenance.

This chapter requires the application of best management practices for road construction and maintenance, water crossings, gravel pits and quarries, weed control, logging systems and landings. The chapter also specifies riparian management zones along all waters except forested wetlands that preclude roads and skid trails, heavy equipment, landings and quarries. The Reserve Trees requirements provide for the number of trees and snags to be left standing in regeneration harvests. Additional provisions include post-harvest site preparation, landing cleanup, slash disposal and reforestation. Protection of threatened and endangered species as well as cultural resources are also included.

This Chapter provides the following enforcement procedures: informal conferences, Notices to Comply, Stop Work Orders, corrective actions by the Department, civil penalties, injunctions and other civil and administrative judicial relief. Enforcement of the provisions of this chapter is the responsibility of the Environmental Trust Department.

Water Quality Standards (Chapter 4-8)

This Chapter establishes tribal water quality standards for the surface waters and ground waters located within the exterior boundaries of the Reservation. The quality of all surface and groundwater on the Reservation is protected to insure the health, economic, aesthetic and cultural well being of all people residing on the Reservation.

Watershed Award 2013

This chapter requires any person who plans to discharge any waste from a point source into Reservation waters, must obtain a permit from the Environmental Trust Department. Any person engaged in any operation or activity that results in a spill or discharge, which may cause pollution of the waters of the Reservation, may be subject to civil penalties, including fines up to $10,000 per day. The Environmental Trust Department may issue cease and desist orders for discharges or cleanup orders for spills or dumping into Reservation waters.

Hydraulic Projects (Chapter 4-9)

This Chapter protects aquatic resources by requiring application and approval of hydraulic projects. Tribal members depend on aquatic resources such as lakes, wetlands, streams and rivers for fish and for cultural and ceremonial purposes.

Water Crossings

Hydraulic projects involve construction or other activities that affect the natural flow or course of streams or rivers. Hydraulic projects include projects requiring construction fill for recreational, industrial, commercial, sewage treatment or residential projects

affecting watercourses, road fills for water crossings, bridges, dams and impoundments requiring rock, sand, dirt, or other material for construction. Application review and approval, as well as enforcement are the responsibility of the Environmental Trust Department.

Water Resources Use And Permitting (Chapter 4-10)

This chapter asserts the water rights of the Colville Tribes and provides for the administration of water permits. The Water Administrator must ensure adequate levels in streams and lakes for fish and wildlife conservation and tribal member use. The Administrator has the authority to remove or shut down diversions, wells, or obstructions to the flow of water and any activities adversely affecting water quality. This code is administered by the Environmental Trust Department.

Rangeland Management (Chapter 4-11)

This chapter requires that rangeland be consolidated into management units and that the grazing capacity and maximum number of livestock are determined and adjusted as needed to comply with integrated resource management objectives. Grazing seasons are determined by the Range director and the Council determines grazing fees and authorizes grazing permits.

Open Range Warning Sign

Livestock counts, branding and inspections for disease are required. Domestic sheep and goats are restricted from rangelands due to the potential to spread disease to the wild bighorn sheep population. Permittees must adjust grazing use if the Director determines that conditions of the range require it. The Land Operations Department is authorized to assess fees and penalties for prohibited acts.

Forest Protection (Chapter 4-12)

This chapter provides for enforcement for forest related offenses such as unlawful timber or woodcutting and arson. The code requires permits for forestry activities on trust lands and timber salvage. Enforcement is the responsibility of all police officers, law enforcement officers, and all law enforcement agencies of the Tribes and BIA.

Wild Horses (Chapter 4-14)

Feral horses on the Colville Reservation

Feral free roaming horses are under the jurisdiction of the Tribes and are managed as part of the natural resources of the Reservation. They are protected from unauthorized capture, branding, undue disturbance and destruction. They and their habitat are to be managed and controlled in a manner designed to achieve and maintain a feral horse herd on the Colville Indian Reservation. The code requires that the herd be maintained in numbers that will insure the perpetuation of the herd, but at the same time will not unduly interfere with the use of rangelands for other purposes. Feral horses are managed by the Range Program and the Fish & Wildlife Department.

Shoreline Management (Chapter 4-15)

This chapter provides for the protection, control, conservation, and utilization of the shoreline resources of the Reservation. It establishes the shoreline regulatory structure for the management of shoreline areas within the Reservation through the planning and fostering of all reasonable and appropriate uses.

All shoreline developments and uses must utilize best management practices that minimize any increase in surface water run off and to control, treat and release runoff so that receiving water quality and shore properties and features are not adversely affected. Natural and cultural resources are to be protected and preserved in any proposed developments. This code is administered by the Planning Department.

Fire Management (Chapter 4-19)

This chapter provides for the establishment and maintenance of a complete, cooperative and coordinated forest fire protection and suppression program. The Fire Management department is empowered to take charge of and direct fire suppression activities and investigate the cause of forest fires. The department also administers burn permits and appoints wardens to provide information to the public, investigate fires, patrol forest areas, inspect spark-emitting equipment and forestland operations to ensure fire prevention. The Tribal Police Department has the authority to investigate, arrest and initiate prosecution of violators.

N

N: Fire History

Source:
Confederated Tribes of the Colville Reservation,
The Mount Tolman Fire Center, 2016.

YEAR	FIRE NAME	WMU	WMU ACRES	FIRE ACRES	PERCENT BURNED
2001	St Mary's	Lwr Omak Creek	17,476	10,028.81	57.39%
2004	Elmer City	Mcginnis Lake	2,416	85.70	3.55%
		Coulee Dam	9,463	473.46	5.00%
		Peter Dan Creek	10,202	1,368.16	13.41%
2004	Hopkins Canyon	Coyote Creek #1	17,433	817.47	4.69%
		Harrison Creek	5,129	772.23	15.06%
		Columbia River 25	15,776	3,478.33	22.05%
2005	Second Hud	Okanogan River 02	4,351	3.84	0.09%
		Wanacut Creek	9,195	599.18	6.52%
		Okanogan River 01	6,823	2,841.87	41.65%
2005	West Omak Lake	Long Lake	8,731	44.79	0.51%
		Potholes	13,766	89.29	0.65%
		Columbia River 26	9,040	356.15	3.94%
		Stubblefield Point	5,984	310.22	5.18%
		Omak Lake	28,861	4,621.91	16.01%
		Goose Flats	19,529	5,834.78	29.88%
2006	Cameron Lake Road	Corkscrew Creek	5,839	418.68	7.17%
		Okanogan River 03	9,707	1,148.26	11.83%
2006	Swawilla Basin	Columbia River 23	3,945	81.48	2.07%
2007	Manilla Creek	Buffalo Creek	4,988	23.89	0.48%
		Meadow Creek	5,119	63.97	1.25%
		Mcginnis Lake	2,416	277.62	11.49%
		Coulee Dam	9,463	1,112.28	11.75%
		Peter Dan Creek	10,202	2,363.06	23.16%
		Columbia River 23	3,945	2,114.85	53.61%
		Swawilla Basin	16,825	11,337.12	67.38%
		Manila Creek	13,704	9,483.02	69.20%

YEAR	FIRE NAME	WMU	WMU ACRES	FIRE ACRES	PERCENT BURNED
2007	South Omak Lake	Nason Creek	8,614	409.47	4.75%
		Kartar Creek	13,825	698.56	5.05%
		Goose Flats	19,529	2,808.88	14.38%
		Omak Lake	28,861	6,584.40	22.81%
2008	Abraham Canyon	No Fork Hall Creek	8,552	0.11	0.00%
		Lower Hall Creek	19,246	213.87	1.11%
		North Fork Hall Creek	8,552	158.22	1.85%
2008	Columbia River Road	Goose Flats	19,529	0.02	0.00%
		Nason Creek	8,614	71.78	0.83%
		Coyote Creek #1	17,433	3,650.38	20.94%
		Kartar Creek	13,825	3,309.39	23.94%
		Columbia River 25	15,776	5,654.12	35.84%
		Smith Condon Creek	5,191	4,507.21	86.83%
		Harrison Creek	5,129	4,904.52	95.62%
2008	French Valley	Omak Lake	28,861	9.74	0.03%
		Mission Creek	7,326	172.51	2.35%
		Lower Omak Creek	17,476	1,183.04	6.77%
2008	Rattlesnake Point	Felix Creek	3,436	307.84	8.96%
		Okanogan River 03	9,707	1,456.65	15.01%
2008	Wilmont	Columbia River 07	3,159	10.71	0.34%
		Lower Wilmont Creek	11,916	137.94	1.16%
2009	Buffalo Lake	Joe Moses Creek	12,873	1.25	0.01%
		Lower Little Ne-spelem River	11,300	54.78	0.48%
		Poker Joe Springs	12,147	272.34	2.24%
2009	Concrete Plant	Coulee Dam	9,463	195.67	2.07%

YEAR	FIRE NAME	WMU	WMU ACRES	FIRE ACRES	PERCENT BURNED
2009	Fish Hatchery	Upper Little Nespelem River	23,981	236.90	0.99%
2009	Johnson Lake	Lower Nespelem River	20,932	711.32	3.40%
2009	Milepost 281	Okanogan River 04	11,833	309.89	2.62%
		Lower Little Nespelem River	11,300	579.41	5.13%
		Poker Joe Springs	12,147	1,329.93	10.95%
2009	Owhi Tree	Owhi Creek	5,117	1.24	0.02%
		Owhi Lake	3,174	9.21	0.29%
2010	Buffalo Lake	Rebecca Lake	2,456	155.19	6.32%
		Seaton Grove	2,806	252.44	9.00%
2012	Buffalo Lake Road	Seaton Grove	2,806	301.93	10.76%
		Peter Dan Creek	10,202	3,066.31	30.06%
		Coulee Dam	9,463	7,929.13	83.79%
2012	Little Jim Creek	Little Jim Creek	2,917	26.12	0.90%
2012	Manila Creek	Manila Creek	13,704	200.59	1.46%
2012	Meteor	Omak Lake	28,861	1.11	0.00%
		Poison Oak Creek	2,537	0.13	0.01%
		Omak Lake	28,861	209.20	0.72%
2012	Peter Dan Creek	Peter Dan Creek	10,202	20.22	0.20%
2012	South Omak Lake	Lower Hall Creek	19,246	1.78	0.01%
		Upper Stranger Creek	10,551	9.08	0.09%
		Cornstalk Creek	7,241	349.29	4.82%
		Lower Stranger Creek	7,714	641.54	8.32%

YEAR	FIRE NAME	WMU	WMU ACRES	FIRE ACRES	PERCENT BURNED
2012	St Mary's Mission Road	Omak Lake	28,861	1.11	0.00%
		Potholes	13,766	1.76	0.01%
		Nason Creek	8,614	18.18	0.21%
		Mission Creek	7,326	141.91	1.94%
		Lower Omak Creek	17,476	1,499.77	8.58%
		Corkscrew Creek	5,839	1,097.70	18.80%
		Beaverhouse Creek	1,668	343.66	20.60%
		Rattlesnake Creek	2,325	643.32	27.67%
		Omak Lake	28,861	9,279.29	32.15%
		Poison Oak Creek	2,537	1,190.41	46.92%
		No Name Creek	2,727	2,623.18	96.19%
2012	Timm Brothers	Columbia River 26	9,040	1,357.82	15.02%
2013	Cameron Lake	Cameron Lake	4,073	24.59	0.60%
		Corkscrew Creek	5,839	106.43	1.82%
2013	Hwy 155	Seaton Grove	2,806	194.08	6.92%
2013	Rattlesnake	Rattlesnake Draw	1,630	5.55	0.34%
		George Creek	4,024	29.67	0.74%
		Columbia River 14	1,062	64.40	6.06%
		Columbia River 13	2,422	406.61	16.79%
2013	Sandhills	Columbia River 16	4,735	109.54	2.31%
2013	Six Mile	Columbia River 10	1,545	45.49	2.94%
		North Fork Threemile Creek	3,885	201.90	5.20%
2013	Six Mile 2	Columbia River 10	1,545	4.82	0.31%

YEAR	FIRE NAME	WMU	WMU ACRES	FIRE ACRES	PERCENT BURNED
2013	Whitmore 3	Kartar Creek	13,825	4.98	0.04%
2013	Whitmore South	Columbia River 25	15,776	169.27	1.07%
2014	Belvedere	Poker Joe Springs	12,147	864.80	7.12%
2014	Brody Canyon	Brody Creek	5,997	237.81	3.97%
		Whitestone Creek	2,236	89.22	3.99%
		Redford Canyon	6,035	491.16	8.14%
2014	Devils Elbow	Lwr Sanpoil River	9,219	208.89	2.27%
		Bridge Creek	19,496	1,620.28	8.31%
		Mcallister Creek	2,061	176.25	8.55%
		South Nanamkin Creek	10,713	955.55	8.92%
		Twentyfive Mile Creek	3,038	666.48	21.94%
		Capoose Creek	3,836	1,311.63	34.19%
		Thirtymile Creek	15,941	5,758.18	36.12%
		Upper Sanpoil River	23,066	8,412.90	36.47%
		Cub Creek	1,643	1,558.78	94.87%
		Deadhorse Creek	3,340	3,300.66	98.82%
2014	Lawson Flats	Nez Perce Creek	18,942	0.00	0.00%
		Nez Perce Creek	18,942	273.56	1.44%
		Columbia River 05	3,410	136.63	4.01%
2014	Silver Creek II	Lower Sanpoil River	9,219	11.35	0.12%
		Copper Creek	5,744	23.93	0.42%
		Silver Creek	3,331	238.38	7.16%

O

O: Range Inventory

Ecological Site Production Comparison 1983-85 and 2012

Source:
North Wind Resource Consulting, Colville Reservation Range Inventory, 2012 - 2013

Plot	Ecological Site Description	NWRC Prduction (2012)	Pointel Prduction (1983-85)	Change 1985 - 2012
7	COOL STONY 9-15 PZ (R008XY-203WA)	640.9	621	+19.9
8	Cool loamy 9-15 PZ (R008XY-103WA)	718.2	1323	-604.8
9	Cool loamy 9-15 PZ (R008XY-103WA)	1021.8	738	+283.8
13	Semiwet Meadow 9-15 PZ (R008XY602WA)	964.9	924	+40.9
16	Sands 9-15 PZ (R008XY502WA)	83.5	654	-570.5
18	Dry Loamy 9-15 PZ (R008XY-101WA)	948	244	+704
19	Dry Loamy 9-15 PZ (R008XY-101WA)	651.3	225	+426.3
20	Dry Loamy 9-15 PZ (R008XY-101WA)	401.1	350	+51.1
23	Dry Stony 9-15 PZ (R008XY-201WA)	740	635	+105
24	Dry Stony 9-15 PZ (R008XY-201WA)	522.6	486	+36.6
28	Dry Loamy 9-15 PZ (R008XY-101WA)	285.7	621	-335.3
29	Dry Loamy 9-15 PZ (R008XY-101WA)	510.4	407	+94.4
31	Dry Loamy 9-15 PZ (R008XY-101WA)	676.5	354	+322.5
33	Dry Stony 9-15 PZ (R008XY-201WA)	717.5	771	-53.5
35	Dry Stony 9-15 PZ (R008XY-201WA)	763.3	462	+301.3
36	Cool loamy 9-15 PZ (R008XY-103WA)	808.8	713	+95.8
38	Loamy 9-15 PZ (R008XY102WA)	320.4	565	-244.6
39	Cool Stony 9-15 PZ (R008XY-203WA)	824.8	602	+222.8

Plot	Ecological Site Description	NWRC Prduction (2012)	Pointel Prduction (1983-85)	Change 1985 - 2012
40a	Dry Loamy 9-15 PZ (R008XY-101WA)	434.2	319	+115.2
41	Cool Stony 9-15 PZ (R008XY-203WA)	564.7	418	+146.7
43	Sands 9-15 PZ (R008XY502WA)	447.7	235	+212.7
45	Cool Stony 9-15 PZ (R008XY-203WA)	744.6	500	+244.6
47	Sandy 9-15 PZ (R008XY501WA)	790.3	388	+402.3
48	Loamy 9-15 PZ (R008XY102WA)	134	1845	-1711
52	Stony 9-15 PZ (R008XY202WA)	365.6	785	-419.4
55	Dry Stony 9-15 PZ (R008XY-201WA)	469.4	302	+167.4
59	Semiwet Meadow 9-15 PZ (R008XY602WA)	860.6	1108	-247.4
60	Mountain Very Shallow 15+ PZ	421.4	208	+213.4
62	Dry Stony 9-15 PZ (R008XY-201WA)	319.2	165	+154.2
64	Dry Stony 9-15 PZ (R008XY-201WA)	432	223	+209
67	Dry Stony 9-15 PZ (R008XY-201WA)	285.5	1190	-904.5
69	Stony 9-15 PZ (R008XY202WA)	370.6	525	-154.4
75	Stony 9-15 PZ (R008XY202WA)	970.1	428	+542.1
81	Sands 9-15 PZ (R008XY502WA)	297.8	487	-189.2
82	Sands 9-15 PZ (R008XY502WA)	1082.8	430	+652.8
84	Sandy 9-15 PZ (R008XY501WA)	423.1	235	+188.1
86b	Dry Loamy 9-15 PZ (R008XY-101WA)	590.7	335	+255.7
87	Dry Stony 9-15 PZ (R008XY-201WA)	849.9	858	-8.1
88	Dry Stony 9-15 PZ (R008XY-201WA)	432.7	632	-199.3

Plot	Ecological Site Description	NWRC Prduction (2012)	Pointel Prduction (1983-85)	Change 1985 - 2012
92	Loamy 9-15 PZ (R008XY102WA)	812.6	758	+546
94	Cool Stony 9-15 PZ (R008XY-203WA)	544.8	1574	-1029.2
103	Douglas-fir/Common Snowberry (PSME/SYAL)	180.5	123	+57.5
127	Douglas-fir/Common Snowberry (PSME/SYAL)	15.6	52	-36.4
128	Douglas-fir/Common Snowberry (PSME/SYAL)	482.9	70	+412.9
142	Douglas-fir/Common Snowberry (PSME/SYAL)	406.8	47	+359.8
156	Subalpine fir-whitebark pine/ kinnikinnick (ABLA-PIAL/ARUV)	95.4	242	-146.6
164a	Ponderosa Pine/Antelope bit-terbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	136.4	431	-294.6
169	Subalpine fir/huckleberry (ABLA/VACCI)	154.6	47	+107.6
189	Sands 9-15 PZ (R008XY502WA)	320.7	383	-62.3
193	Ponderosa pine/Idaho fescue (PIPO/FEID)	155.2	1133	-977.8
195	Ponderosa pine/antelope bit-terbrush, Indian ricegrass phase (PIPO/PUTR2, ACHY)	629	69	+560
196a	Ponderosa pine/antelope bit-terbrush, Indian ricegrass phase (PIPO/PUTR2, ACHY)	433.8	502	-68.2
197	Cool Stony 9-15 PZ (R008XY-203WA)	439.9	133	+306.9
198	Dry Stony 9-15 PZ (R008XY-201WA)	590.8	180	+410.8
502a	Dry Loamy 9-15 PZ (R008XY-101WA)	558.9	389	+169.9
504a	Stony 9-15 PZ (R008XY202WA)	968.2	839	+129.2

Plot	Ecological Site Description	NWRC Prduction (2012)	Pointel Prduction (1983-85)	Change 1985 - 2012
505	Dry Loamy 9-15 PZ (R008XY-101WA)	1303.6	614	+689.6
506	Dry Loamy 9-15 PZ (R008XY-101WA)	322.1	505	-182.9
507a	Very Shallow 9-15 PZ (R008XY-301WA)	1882.5	72	+1810.5
508a	Dry Stony 9-15 PZ (R008XY-201WA)	956.9	1100	-143.1
509a	Loamy 9-15 PZ (R008XY102WA)	932.1	781	+151.1
510	Dry Stony 9-15 PZ (R008XY-201WA)	1326.6	951	+375.6
514a	Loamy 9-15 PZ (R008XY102WA)	149.2	854	-704.8
515	Sands 9-15 PZ (R008XY502WA)	570.3	803	-232.7
516a	Dry Stony 9-15 PZ (R008XY-201WA)	641.7	787	-145.3
517a	Dry Loamy 9-15 PZ (R008XY-101WA)	571	1065	-494
520	Dry Stony 9-15 PZ (R008XY-201WA)	643.1	608	+35.1
521	Stony 9-15 PZ (R008XY202WA)	900.1	1317	-416.9
522	Dry Loamy 9-15 PZ (R008XY-101WA)	393.7	846	-452.3
523	Sands 9-15 PZ (R008XY502WA)	277.1	1311	-1033.9
524	Stony 9-15 PZ (R008XY202WA)	769.2	404	+365.2
527	Cool Stony 9-15 PZ (R008XY-203WA)	694.1	928	-233.9
701	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	366.6	409	-42.4
702X	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	649.7	727	-77.3

Plot	Ecological Site Description	NWRC Prduction (2012)	Pointel Prduction (1983-85)	Change 1985 - 2012
704	Douglas -fir/common snowberry, quaking aspen phase (PSME/SYAL, POTR5)	374	301	+73
707	Douglas-fir/Common Snowberry (PSME/SYAL)	566.6	236	+330.6
709a	Cool Stony 9-15 PZ (R008XY-203WA)	465.7	655	-189.3
712	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	164.3	1096	-931.7
713	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	789.3	736	+53.3
714	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	1628.2	1719	-90.8
715	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	858.7	659	+199.7
740	Ponderosa pine/common Snowberry (PIPO/SYAL)	298.1	630	-331.9
742a	Douglas-fir/pinegrass (PSME/CARU)	425	405	+20
770	Subalpine fir/northern twinflower (ABLA/LIBO3)	182.7	140	+42.7
775a	Sands 9-15 PZ (R008XY502WA)	755.4	750	+5.4
777	Sandy 9-15 PZ (R008XY501WA)	518.4	1438	-919.6
778	Dry Stony 9-15 PZ (R008XY-201WA)	1251.9	552	+699.9
787	Stony 15+ PZ (R043AY202WA)	248.1	272	-23.9
788	Dry Loamy 9-15 PZ (R008XY-101WA)	441.4	1471	-1029.6
789a	Dry Loamy 9-15 PZ (R008XY-101WA)	752	1442	-690

Plot	Ecological Site Description	NWRC Prduction (2012)	Pointel Prduction (1983-85)	Change 1985 - 2012
791	Sandy 9-15 PZ (R008XY501WA)	485.8	1216	-730.2
792	Sands 9-15 PZ (R008XY502WA)	998.1	918	+80.1
793	Dry Stony 9-15 PZ (R008XY-201WA)	538.1	1147	-608.9
794	Ponderosa pine/Idaho fescue (PIPO/FEID)	533.3	437	+96.3
795	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	321	365	-44
797	Ponderosa Pine/Antelope bitterbrush, Idaho Fescue phase (PIPO/PUTR2, FEID)	266.5	613	-346.5
798	Dry Stony 15+ PZ (R043AY-201WA)	550.5	258	+292.5
804	Quaking aspen series (POTR5)	673.8	550	+123.8
808	Ponderosa pine/Common Snowberry, Quaking Aspen Phase (PIPO/SYAL, POTR5)	924	944	-20
810	Cool loamy 9-15 PZ (R008XY-103WA)	643.6	1315	-671.4
812	Cool Stony 9-15 PZ (R008XY-203WA)	356.6	657	-300.4
813	Loamy 9-15 PZ (R008XY102WA)	572.2	743	-170.8
818	Dry Loamy 9-15 PZ (R008XY-101WA	244.4	402	-157.6
Sands	Sands 9-15 PZ (R008XY502WA)	611	700	-89

Source: North Wind Resource Consulting, Colville Reservation Range Inventory, 2012. 2013.

P

P: Water Quality Analysis

Source:
The Center For Applied Research

This appendix provides an assessment of surface water quality conditions on the Colville Reservation. The purpose of the water quality assessment is to analyze water quality throughout the Reservation during the period 2001-2015 in the Columbia River, Okanogan River, Sanpoil River, and their major tributaries. The analysis focuses on the evaluation of water quality impacts from landuse and management activities including sivicultural practices, livestock activities, and roads.

Methodology

Water quality data was obtained from the CTCR Environmental Trust Department (ETD) and the Environmental Protection Agency (EPA) Storage and Retrieval Data Warehouse (STORET) (EPA, 2016). The water quality assessment was conducted for 15 Resource Management Units (RMUs) areas, which have been defined on the Reservation based on differences in biological, geological, and/or hydrologic attributes (Hunner, 2014).

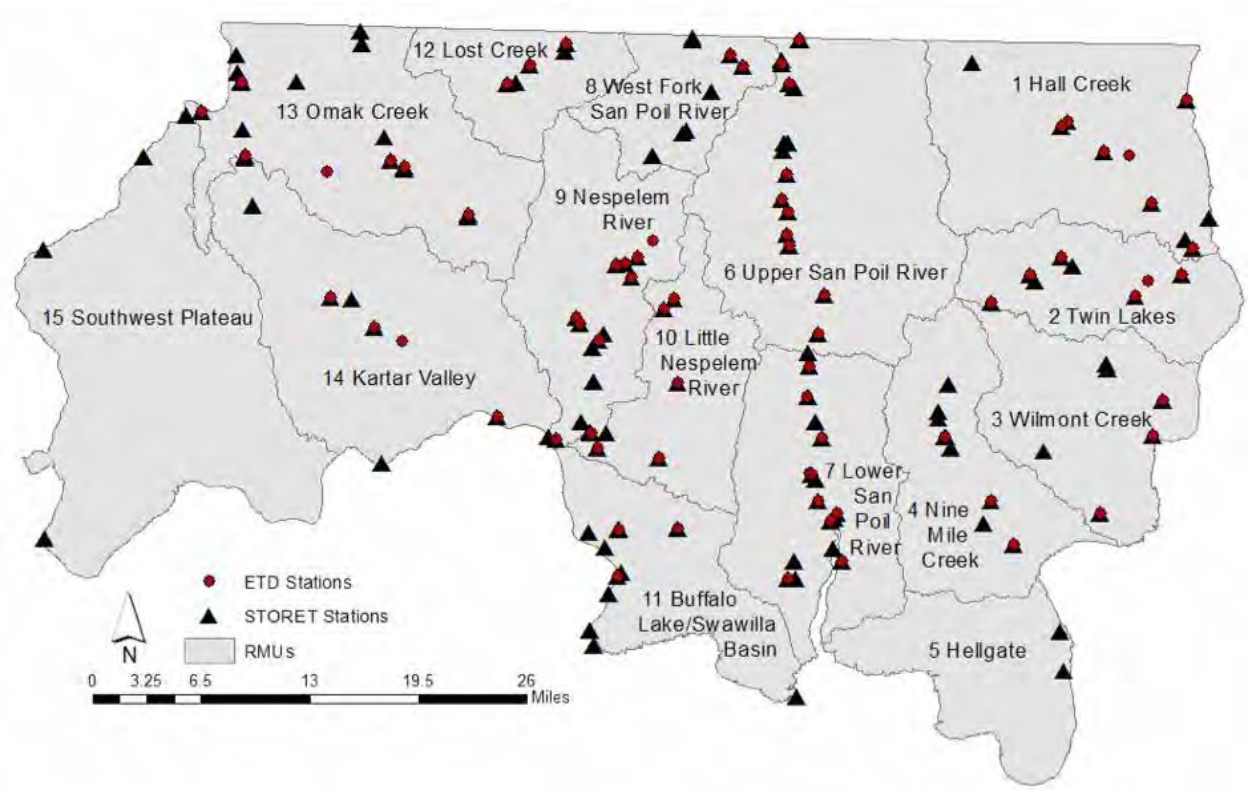
The Environmental Trust Department collects field water quality parameters at approximately 75 surface water quality sites and 12 RMUs (CTCR, 2013). The EPA STORET database contains additional data from ETD and water quality data collected by U.S. Bureau of Reclamation, EPA National Aquatic Resource Survey, and the Washington Department of Ecology at approximately 134 surface water quality sampling sites and 15 RMUs. The Environmental Trust Department relies on these other agencies to monitor water quality in the Columbia and Okanogan Rivers.

Water quality sampling sites were selected by consideration of tribal interests, accessibility, flows, ecological sources, and point and nonpoint sources. However, the majority of water quality sampling sites are located upstream of confluences of the major rivers (CTCR, 2013). Figure 1 below shows the ETD and STORET water quality sampling stations located within the 15 RMUs.

The following parameters were analyzed to characterize the effects of land use and management activities throughout the Colville Indian Reservation. These parameter are monitored by ETD as recommended by EPA under Section 106 of the Clean Water Act (EPA, 2007).

- Nutrients (nitrate, nitrite, ammonia, total kjeldahl nitrogen (TKN), total nitrogen (TN), orthophosphate);
- Bacteria (E. Coli, fecal coliform);
- Physical (total suspended solids (TSS), dissolved oxygen (D.O.), temperature, pH, turbidity, flow).

Figure 1: ETD and STORET Water Quality Sampling Stations



Quality control and quality assurance (QA/QC) was conducted on all water quality data for accurate representation of water quality in each RMU. Data was corrected in each database prior to input into the water quality analysis. Data errors included incorrect data units and other miscellaneous typos. In addition, a few data points were omitted from this study due to impossibly high inaccurate values (e.g. pH of 810 S.U.). All non-detection values, or data reported by the laboratory to be equal to a value between zero and the reporting limit, were set to the reporting limit. All non-detection values were set equal to zero. Both of these methods are considered conservative approaches for water quality analyses and this methodology is also utilized by the ETD for assessing water quality in its annual reports.

All parameter concentrations were graphed and compared with CTCR water quality standards (where applicable) to characterize water quality in each RMU. These graphs show the acute exceedances of the CTCR water quality standards for each parameter. Sampling sites were categorized by beneficial use classifications and are shown on the graphs. STORET data are shown on the graph for QA/QC and concentration comparison purposes.

Water Quality Standards

The Confederated Tribes of the Colville Reservation have a primary interest in the protection, control, conservation, and utilization of the water resources of the Colville Indian Reservation (CTCR, 2010). CTCR has developed water quality standards for some parameters which are published in both the Tribal Natural Resource Codes (Chapter 4-8) and in the Code of Federal Regulations (40 CFR 131.35).

The Confederated Tribes of the Colville Reservation water quality standards were developed to protect and support the beneficial uses of its surface waters and are classified into four stream water classes. Beneficial uses include providing fish, shellfish, wildlife habitat, natural food chain maintenance, recreation, water supply, commerce and navigation, ceremonial and religious water use, and stock watering. Table 1 below shows water quality standards for each parameter and beneficial uses by water class (CTCR, 2013).

The Confederated Tribes of the Colville Reservation currently has no criteria specified for the other parameters used in this analysis and not listed in Table 1, instead, the CTCR follows recommendations of the EPA for guidance. CTC 4-8 specifies, "Deleterious concentrations of toxic, or other non-radio-active materials, shall be determined by the Department in consideration of the 'Quality Criteria for Water,' published by EPA (1976), and as revised, as an authoritative source for criteria and/or other relevant information". However, as required by the Federal Clean Water Act, the CTCR Water Quality Standards include anti-degradation standards prohibiting reductions in water quality. In addition, CTCR Tribal code contains narrative water quality standards for toxic, radioactive, or deleterious materials, and aesthetic values (CTCR, 2010).

The Confederated Tribes of the Colville Reservation Water Quality Assessment Reports list the streams where concentration of parameters of concern exceed water quality standards. In general, water quality standard exceedance occur in all four classes of water (CTCR, 2013).

Nutrients

Nutrients can be caused by rainfall-induced runoff from agricultural lands and urban areas, where nutrient compounds have been added as fertilizer, from wastewater treatment facilities, and other point and non-point sources. In addition, high sediment delivery rates may accompany raised nutrient inputs, affect channel and habitat conditions, and be linked with lower DO and raised temperatures (CTCR, 2013). The Confederated Tribes of the Colville Reservation monitors for nitrogen species and orthophosphate. The data for each nitrogen species and orthophosphate are shown below.

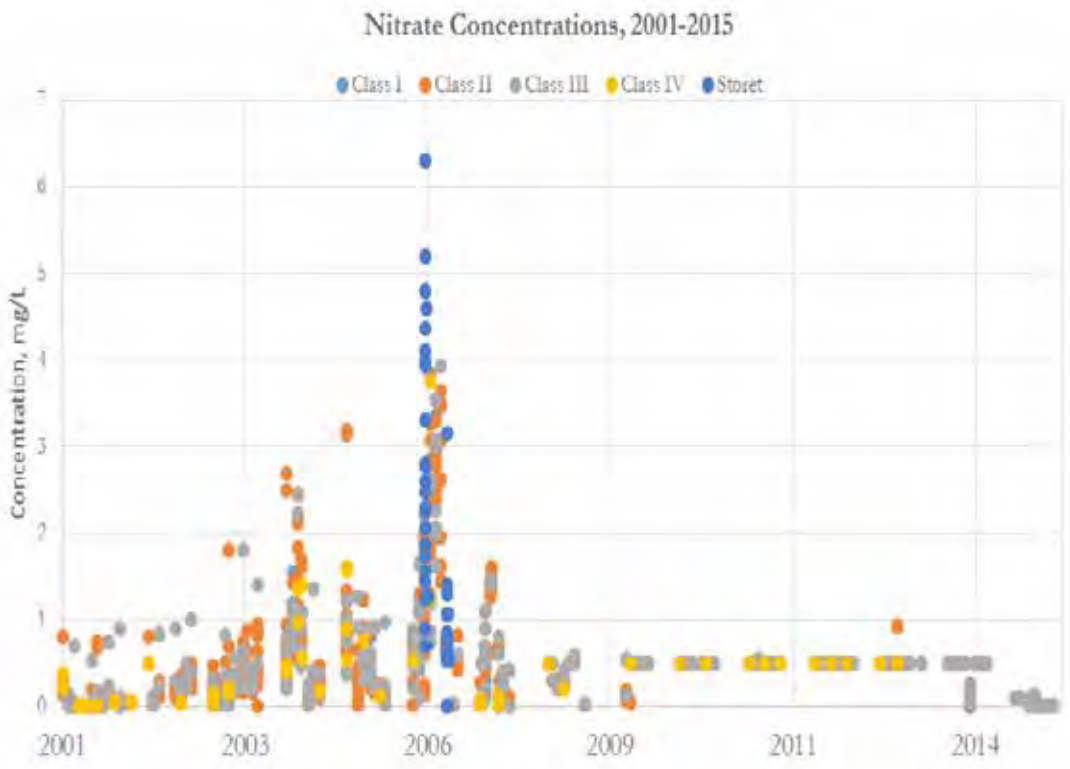
Table 1
Confederated Tribes of the Colville Reservation Chapter 4-8 Water Quality Standards and Beneficial Uses per Class

	Water Quality Standard					Beneficial Uses
Classification	**Fecal Coliform**	**D.O.**	**Temperature**	**pH**	**Turbidity**	
Class I (Extraordinary)	≤ geometric mean of 50 organisms/100mL, with not more than 10% of samples exceeding 100 organisms/100mL	<9.5 mg/l	≤ 16.0ºC	6.5 to 8.5	≤ 5 NTU, or <= 10% increase if BG > 50 NTU	Water supply (domestic, industrial, agricultural), commerce and navigation, ceremonial and religious use, fish and shellfish, recreation, stock watering, fish migration.
Class II (Excellent)	≤ geometric mean of 200 organisms/100mL, with not more than 10% of samples exceeding 400 organisms/100mL.	> 8.0 mg/l	≤ 18.0º C	6.5 to 8.5	≤ 5 NTU, or <= 10% increase if BG > 50 NTU	Water supply (domestic, industrial, agricultural), commerce and navigation, ceremonial and religious use, fish and shellfish, recreation, stock watering, fish migration.
Class III (Good)		> 6.5 mg/l	≤ 21.0ºC	6.5 to 8.5	≤ 10 NTU, or <= 20% increase if BG > 50 NTU	Water supply (domestic, industrial, agricultural), commerce and navigation, fish and shellfish, recreation, stock watering, fish migration.
Class IV (Fair)	≤ geometric mean of 200 organisms/100mL, with not more than 10% of samples exceeding 400 organisms/100mL.	> 4.0 mg/l	≤ 22.0º C	6.5 to 9.0	≤ 10 NTU, or <= 20% increase if BG > 50 NTU	Water supply (domestic, industrial, agricultural), commerce and navigation, recreation, stock watering, fish migration.

Nitrate

Figure 2 shows the changes in nitrate concentrations. There was a large increase of nitrate concentration in 2006. From 2009-2015 all values were measured below the reporting limit or as non-detection. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. The Confederated Tribes of the Colville Reservation currently has no criteria specified for nitrate.

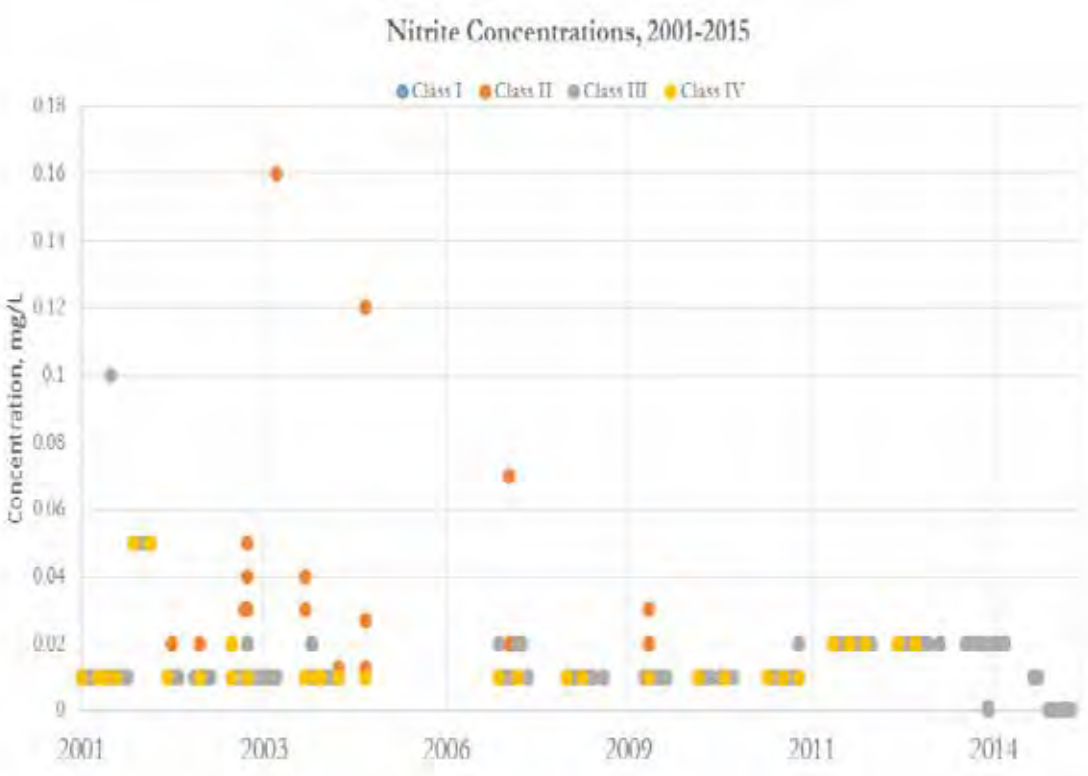
Figure 2: Nitrate Concentrations, 20001-2015



Nitrite

Nitrite concentrations followed similar concentration patterns as nitrate. Figure 3 shows the changes in nitrite concentrations. There were 4 spikes of nitrite concentrations in 2001 (in Class III waters), 2003 (in Class II waters), 2005 (in Class II waters), and 2007 (in Class II waters). Duplicate data was not available to verify these concentration spikes. In addition, STORET data was not available for nitrite concentrations. However, all other nitrite concentrations are very low with the majority of concentrations being below the reporting limit or as non-detection. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. In addition, no data was available for the year 2006, and data was only available for RMUs 9-14 in 2005. The Confederated Tribes of the Colville Reservation currently has no criteria specified for nitrite.

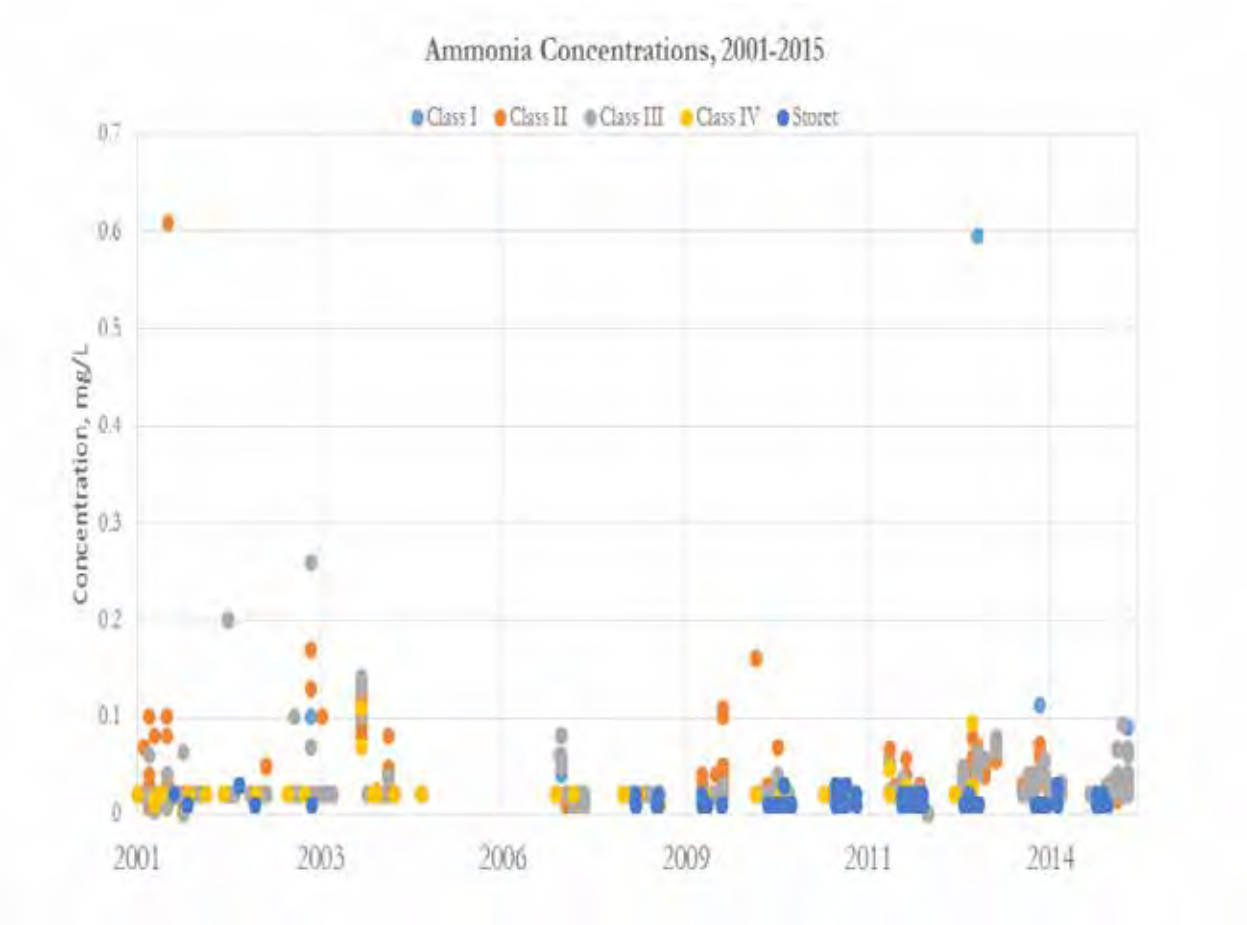
Figure 3: Nitrite Concentrations, 2001-2015



Ammonia

Figure 4 shows the changes in ammonia concentrations. However, there were 2 spikes of ammonia concentrations in 2001 (in Class II waters), 2013 (in Class I waters). Duplicate data was not available to verify these concentration spikes. However, all other ammonia concentrations are very low with the majority of concentrations being below the reporting limit or as non-detection. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. In addition, no data was available for the year 2006, and data was only available for RMUs 9-14 in 2005. The Confederated Tribes of the Colville Reservation currently has no criteria specified for ammonia.

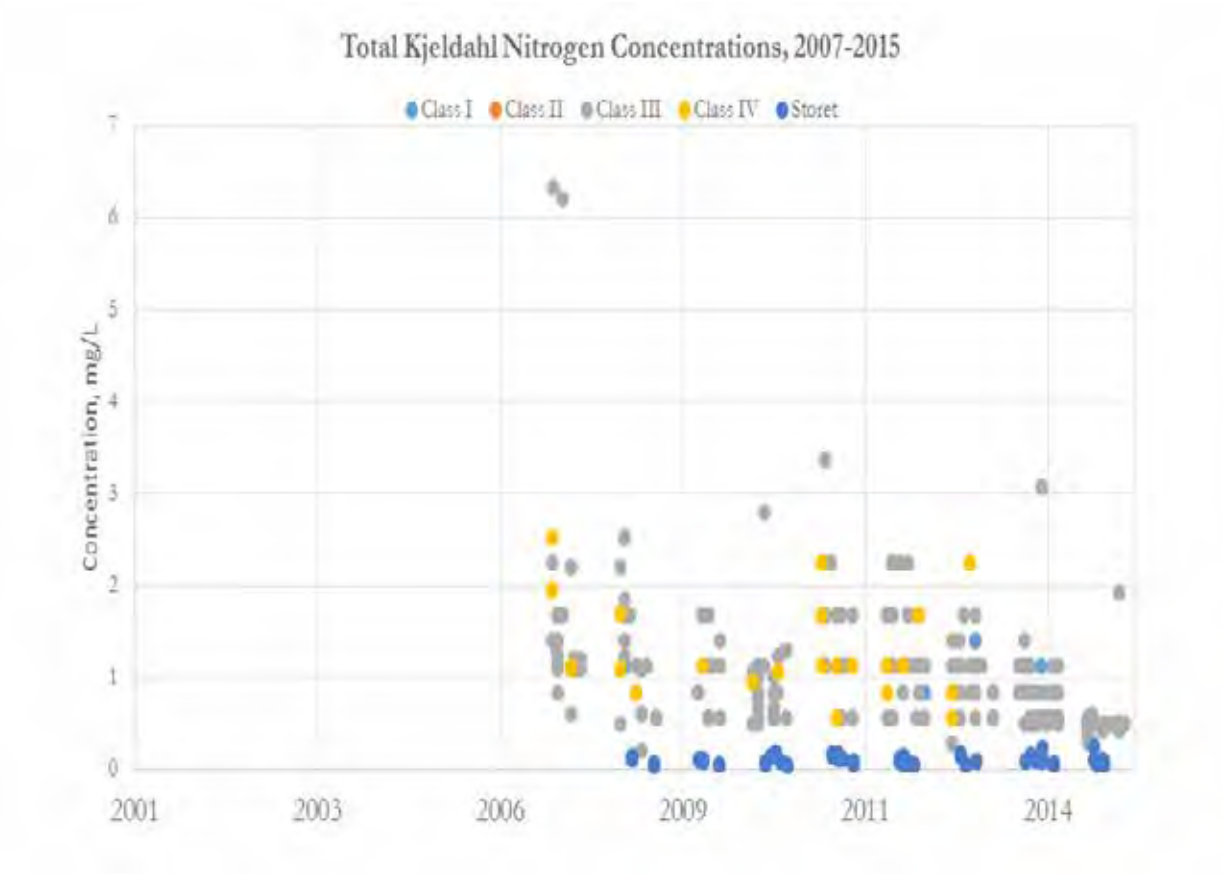
Figure 4: Ammonia Concentrations, 2001-2015



Total Kjeldahl Nitrogen

Figure 5 shows the changes in total kjeldahl nitrogen (TKN) concentrations. However, there were 2 spikes of TKN concentrations in 2007 (in Class III waters); both were measured in April and June. Duplicate data was not available to verify these concentration spikes. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. In addition, no data was available from 2001-2006. The Confederated Tribes of the Colville Reservation currently has no criteria specified for TKN.

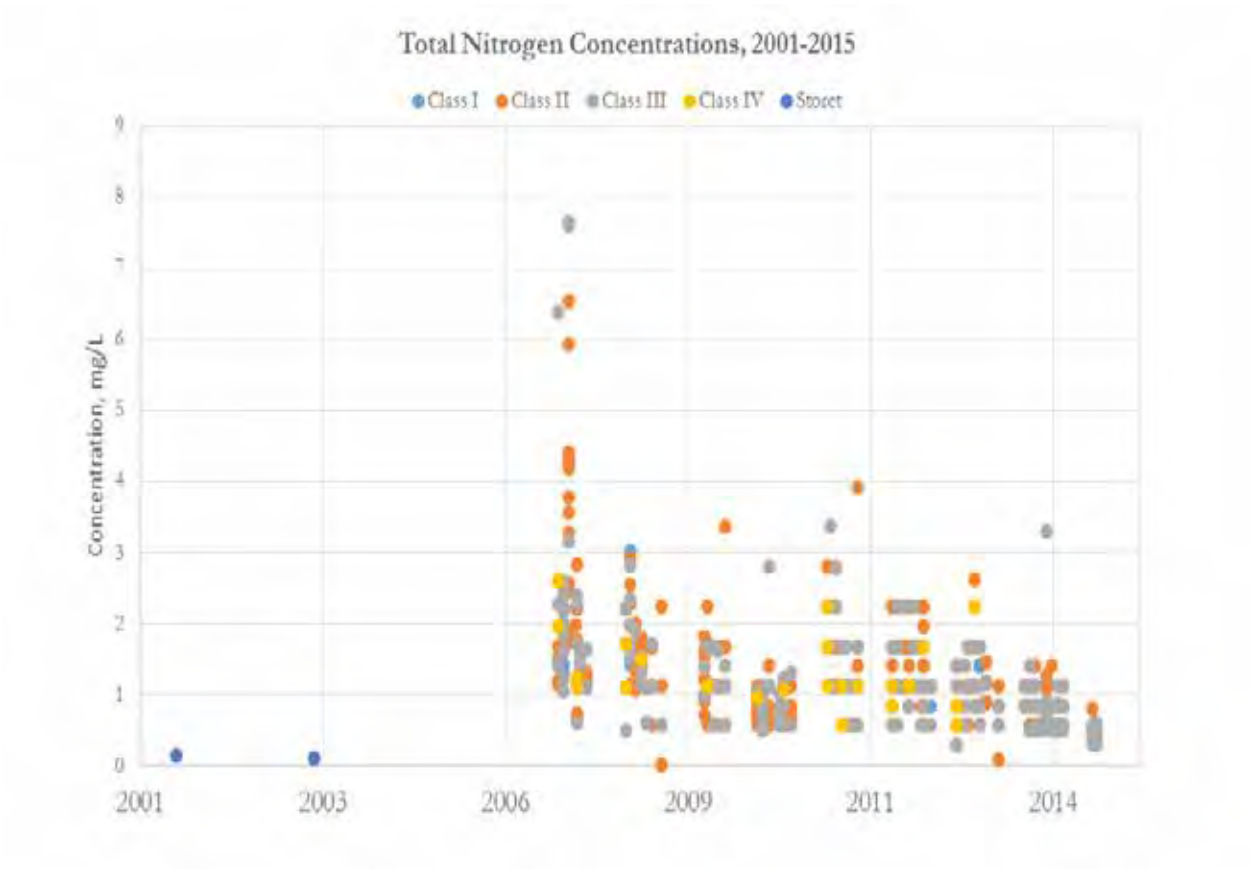
Figure 5: Total Kjeldahl Nitrogen Concentrations, 2007-2015



Total Nitrogen

Figure 6 shows the changes in total nitrogen (TN) concentrations. In 2007, there were high concentrations of TN, however, concentrations have decreased since then. Duplicate data was not available to verify the increase in concentrations. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. In addition, no data was available from 2001-2006, except for 2 TN measurements in 2001 and 2003. The Confederated Tribes of the Colville Reservation currently has no criteria specified for TN.

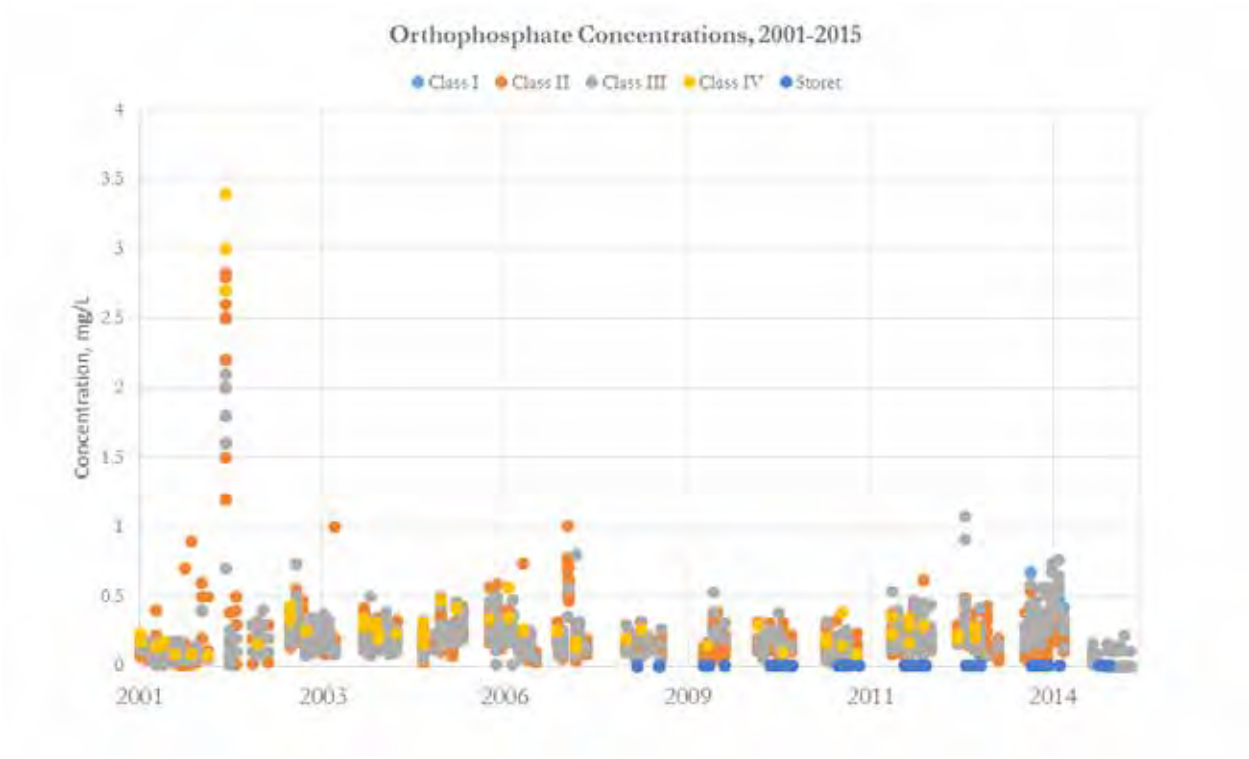
Figure 6: Total Nitrogen, 2001-2015



Orthophosphate

Figure 7 shows the changes in orthophosphate concentrations. In 2002, there were high concentrations of orthophosphate, however, concentrations have decreased since then and have remained relatively unchanged. Duplicate data was not available to verify the increase in concentrations. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. The Confederated Tribes of the Colville Reservation currently has no criteria specified for orthophosphate.

Figure 7: Orhophosphate Concentrations, 2001-2015



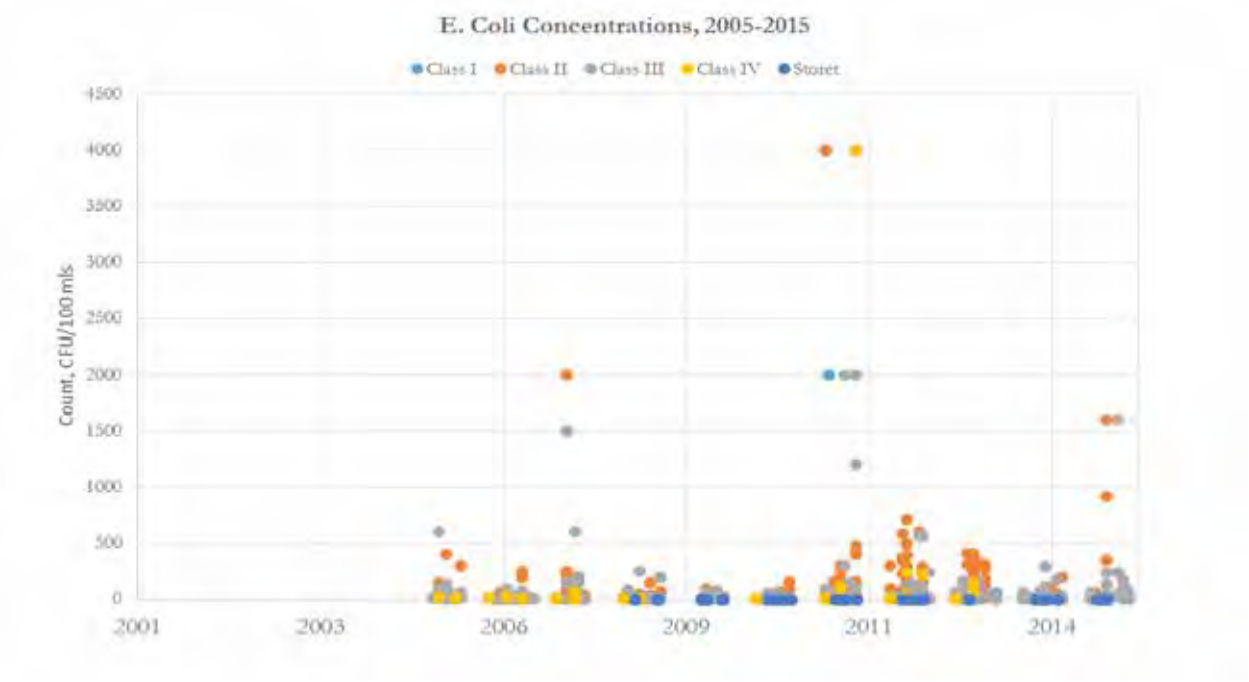
Bacteria

Waters with high levels of E. coli and fecal coliform fail to completely support water supply, ceremonial and religious use, recreation, commerce and navigation, and stock watering goals. Potential causes for high E. coli and fecal coliform levels includes grazing and livestock management with numbers of animals concentrated along streams, failing septic systems near streams, and wildlife (CTCR, 2013). The Confederated Tribes of the Colville Reservation monitors for E. coli and fecal coliform as shown below.

E. Coli

Figure 8 shows the changes in E. coli counts. There were several very high counts of E. coli in 2007, 2011, and 2015. Duplicate data was not available to verify the increase in concentrations. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. In addition, no data was available from 2001-2004. The Confederated Tribes of the Colville Reservation currently has no criteria specified for E. coli.

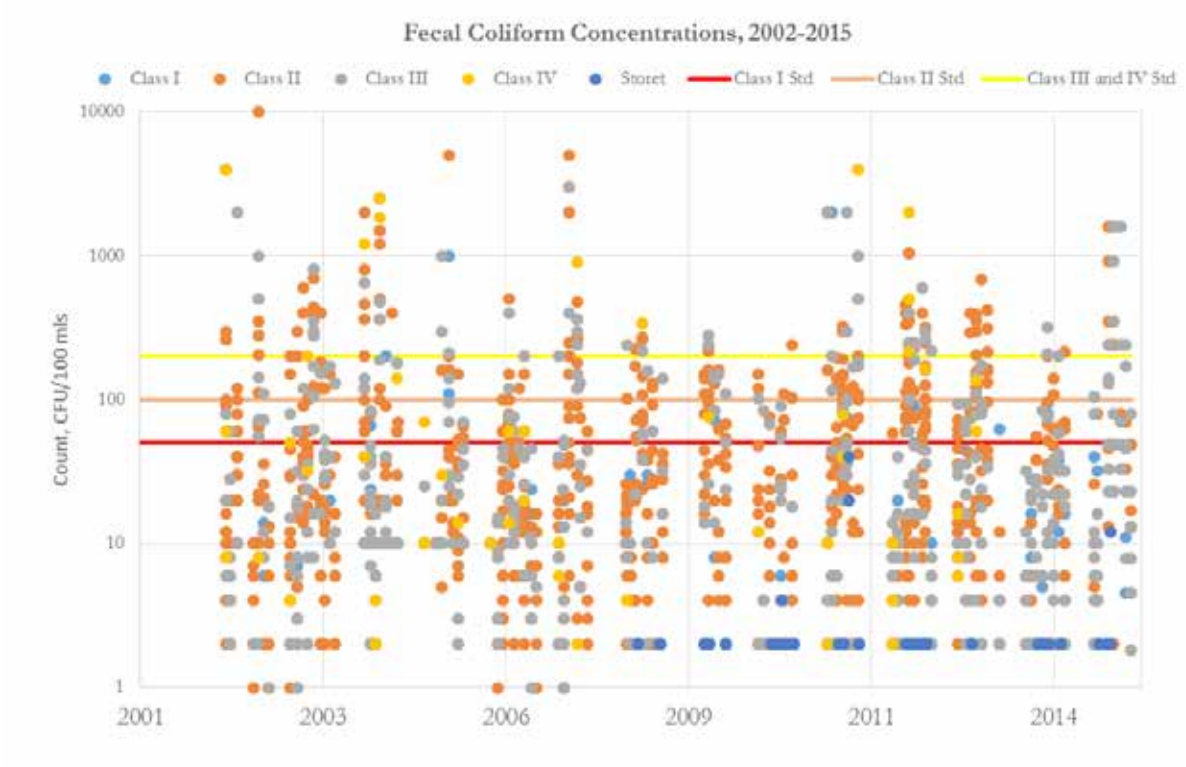
Figure 8: E. Coli Concentrations, 2005-2015



Fecal Coliform

Figure 9 shows the changes in fecal coliform counts. Acute exceedances of water quality standards occurred every year and in all water classes. There are also many severely high measurements that occurred almost every year (as high as 10,000 CFU/100mls) (note the use of a logarithmic scale on the y-axis). Duplicate data was not available to verify the increase in concentrations. No data was available in 2014-2015 for RMUs 1-5, 9-11, and 13-14. In addition, no data was available in 2001.

Figure 9: Fecal Coliform Concentrations, 2001-2015



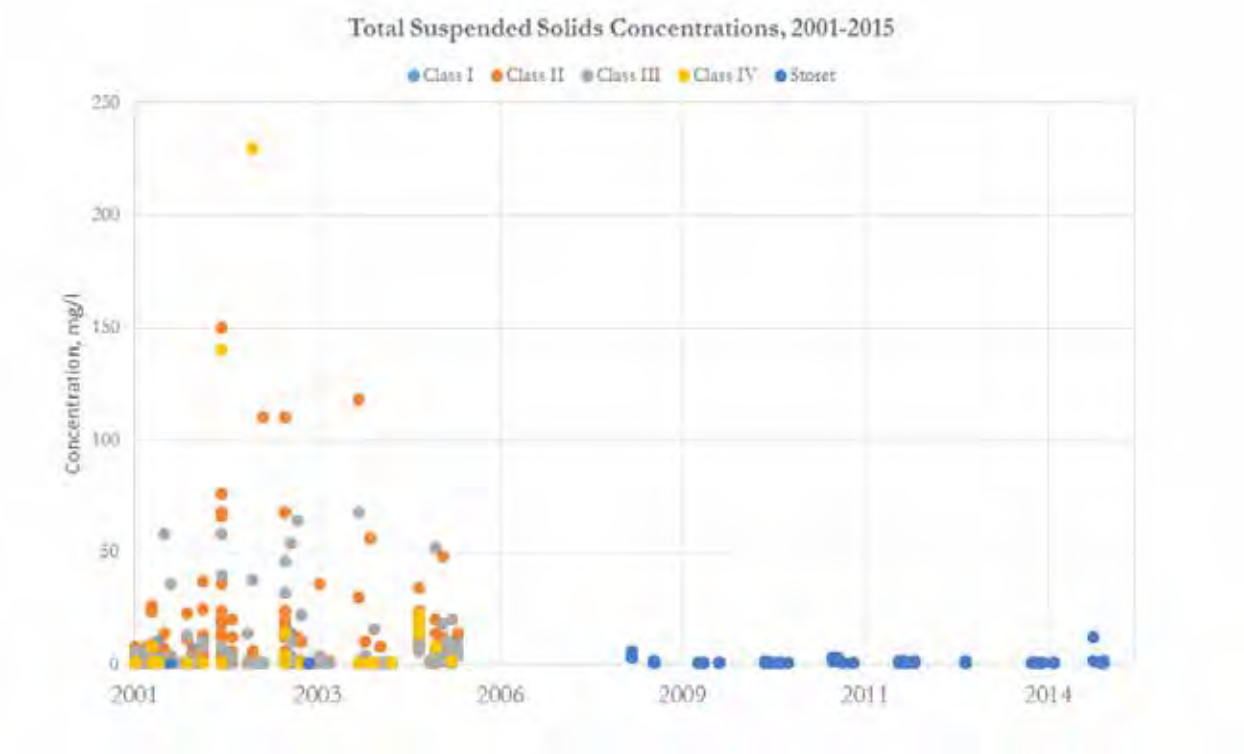
Physical Parameters

Physical parameter data is included below for all available data. Conductivity was excluded from this analysis due to a large amount of erroneous data. The data errors are most likely due to inconsistent unit labeling and mislabeling of units.

Total Suspended Solids

Figure 10 shows the changes in total suspended solids (TSS) concentrations. The figure shows lower TSS concentrations from 2008-2015 because the data is from RMU 11 only, which has historically lower TSS concentrations. No other data was available from 2006-2015. The Confederated Tribes of the Colville Reservation currently has no criteria specified for TSS.

Figure 10: Total Suspended Solids Concentrations, 2001-2015

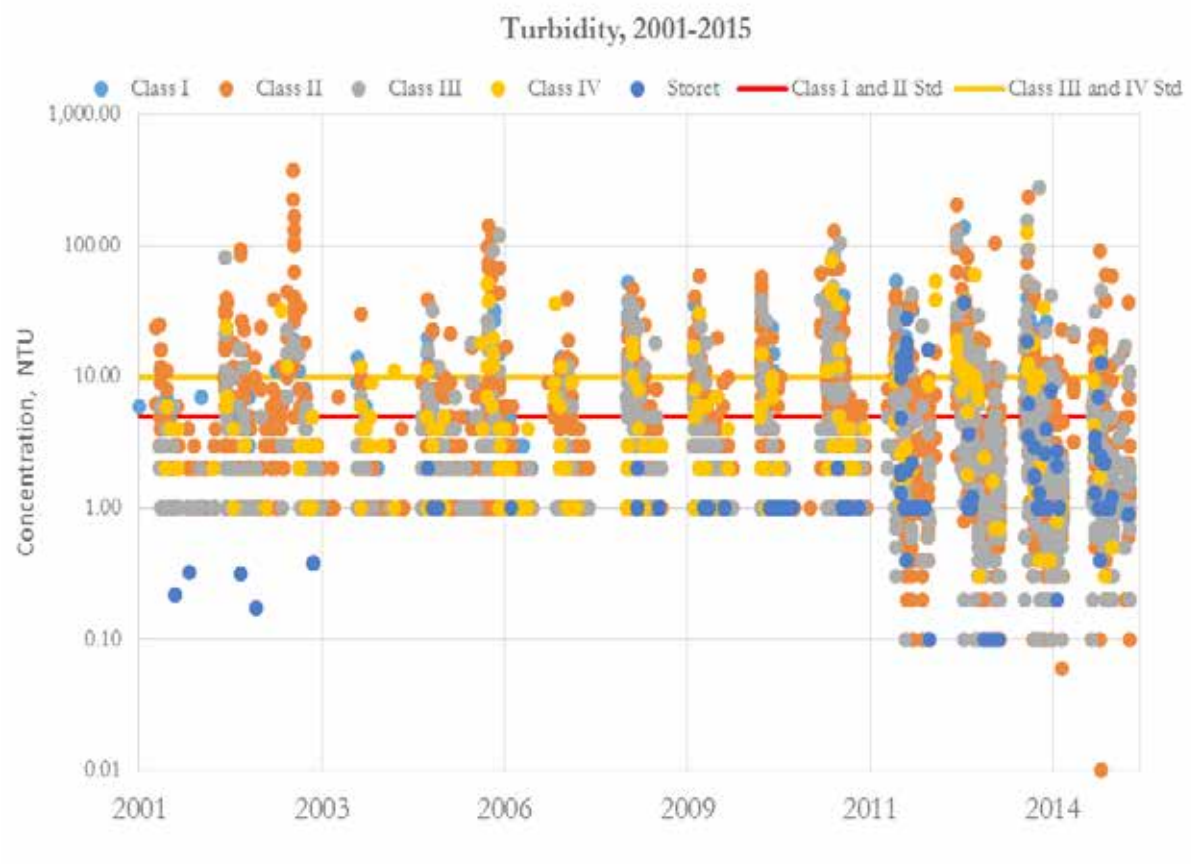


Turbidity

The causes of high turbidity include grazing, roads, forest practices, stream bank cutting, and beaver dam failure. The Confederated Tribes of the Colville Reservation turbidity criterion applies to changes in turbidity caused by a land use activity at a given site and time. Ambient monitoring does not determine exceedances (CTCR, 2013).

Figure 11 shows the changes in turbidity. There are many severely high measurements that occurred almost every year (as high as 370 BTU) (note the use of a logarithmic scale on the y-axis). Duplicate data was not available to verify the increase in concentrations.

Figure 11: Turbidity, 2001-2015

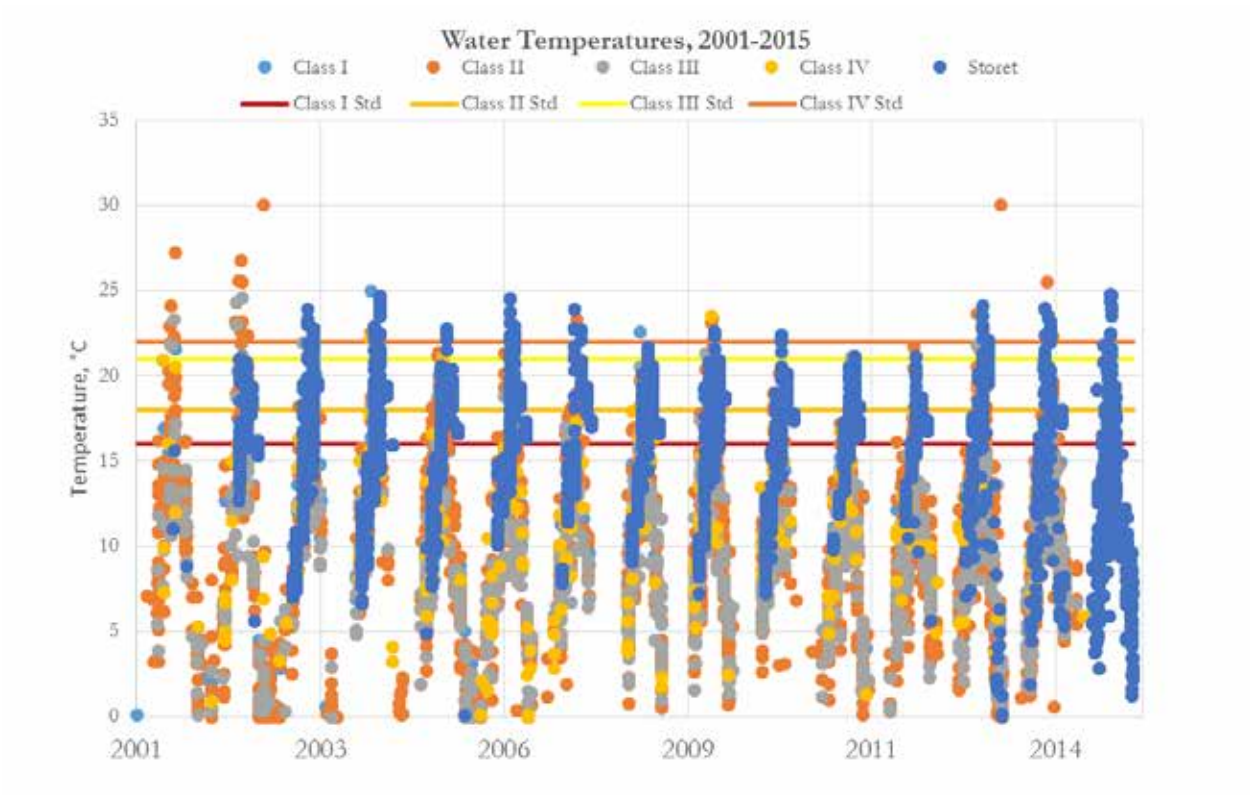


Water Temperature

High water temperatures are caused by grazing, stream-adjacent roads, agriculture, land clearing, logging, and wildlife. High water temperatures may create an environment that fails to effectively support fish and shellfish, wildlife habitat, fish migration, and natural food chain maintenance goals (CTCR, 2013).

Figure 12 shows the changes in water temperature. There were some exceedances of the water quality standards, however the measurements follow a normal diurnal temperature regime.

Figure 12: Water Temperature, 2001-2015

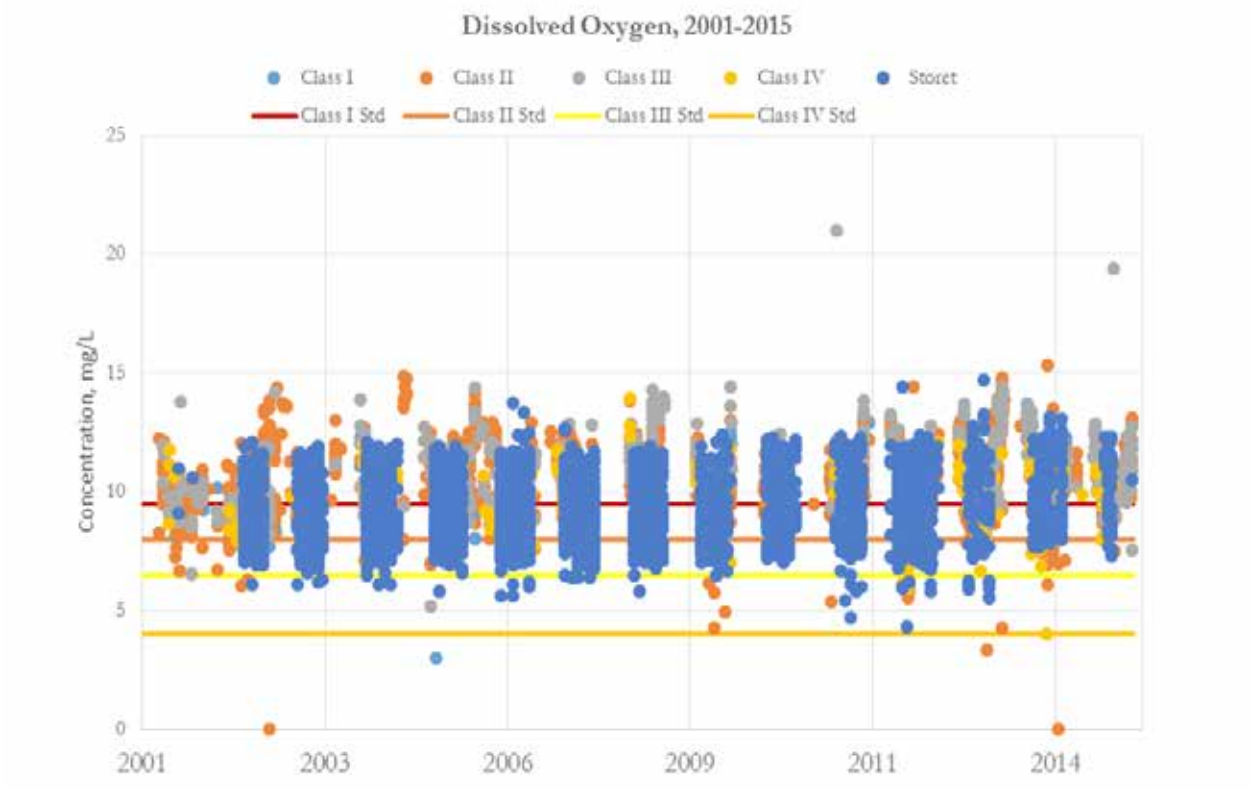


Dissolved Oxygen

Low dissolved oxygen (D.O.) levels often are associated with warm water temperatures, and turbidity. Reduced riparian vegetation or increasing stream channel widths exacerbate natural sources of warm water, such as warm air temperature. Potential causes of poor riparian or channel condition include streamside clearing for home sites and agriculture, stream-adjacent roads, overgrazing in riparian areas, streamside areas logged in the past with limited shade requirements (CTCR, 2013).

Figure 13 shows the changes in D.O. concentrations. Acute exceedances of water quality standards occurred every year and in all water classes. Data was unavailable for RMUs 1-4 in 2006, and RMUs 6, 8-10, and 12-14 in 2010.

Figure 13: Dissolved Oxygen, 2001-2015

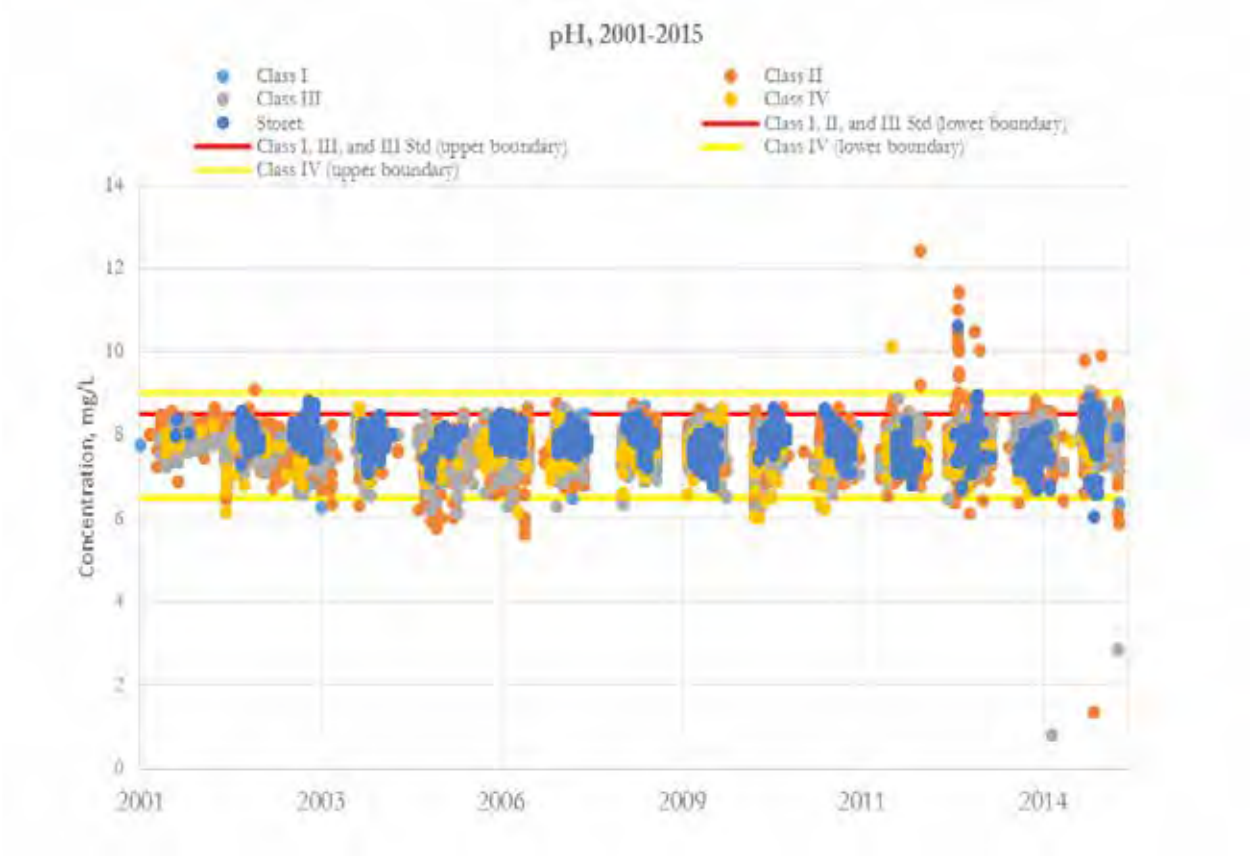


pH

Waters with low or high levels of pH fail to completely support fish & shellfish, wildlife habitat, fish migration, and natural food chain maintenance goals. Causes of pH exceedances have been determined by CTCR to be natural, due to the geology/soil parent material in the area. High pH can also be caused by high photosynthetic activity of algae concentrations (CTCR, 2013).

Figure 14 shows the changes in pH. Some acute exceedances of water quality standard occur in 2013-2015, however, these may be erroneous data due to very acidic or basic pH values. Duplicate data was not available to verify these low and high pH values.

Figure 14: pH, 2001-2015

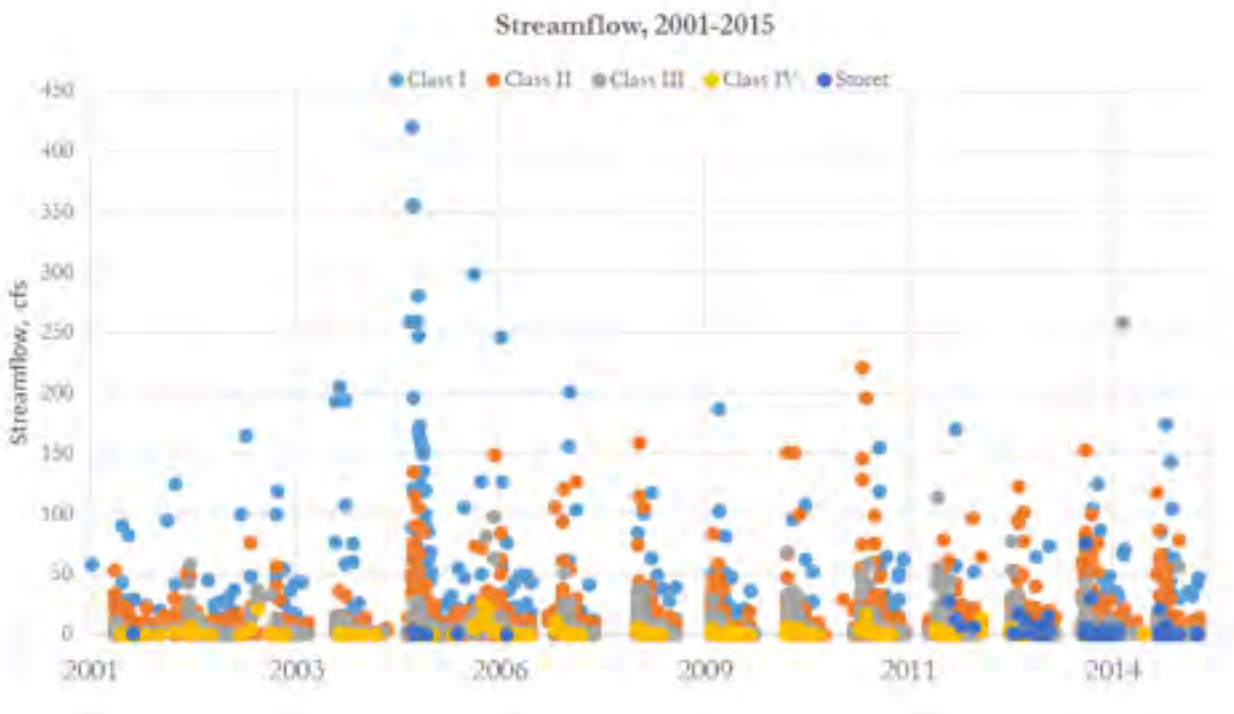


Streamflow

Investigations suggest that human-caused landscape disturbances have resulted in elevated peak flows and diminished low flows or annual mean flows in some watersheds as a result of vegetation removal and associated soil impacts and reduced infiltration, loss of riparian vegetation and in-channel functionality, and channel entrenchment (Hunner, 2014).

Figure 15 shows the changes in flow. More information on flow is included in Table 2 below.

Figure 15: Streamflow, 2001-2015



Conclusions

The 2014 CTCR Hydrology Report states that "water quality commonly exceeds standards set by the Tribes (CTC Chapter 4-8)". Past records and recent tests indicate that segments of many lotic (flowing) water bodies fail to meet EPA and Tribal water quality standards for temperature, dissolved oxygen, bacteria (fecal coliform) and turbidity. Recent assessment reports indicate that more than a quarter, and as high as forty percent, of all monitored streams experience standard criteria exceedances or levels of concern for these parameters. Violation of standards occur mostly in summer months, when water temperatures exceed standards, dissolved oxygen levels fall below minimum standards, and fecal bacteria counts become concentrated during low flows. Turbidity values typically are highest in the spring during periods of increased runoff and erosion, particularly in watersheds affected by stream-adjacent land use activities (Hunner, 2014).

This exceedance analysis also showed similar results to the 2014 CTCR Hydrology Report. Tables 2-6 show the number of samples per parameter, the number of exceedances of the water quality standards, and the percentage of total samples that exceeded water quality standards. For all classes of water, concentrations did not meet CTCR water quality standards set for fecal coliform, dissolved oxygen, temperature, pH, and turbidity. Therefore, water quality in each RMU was not protective of the designated beneficial uses from 2001-2015.

Table 2: Fecal Coliform number of samples per parameter, the number of exceedances of the water quality standards, and the percentage of total samples that exceeded water quality standards, 2002-2015

ANNUAL NUMBER OF SAMPLES THAT PRODUCED RESULTS *(Fecal Coliform)*

Management Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	3	3	2	3	2	3	2	1	1	3	7	5		
Hall Creek	12	14	7	7	14	7	8	6	10	8	11	8		
Hellgate														
Kartar Valley	5	8	9	8	9	6	1	2	3	7	6	7		
Little Nespelem River	6	9	7	5	9	5	7	2	4	8	9	8		
Lost Creek	6	9	9	9	6	6	9	4	3	9	11	8	21	12
Lower San Poil River	17	30	17	15	26	18	7	6	17	20	29	18	54	49
Nespelem River	8	14	15	16	13	9	12	7	4	14	15	8		
Nine Mile Creek	10	8	3	4	3	5	2	2	4	3	6	4		
Omak Creek	16	24	21	21	24	16	15	9	6	19	22	9		
Twin Lakes	15	16	7	10	12	9	8	4	8	8	12	7		
Upper San Poil River	14	20	14	10	21	13	12	5	16	15	24	22	28	21
West Fork San Poil River	8	9	7	6	9	7	7	5	8	7	11	9	19	13
Wilmont Creek	8	6	5	4	3	6	5	6	6	6	7	6		
Total	128	170	123	118	151	110	95	59	90	127	170	119	122	95

ANNUAL NUMBER OF EXCEEDANCES *(Fecal Coliform)*

Management Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	1		1			1	1				4	1		
Hall Creek	1	3				3		1		2		4		
Hellgate														
Kartar Valley	4	1	6	2	2	3		1		5	3	1		
Little Nespelem River	2	1	4	1		1				4	3	2		
Lost Creek	1	2	2			1	2		1	1	5	3	3	2
Lower San Poil River		6	1	3		1		1		4	2		4	7
Nespelem River	1	1	5		1	4	2	3		4	2	1		
Nine Mile Creek		2				1	2	1			3	2		
Omak Creek	8	1	6	1	4	6	3	5	1	8	8			
Twin Lakes	2	3			2	1	2		1	3	1	1		
Upper San Poil River		6	1	3				3		3	3	4	2	3
West Fork San Poil River		4		2					1		1			2
Wilmont Creek		2				3		1	1	1	3	1		
Total	20	32	26	12	9	25	12	16	5	35	38	20	9	14

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(Fecal Coliform)*

Management Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	33%	0%	50%	0%	0%	33%	50%	0%	0%	0%	57%	20%	*no data*	*no data*
Hall Creek	8%	21%	0%	0%	0%	43%	0%	17%	0%	25%	0%	50%	*no data*	*no data*
Hellgate	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*
Kartar Valley	80%	13%	67%	25%	22%	50%	0%	50%	0%	71%	50%	14%	*no data*	*no data*
Little Nespelem River	33%	11%	57%	20%	0%	20%	0%	0%	0%	50%	33%	25%	*no data*	*no data*
Lost Creek	17%	22%	22%	0%	0%	17%	22%	0%	33%	11%	45%	38%	14%	17%
Lower San Poil River	0%	20%	6%	20%	0%	6%	0%	17%	0%	20%	7%	0%	7%	14%
Nespelem River	13%	7%	33%	0%	8%	44%	17%	43%	0%	29%	13%	13%	*no data*	*no data*
Nine Mile Creek	0%	25%	0%	0%	0%	20%	100%	50%	0%	0%	50%	50%	*no data*	*no data*
Omak Creek	50%	4%	29%	5%	17%	38%	20%	56%	17%	42%	36%	0%	*no data*	*no data*
Twin Lakes	13%	19%	0%	0%	17%	11%	25%	0%	13%	38%	8%	14%	*no data*	*no data*
Upper San Poil River	0%	30%	7%	30%	0%	0%	0%	60%	0%	20%	13%	18%	7%	14%
West Fork San Poil River	0%	44%	0%	33%	0%	0%	0%	0%	13%	0%	9%	0%	0%	15%
Wilmont Creek	0%	33%	0%	0%	0%	50%	0%	17%	17%	17%	43%	17%	*no data*	*no data*
Average	19%	19%	21%	10%	5%	25%	18%	24%	7%	25%	28%	20%	7%	15%

Table 3: Temperature number of samples per parameter, the number of exceedances of the water quality standards, and the percentage of total samples that exceeded water quality standards, 2001-2015

ANNUAL NUMBER OF SAMPLES THAT PRODUCED RESULTS *(Temperature)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	14	30	17	10	21	36	22	27	24	22	28	22	19	4	2
Hall Creek	10	4	3	9	12		7	13	16	11	18	16	29	24	19
Hellgate													1	2	1
Kartar Valley	18	17	2		13	32	17	11	17	3	27	22	27	12	12
Little Nespelem River	6	16	8	9	9	20	15	11	9	12	16	18	30	11	8
Lost Creek	12	12	6		26	17	11	18	17	3	21	22	37	42	27
Lower San Poil River	12	35	24	16	31	39	26	51	41	36	49	35	59	122	93
Nespelem River	11	32	21	20	41	41	31	35	35	28	32	32	45	29	19
Nine Mile Creek	3	2	3	6	7	1	1	6	5	4	5	10	16	14	10
Omak Creek	45	51	36	12	97	39	24	45	46	14	59	59	62	37	26
Twin Lakes	10	10	1	9	12		6	18	13	11	17	10	17	22	12
Upper San Poil River	19	39	37	29	42	54	31	45	44	37	45	43	64	66	45
West Fork San Poil River	13	7	10		32	17	9	16	18	3	21	17	21	30	17
Wilmont Creek	5	6	1	8	6	1	5	9	11	7	11	14	18	18	12
Total	178	261	169	128	349	297	205	305	296	191	349	320	445	433	303

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(Temperature)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	1	8	4	2	3	4	1	1	3	1		3	1		
Hall Creek									2					5	
Hellgate															
Kartar Valley	2	1					1		1				2		2
Little Nespelem River	1	1				2	2		2	2	1	1	3	2	2
Lost Creek	2														1
Lower San Poil River	4	1	2	1	2	1	1	3	1	1	1	1		4	7
Nespelem River		1	1		1	2			2				4		1
Nine Mile Creek									1				2	1	
Omak Creek	7	13		1	4	3	1	2	7		1		5	3	5
Twin Lakes									2					5	
Upper San Poil River	2	5	3	4				2	4				3	1	3
West Fork San Poil River	1	1			1			1	1						
Wilmont Creek														1	
Total	20	31	10	8	11	12	6	9	26	4	3	5	20	22	21

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(Temperature)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	7%	27%	24%	20%	14%	11%	5%	4%	13%	5%	0%	14%	5%	0%	0%
Hall Creek	0%	0%	0%	0%	0%	*no data*	0%	0%	13%	0%	0%	0%	0%	21%	0%
Hellgate	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	0%	0%	0%
Kartar Valley	11%	6%	0%	*no data*	0%	0%	6%	0%	6%	0%	0%	0%	7%	0%	17%
Little Nespelem River	17%	6%	0%	0%	0%	10%	13%	0%	22%	17%	6%	6%	10%	18%	25%
Lost Creek	17%	0%	0%	*no data*	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%
Lower San Poil River	33%	3%	8%	6%	6%	3%	4%	6%	2%	3%	2%	3%	0%	3%	8%
Nespelem River	0%	3%	5%	0%	2%	5%	0%	0%	6%	0%	0%	0%	9%	0%	5%
Nine Mile Creek	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	13%	7%	0%
Omak Creek	16%	25%	0%	8%	4%	8%	4%	4%	15%	0%	2%	0%	8%	8%	19%
Twin Lakes	0%	0%	0%	0%	0%	*no data*	0%	0%	15%	0%	0%	0%	0%	23%	0%
Upper San Poil River	11%	13%	8%	14%	0%	0%	0%	4%	9%	0%	0%	0%	5%	2%	7%
West Fork San Poil River	8%	14%	0%	*no data*	3%	0%	0%	6%	6%	0%	0%	0%	0%	0%	0%
Wilmont Creek	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	0%
Average	9%	7%	3%	5%	2%	3%	2%	2%	10%	2%	1%	2%	4%	6%	6%

Table 4: Dissolved Oxygen number of samples per parameter, the number of exceedances of the water quality standards, and the percentage of total samples that exceeded water quality standards, 2001-2015

ANNUAL NUMBER OF SAMPLES THAT PRODUCED RESULTS *(Dissolved Oxygen)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	8	25	2	10	2	11	17	19	21		12	21	19	4	2
Hall Creek	4	4	3	9	4		7	12	16	10	7	13	23	25	19
Hellgate													1	2	1
Kartar Valley	18	13	1		14	25	12	6	13		17	21	27	12	12
Little Nespelem River	4	13	1	9	2	5	12	10	8		8	18	30	11	8
Lost Creek	12	10	6		26	17	8	9	14		12	22	38	42	27
Lower San Poil River	5	31	1	17	5	7	20	45	42	2	35	34	59	122	96
Nespelem River	5	29	3	19	4	10	20	31	36		23	32	45	29	19
Nine Mile Creek	2	2	2	5			1	6	5	4	3	6	12	14	10
Omak Creek	45	41	23	11	90	32	18	27	37		34	59	63	37	26
Twin Lakes	2	10	2	9	2		5	17	12	11	8	10	12	22	12
Upper San Poil River	6	31	1	28	7	13	25	37	43		22	42	64	66	45
West Fork San Poil River	13	6	7		33	17	6	6	15		12	17	21	32	17
Wilmont Creek	3	4	1	9	1		4	9	9	7	3	7	15	18	12
Total	**127**	**219**	**53**	**126**	**190**	**137**	**155**	**234**	**271**	**34**	**196**	**302**	**429**	**436**	**306**

ANNUAL NUMBER OF EXCEEDANCES *(Dissolved Oxygen)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	1	11		2		3	5	2	2			5		1	
Hall Creek					1		1		1				1	4	
Hellgate															
Kartar Valley	2	2					1		1		1	3			
Little Nespelem River		2						1	3			2		1	1
Lost Creek												5	1		
Lower San Poil River	1	1	1	1		1	2	2	2			2	1	2	4
Nespelem River									2			1			
Nine Mile Creek											1			5	
Omak Creek	2	3					1	1	2			8		1	
Twin Lakes				1									1	6	
Upper San Poil River	5	7	1	7	3	3	3	2	9		2	6		1	
West Fork San Poil River												4			
Wilmont Creek					1									2	
Total	**11**	**26**	**2**	**11**	**5**	**7**	**13**	**8**	**22**		**4**	**36**	**4**	**23**	**5**

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(Dissolved Oxygen)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basin	13%	44%	0%	20%	0%	27%	29%	11%	10%	*no data*	0%	24%	0%	25%	0%
Hall Creek	0%	0%	0%	0%	25%	*no data*	14%	0%	6%	0%	0%	0%	4%	16%	0%
Hellgate	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	0%	0%	0%
Kartar Valley	11%	15%	0%	*no data*	0%	0%	8%	0%	8%	*no data*	6%	14%	0%	0%	0%
Little Nespelem River	0%	15%	0%	0%	0%	0%	0%	10%	38%	*no data*	0%	11%	0%	9%	13%
Lost Creek	0%	0%	0%	*no data*	0%	0%	0%	0%	0%	*no data*	0%	23%	3%	0%	0%
Lower San Poil River	20%	3%	100%	6%	0%	14%	10%	4%	5%	0%	0%	6%	2%	2%	4%
Nespelem River	0%	0%	0%	0%	0%	0%	0%	0%	6%	*no data*	0%	3%	0%	0%	0%
Nine Mile Creek	0%	0%	0%	0%	*no data*	*no data*	0%	0%	0%	0%	33%	0%	0%	36%	0%
Omak Creek	4%	7%	0%	0%	0%	0%	6%	4%	5%	*no data*	0%	14%	0%	3%	0%
Twin Lakes	0%	0%	0%	11%	0%	*no data*	0%	0%	0%	0%	0%	0%	8%	27%	0%
Upper San Poil River	83%	23%	100%	25%	43%	23%	12%	5%	21%	*no data*	9%	14%	0%	2%	0%
West Fork San Poil River	0%	0%	0%	*no data*	0%	0%	0%	0%	0%	*no data*	0%	24%	0%	0%	0%
Wilmont Creek	0%	0%	0%	0%	100%	*no data*	0%	0%	0%	0%	0%	0%	0%	11%	0%
Average	**10%**	**8%**	**15%**	**6%**	**14%**	**7%**	**6%**	**3%**	**8%**	**0%**	**4%**	**10%**	**1%**	**9%**	**1%**

Table 5: pH number of samples per parameter, the number of exceedances of the water quality standards, and the percentage of total samples that exceeded water quality standards, 2001-2015

ANNUAL NUMBER OF SAMPLES THAT PRODUCED RESULTS *(pH)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basir	14	28	17	9	21	36	22	26	22	23	19	22	19	4	2
Hall Creek	10	4	3	9	13		7	13	16	8	16	16	28	22	19
Hellgate													1	2	1
Kartar Valley	15	17	2		14	31	12	11	17	3	27	21	27	12	11
Little Nespelem River	6	15	8	5	9	20	15	11	9	12	8	18	30	11	8
Lost Creek	9	13	5		24	16	5	17	17	3	21	22	38	42	27
Lower San Poil River	12	29	25	17	30	39	26	51	41	36	8	35	59	122	96
Nespelem River	12	33	21	15	41	41	31	35	36	28	8	33	45	29	19
Nine Mile Creek	3	2	3	6	7	1	1	6	5	4	6	9	15	12	10
Omak Creek	35	51	34	3	83	39	18	45	46	14	53	59	62	36	26
Twin Lakes	9	9	2	9	12		6	16	13	11	16	11	17	19	12
Upper San Poil River	19	39	37	29	42	52	30	44	44	37	14	43	64	63	45
West Fork San Poil River	9	7	7		31	17	3	16	18	3	21	17	21	33	17
Wilmont Creek	5	6	1	9	7	1	5	9	11	8	11	13	18	15	12
Total	**158**	**253**	**165**	**111**	**334**	**293**	**181**	**300**	**295**	**190**	**228**	**319**	**444**	**422**	**305**

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(pH)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basir	1	11		2		3	5	2	2			5		1	
Hall Creek					1		1		1				1	4	
Hellgate															
Kartar Valley	2	2					1		1		1	3			
Little Nespelem River		2						1	3			2		1	1
Lost Creek												5	1		
Lower San Poil River	1	1	1	1		1	2	2	2			2	1	2	4
Nespelem River									2			1			
Nine Mile Creek											1			5	
Omak Creek	2	3					1	1	2			8		1	
Twin Lakes				1									1	6	
Upper San Poil River	5	7	1	7	3	3	3	2	9		2	6		1	
West Fork San Poil River												4			
Wilmont Creek					1									2	
Total	**11**	**26**	**2**	**11**	**5**	**7**	**13**	**8**	**22**		**4**	**36**	**4**	**23**	**5**

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(pH)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basir	7%	39%	0%	22%	0%	8%	23%	8%	9%	0%	0%	23%	0%	25%	0%
Hall Creek	0%	0%	0%	0%	8%	*no data*	14%	0%	6%	0%	0%	0%	4%	18%	0%
Hellgate	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	0%	0%	0%
Kartar Valley	13%	12%	0%	*no data*	0%	0%	8%	0%	6%	0%	4%	14%	0%	0%	0%
Little Nespelem River	0%	13%	0%	0%	0%	0%	0%	9%	33%	0%	0%	11%	0%	9%	13%
Lost Creek	0%	0%	0%	*no data*	0%	0%	0%	0%	0%	0%	0%	23%	3%	0%	0%
Lower San Poil River	8%	3%	4%	6%	0%	3%	8%	4%	5%	0%	0%	6%	2%	2%	4%
Nespelem River	0%	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	3%	0%	0%	0%
Nine Mile Creek	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%	0%	42%	0%
Omak Creek	6%	6%	0%	0%	0%	0%	6%	2%	4%	0%	0%	14%	0%	3%	0%
Twin Lakes	0%	0%	0%	11%	0%	*no data*	0%	0%	0%	0%	0%	0%	6%	32%	0%
Upper San Poil River	26%	18%	3%	24%	7%	6%	10%	5%	20%	0%	14%	14%	0%	2%	0%
West Fork San Poil River	0%	0%	0%	*no data*	0%	0%	0%	0%	0%	0%	0%	24%	0%	0%	0%
Wilmont Creek	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%
Average	**5%**	**7%**	**1%**	**6%**	**2%**	**2%**	**5%**	**2%**	**7%**	**0%**	**3%**	**10%**	**1%**	**10%**	**1%**

Table 6: Turbidity number of samples per parameter, the number of exceedances of the water quality standards, and the percentage of total samples that exceeded water quality standards, 2001-2015

ANNUAL NUMBER OF SAMPLES THAT PRODUCED RESULTS *(Turbidity)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basir	14	31	17	10	21	36	22	26	24	22	28	22	19	4	2
Hall Creek	9	4	3	9	13		7	13	16	11	18	16	29	25	19
Hellgate													1	2	1
Kartar Valley	18	17	2		14	32	17	11	17	3	27	22	27	12	12
Little Nespelem River	6	16	8	9	9	20	15	11	9	12	15	18	30	10	8
Lost Creek	12	13	6		26	17	11	18	17	3	21	22	38	41	27
Lower San Poil River	12	35	25	17	31	38	26	51	42	36	49	35	59	122	96
Nespelem River	12	33	21	20	41	41	31	35	36	28	32	33	45	29	19
Nine Mile Creek	3	2	3	6	7	1	1	6	5	4	6	10	15	14	10
Omak Creek	45	52	35	12	97	40	24	45	46	14	59	56	63	37	26
Twin Lakes	10	10	2	9	12		7	18	13	11	17	11	17	23	12
Upper San Poil River	19	39	36	29	42	53	31	45	44	37	45	43	64	66	45
West Fork San Poil River	13	7	10		33	17	9	16	18	3	21	17	21	33	17
Wilmont Creek	5	6	1	9	7	1	5	9	11	7	11	14	18	18	12
Total	**178**	**265**	**169**	**130**	**353**	**296**	**206**	**304**	**298**	**191**	**349**	**319**	**446**	**436**	**306**

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(Turbidity)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basir	3	9	6	2	7	8	2	7	6	7	14	14	10	2	1
Hall Creek	2	2	3	2	2		4	3	6	4	7	4	11	10	5
Hellgate													1	2	
Kartar Valley		6	1		6	10	4	8	4	2	13	9	10	1	5
Little Nespelem River	2	3	3		1	4	2	4	5	2	9	3	18	7	5
Lost Creek	3	4	3		3	5	2	3	3	3	6	4	10	10	6
Lower San Poil River	1	1	4	1	1	6	1	7	6	6	11	7	13	19	7
Nespelem River			3	2	1	4	1	3	1	2	3	4	10	7	5
Nine Mile Creek		1	3	1	1		1	1	2	2	2	3	3	6	4
Omak Creek	3	17	12		8	12	5	12	8	6	22	23	19	11	7
Twin Lakes		3	1	1	1		4	2	1	6	2	4	5	5	3
Upper San Poil River	1	4	12	3	5	2	1	10	5	6	11	11	10	12	5
West Fork San Poil River	2	2	3					1		1	4	5	1	6	2
Wilmont Creek		2	1	1	1		2	1	2	3	2	9	4		2
Total	**17**	**54**	**55**	**13**	**37**	**51**	**29**	**62**	**49**	**50**	**106**	**100**	**125**	**98**	**57**

PERCENTAGE OF TOTAL SAMPLES THAT EXCEEDED WATER QUALITY BENCHMARKS *(Turbidity)*

Management Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Buffalo Lake/Swawilla Basir	21%	29%	35%	20%	33%	22%	9%	27%	25%	32%	50%	64%	53%	50%	50%
Hall Creek	22%	50%	100%	22%	15%	*no data*	57%	23%	38%	36%	39%	25%	38%	40%	26%
Hellgate	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	*no data*	100%	100%	0%
Kartar Valley	0%	35%	50%	*no data*	43%	31%	24%	73%	24%	67%	48%	41%	37%	8%	42%
Little Nespelem River	33%	19%	38%	0%	11%	20%	13%	36%	56%	17%	60%	17%	60%	70%	63%
Lost Creek	25%	31%	50%	*no data*	12%	29%	18%	17%	18%	100%	29%	18%	26%	24%	22%
Lower San Poil River	8%	3%	16%	6%	3%	16%	4%	14%	14%	17%	22%	20%	22%	16%	7%
Nespelem River	0%	0%	14%	10%	2%	10%	3%	9%	3%	7%	9%	12%	22%	24%	26%
Nine Mile Creek	0%	50%	100%	17%	14%	0%	100%	17%	40%	50%	33%	30%	20%	43%	40%
Omak Creek	7%	33%	34%	0%	8%	30%	21%	27%	17%	43%	37%	41%	30%	30%	27%
Twin Lakes	0%	30%	50%	11%	8%	*no data*	57%	11%	8%	55%	12%	36%	29%	22%	25%
Upper San Poil River	5%	10%	33%	10%	12%	4%	3%	22%	11%	16%	24%	26%	16%	18%	11%
West Fork San Poil River	15%	29%	30%	*no data*	0%	0%	0%	6%	0%	33%	19%	29%	5%	18%	12%
Wilmont Creek	0%	33%	100%	11%	14%	0%	40%	11%	18%	43%	18%	64%	22%	0%	17%
Average	**11%**	**27%**	**50%**	**11%**	**14%**	**15%**	**27%**	**22%**	**21%**	**40%**	**31%**	**33%**	**34%**	**33%**	**26%**

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Q

Q: Best Management Practices

Source:
Forest Management Plan, 2015
Range Management Plan, 2015

Range Best Management Practices

A list of the more common BMPs that are practiced as part of management of rangeland on the Colville Indian Reservation is provided below. These are provided in the Range Management Plan, which should be referenced for the current, complete list of BMPs. The Range Program meets with each permittee annually to review their best management practices for their individual range unit and to develop strategies to successfully improve the rangelands on the Reservation.

Fencing

Fencing is applied in areas where livestock control is needed. Fences may not be needed where natural barriers will serve the purpose. Program will use the NRCS fencing specification when designing new fence-line with a minimum life expectancy of 25 years.
Fences should meet the following criteria:

- All new fencing that is being installed will be "wildlife friendly" which means the top and bottom wires will be smooth barbless wire.
- Due to frequency of fire fence H-brace will be constructed using metal posts.
- Gates will be installed in fences approximately every ½ mile or in appropriate places to assist with livestock movement.
- Permittees are responsible for the maintenance of fences and gates on their assigned Range Units.
- Range Units with more than one permittee, areas of fence maintenance will be determined in coordination with the Land Operations / Range Program and the permittees prior to the grazing season.

Watering Development

Control livestock access to water and reduce impacts to riparian areas such as streams, wet lands, springs, lakes and ponds by installing Springs and Hard watering points/crossings when funding is available.

- Construction of Springs (offsite watering points) consists of installing water troughs where natural spring, streams, and other water bodies occur within range units to provide water and to encourage distribution of grazing animals and improve livestock gains.
- Hard watering points/crossings is a trail or travelway constructed across a stream or at a water access point that allows livestock to cross or to drink with minimal disturbance to the streambank and channel and will be constructed utilizing NRCS specifications to:
    - Prevent or minimize water degradation from sediment, nutrient and organic loading.
    - Protect the watercourse from restricted capacity, degradation and adverse hydrological impacts.

- o Protect the land from streambank erosion.
- o Provide a means for livestock to cross a watercourse or provide a stable area to drink from the stream.

Cattle guards

Cattle guards are the best solution for safely containing livestock without the use of gates. They enable access to rangelands while keeping livestock secure and eliminating safety issues on public access roads.

- Install cattle guards when funding allows to safely contain livestock without the use of gates.
- Work cooperatively with Counties and BIA Roads to ensure and provide that periodic maintenance of cattle guards takes place.
- The type of cattle guard installed is based upon the traffic type and anticipated traffic load.
- All cattle guards are required to have by-pass gates.

Salting

Salting practices are used to provide range livestock with minerals and nutrients but it also is used to distribute livestock evenly throughout the range units for full utilization.

- Salt and mineral blocks are to be placed on uplands at least one-half mile from the nearest water source, and at least one-fourth mile away from tree plantations and/or seed tree harvest units.
- Salt and mineral blocks are to be kept off the ground and moved from site to site utilizing as much of the Range Unit as possible.
- Blocks are to be removed at the end of the grazing season.

Grazing Strategies

Grazing systems are designed to increase livestock production and improve the forage cover by allowing for periods of rest and by encouraging more even distribution of grazing use. The grazing system or strategy that may be employed includes the following general types:

- Rotation grazing means livestock are strategically moved through a series of fresh pastures in order to provide a “grazing-rest period” in able for plants to regrow.
- Deferred grazing typically defers grazing until the most important forage plants have set seed before grazing that area. This is a good way to improve heavily grazed rangelands that are in poor condition.

- Delayed turnout, associated with deferred grazing, is a beneficial management practice for native range. Early spring growth is made at the expense of food reserves stored in the roots or stem bases. If plants are not allowed to grow long enough to replace depleted food reserves, the plants will be weakened. Repeated early use can kill the desirable perennials. Delayed turnouts may also be utilized as a strategy to protect culturally significant plants or ensure they are available for harvest by the membership.
- Deferred-rotation systems delay the use of one unit until after seed set while other units continue to be grazed. The following year, the deferment is rotated to another unit. Thus, each unit is given an occasional rest from grazing during the critical seed-production season. Expensive cross-fencing and more handling of livestock often is required.

Range Plantings

Utilize range planting/reseeding to establish native and desirable non-native vegetation such as grasses, forbs, legumes, shrubs, and trees. This practice may be applied as part of a resource management system to accomplish one or more of the following purposes:

- o Restore a plant community similar to its historic climax or the desired plant community.
- o Provide or improve forages for livestock.
- o Provide or improve forage, browse or cover for wildlife.
- o Reduce erosion by wind and/or water.
- o Improve water quality and quantity.

- Utilize seed mixes that are comprised of species that are based upon the ecological sites where they are to be used.
- This practice shall be applied where desirable vegetation is below the acceptable level for natural reseeding to occur, or where the potential for enhancement of the vegetation by grazing management is unsatisfactory.
- Selection of a species or combination of species shall be designed to meet the desired nutritional/palatability and ground cover requirements for the kind and class of livestock and wildlife.
- Selection of species or combination of species shall be designed to meet the desired season of use or grazing period.
- A mixture of shrubs and trees indigenous to the site shall be planted when riparian area, stream bank stability and water temperature criteria are important.

Weed Management

Noxious weeds are non-native aggressive plant species that out-compete desirable and native plant species. These invasive weeds are a threat to pasture and rangeland, riparian plant communities, agriculture production, and some species are toxic to livestock and humans.

Land Operations / Range Program staff focuses time on prevention measures, treating and eradicating new weed infestations, educating landowners, tribal members and other tribal program staff. The noxious weed program is detailed in the Integrated Weed Management Plan.

- Establish management goals and objectives for weed infested sites.
- Utilize a combination of chemical, biological cultural and mechanical treatments whenever practical.
- Herbicide applications would be implemented in a manner to avoid off site movement of herbicides either through the air, through soil, or along the soil surface. Project site terrain, soil type, and vegetation would be taken into consideration when selecting herbicide type, application method, and application timing.
- Evaluate and monitor the effectiveness of weed control treatments.
- Include pre-treatment surveys for sensitive habitat and species listed under the ESA within or adjacent to proposed treatment areas.
- Clean equipment, vehicles, and clothing of personnel to remove weed seeds/materials.
- All approved herbicides would be handled and applied in strict accordance with all label restrictions and precautions, as well as applicable Tribal policy.
- Applicators are responsible for complying with all applicable Federal, State, Tribal and county laws, codes, and regulations connected with the use of weed control herbicides.
- Applicators would comply with safety requirements, including personal protective equipment, spray equipment, herbicide labels and rates, and environmental concerns
- On sites treated with pesticides, sign will be posted to alert the public.

Forest Best Management Practices

The following Best Management Practices (BMPs) are provided in the Forest Management Plan, which should be referenced for the most current and complete list.

Harvest Operations, Site Preparation & Prescribed Fire

1. Retain course woody debris/ large woody debris densities that meet the following minimums to sustain soil/plant productivity, hydrologic functions, and habitat:

Dry ponderosa pine/Douglas-fir forest	5 – 10 tons/acre
Cool Douglas-fir forest	10 – 20 tons/acre
Cool lodgepole pine, lower subalpine fir forest	8 – 24 tons/acre

Course woody debris is defined as downed woody material > 4 inches in diameter.

2. On whole tree skidding operations, slash should be dragged back out to the woods on sites that are not meeting woody residue targets.
3. In previously un-entered stands, use designated skid roads to limit soil compaction to less than 12 percent of the harvest area.
4. Minimize the width of skid roads.
5. For stands previously logged with tractors, utilize existing skid roads. Rip all skid roads used in the final harvest entry.
6. Rip skid roads discontinuously, preferably with winged ripper teeth when the soil is dry. Rips should be spaced no more than 36 inches apart and from 12 to 18 inches deep or to bedrock, whichever is shallower. Designated skid roads should be ripped if they will not be used again until the next rotation.

Construct adequate waterbars on skid roads, yarding corridors, and fire lines prior to fall rains/snowfall. Construct waterbars using the following techniques:

a. Open the downslope end of the waterbar to allow free passage of water.

b. Construct the waterbar so that it will not deposit water where it will cause erosion.

c. Compact the waterbar berm to prevent water from breaching the berm.

d. Skew waterbars no more than 30 degrees from perpendicular to the centerline of the road or trail.

Waterbar spacing in Feet by Gradient and Erosion Class.			
GRADIENT (%)	EROSION CLASS/SPACING BY FEET		
	High	Moderate	Low
2-5	200	300	400
6-10	150	200	300
11-15	100	150	200
16-20	75	100	150
21-35	50	75	100
36+	50	50	50

Spacing is determined by slope distance and is the maximum allowed for the grade.

The following guide lists the rock types according to erosion class:

High: granite, sandstone, andesite porphyry, glacial or alluvial deposits, soft matrix conglomerate,

Volcanic ash, pyroclastics.

Moderate: basalt, andesite, quartzite, hard matrix conglomerate, rhyolite.

Low: metasediments, metavolcanics, hard shale.

7. Avoid placement of skid roads through areas with high water tables.
8. Use appropriate seasonal restrictions that would result in no off-site damage for designated skid roads.
9. Allow logging on snow when snow depth is 18 inches or greater and negligible ground surface exposure occurs during the operation.
10. Construct waterbars on skid roads according to guidelines in following section.
11. When possible have coarse woody debris in variable size classes with at least half of the tonnage in 15-inch and greater diameter class, uniformly distributed throughout the area.
12. Avoid tractor/dozer piling slash on ash cap soils to minimize soil compaction. Excavator site preparation techniques shall be applied to reduce soil compaction.
13. Exposing mineral soil on not more than 35 percent of a forest regeneration site will be sufficient to encourage germination of seed and ensure successful natural regeneration providing the distribution of bare ground is uni-

form. No more than 50% of each practice or treatment area shall be scarified, including portions where detrimental soil conditions have been caused. Areas outside of the normal road prism including landings and skid trails shall be considered part of the practice or treatment area. Detrimental soil conditions include soil displacement, compacti0on, and fire damage.

14. To reduce the severity and extent of forest soil compaction that adversely affects site productivity, the following treatments and practices will be followed where applicable.
    a. Minimizing skid trail length by careful planning;
    b. Rehabilitate compacted soils by ripping and sub-soiling treatments where appropriate (i.e. temporary landings, abandoned roads and skid trails.
    c. Winter log over snow and frozen ground;
    d. Using low ground pressure equipment.
15. Minimize soil compaction by conducting ground-based harvest activities only on a seasonal basis when soils are dry (>15 bar tension) or are frozen and have a protective snow cover. Harvesting activities should only occur on ash-mantled soil (Andosols and Andic soil suborders) when the frozen surface is at least 2 inches thick and snow covering the frozen surface is at least 2 feet thick and accumulating. Use of certain types of mechanical harvesting, specifically whole tree yarding with feller-bunchers/rubber tire and tracked grapple skidders, should be required to adhere to this BMP when winter logging is required.
16. Whole tree skidding methods will generally not be utilized in silvicultural prescriptions such as Commercial Thinning, Improvement Cuts and overstory removals where protection of leave trees and regeneration is a critical objective.
17. Landings, roads and skid trails should be located outside of riparian management zones whenever possible.
18. Detrimental soil conditions (DSD) shall not be caused on more than 25% of each practice or treatment area from the cumulative effects of forest practice operations and treatments.

Disturbance Type	Detrimental Threshold Value
Compaction	Change from natural bulk density detectable by penetrometer
Puddling	Ruts > 6 inches deep
Displacement	Removal of > 1 inch of any surface horizon from a contiguous area greater than 100 feet.
Surface erosion	Rills, gullies, pedestals, and soil deposition.
Severely burned soil	Physical and biological changes to the soil resulting from high-intensity burns of long duration as described in the Burned-Area Emergency Rehabilitation Handbook (FSH 2509.13).

19. Ground-based skidding equipment will be restricted to sustained slopes less than 40 percent. Cable yarding will be used on all sustained slopes greater than 40 percent
20. Cable yarding as a mitigation practice will be used on all ground, independent of slope, that includes soils of a fragile or highly compactable nature and soils that are shallow and poorly developed, especially on droughty sites. These are sites where designated skid trails or winter logging is not feasible.
21. Ground skidding or mechanical slash piling will not be use on harvest areas where the soils (wet or dry) have "severe" or "very severe" hazard ratings for compaction, puddling or displacement from ground skidding or slash piling activities.
22. Minimize mineral soil surface displacement by reducing the number of excavated skid trails and matching the appropriate cable system to the terrain. Special soil protection precautions will be used in more sensitive areas where displacement may result in removal/loss of volcanic ash cap or exposure to unfavorable substrates (in shallow soils and some glacial soils, e.g.).
23. Mechanical slash piling when used will be restricted to slopes less than 45 percent. In high-density fuels area on sustained slopes over 40 percent, cable yarding of unmerchantable materials will be used to reduce wildfire risk. Blade-based site preparation methods and excessive scalping will not be used, particularly on sensitive soil areas.
24. Select prescribed burning techniques that burn woody material in place (i.e. broadcast burning) on slopes greater than 40 percent.

25. Use cool, low intensity prescribed burning in the spring or early summer while the surface soil is moist. This will benefit soil fertility by maintaining soil nitrogen and organic matter levels and mineralizing elements held in various organic components. It will also reduce levels of some pathogenic organisms and enhance soil moisture replenishment by reducing thick duff or litter layers. Allow decomposition to occur for a minimum of one to two years between burns in moist, warm habitat types.
26. Where levels of downed wood of finer sizes present a high risk of consumption by wildfire, prescribed fire or other fuel reduction treatments will be used to reduce this risk and aid in the maintenance of soil productivity.
27. Use fire hazard reduction methods that limit the concentration and removal of large woody residue following intermediate harvest. Desired logs should represent an appropriate range of decomposition classes.
28. Generally, prescribed burning will only occur when the surface soils are moist and weather conditions permit smoke management objectives to be met.
29. Hot, intense, long duration prescribed fires will not be used for fuels treatments because of the following reasons. "Hot" fires generate excessive heat that can volatilize essential plant nutrients, consume soil organic matter and beneficial micro flora and fauna, and expose mineral soil. Additionally hot fires can cause surface hydrophobic conditions leading to increased surface soil erosion and gullying. Nutrient losses (esp. nitrogen) and disrupted nutrient cycling is most significant on high-elevation soils with volcanic ash surfaces, and hydrophobic occurrences are most common on coarser-grained granitic soils.

Road Maintenance and Construction BMPs

1. Minimize road use within a management unit by arranging timber harvest spatially and temporally.
2. Minimize road mileage and density through proper stand delineation, designated skid trails and abandonment of unnecessary existing roads.
3. Construct new roads only where the existing road system is a) currently producing or has the potential (if utilized again) to cause significant soil erosion and sedimentation into streams; b) inadequate to allow access to areas of sustained slope over 40 percent for cable yarding systems; c) inadequate to access commercial timber land with skid distances less than 1500 feet.
4. Road construction in historically unstable ground (evidence or records of past mass wasting or failure) and in areas where risk of groundwater interception is high, such as steep headwalls of headwaters, watershed bowls, or where groundwater or seepage water accumulates to produce ephemeral

water tables will be avoided. Avoid headwalls, midslope locations on steep unstable slopes, seeps, old landslides, slopes in excess of 70 percent, and areas where the geologic bedding planes or weathering surfaces are inclined with the slope.

5. Preventive measures after activity will include restoring vegetation to provide root cohesion and ground cover and to reduce soil moisture content, correctly abandoning road prisms, and possibly implementing deep-seated erosion control methods.
6. Shallow soils should not be used for landings or skid trails and should have equipment restrictions. If a skyline logging system requires the use of a shallow soil area, the affected area should be erosion-proofed through use of rock or other appropriate methods. Shallow soil areas are recognized as among the most fragile ecosystems, as damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate.
7. The use of pioneering ground covering species will be encouraged to re-vegetate areas where soils have suffered an irreversible decline in site potential from land use activities, particularly a loss of ash mantle and exposure to unfavorable substrate (in shallow soils, some glacial soils).
8. Relocate or decommission roads in riparian areas and place future new roads outside of riparian areas.
9. Streambanks and riparian areas exposed (non-vegetated) by management activities, construction or natural impacts are to be re-vegetated immediately.

ROADS AND LANDINGS

Road Location

Practices:

1. Locate roads on stable positions (e.g., ridges, natural benches and flatter transitional slopes near ridges and valley bottoms). Implement extra mitigation measures when crossing unstable areas as necessary.
2. Avoid headwalls, midslope locations on steep unstable slopes, seeps, old landslides, slopes in excess of 70 percent, and areas where the geologic bedding planes or weathering surfaces are inclined with the slope.
3. Locate roads to minimize heights of cutbanks. Avoid high, steeply sloping cutbanks in highly fractured bedrock.
4. Locate roads on well-drained soil types. Roll the grade to avoid wet areas and provide drainage.
5. Locate stream-crossing sites where channels are well defined, unobstructed and straight.

Road Design

1. Base road design standards and design criteria on road management objectives such as traffic requirements of the proposed activity and the overall transportation plan, an economic analysis, safety requirements, resource objectives and the minimization of damage to the environment.
2. Consider future maintenance concerns and needs when designing roads.
3. Preferred road gradients are 2 to 10 percent with a maximum grade of 15 percent. Consider steeper grades in those situations where they will result in less environmental impact. Avoid grades less than 2 percent.
4. Road Surface Configurations:
   a. Outsloping – sloping the road prism to the outside edge for surface drainage is normally recommended for local spurs or minor collector roads where low volume traffic and lower traffic speeds are anticipated. It is also recommended in situations where long intervals between maintenance will occur and where minimum excavation is desired. Outsloping is not recommend on gradients greater than 8-10 percent.
   b. Insloping – sloping the road prism to the inside edge is an acceptable practice on roads with gradients more than 10 percent and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure.
   c. Crown and Ditch – this configuration is recommended for arterial and collector roads where traffic volume, speed, intensity and user comfort area a consideration. Gradients may range from 2 to 15 percent as long as adequate drainage away from the road surface and ditch lines is maintained.
5. Minimize excavation through the following actions: use of balanced earthwork, narrow road width, and end-hauling where slopes are greater than 60 percent.
6. Locate waste areas suitable for depositing excess excavated material.
7. Surface roads if they will be subject to traffic during wet weather. The depth and gradation of surfacing will be determined by traffic type, frequency of use, weight of traffic, maintenance objectives, along with the stability and strength of the road foundation and surface materials.
8. Provide vegetative or artificial stabilization of cut and fill slopes in the design process. Avoid establishment of vegetation where it inhibits drainage from the road surface or where it restricts safety or maintenance.
9. Prior to completion of design drawings, field check the design to assure that it fits the terrain, drainage needs have been satisfied, and all critical slope conditions have been identified and adequate design solutions applied.

Surface Cross Drain Design

1. Design cross drains in ephemeral or intermittent channels to lie on solid ground rather than on fill material to avoid road failures.
2. Design placement of all surface cross drains to avoid discharge onto erodible (unprotected) slopes or directly into stream channels. Provide a buffer or sediment basin between the cross drain outlet and the stream channel.
3. Locate culverts or drainage dips in such a manner to avoid discharge onto unstable terrain such as headwalls, slumps, or block failure zones. Provide adequate spacing to avoid accumulation of water in ditches or surfaces through these areas.
4. Provide energy dissipaters (e.g., rock material) at cross drain outlets or drain dips where water is discharged onto loose material or erodible soil or steep slopes.
5. Place protective rock at culvert entrance to streamline water flow and reduce erosion.
6. Use drainage dips in place of culverts on roads that have gradients less than 10 percent or where road management objectives result in blocking roads. Avoid drainage dips on road gradients greater than 10 percent.
7. Locate drainage dips where water might accumulate or where there is an outside berm that prevents drainage from the roadway.
8. When sediment is a problem, design cross drainage culverts or drainage dips immediately upgrade of stream crossings to prevent ditch sediment from entering the stream.
9. Rolling gradients are recommended in erodible and unstable soils to reducesurface water volume and velocities as well as culvert requirements.

Permanent Stream Crossing Design

1. Use pipe arch culverts on most fishery streams. Use bottomless arch culverts and bridges where gradients greater than 5 percent, stream discharge, and value of fishery resource dictate special engineering considerations necessary to ensure uninterrupted fish passage.
2. Use controlled blasting techniques that minimize the amount of material displaced from road location.

3. Construct embankments, including waste disposal sites, of appropriate materials (no slash or other organic materials) using one or more of the following methods:
   a. Layer placement (tractor compaction)
   b. Layer placement (roller compaction
   c. Controlled compaction (85 to 95 percent maximum density)
4. Slash and organic material may remain under waste embankment areas outside the road prism and outside units planned for broadcast burning.
5. Avoid sidecasting where it will adversely affect water quality or weaken stabilized slopes.
6. Provide surface drainage prior to fall rains and snowfall.
7. Clear drainage ditches and natural watercourses of woody material deposited by construction or logging above culverts prior to fall rains and snowfall.

Temporary Stream Crossing Design

1. Evaluate the advantages and disadvantages of a temporary versus permanent crossing structure for access to the area during all seasons over the long-term in terms of economics, maintenance and resource requirements.
2. Design temporary structures such as prefabricated temporary timber bridges, multiple culverts with minimum fill height, cattleguard crossings, or log cribs to keep vehicles out of the stream.
3. Minimize the number of temporary crossings on a particular stream.
4. Avoid temporary stream crossings on fishery streams.

Low Water Ford Stream Crossing Design

1. To design low water fords that minimize disturbance of the stream and riparian environment.
2. Use only when site conditions make it impractical or uneconomical to utilize a permanent or temporary crossing structure.

Road Construction

1. Limit road construction to the dry season (generally between May 15 and October 15). When conditions permit operations outside of the dry season, keep erosion control measures current with ground disturbance to the extent that the affected area can be rapidly closed/blocked and weatherized if weather conditions warrant.

2. Mange road construction so that any construction can be completed and bare soil can be protected and established prior to fall rains and/or snowfall.
3. Confine preliminary equipment access (pioneer road) to within the roadway construction limits.
4. Construct pioneer road so as to prevent undercutting of the designated final cutslope and prevent avoidable deposition of materials outside the designated roadway limits. Conduce slope rounding at the first opportunity during construction to avoid excess amounts of soil being moved after excavation and embankment operations are completed.
5. Use controlled blasting techniques that minimize the amount of material displaced from road location.
6. Construct embankments, including waste disposal sites, of appropriate materials (no slash or other organic materials) using one or more of the following methods:
   a. Layer placement (tractor compaction)
   b. Layer placement (roller compaction
   c. Controlled compaction (85 to 95 percent maximum density)
7. Slash and organic material may remain under waste embankment areas outside the road prism and outside units planned for broadcast burning.
8. Avoid sidecasting where it will adversely affect water quality or weaken stabilized slopes.
9. Provide surface drainage prior to fall rains and snowfall.
10. Clear drainage ditches and natural watercourses of woody material deposited by construction or logging above culverts prior to fall rains and snowfall.

Permanent Stream Crossing Construction

1. Confine culvert installation to the low flow period (generally July 15 to October 15) to minimize sedimentation and the adverse effects of sediment on aquatic life.
2. Divert the stream around the work area to minimize downstream sedimentation.
3. Install culverts as close to zero percent slope as possible on fishery streams, buy not in excess of 0.5 percent. Place culverts in the streambed at the existing slope gradient on larger non-fishery streams. Place energy dissipaters (e.g., large rock) at the outfall of culverts on small non-fishery streams to reduce water velocity and minimize scour at the outlet end.

4. Countersink culvert 6 to 8 inches below the streambed to minimize scouring at the outlet. Increase culvert diameters accordingly to offset the countersink.
5. Limit activities of mechanized equipment in the stream channel to the area necessary for installation.
6. Place permanent stream crossing structures in fishery streams before heavy equipment moves beyond the crossing area. Where this is not feasible, install temporary crossings to minimize stream disturbance.
7. Place riprap on fills around culvert inlets and outlets.

Temporary Stream Crossing Construction

1. Where possible, limit the installation and removal of temporary crossing structures to only one time during the same year and within the prescribed work period. Installation and removal should occur during the low flow period (generally July 15 to October 15).
2. Use backfill material that is as soil-free as practicable over temporary culverts. Whenever possible use washed river rock covered by pit run of one inch minus as a compacted running surface.
3. Spread and reshape clean fill material to the original lines of the streambed channel after a crossing is removed to ensure the stream remains in its channel during high flow.
4. Use log cribbing in tractor logging units when it is impractical to use a culvert and rock backfill material. Remove upon completion of logging the unit.
5. Limit activities of mechanized equipment in the stream channel to the area that is necessary for installation and removal operations.
6. Remove stream crossing drainage structures and in-channel fill material during low flow and prior to fall rains. Re-establish the natural drainage configuration upon completion of project.

Low-Water Ford Stream Crossing Construction

1. Restrict construction and use to low flow period (generally July 15 to October 15).
2. Use washed rock/gravel or concrete slab in the crossing.
3. Apply rock on road approaches within 150 feet of each side of the ford to prevent washing and softening of the road surface.

Landings

1. Locate landings at sites approved by interdisciplinary team.
2. Avoid placing landings adjacent to or in meadows or other wetland areas.
3. Clear or excavate landing to minimum size needed for safe and efficient operations.
4. Select landing locations considering the least amount of excavation, erosion potential, and where sidecast will not enter drainages or damage other sensitive areas.
5. Deposit excess excavated material on stable sites where there is no erosion potential
6. Where non-permanent landings are compacted, rip with sub-soiler equipment for site restoration.
7. Restore landings to the natural configuration or shape to direct the runoff to pre-selected spots where water can be dispersed to natural, well-vegetated, gentle ground.

Road Erosion Control

1. Apply protective measures to all areas of disturbed, erosion-prone, unprotected ground, including waste disposal sites prior to fall rains and/or snowfall. Protective measured may include water bars, water dips, grass seeding, planting deep-rooted vegetation, and/or mulching. Armor or buttress fill slopes and unstable areas with rock that meets construction specifications.
2. Use seasonal restrictions on natural surface roads.
3. Road Renovation/Improvement

Road Renovation and Improvement

1. Require roadside brushing be done in a manner that prevents disturbance to root systems (i.e., Improve flat gradients to a minimum of 2 percent or provide raised subgrade sections (turnpike) to avoid saturation of the road prism.
2. Reconstruct culvert catchbasins to specifications. Catchbasins in solid rock need not be reconstructed provided soil, rock or other debris does not restrict water flow.
3. Identify potential water problems caused by off-site disturbance and add necessary drainage facilities.

4. Identify ditch line and outlet erosion caused by excessive flows and add necessary drainage facilities and armoring.
5. Replace undersized culverts and repair damaged culverts and downspouts.
6. Add additional full-rounds, half-rounds, and energy dissipaters as needed.
7. Correct special drainage problems (e.g., high water table, seeps) that effect stability of subgrade through the use of perforated drains, geotextiles or drainage bays.
8. Eliminate undesirable berms that retard normal surface runoff.
9. Restore outslope or crown sections.
10. Avoid disturbing backslope while reconstructing ditches.
11. Surface inadequately surfaced roads that are to be left open to traffic during wet weather.
12. Avoid using excavators for brushing.

Road Maintenance

1. Provide basic custodial care to protect the road investment and to ensure minimal damage to adjacent land and resources.
2. Perform blading and shaping to conserve existing surface material, retain the original crowned or outsloped self-draining cross section, prevent or remove rutting berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid wasting loose ditch or surface material over the shoulder where it can cause stream sedimentation or weaken slump prone areas. During maintenance, avoid undercutting backslopes.
3. Keep road inlet and outlet ditches, catchbasins, and culverts free of obstructions, particularly before and during winter rainfall/snowfall. However, keep routine machine cleaning of ditches to a minimum during the wet season.
4. Promptly remove slide materials when it is obstructing road surfaces and ditch line drainage. Save all soil or material useable for quarry reclamation and stockpile for future reclamation projects. Utilize remaining slide material for needed road improvement or place in a stable waste area. Avoid sidecasting of slide material where it can damage, overload, saturate embankments, or flow into downslope drainage channels. Re-establish vegetation in areas where more than 50 percent of vegetation has been destroyed due to sidecasting
5. Retain vegetation on cut slopes unless it poses a safety hazard or restricts maintenance activities. Cut roadside vegetation rather than pulling it out and disturbing the soil.

6. Remove snow on haul roads in a manner that will protect roads and adjacent resources. Remove or place snow berms to prevent water concentration on the roadway or on erodible sideslope soils.
7. Patrol areas subjected to road or watershed damage during periods of high runoff.

Dust Abatement

1. Use dust palliatives or surface stabilizers to reduce surfacing material loss and buildup of fine sediments that may wash off into watercourses.
2. Closely control application of dust palliatives and surface stabilizers, equipment cleanup, disposal of excess material to prevent contamination or damage to water resource values.

Road Access Restrictions

1. Barricade or block roads using gates, guard rails, earth/log barricades, boulders, logging debris, or a combination of these methods. Avoid blocking roads that will need future maintenance (i.e. culvert cleaning, slide removal, etc.) with un-removable barricades. Use guardrails, gates, or other barricades capable of being opened for road needing future maintenance.
2. Provide maintenance of block roads in accordance with design criteria.
3. Install waterbars, cross drains, cross sloping, or drainage dips if not already on road to assure drainage.
4. Scarify, mulch, and/or seed for erosion control.

Road and Landing Decommissioning

1. Conduct interdisciplinary review before decommissioning roads to reduce road density and protect riparian habitat.
2. Rip temporary spur roads and landings by an approved method to remove ruts, berms, and ditches while leaving or replacing surface cross drain structures.
3. Return roads or landings not needed for future resource management to resource production by re-vegetating with native species. Apply mulch and fertilizer where appropriate.

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R: Natural Resource Code Violations

Source:
Environmental Trust Department, Confederated Tribes of the Colville Reservation, 2016

Natural Resource Code Violations, 2001 - 2015				
Year	**Natural Resource Code Section**	**Documentation**	**Landowner**	**Operator**
2001	4-7-7 Deviation from application 4-7-75 Housekeeping	Inf. Conf. Note Stop Work Order	Trust	Van Brunt
2001	222-24-070 Ground-based logging	Inf. Conf. Note Notice to Comply	Fee- Jacobsen	Williamson Consulting
2002	4-7-61 Road maintenance 4-7-70 Skid trail	Inf. Conf. Note	Trust	CTRC
2002	4-7-61 Road maintenance 4-7-70 Skid trail	Inf. Conf. Note Notice to Comply	Trust	CTRC
2002	4-7-61 Road maintenance	Inf. Conf. Note	Trust	
2002	4-7-7 Deviation from application 4-7-70 Skidding in SMZ	Inf. Conf. Note	Trust	CTRC
2002	4-7-61 Road erosion	Letter	Trust	CTRC
2002	4-7-61 Road maintenance	Inf. Conf. Note	Fee- Aspen Kinerk	Gardner Logging
2002	4-7-7 Deviation from application 4-7-70 Skidding in creek	Inf. Conf. Note	Trust	CTRC
2002	4-7-61 Road maintenance	Inf. Conf. Note	Fee- Gilchrist	Williamson Consulting
2002	4-7-7 Logging without permit	Notice to Comply	Trust	Kiser
2002	222-20-060 Deviation from application 222-24-020 Road location in stream	Inf. Conf. Note Notice to Comply	Fee-MacArthur & Davis	MacArthur & Davis
2003	222-20-010 Logging without permit	Stop Work Order	Fee-Layman Lbr	Robert Coby
2003	222-30-022 Logging in RMZ 4-7-61 Road maintenance	Notice to Comply Stop Work Order	Fee- Aspen Kinerk	Boise Cascade
2003	4-7-61 Road maintenance	Stop Work Order	Fee- Boise Cascade	Boise Cascade
2003	4-7-61 Road erosion, drainage	Letter	Trust	CTRC

Natural Resource Code Violations, 2001 - 2015				
Year	**Natural Resource Code Section**	**Documentation**	**Landowner**	**Operator**
2003	4-7-7 Deviation from application 4-7-70 Skidding	Inf. Conf. Note	Trust	CTRC
2003	4-7-7 Logging without permit	Inf. Conf. Note	Fee- Miller / Simpson	Erb Corp
2003	4-7-70 Skidding in RMZ	Inf. Conf. Note	Trust	B. Nissen
2004	Road erosion, drainage	Letter	Trust	CTRC
2005	4-9-10 Rock placement w no permit	Letter	Trust	J. Lobe
2005	4-7-7 Deviation from application	Letter	Trust	Gallaher
2005	222-20-010 Logging without permit 222-30-022 Harvest in RMZ 222-46-070 Failure to stop work 4-9-6 Machine crossing with no permit	Inf. Conf. Note 2 Stop Work Orders Civil penalty	Fee- Hayden	Wiltse
2005	4-7-7 Logging without permit	Report Inf. Conf. Note Notice to Comply	Trust	C. Nissen
2006	4-7-67 RMZ- harvest, landings, piling, skidding 4-7-60 No water crossing structure	Letter	Trust	CTRC
2006	4-7-7 Logging without permit	Letter	Trust	C. Nissen
2006	4-7-60 Deficient water crossing	Letter	Fee- Boise Cascade	CTRC
2006	4-7-70 Skidding in SMZ	Letter	Trust	CTRC
2006	4-9-10 HPA with no permit 4-9-50 Filling in waterway	Report Letter	Trust	M. Stensgar
2007	4-7-70 Skidding in SMZ 4-7-68 Felling and Bucking in SMZ 4-9-6 Machinery walking up stream channel	Letter	Trust	CTRC

Natural Resource Code Violations, 2001 - 2015				
Year	**Natural Resource Code Section**	**Documentation**	**Landowner**	**Operator**
2007	4-7-60 Deficient water crossing	Letter	Trust	CTRC
2007	4-9- Deviation from approved permit	Letter	Fee- Jannot	F&W
2007	4-7-61 Eroding roads and crossings	Letter	Trust	CTRC
2008	4-7-7 Deviation from application 4-7-9 Failure to comply w approval conditions 4-7-67 Falling, skidding, landings in RMZ 4-7-68 Failure to leave reserve trees 4-9-6 Skidding across stream	Letters Inf. Conf. Note Stop Work Order	Trust	CTRC
2008	4-7-60 Deficient water crossing, road erosion	Letter	Trust	CTRC
2008	4-9-5 Machinery in stream	Letter	NVEC ROW	NVEC
2008	4-7-67 Machinery in RMZ 4-9-5 Machinery in stream	Inf. Conf. Note	Trust	CTRC
2009	4-7-7 Deviation from application 4-7-67 Felling and landings in RMZ	Memo	Trust	CTRC
2009	4-9-56 Clearing debris from culvert inlet	Letter	Okanogan Co ROW	Okanogan Co Public Works
2009	4-9-5 Machinery in stream	Violation notice Penalty	Trust	T. Epperson
2009	4-7-7 Logging without permit 4-7-65 Inappropriate harvest system 4-7-66 Trees felled and yarded in water 4-7-67 Trees felled from inner zone RMZ 4-9-6 Work in lake with no permit 4-9-62 Logging in water	Report to Natural Resource Enforcement	Unknown	Unknown

Natural Resource Code Violations, 2001 - 2015				
Year	**Natural Resource Code Section**	**Documentation**	**Landowner**	**Operator**
2010	4-7-72 Site prep	Memo	Trust	MTFC
2011	4-9-10 Pond built in floodplain with no permit	Notice	Fee-Saltz	Saltz
2013	4-7-66 Skid trail in draw 4-7-65 Landing erosion 4-7-60 Road erosion	Report	Trust	MTFC
2014	4-7-7 Salvage Harvest w/out Permit 4-7-66 Trees felled in the inner Riparian Management Zone of Capoose Creek	Informal Meeting on-site	Trust	Chris Jurgensen
2014	4-7-75 Soil contamination, trash	Notice to Comply	Trust	Nighthawk Excavation
2014	4-9-5 Crossed Stranger Creek with Dozer without HPA Approval	Informal Meeting on-site	Lawney L. Reyes	Donnie Fry
2014	4-7-7 Deviation from application 4-7-9 Departure from approval conditions 4-7-66/67 Equipment in RMZ 4-9-7 Departure from approval conditions 4-9-49 Equipment crossing stream	Notice to Comply	Trust	CTFC
2015	4-7-61(b) Lack of Road Maintenance	Inf. Conf. Note	Trust	CTFC
2015	4-7-9 Deviation from application 4-7-61 Road drainage 4-7-66/67 Falling and harvest in RMZ	Inf. Conf. Note	Trust	D. Richter

Natural Resource Code Violations, 2001 - 2015				
Year	**Natural Resource Code Section**	**Documentation**	**Landowner**	**Operator**
2015	4-7-9 Deviation from application 4-7-61 Road drainage 4-7-66/67 Falling and harvest in RMZ	Notice to Comply	Trust	D. Richter
2015	4-7-75 Soil Contamination	Notice to Comply	Trust	CTFC
2015	4-9-51(1) Placing suction hoses without a Temporary Water Withdrawal Permit 4-9-57(i) Erosion with associated drafting 4-9-65 Soil Contamination	Notice to Comply	Trust	CTFC
2015	4-9-49 Road approaches and ditch lines draining to natural spring near Rebecca Lake	Email	Trust	BIA Roads
Source: Environmental Trust Department, Confederated Tribes of the Colville Reservation, 2016				

S

S: Socioeconomic Modeling Assumptions

Source:
The Center for Applied Research

Economic Multipliers And Modeling Assumptions

The revenue and expenditure figures outlined in Tables 31-35 of the socioeconomic analysis represent the initial exogenous change in demand triggered by each resource management alternative. Industry specific multipliers[1] were then applied to these revenue/expenditure figures to approximate the direct, indirect, induced, and total change in output, employment, and labor income.

The Bureau of Economic Analysis' RIMS II Type I and Type II multipliers provided a framework for modeling and quantifying the entire scope of economic impacts within the Study Region. The model output reported in this analysis differentiates between: a) direct economic effects, i.e., the immediate effects associated with the change in final demand in the affected industries; b) the indirect economic effects, i.e., the secondary effects or production changes in backward-linked industries caused by input requirement changes in the directly affected industries; and c) the induced economic effects, i.e., the impact on all local industries due to the increased expenditure of new household income generated by the directly and indirectly affected industries.

Industry-Specific Economic Multipliers

Table 1 and Table 2 below summarize the specific RIMS II economic multipliers that were applied to the various revenue/expenditure components discussed above. Wherever possible, these revenue/expenditure components were disaggregated to allow for the application of the most appropriate economic multiplier. For instance, harvest revenue/expenditure can be disaggregated into six separate components: i) logging and transportation; ii) sale administration undertaken by the Colville Tribal Sort Yard; iii) stumpage revenue recirculated into forest management activities and preparation for future sales; iv) stumpage revenue recirculated into environmental cleanup activities; v) stumpage revenue recirculated into the Tribes' land purchasing program, and vi) stumpage revenue deposited into the Tribes' General Fund where it finances the Tribes' IT, social, and public works programs. A different set of multipliers was applied to each of these four activities to facilitate a more accurate and dynamic estimate of the regional economic impacts associated with each of the resource management alternatives.

1 The U.S. Department of Commerce, Bureau of Economic Analysis' Regional Input-Out¬put Modeling System Type I and Type II Multipliers were utilized in this analysis to estimate the direct, indirect, and induced effects of the final demand change represented by the each of the resource management alternatives.

Table 1: RIMS Type 1 Economic Multipliers Used in Analysis

NAICS* Code	Industry Description	Output Δ/ million $	Earnings Δ/ million $	Employment Δ/ million $	Value Added Δ/ million $
aggregation	Social assistance, nursing and care facilities, educational services, & administrative support	1.2755	0.5424	20.6148	0.7923
115000	Support activities for agriculture and forestry	1.2574	0.6127	19.7646	0.8788
113000	Forestry and logging	1.5634	0.5007	11.8083	0.8764
321200	Veneer, plywood, and engineered wood product manufacturing	1.5950	0.3002	7.1660	0.5375
321100	Sawmills and wood preservation	1.7882	0.3668	8.6673	0.6386
5416A0	Environmental and other technical consulting services	1.2746	0.5684	14.2963	0.7755

*North American Industry Classification System (NAICS)
Note: Series: 2007 U.S. Benchmark I-O data and 2013 Regional Data

Table 2: RIMS Type II Economic Multipliers Used in Analysis

NAICS* Code	Industry Description	Output Δ/ million $	Earnings Δ/ million $	Employment Δ/ million $	Value Added Δ/ million $
aggregation	Social assistance, nursing and care facilities, educational services, & administrative support	1.0812	0.4795	18.7933	0.6744
115000	Support activities for agriculture and forestry	1.0381	0.5414	17.6956	0.7461
113000	Forestry and logging	1.3842	0.4424	10.1175	0.7680
321200	Veneer, plywood, and engineered wood product manufacturing	1.4876	0.2652	6.1524	0.4725
321100	Sawmills and wood preservation	1.6569	0.3241	7.4288	0.5591
5416A0	Environmental and other technical consulting services	1.0712	0.5022	12.3772	0.6525

*North American Industry Classification System (NAICS)
Note: Series: 2007 U.S. Benchmark I-O data and 2013 Regional Data

The multipliers shown in Table 1, when applied to an initial change in demand, illustrate the magnitude of the direct and indirect economic impacts stemming from that change in demand. Conversely, the multipliers shown in Table 2, when applied to that same initial change in demand, illustrate the magnitude of the direct, indirect, and induced economic impact stemming from that change in demand. The results of this exercise are described in detail below in the Summary of Impacts section of this report.

Modeling Assumptions

In reviewing the results of this socioeconomic impact analysis, it is important to keep in mind several modeling assumptions that were necessarily employed given the specula¬-tive nature of the alternative management scenarios, the input data used in the model, and the framework of the model itself. In terms of modeling assumptions, the RIMS II multipliers utilized in this modeling exercise are based on average relationships between input and output variables within Ferry County and Okanogan County, Washington. Therefore, the economic effects summarized herein are limited to these two counties, not the Colville Reservation. Using multipliers to model the economic impacts of each of the alternative resource management strategies requires the adoption of several limiting as¬-sumptions which are designed to produce upper bound estimates.

The most notable assumptions utilized in this socioeconomic analysis, and typical to any input-output modeling program, include:

a) Supply constraints do not exist. In reality, supply constraints may prevent affected industries from increasing their demand for supply inputs and labor to accommodate changes in demand related to the resource management alternatives.
b) Increases in output from affected firms within the Study Region will require a reciprocal increase in inputs. If the model suggests that a firm will double its production, then it is assumed that it will also double its demand for inputs to facilitate that level of production.
c) Affected firms within the Study Region will choose to acquire inputs from suppliers within the Study Region whenever such suppliers exist within the Study Region. As an example, if the saw mill purchases a new forklift, it will always purchase that forklift from a supplier within the Study Region (assuming a supplier exists) rather than from a supplier outside of the Study Region.
d) There are no demand constraints for the Tribes' range and timber resources. There is sufficient demand for the harvest levels identified in each of the management alternatives, and demand for the Tribes' rangeland is expected to remain at current levels or increase over the 15-year planning period.
e) Resource usage levels will not be significantly affected by major environmental changes or occurrences over the 15-year planning period. The sustainability of resource usage levels is also not considered in this model.

It should be noted that this analysis does not differentiate between full-time and part-time employment positions. Actual employment figures (direct jobs only) in 2014 show that approximately 86% of employees within affected industries are employed in full-time po¬sitions, and approximately 14% of employees are employed in part-time positions. This ratio can reasonably be applied to each of the management alternatives.

T

T: Federal Register Notices

Source:
Federal Register, Volume 79, No.225, November 21, 2014
BIA Notice of Intent

Federal Register, Volume 82, No.113, June 14, 2017
BIA Notice of Availability

Federal Register, Volume 82, No.144, July 28,2017
EPA Notice of Availability

Federal Register / Vol. 79, No. 225 / Friday, November 21, 2014 / Notices 69521

would continue to maintain open water habitat for waterfowl use. Under this alternative, the public use program would be similar to alternative A; however, under this alternative, we would eliminate less used or dead-end trails in the wilderness area.

Alternative D (Focus on Expansion of Priority Public Uses)

Alternative D emphasizes expanding wildlife-dependent priority public uses on the refuge. Public use and access would be maximized to the greatest extent practical, while minimizing impacts to wildlife. We would expand refuge infrastructure, including construction of new trails, observation towers, signage, and parking lots; expand hunting; and allow fishing in select areas of the refuge. This alternative would maximize public outreach, enhance and develop new environmental interpretation and education programs, aggressively expand partnerships, and increase staff presence at programs and events. In general, refuge habitats would be managed similarly to alternative B; however, this alternative would increase open water habitat to improve public viewing opportunities.

Comments

We solicited comments on the draft CCP/EA from May 14 to June 30, 2014 (79 FR 27634). During the comment period, we received 80 written responses. We evaluated all of the substantive comments we received, and include a summary of those comments, and our responses to them, as appendix G in the final CCP.

Selected Alternative

After considering the comments we received on our draft CCP/EA, we made minor changes to alternative B, including not moving forward on the proposed parking area and wildlife observation opportunity on White Bridge Road, and correcting minor editorial, formatting, and typographical errors. These changes are described in the FONSI (appendix E in the final CCP) and in our response to public comments (appendix G in the final CCP).

We have selected alternative B to implement for Great Swamp NWR, with these minor changes, for several reasons. Alternative B comprises a mix of actions that, in our professional judgment, work best towards achieving the refuge's purposes, vision, and goals, NWRS policies, and the goals of other State and Regional conservation plans. We also believe that alternative B most effectively addresses key issues raised during the planning process. The basis of our decision is detailed in the FONSI (appendix E in the final CCP).

Public Availability of Documents

You can view or obtain the final CCP, including the FONSI, as indicated under **ADDRESSES**.

Dated: October 6, 2014.

Deborah Rocque,

Acting Regional Director, Northeast Region.

[FR Doc. 2014–27590 Filed 11–20–14; 8:45 a.m.]

BILLING CODE 4310–55–P

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[AAK6006201 134A2100DD AOR3B30.999900]

Intent To Prepare a Programmatic Environmental Impact Statement for the Proposed Integrated Resource Management Plan for the Colville Reservation in Okanogan and Ferry Counties, WA

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice.

SUMMARY: This notice advises the public that the Bureau of Indian Affairs (BIA), in cooperation with the Confederated Tribes of the Colville Reservation (Tribes), intends to gather information necessary to prepare a programmatic environmental impact statement (Programmatic EIS) for the proposed Integrated Resource Management Plan (IRMP) for the Colville Reservation in Okanogan and Ferry Counties, Washington. This notice also announces public scoping meetings to identify potential issues and content for inclusion in the Programmatic EIS.

DATES: The dates and locations of public scoping meetings will be published in the Omak-Okanogan County Chronicle, the Statesman Examiner, the Star, and the Tribal Tribune. Additional information will also be posted at the Tribes' Web site: *www.colvilletribes.com*. Written comments must arrive within 30 days following the public scoping meetings.

ADDRESSES: Comments may be submitted by mail, email, hand carry or fax to: Dr. BJ Howerton, Environmental Services Manager, BIA Northwest Regional Office, 911 NE 11th Avenue, Portland, OR 97232–4169, Phone: (503) 231–6749, Fax: (503) 231–2275, Email: *bj.howerton@bia.gov*; or Debra Wulff, BIA Superintendent, Colville Agency, Bureau of Indian Affairs, P.O. Box 111, Nespelem, WA 99155–0111, Phone: (509) 634–2316, Fax: (509) 634–2355, Email: *debra.wulff@bia.gov*.

FOR FURTHER INFORMATION CONTACT: Dr. BJ Howerton at (503) 231–6749 or *bj.howerton@bia.gov* or Debra Wulff at (509) 634–2316 or *debra.wulff@bia.gov*.

SUPPLEMENTARY INFORMATION: The proposed action is the preparation of an IRMP for the Colville Reservation and the BIA approval of long-term natural resource planning goals and objectives for the Colville Reservation. The Tribes may use the Programmatic EIS for tiered, project-specific environmental assessments to cover specific actions as the IRMP is implemented.

The Tribes have managed their natural resources under the goals and objectives of an IRMP from 2000 to 2014. The new IRMP will replace the expiring plan. The Programmatic EIS will consider a proposed strategy in the IRMP that enhances the existing plan, where timber harvesting and livestock grazing levels remain at the existing levels with improved scheduling based on more accurate mapping data, open ground modeling and current forest inventory data. The strategy would include improved management practices to reduce erosion from forest roads, increase enforcement of livestock rotation requirements, and provide a formal project review process to ensure compliance with the IRMP and tribal resource codes.

Other alternative forest management strategies to be considered include: (1) A forest restoration strategy to emphasize thinning through the forest to return to historic conditions with a reduced harvest level, (2) an accelerated harvest strategy intended to maximize revenue to the Tribes, and (3) a No Forest Management strategy that would end timber harvesting.

Rangeland management alternatives include: (1) A strategy to rest and rotate range units on a yearly basis, (2) a strategy to increase livestock grazing by allowing additional grazing by off-reservation cattle ranchers, and (3) a strategy to eliminate livestock grazing altogether.

No Action or continuation of the current IRMP goals and objectives will also be considered along with any additional strategies or alternatives that may be developed as a result of public scoping.

Significant issues to be covered during the scoping process may include, but will not be limited to air quality, geology and soils, surface and groundwater resources, wildlife habitat, threatened and endangered species, cultural resources, socioeconomic conditions, land use, aesthetics, and Indian trust resources.

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Directions for Submitting Public Comments

Please include your name, return address, and the caption "Programmatic EIS, Colville Reservation IRMP" on the first page of any written comments you submit. You may also submit comments at the public scoping meetings.

The public scoping meetings will be held to seek comments from the Tribal Business Council, resource managers, agency representatives, and community members concerning the planning and environmental issues surrounding the use of natural resources of the Colville Reservation. The meetings will be held at various Colville Reservation communities and notices will be published in Omak-Okanogan County Chronicle, the Statesman Examiner, the Star, and the Tribal Tribune. Additional information will also be posted at the Tribe's Web site: *www.colvilletribes.com.*

Public Availability of Comments

Comments, including names and addresses of respondents, will be available for public review at the BIA address shown in the **ADDRESSES** section of this notice, during regular business hours, Monday through Friday, except holidays. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Authority

This notice is published in accordance with sections 1503.1 of the Council on Environmental Quality Regulations (40 CFR parts 1500 through 1508) and Sec. 46.305 of the Department of the Interior Regulations (43 CFR Part 46), implementing the procedural requirements of NEPA, as amended (42 U.S.C. 4321 *et seq.*), and is in the exercise of authority delegated to the Assistant Secretary—Indian Affairs, by part 209 of the Departmental Manual.

Dated: November 10, 2014.

Kevin Washburn,

Assistant Secretary—Indian Affairs.

[FR Doc. 2014–27682 Filed 11–20–14; 8:45 am]

BILLING CODE 4310–W7–P

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[AAK6006201 145A2100DD AOR3030.999900]

Notice of Intent To Prepare an Environmental Impact Statement for Aiya Solar Project on the Moapa River Indian Reservation, Clark County, NV

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice.

SUMMARY: In order to comply with the National Environmental Policy Act (NEPA), the Bureau of Indian Affairs (BIA), as lead agency in cooperation with the Moapa Band of Paiute Indians (Moapa Band), the Bureau of Land Management (BLM), and other Federal agencies, intend to prepare an environmental impact statement (EIS) that will evaluate a photovoltaic solar energy generation project on the Moapa River Indian Reservation and a transmission line located on tribal lands, private lands and Federal lands administered and managed by BLM in Clark County, Nevada.

This notice announces the beginning of the scoping process to solicit public comments and identify potential issues related to the EIS. It also announces that two public scoping meetings will be held in Nevada to identify potential issues, alternatives, and mitigation to be considered in the EIS.

DATES: The dates and locations of the public scoping meetings will be published in the Las Vegas Sun, Las Vegas Review-Journal, and Moapa Valley Progress 15 days before the scoping meetings. Written comments on the scope of the EIS or implementation of the proposal must arrive by December 22, 2014.

ADDRESSES: You may mail, email, or hand carry written comments to either Mr. Paul Schlafly, Natural Resource Specialist, Bureau of Indian Affairs, Southern Paiute Agency, 180 North 200 East Suite 111, P.O. Box 720, St. George, Utah 84770; telephone: (435) 674–9720; email: *paul.schlafly@bia.gov*, or Mr. Chip Lewis, Acting Regional Environmental Compliance Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, Arizona 85004; telephone: (602) 379–6782; email: *chip.lewis@bia.gov.*

SUPPLEMENTARY INFORMATION: The proposed Federal action, taken under 25 U.S.C. 415, is BIA's approval of a solar energy ground lease and associated agreements entered into by the Moapa Band with a subsidiary of First Solar, Inc. (First Solar) to provide for construction and operation of an up-to 100 megawatt (MW) alternating current solar photovoltaic (PV) electricity generation facility located entirely on the Moapa River Indian Reservation and specifically on lands held in trust by BIA for the Moapa Band. The proposed 230 kilovolt (kV) generation-tie transmission line required for interconnection may be located on Tribal lands, private lands and/or Federal lands administered and managed by BLM. First Solar has accordingly requested that the BIA and BLM additionally approve right-of-ways (ROWs) authorizing the construction and operation of the transmission line. Together, the proposed solar energy facility, transmission line, and other associated facilities will make up the proposed Moapa River Solar Project (Project).

The Project would be located in Township 14 South, Range 66 East, Sections 29, 30, 31, and 32 Mount Diablo Meridian, Nevada. The generation facility would generate electricity using First Solar's PV panels. Also included would be inverters, a collection system, an on-site substation to step-up the voltage to transmission-level voltage at 230 kV, an operations and maintenance building, and other related facilities. A single overhead 230 kV generation-tie transmission line, approximately 1.5 to 3 miles long, would connect the solar project to either NV Energy's Reid-Gardner 230kV substation or the proposed Reid Gardner Collector Substation, which is under development by NV Energy.

Construction of the Project is expected to take approximately 12 to 15 months. First Solar is expected to operate the energy facility for 30 years, with two options to renew the lease for an additional 10 years, if mutually acceptable to the Moapa Tribe and First Solar. The Project is expected to be built in one phase of up to 100 MW, per the demand of potential off-takers or utilities. During construction, the PV panels will be placed on top of fixed-tilt and/or single-axis tracking mounting systems that are set on steel posts embedded in the ground. Other foundation design techniques may be used depending on the site topography and conditions. No water will be used to generate electricity during operations. Water will be needed during construction for dust control and a minimal amount will be needed during operations for landscape irrigation and administrative and sanitary water use on site. The water supply required for the Project would be leased from the

27278 Federal Register / Vol. 82, No. 113 / Wednesday, June 14, 2017 / Notices

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[178A2100DD/AAKC001030/A0A501010.999900]

Draft Programmatic Environmental Impact Statement for the 2015 Integrated Resource Management Plan for the Colville Indian Reservation, Nespelem, Washington

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice of availability.

SUMMARY: This notice advises the public that the Bureau of Indian Affairs (BIA) as lead agency, with the Confederated Tribes of the Colville Reservation (Tribes) and the United States Environmental Protection Agency (EPA) serving as cooperating agencies, has prepared a Draft Programmatic Environmental Impact Statement (DEIS) for the 2015 Colville Reservation Integrated Resource Management Plan (IRMP). This notice announces that the DEIS is now available for public review.

DATES: Any comments on the DEIS must arrive on or before the date 45 days after the EPA publishes a Notice of Availability of the DEIS in the **Federal Register**.

ADDRESSES: The DEIS is available for public review online at *http://www.colvilletribes.com/irmp* and in hard copy at the following locations:

- Omak Public Library, 30 S Ash St., Omak, Washington 98841
- Omak Senior Meal Site, 511 E. Benton Street, Omak, Washington 98841
- Nespelem Resource Center, 12 Lakes St., Nespelem, Washington 99155
- Nespelem Senior Meal site, 322 10th Street, Nespelem, Washington 99155
- Keller Resource Center, 11673 S. Hwy 21, Keller, Washington 99140
- Keller Senior Meal Site, 7 Jim James Road, Keller, Washington 99140
- Inchelium Resource Center, 12 Community Center Loop, Inchelium, Washington 99138
- Inchelium Senior Meal Site, 16 Shortcut Road, Inchelium, Washington 99138

You may mail or hand-deliver written comments to Mr. Stanley Speaks, Northwest Regional Director, Bureau of Indian Affairs, 911 Northeast 11th Avenue Portland, Oregon 97232–4169. You may also mail comments to BIA Colville Agency Superintendent Debra Wulff, P.O. Box 111, Nespelem, Washington 99155–0111 or hand deliver to the Superintendent's office at 10 Nez Perce Street, Nespelem, Washington. You can also submit comments by email to: *debra.wulff@bia.gov.*

FOR FURTHER INFORMATION CONTACT: Ms. Debra Wulff, Superintendent, Bureau of Indian Affairs, Colville Agency, P.O. Box 111, Nespelem, Washington 99155–0111, (509) 634–2316.

SUPPLEMENTARY INFORMATION: The Tribes have prepared an IRMP for the natural and cultural resources of the Colville Reservation. The plan updates the original IRMP that was prepared and implemented in 2000. The IRMP incorporates management goals and objectives for the commercial forest, rangeland and agricultural lands of the Reservation.

The Tribes' forest products industry, livestock grazing, and agriculture have the potential to impact the natural and human environments of the Reservation. The DEIS analyzes the potential impacts associated with these activities. These include impacts to land resources such as geology, minerals, and soils, watershed function, surface and groundwater resources, air quality, biological resources, cultural and paleontological resources, socioeconomic conditions, transportation and forest access roads, land use, public services, noise, aesthetics, recreation, climate change, cumulative effects, and indirect and growth inducing effects.

The DEIS considers five management alternatives developed by the Tribes' IRMP Core Team. The interdisciplinary team developed these management alternatives for consideration and analysis and designated a preferred alternative (Alternative 2) that was approved by the Colville Business Council in June 2014. The team also conducted a community survey in 2014 that asked community members to choose a preferred alternative. All groups were unanimous in selecting Alternative 2 as the preferred alternative. The alternatives are:

1. Continue the Current Management Strategy
2. Enhance and Improve the Current Management Strategy (Preferred Alternative)
3. Concentrate on Forest and Rangeland Health Problems
4. Expand Forest and Livestock Production
5. Eliminate Timber Harvesting and Livestock Grazing

A Notice of Intent (NOI) to prepare an EIS was released in the **Federal Register** on November 21, 2014. Public scoping meetings were held in four Reservation communities in October 2015 and a Scoping Meetings Report was released in March 2016. An administrative draft DEIS was prepared and reviewed by the IRMP Core Team and appropriate revisions were incorporated along with supplemental information.

Directions for submitting comments: Please include your name, return address, and the caption: ''DEIS Comments, Colville Reservation IRMP,'' on the first page of your written comments. If emailing comments, please use ''DEIS Comments, Colville Reservation IRMP,'' as the subject of your email.

Locations where the DEIS is available for review: The DEIS is available for review during regular business hours at the addresses noted above in the **ADDRESSES** section of this notice. The DEIS is also available online at *http://www.colvilletribes.com/irmp.*

To obtain a compact disc copy of the DEIS, please provide your name and address in writing or by voicemail to Debra Wulff, Bureau of Indian Affairs, at the address or phone number above in the **FOR FURTHER INFORMATION CONTACT** section of this notice. Individual paper copies of the DEIS will be provided upon payment of applicable printing expenses by the requestor for the number of copies requested.

Public comment availability: Comments, including names and addresses of respondents, will be available for public review during regular business hours at the BIA mailing address shown in the **ADDRESSES** section of this notice. Before including your address, telephone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Authority: This notice is published pursuant to Sec. 1503.1 of the Council of Environmental Quality Regulations (40 CFR parts 1500 through 1508) and Sec. 46.305 of the Department of the Interior Regulations (43 CFR part 46), implementing the procedural requirements of the NEPA of l969, as amended (42 U.S.C. 4371, *et seq.*), and is in the exercise of authority delegated to the Assistant Secretary—Indian Affairs by 209 DM 8. This notice is also published in accordance with federal general conformity regulations (40 CFR part 93).

Dated: May 15, 2017.

Michael S. Black,

Acting Assistant Secretary—Indian Affairs.

[FR Doc. 2017–12288 Filed 6–13–17; 8:45 am]

BILLING CODE 4337–15–P

triennial review process defined in section 303(c)(1) of the CWA, the states and authorized tribes are responsible for maintaining and revising WQS. Standards consist of designated uses, water quality criteria to protect those uses, a policy for antidegradation, and may include general policies for application and implementation. Section 303(c)(1) requires states and authorized tribes to review and modify, if appropriate, their WQS at least once every three years. States and authorized tribes must adopt water quality criteria that protect designated uses. Consistent with EPA's regulations at 40 CFR 131.11(a), protective criteria must be based on a sound scientific rationale and contain sufficient parameters or constituents to protect the designated uses. Criteria may be expressed in either narrative or numeric form. States and authorized tribes have four options when adopting water quality criteria for which EPA has published section 304(a) criteria. They may: (1) Establish numerical values based on recommended section 304(a) criteria; (2) Adopt section 304(a) criteria modified to reflect site-specific conditions; (3) Adopt criteria derived using other scientifically defensible methods; or (4) Establish narrative criteria where numeric criteria cannot be established or to supplement numeric criteria (40 CFR 131.11(b)).

V. Solicitation of Scientific Views

EPA is soliciting additional scientific views, data, and information regarding the science and technical approach used in the derivation of the draft criteria.

Dated: July 17, 2017.

Michael H. Shapiro,

Acting Assistant Administrator.

[FR Doc. 2017–15968 Filed 7–27–17; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9034–4]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7146 or *http://www.epa.gov/nepa.*

Weekly receipt of Environmental Impact Statements (EISs) Filed 07/17/2017 Through 07/21/2017 Pursuant to 40 CFR 1506.9.

Notice

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *http://www.epa.gov/compliance/nepa/eisdata.html.*

EIS No. 20170134, Final, FHWA, IL, Interstate 290 Eisenhower Expressway, Contact: Catherine A. Batey 217–492–4600, Under MAP–21 Section 1319, FHWA has issued a single FEIS and ROD. Therefore, the 30-day wait/review period under NEPA does not apply to this action.

EIS No. 20170135, Draft, NPS, WA, Olympic National Park Draft Mountain Goat Management Plan, Comment Period Ends: 09/26/2017, Contact: Christina Miller 360–565–3004.

EIS No. 20170136, Draft, BIA, WA, Confederated Tribes of the Colville Reservation Integrated Resource Management Plan 2015, Comment Period Ends: 09/11/2017, Contact: Anna Schmidt 503–231–6808.

EIS No. 20170137, Draft Supplement, Caltrans, CA, I–710 Corridor Project, Comment Period Ends: 09/22/2017, Contact: Jason Roach 213–897–0357.

EIS No. 20170138, Final, FERC, VA, Atlantic Coast Pipeline and Supply Header Project, Review Period Ends: 08/28/2017, Contact: Kevin Bowman 202–502–6287.

EIS No. 20170139, Final, FHWA, IL, US 30 from IL 136 to IL 40 Whiteside Co., Contact: Catherine A. Batey 217–492–4600, Under MAP–21 Section 1319, FHWA has issued a single FEIS and ROD. Therefore, the 30-day wait/review period under NEPA does not apply to this action.

EIS No. 20170140, Draft, USFS, WY, North Savery Project, Comment Period Ends: 09/12/2017, Contact: Paula Guenther 307–326–2507.

EIS No. 20170141, Draft, AFS, MT, Starry Goat, Comment Period Ends: 09/11/2017, Contact: Lisa Osborn 406–295–7558.

EIS No. 20170142, Adoption, Final, FAA, CA, ADOPTION—Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training at Marine Corps Air Ground Combat Center, Review Period Ends: 09/04/2017, Contact: Paula Miller 202–267–7378. The U.S. Department of Transportation's Federal Aviation Administration (FAA) has adopted the U.S. Department of Navy's FSEIS #20160327, filed 12/30/2016 with EPA. FAA was a cooperating agency on the project and recirculation of the document is not necessary under Section 1506.3(c) of the CEQ Regulations.

Amended Notices

EIS No. 20170106, Draft, NMFS, OR, Analyze Impacts of NOAA's National Marine Fisheries Service joining as a signatory to a new U.S. v. Oregon Management Agreement for the Years 2018–2027, Comment Period Ends: 08/21/2017, Contact: Jeromy Jording 360–753–9576. Revision to the FR Notice Published 06/23/2017: Extending the Comment Period from 08/07/2017 to 08/21/2017.

Dated: July 25, 2017.

Dawn Roberts,

Management Analyst, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 2017–15966 Filed 7–27–17; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–9965–40–OA]

Notification of a Public Teleconference of the Chartered Clean Air Scientific Advisory Committee (CASAC) and the CASAC Secondary National Ambient Air Quality Standards Review Panel for Oxides of Nitrogen and Sulfur

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The EPA Science Advisory Board (SAB) Staff Office announces a public teleconference of the Chartered Clean Air Scientific Advisory Committee (CASAC) and CASAC Secondary National Ambient Air Quality Standards Review Panel for Oxides of Nitrogen and Sulfur to discuss the CASAC draft review of the EPA's *Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter—Ecological Criteria (First External Review Draft—February 2017).*

DATES: The teleconference will be held on August 31, 2017, from 1:00 p.m. to 5:00 p.m. (Eastern Time).

ADDRESSES: The public teleconference will be held by telephone only.

FOR FURTHER INFORMATION CONTACT: Any member of the public wishing to obtain information concerning the public meeting may contact Dr. Thomas Armitage, Designated Federal Officer (DFO), EPA Science Advisory Board Staff Office (1400R), U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue NW., Washington, DC 20460; by telephone at (202) 564–2155 or at *armitage.thomas@epa.gov.* General information about the CASAC, as well as any updates concerning the meeting

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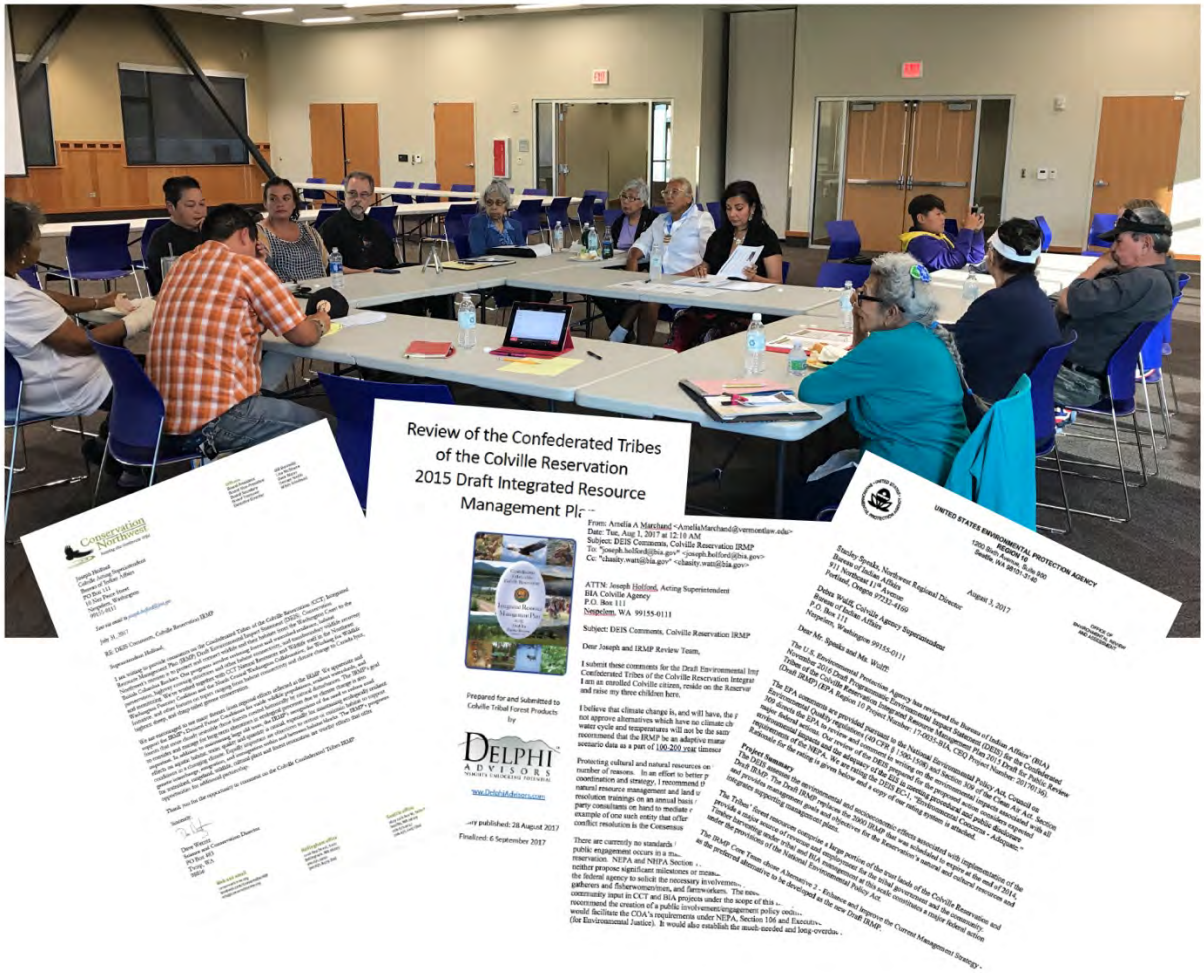
U: Response to Comments

Source:
The Center for Applied Resource
Response to Comments on the Draft Programmatic EIS
2018

Confederated Tribes of the Colville Reservation
Integrated Resource Management Plan
Programmatic Environmental Impact Statement

Response to Comments

on the Draft Programmatic EIS



Prepared
by

THE CENTER FOR APPLIED RESEARCH
1133 Filbert Street
San Francisco, California 94109

August 7, 2018

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Introduction

The Colville Tribes' forest resources comprise a large portion of the trust lands of the Colville Reservation and provide a major source of revenue and employment for the tribal government and the community. Timber harvesting under tribal and BIA management at this scale, along with livestock grazing, constitutes a major federal action under the provisions of the National Environmental Policy Act (NEPA) and necessitates the preparation of a Programmatic Environmental Impact Statement (EIS).

In 1988, the BIA began a national IRMP initiative intended to develop comprehensive, integrated plans for each reservation. The passage of Indian forestry and agriculture acts in the early 1990s established the requirement that forest and agricultural plans comply with tribal Integrated Resource Management Plans.

An Integrated Resource Management Plan (IRMP) is defined as a tribe's strategic plan for the comprehensive management of a reservation's resources. IRMPs are developed in a process that examines the relationships among natural resources and their various uses, economic trends, cultural needs, and social forces. The ultimate goal of an IRMP is to create a balance within natural resource management actions that reflects the social, cultural, economic, and natural resource values of reservation residents.

The Draft Programmatic Environmental Impact Statement (DEIS) assessed the potential environmental and socioeconomic effects associated with implementation of the 2015 Integrated Resource Management Plan (IRMP) for the Colville Indian Reservation. The focus of the DEIS is the likely environmental and socioeconomic impacts of timber harvesting and livestock grazing as they are to be managed under the goals and objectives of the IRMP.

The DEIS was completed in November 2016 and in 2017, the BIA and the EPA published Notices of Availability in the Federal Register. The IRMP and the DEIS were posted on the Tribes' website and hard copies of the DEIS were provided at eight locations on the Reservation for public review.

In July 2017, community meetings were held in four Reservation communities to receive public comments on the DEIS. Written comments were also received. This document presents the comments received and provides responses, as required by NEPA. To facilitate review, the comments have been organized into topic areas.

Public Review Comments and Responses

The Planning Process

Community Involvement

Comments:

🗣 I wish that there were more people participating because a lot of people don't recognize that it's a part of our sovereignty.

🗣 I don't think my voice is heard and I've heard it from tribal members time and time again, and it's a foregone conclusion, what's going to happen. I've been doing NEPA for the last 10 years and I do the EA sections. There's always a FONSI, it's like a rubber stamp all the time. I've seen that time and time again, so here's a perfect example of that. I don't have faith that any of our comments are going to be heard.

🗣 Will our comments be presented to the council in a manner that deals with our concerns that are raised? Giving them a copy is one thing, because I know how that works. It doesn't guarantee that they will take the time to sit with the document. I don't think they're going to invest that much time frankly, even with an executive summary. That's asking too much, too. I mean, I get it, and that effort just seems like it's not going to get us very far in being heard again.

🗣 I was hoping tonight we would be helping put things together that we want, to make it whole. We know we're not functioning 100 percent, maybe not even 50 percent, and if we keep arguing about this, that, and the other thing, we're always going to be that way.

🗣 Protecting cultural and natural resources on the Colville Reservation is very difficult for a number of reasons. In an effort to better prepare managers and technical specialists with project coordination and strategy, I recommend that all Colville Tribal and Colville Agency natural resource management and land use regulation departments complete conflict or dispute resolution trainings on an annual basis and that the Bureau of Indian Affairs have third party consultants on hand to mediate or facilitate conflict and stakeholder assessments. An example of one such entity that offers assistance to entities on collaboration, negotiation and conflict resolution is the Consensus Building Institute, see http://www.cbuilding.org/.

Response:

One of the most important steps in the preparation of an IRMP is community outreach. For this reason, the Tribes' IRMP Core Team conducted a community survey in 2014. Over 1,000 surveys were completed, representing a 14 percent sample of the adult Reservation population. The Colville Reservation Community Survey solicited input from tribal members and residents of the Colville Reservation. The purpose of the survey was to document the community's priorities, preferences, and concerns regarding the management of the Tribes' natural resources.

The IRMP Core Team developed initial concepts for the IRMP, including four additional alternative management strategies. These were presented in the community survey to ascertain the community's management preference. A majority of survey respondents

and the IRMP Core Team chose Alternative 2 (to enhance and improve the existing IRMP) as the preferred alternative. The team recommended Alternative 2 to the Tribal Council and they agreed with the recommendation and unanimously passed a resolution to develop Alternative 2 into the IRMP.

The community survey results played an important role in developing goals and objectives for the management of the natural resources of the Colville Reservation. The results revealed the ways that community members use natural resources such as firewood and plant gathering, hunting and fishing, and recreational activities along the lakes, streams and rivers of the Reservation. The results also revealed community perceptions of the Tribes' management of forest and range resources and the benefits that accrue to the Tribes' membership and the Reservation community, as well as the flora and fauna of the Reservation. In 2015, the Results of the 2014 Community Survey were published and posted on the Tribes' website. The survey results were formally presented to the Tribal Council.

During 2015, the team developed the IRMP and presented a draft to the Tribal Council in September. In October, the draft IRMP was posted on the Tribes' website for public review. After additional review and revisions, the most recent draft of the IRMP was posted on the Tribes' website in January 2017 for public review and comment.

Scoping meetings for the DEIS were then announced on the Tribes' website, public notices were posted at community facilities and email notices were sent to interested members of the Reservation community. Public scoping meetings were held at community centers in Inchelium, Keller, Omak, Nespelem, and the Tribes' administration building in October 2015.

The scoping meetings included a presentation of the IRMP planning process, the alternative management approaches that were considered by the IRMP Core Team and the Colville Business Council, and the ranking of alternatives by the participants in the Community Survey. The presentation also provided an overview of the content of the IRMP and the management enhancements developed as part of the preferred management alternative. Comments received at the meetings were summarized in the Scoping Meetings Report that was provided to the Tribal Council, the IRMP Core Team and the Reservation community via the Tribes' website.

The DEIS was prepared and underwent administrative review by the IRMP C0re Team. It was then provided to the Tribal Council for their review. Revisions were made based on these reviews, and the DEIS was posted on the Tribes' website in anticipation of public and agency review.

In the course of preparing the IRMP, the Core Team encountered a number of conflicting priorities. These were expected. Concerns were expressed by team members that some interdepartmental communications were unnecessarily adversarial. Most of the interactions of this multidisciplinary team, however, were professional and productive, ultimately resulting in the successful preparation of an IRMP and DEIS.

The Planning Team

Comments:

🗣Why on earth did we get these outside people from Denver and San Francisco to do the EIS, when we had this fellow in Portland that did the EIS for the first IRMP. Why didn't we just have him do it? I even called the fellow from Denver and asked him "Are you really out here? Do you have people out here in the field doing these tests?"

🗣This is the second group of consultants that have actually put words in the mouths of the people on the IRMP team. The first group walked all over John St-Pierre and this consultant walked all over this team. There's been a lot of arguments that I've heard about what they wanted put in there and what the consultant interpreted and put in there. That's what makes me so angry. It's like we pay them cold hard cash that they can take and spend anywhere, hundreds of thousands of dollars and that doesn't come easy to us.

Response:

The Tribes' Natural Resources Restoration Plan of 2013 provided that consultants be contracted as necessary to provide technical support to the IRMP Core Team, develop data, conduct analyses, create alternatives, prepare exhibits and educational materials, edit the IRMP document, and write the Environmental Impact Statement. Funding for the Restoration Plan and development of the IRMP and EIS came from the funds settling the litigation between the Tribes and the federal government.

The IRMP Core Team chose the Center for Applied Research to provide this technical support, based on the Center's expertise in integrated resource management planning and environmental impact analysis. In addition, the Center has a long history of working for tribal governments throughout the western United States.

Per the objectives of the Restoration Plan, the Center was contracted to facilitate the preparation of the IRMP. The Center's approach to integrated resource management planning encourages the participatory and consensual development of an IRMP by the managers of the Reservation's natural and cultural resources, taking into consideration the concerns and priorities of the Reservation community as revealed in a community survey. The basis of an IRMP are the management goals and objectives. These were prepared by the Tribes' representatives from the following departments and programs:

- Forestry
- Rangeland
- Environmental Trust
- Fish & Wildlife
- History and Archaeology
- Parks and Recreation
- Fire Management

The IRMP also derives much of its narrative from management plans and technical reports provided by the departments and programs. In addition, the IRMP underwent numerous draft reviews by the IRMP Core Team and natural resources staff.

The Integrated Resource Management Plan

Comments:

🗣The BIA needs this document to continue harvesting timber and managing the Reservation. Some of the frustration is that we have a very broken system across all the Reservation. The BIA is broken, the tribes decision-making processes are broken and this reflects that loud and proud. And it's just sickening, because things that need to be addressed, like why people don't do the things they are supposed to do in their jobs that they are put in, is a human thing and that's not addressed. You can talk about mistletoe, and overstock of cattle, and depletion of water resources, but those are human caused issues and that's the way humans think. We do not want to allow people that are trained in those ways to bring that transformational change.

🗣This isn't transformational change and that's what we need. We don't need another plan that says that we recommend that you harvest this much because we are already told what's going to be harvested and why.

🗣While integration of resource needs was the desire of the staff working on the first IRMP, the integration of the resources was never achieved. As a result, impacts to streams, lakes, and the land continue with mass wasting and ecological damages that resulted in the tribe suing the BIA for mismanagement of their lands. To date the integration of all resources has not occurred and the BIA continues to use the same practices that caused so much damage to the Tribes' resources.

🗣The greatest problem with the first IRMP was the lack of integration of all resources and goals. This document continues this non-integration for the Tribes' resources other than Forestry and Range. The Environmental Trust Department tasked with overseeing forestry practices, is not allowed to do its job. Instead, following the Canadian policy, where the industry monitors their own activity, the 3P process makes an effort to integrate, but requirements worked out are most often not put into the actual harvest contract with the contractors, with specific language to ensure that integration is carried into implementation.

🗣When Forestry talked to the first IRMP consultant they found out that he had attributed the rainfall amount from Inchelium across the Reservation indicating a much higher growth rate than what was actually seen on the ground. All of these factors led to an unsustainable practice and ultimately led to a lawsuit against the BIA/US government for mismanagement of the tribes' resources and the $193 million dollar award to the Colville Reservation for damages. Is that the plan again?

🗣Seven IRMP draft reviews are a lot of reviews. My concern is how were those reviews, and the issues that came out of those reviews, did that change the scope of the document? Because all that we can say is that we have to take your word for it.

Response:

Integrated resource management is an approach to reservation resource management that takes a whole system approach, viewing all resources (natural, social, cultural, and economic) as being interrelated in such a manner that management actions directed at one resource also affect others. As such, the integrated resource management approach accommodates the management of natural resources that involve multiple, and

sometimes, conflicting uses. In developing the IRMP, the goal of the planning effort was to provide a plan that balances multiple uses in a way that ensures the long-term sustainability of all the natural resources that are important to the tribes of the Colville Reservation.

Integrated resource management planning on the Colville Reservation is a fairly recent development in the history of the Reservation. It wasn't until 1960, with passage of the Multiple Use - Sustained Yield Act, that the federal government acknowledged that natural resources such as forests and rangelands are used for multiple purposes.

From the earliest years of timber harvesting, the management of the Reservation's natural resources were not guided by any planning documents. The first formal forest management plan for the forests of the Colville Reservation was prepared in 1961 after a half century of timber harvesting. The plan emphasized the production of timber crops.

The 2000 IRMP was the first multiple use natural resource management plan developed for the Colville Reservation after almost a century of timber harvesting and grazing. The IRMP provided a holistic approach to the natural resources of the Reservation: the watersheds, forests, rangelands and the fish, wildlife and humans who inhabit them.

In 2005, the Colville Tribes and 40 other federally-recognized tribes filed a lawsuit against the United States, in which the tribes alleged that the Department of the Interior and the Department of the Treasury had mismanaged monetary assets and natural resources held in trust by the United States for the benefit of the tribes.

The Colville Tribes agreed to accept a $193 million settlement offer from the federal government to resolve historical grievances over the accounting and management of tribal trust funds and trust lands that had been a source of conflict between Indian tribes and the United States for decades.

The management strategy of the 2000 IRMP was designed to address a host of forest and watershed health issues resulting from a century of past management practices such as selective harvesting, fire exclusion, inappropriate road construction and logging practices.

The 2015 IRMP continues to address legacy environmental issues in the context of a holistic, integrated resource management strategy. In developing the preferred alternative management approach, the IRMP team reviewed the 2000 IRMP goals and objectives and identified a number of enhancements and improvements to be incorporated into the 2015 IRMP to improve management of the Reservation's natural resources. These include:

- Establishment of Special Emphasis Areas:
    - Lake Management Areas
    - Wildlife habitat and travel corridors
    - Cultural plant gathering areas
- Enhanced Best Management Practices for forests, agriculture and rangelands.

- Adaptable harvest volume for timber sales based on site conditions.
- Improved enforcement of rangeland grazing permit requirements.
- Development and implementation of a Forest Road Management Plan with construction and closure standards.
- Transportation and timber harvest plans developed with Light Detection and Ranging (LIDAR), a laser-based remote sensing technology.
- Development and implementation of a climate change strategy.
- A new Memorandum of Understanding with the Bonneville Power Administration to re-establish native plants in mitigation areas.
- Increased efforts to control invasive weeds, emphasizing non-herbicidal treatments.
- Additional wildlife population augmentation for species with diminishing numbers.
- Okanogan Nations Alliance collaboration regarding aboriginal territories.

National Environmental Policy Act and Tribal Environmental Review

Comments:

We should just go by NEPA law, because this IRMP/EIS is a waste of time. We should be going by NEPA law, that's the only way to protect.

The BIA got rid of NEPA, the person that knew how to do NEPA, because we don't do NEPA here. We just do pieces and stuff.

Response:

The IRMP and the underlying Forest Management Plan and Rangeland Management Plan were prepared in compliance with the National Indian Forest Resources Management Act and the American Indian Agricultural Resource Management Act. The acts require these plans to be consistent with the goals and objectives of the IRMP.

The DEIS was prepared in compliance with the statutory and regulatory requirements of NEPA, as well as NEPA-related BIA regulations and guidelines. Although a Programmatic Environmental Assessment would likely have been sufficient to fulfill the Tribes' compliance requirements, the Tribal Council chose to prepare a more rigorous Programmatic Environmental Impact Statement, in part, because it required significant, formal, public involvement.

All projects implemented under the IRMP and the underlying resource management plans are subject to further environmental review when they are proposed. An Environmental Assessment, tiered from the Programmatic EIS, is prepared for each project, providing project specific impact analysis by the IRMP Core Team.

Comments:

There are currently no standards in place or enforced by the Tribes or the Colville Agency for ensuring that public engagement occurs in a manner which addresses environmental justice issues on the Reservation. NEPA and NHPA Section 106 both call for public and stakeholder

involvement, yet neither propose significant milestones or measurable indicators of good faith acts on behalf of the federal agency to solicit the necessary involvement, particularly from subsistence hunters, gatherers and fisherwomen/men, and farmworkers. The need to have tribal member and community input in CCT and BIA projects under the scope of this DEIS is very important. I recommend the creation of a public involvement/engagement policy codified by CCT law that would facilitate the Colville Agency's requirements under NEPA, Section 106 and Executive Order 12898 (for Environmental Justice). It would also establish the much-needed and long-overdue role of tribal and community member input in the activities affecting their living environment, natural resources, and communities.

🗣I know that we have the 3P process and I think it's important to know and to understand that each discipline comes to the table and they look environmentally at any activity that happens on the Reservation. I think it's a process that could be improved, but my hope is that whatever this IRMP ends up being, the tribal departments must live with it in managing the resources on our Reservation. Our tribal government, the 14 people at that table, must also support it and know what it is. It's a 15-year document and it's what we all will have to live with. It is for the benefit of all tribal members, not just the tribal departments, not just our tribal government, it's for all of us.

🗣When the Tribal Council makes a decision, they are making it with the best information that they have in front of them. We do not know what and how it's communicated to them and how they are making their decision, but we do elect them and they can only make the decisions they make with the information that's provided to them. So sometimes it goes my way and sometimes it doesn't. Life is not fully funded. I just do the best that I can and I've been able to accomplish some pretty big projects.

Response:
The requirements for public involvement under NEPA are very clear. Public scoping meetings and distribution of the scoping report prior to preparation of the DEIS, mandatory public meetings to review and comment on the DEIS, and formal responses to comments, are all required. Scoping meetings and DEIS community meetings were both held in four communities for a total of eight community meetings. In addition, the IRMP Core Team conducted numerous community meetings throughout the planning process to provide updates on the planning process and the natural resource management strategy, and to gather comments and concerns from the community.

Most significantly, the IRMP Core Team actively sought out community input via a community survey that obtained responses from over 1,000 members of the Reservation community. These responses were provided to the Tribal Council and the Reservation community in a formal report: Results of the 2014 Community Survey. The planning process did not lack opportunities for the community to provide input. The biggest challenge in this regard, was to encourage community members to review the documents provided on the Tribes' website and attend the meetings.

Throughout the planning process, the Tribal Council was formally presented with the IRMP planning objectives, alternative management strategies, community input, and environmental impact analysis.

Alternatives

Comments:

🗣Alternative 4 says expand forest and livestock and that's the page that I said was utterly ridiculous and didn't even belong in the document. NEPA requires viable alternatives and this doesn't even meet NEPA.

🗣Alternative #3 is at a sustainable level targeting timber that is prone to climate change, disease and insects.

🗣The preferred alternative should include a strong element of insect and disease control.

Response:

The preferred management alternative (#2) and the four alternative management strategies were developed by the IRMP Core Team in compliance with the requirements of NEPA. The alternatives were developed to provide a range of management strategies, most significantly concerning harvest methods, annual allowable cut, and livestock grazing levels. These alternatives were informed by Tribal Council suggestions, resource manager expertise, and community input, primarily from the Community Survey. Four of the five alternatives (including the preferred alternative) include goals and objectives addressing insect and disease control.

The Holistic Goal

Comments:

🗣We have these different departments that are given their marching orders and they have to go out and do their jobs. Do they intentionally, in the past or now, go out there to my detriment? Intentionally? I find that hard to believe because many of them are tribal members. The balance in the Holistic Goal is the balance we need to strive for.

🗣Is this IRMP going to address all of the folks needs, for the natural needs of the animals, the roots, the berries? At the end of the day with this IRMP, how do we balance harvesting our Reservation to meet the needs of our people? Because we walk in this world now. You know, in my grandmother's day, they didn't have a house payment. They didn't have an electricity payment, they didn't have the grocery bills. They lived simply, they lived off the land. Could we go back to that? I do not believe we could go back to that. But to what degree do we allow our resources to be harvested? How do we let them be harvested? I thank the group that developed this, I know they put a lot of effort into it.

🗣The IRMP indicates that our tribe will do a balanced, sustainable management. If the IRMP is going to be the plan that our tribal government says will manage all of our natural resources on this Reservation, it must be something that they actually support and fund. There are tribal programs that are created by law and regulations, with directives to do their work a certain way, and if it conflicts with the IRMP, they must be mitigated quickly. We can come up with best practices today, but how will it be administered? Will it be complied with by the tribal government as the departments try to carry it out? That's something that we want to make sure is on the record.

🗣We are very concerned, not only for our water, our air, our land, our roots, our berries, our medicines, and our brothers and sisters (the elk, the deer, and the fish), but also for us. What my great grandchildren will have should be comparable to what I have today. The departments that administer these programs and our tribal government should ensure that.

🗣We are our own worst problem and that it boils right down to the same one thing: we need money. Where is the money going to come from? Do we support the health and welfare of our water, our land, our animals, and our cultural roots and berries, or do we support the people. It's always going to be that way. People need to eat, people need a lifestyle, but we also live here and it is more important that we take care of the land, and the water and animals will take care of us. 100 years from now, after we are all gone, our grandchildren and great grandchildren will be able to enjoy this if everything goes well. We'll see where we go from today in this new era.

🗣The main focus of the EIS is how many millions of board feet of timber they're going to cut for that year and how many cows are going to be let out in the riparian areas.

🗣I always have the holistic goal with me, wherever I go, it's in my folder. I recall the comments and statements that were made at our meetings to make this holistic goal and some of the words in there come from myself, but we all put it together and that's the way we want this Reservation to be and it hasn't happened. I was hoping and praying that it would.

🗣The Holistic Goal says we should have balance and sustainability. We have to take into consideration, I believe, with our IRMP for the big umbrella, is the membership. The mother earth and us are like one, so I believe that balance has to be there.

Response:
The Holistic Goal is a resolution passed by the Tribal Council in 1996. It anticipated preparation of the Tribes' first IRMP in 2000, providing an overarching goal under which the IRMP was to be consistent. In addition, the IRMP team prepared a list of Desired Future Conditions as part of the IRMP, to further guide the development of planning goals and objectives.

The Holistic Goal is an important part of the 2015 IRMP. In addition, the IRMP Core Team updated the list of Desired Future Conditions for inclusion in the 2015 IRMP. The DEIS further analyzed the alternatives for their consistency with the Holistic Goal and the potential to achieve the Desired Future Conditions.

For almost a century, the Reservation's natural resources were managed without the Holistic Goal or integrated resource management. The legacy of environmental impacts from this period are described in both the IRMP and the DEIS. These impacts cannot be remediated within a single 15-year planning period. The IRMP strives toward a management strategy that will mitigate the impacts of future management activities while remediating the legacy impacts of past management activities.

Annual Allowable Cut and Sustainable Harvest

Comment:

They keep harvesting and the trees are getting thinner and thinner. You can look through every forest all the way to Omak and see for miles. That's a concern for me because what is there going to be seven generations from now? A twig? I think we're not allowing our forest to regenerate, at least that's what I've seen when I go out.

Response:

The Forestry Program utilizes a variety of management techniques to maintain a healthy forest. Thinning trees and reducing understory stocking (especially in areas overstocked from years of fire suppression) plays a critical role in reducing fire hazard and helping individual trees grow. With these treatments, the goal is to maintain tree growth, not to regenerate new trees in the understory. Regeneration treatments are also a common practice on the Reservation. These treatments are implemented to facilitate the establishment of new regeneration. Natural regeneration can take up to five years to establish in these stands. Planting stands can establish regeneration much faster. Planting and natural regeneration are prescribed depending on site specific conditions and available funding. The Forest Management Plan provides for a variety of these treatments across the landscape to achieve a range of stand conditions and age classes over time.

Comments:

If we keep within the allowable cut and then a forest fire comes along and wipes out everything, where is the adjustment in board feet? I don't see where there is an adjustment, so how can that be sustainable?

We had a lot of the forest burn and now we're trying to bring more timber for the loggers and cutters, and we just don't have the timber that we used to have. We have timber on the Inchelium side, and they've hardly touched it. There's a lot of timber over there.

Response:

Wildfires have had an impact on the Tribes standing inventory of timber. The Forestry Program has mapped the fire damage and re-measured the forest inventory. The program is currently in the process of analyzing the inventory data to determine what impact these fires have had on the long-term sustained yield of timber supply, and will make recommendations to the Tribe on what the implications are to the annual allowable cut.

The harvest schedule has also been adjusted to reflect the fire damage. The harvest has been shifted to project areas that were not burned. The Forestry Program will review this harvest schedule and make adjustments every 3-5 years as more information and data becomes available.

Comments:
🗣We take 77 million board feet off our Reservation and most of it comes from the east side of the Reservation because most of the trees are there, but we also have most of the wildlife on this side. So, if we just keep taking them and I don't see anything getting replanted. Our forestry practices are better than they used to be, but do you think that our Reservation can sustain another 15 years just like the last 15, and still have what we have today in 2017? What's going to be left at the end of that 15 years?

Response:
The Forestry Program plants thousands of acres every year. Many other stands are prescribed to naturally regenerate. All treated stands are monitored by the district forestry staff the 1st, 3rd and 5th years after treatment, to determine if adequate stocking is achieved. In cases where regeneration is not adequate, appropriate action can be taken to ensure trees are established.

Comments:
🗣I saw the chart of all those decades in the past where our harvesting went on: high, low, high, low. I have to say this on behalf of those that aren't here to speak on their own behalf: they did the best that they could with what they had at the time. Those were their best practices at that time. My entire family, they were out there. They thinned, they burned, they harvested, they were loggers, they were a part of this. So, I cannot speak negatively about that, it was what it was. It's the past, can we learn from it?

🗣All through the last IRMP I consistently saw sustainability and in this one I'm not seeing sustainability. So that the land can sustain itself after your activity is done. That's really important. The even-age growth, I just don't agree with that. It's just that I don't think our forest can sustain it.

🗣The allowable cut level in alternative one, two and four are not sustainable especially in the light of climate change. With the increases and severity of the number of wildfires and changes in snow and rain patterns, adaptability needs to be the plan to ensure that resources are sustainable.

Response:
A long term sustained yield analysis was completed in the 2013 Forest Inventory Analysis. This report was incorporated into the IRMP and Forest Management Plan. It is important to remember that the IRMP only sets the annual allowable cut for the next 15 years. The Forest Inventory Analysis performed a non-declining even flow analysis for over 120 years to determine a reasonable sustained yield. That same report also illustrates that even with a consistent timber harvest operation for the last 50 years, the Tribes total board feet of standing inventory has been steadily increasing over the last few decades. This indicates that growth exceeds harvest.

Timber Harvest and Logging Practices

Comments:

When I used to go to Twin Lakes, you couldn't see a clear-cut spot anywhere, and now you can see them all over the place.

They wiped out the trees all the way downstream from Bridge Creek to Log Cabin just within the last 5 or 6 or 7 years. They came in again and again and cut and now there's nothing but brush. I get it about the fires and the thinning. I agree that if it doesn't burn, it needs to be thinned because there has to be some kind of management of the forest.

Response:

Harvest operations in this area during the stated period were all related to blowdown salvage operations in the Bridge Creek and Hall Creek areas that occurred after a severe wind storm swept through the entire Sanpoil Valley. It was a difficult operation because the trees were down and broken. The Tribal Council directed the Forestry Program to aggressively salvage all blowdown trees. This project was a reaction to a natural disturbance, much like a fire salvage.

Comment:

You can see where they have logged and sprayed, and actually it doesn't look like they did a bad job compared to some places where it looks like someone went in with a grenade and blew up the land and it totally looks bad.

Response:

Spraying for site preparation and planting has not occurred on the Reservation since the late 1990's, but it was a very successful practice at that time, creating many of the well-established plantations that now exist across the Reservation.

Comments:

If we follow the actions of the last IRMP then we're still going to have a lot of the problems that we have currently, like at Devil's Elbow with the soil erosion. They said they were going to protect it and there wouldn't be as many skid trails. The soil erosion and the skid trails came straight down a slope and should never have come down at that angle. The erosion that came down the following spring proved it. It totally washed the road out and everything down below. I understand that in the past we didn't follow best management practices for logging, but some of the activities that have occurred on the Reservation are not following the best management practices if you do not take everything into consideration.

On Devil's Elbow and on the North Star, they left so much waste. If they're not going to take it there's no reason for them to cut it and leave depths of waste there to be burned later.

Response:

The Forestry Program is not aware of any major erosion issues involving the Devil's Elbow Fire Salvage, beyond those typically resulting from a wildfire. Harvest operations do have impacts on the environment and the IRMP and Forest Management Plans designate best management practices that guide the proper implementation of harvest

operations that mitigate the impact of heavy equipment on the ecosystem to an acceptable level.

Cutting and bucking specifications are outlined in the Forest Management Plan and for each timber sale contract. The forestry program enforces these specifications during harvest operations to ensure the full utilization of the Tribe' resources. Fire salvages tend to have a higher amount of waste because many of the trees are damaged to where they no longer meet quality specifications. The Forestry Program works closely with the purchasers to reach full utilization, but often some portion of a tree cannot be utilized, especially on salvage operations.

Comment:
Does aesthetics really matter today? Because when you're done with logging, when you're walking away from it, it still has to be something that is appealing to the eye.

Response: A variety of site preparation techniques are used to prepare stands for planting and natural regeneration. The IRMP and the Forest Management Plan have requirements to leave a varying amount of downed debris for soil stability and wildlife habitat. Initially, this may be aesthetically unappealing, however, it facilitates regeneration of the site.

Comments:
I wanted to believe that all the people managing the forest were managing it the way that they should, until my uncle came and got me and said, "I need your help. I need you to come stand with me. We need to do these petitions, we need to do this. We were fighting Dead Horse at that time, which was the very first helicopter logging. Why? Because that was another inoperable area and it was a deferred watershed management unit.

Our environmental groups on the Reservation do not like helicopter logging. I wish we would get back to selective cutting which they did before 1985 when the clear-cutting started. Environmental groups are fighting that, trying to get them to stop, but they won't. I have letters from elders who didn't like what they did to McAlister Ridge with the helicopter logging. You could see the helicopter logging as you came from Omak. I was on the field trip and I couldn't believe that they were going to do that to our ridges. Our ridges and our mountain tops are sacred to us. The helicopter logging was taking all the trees which were previously classified as inoperable.

Response:
The Deadhorse helicopter sale was considered under a Tribal Council directive and resolution. The project was reviewed by the Forestry Program and deemed uneconomical and was never implemented. The helicopter cost exceeded the value of the timber.

The McAlister Ridge helicopter sale was developed by the Forestry Program in response to a Tribal Council directive and resolution. Log prices were very high at the time and the project helped meet obligations to the mill and provided revenue to the Tribes. In the Forest Management Plan, all commercial timber acres are available for harvest,

including helicopter ground. Helicopter operations will likely continue to some extent in the future unless these areas are removed from the commercial cutbase. The timing of helicopter projects will depend on future log prices and site-specific issues that arise as the harvest schedule is implemented.

Comment:
When you look at our forest and the number of people that we have to harvest and to remediate or ensure that its remediated, we don't really have enough workforce to do that, and they get pressed to comply. The IRMP says you do this this way, but when you get right down to it, if they only have the resources to do 50%, that's all they have. So, walking into the project they know they're going to be non-compliant. Intentionally? No, I don't believe they go out there to intentionally be 50% compliant. But if they were fully funded to do the best job with the best practices, they would go in there and do it at 100%. But if you're only giving them funding for 50% management, you're only going to get 50% management.

Response:
The ability to properly manage the Tribes' forest resources does require adequate funding. The Forestry Program utilizes a variety of funding mechanisms to achieve management goals, including federal and tribal dollars. The Forestry Program coordinates with the Tribal Council on all projects and budgets to ensure that all departments are aware of funding needs.

Comment:
During the time that they were clear-cutting, we didn't have the Omak mill, but we had a mill in Nespelem and we had a pulp plant in Inchelium. We had other businesses, but weren't self-reliant. So, the tribal government had to make a decision, and the decision that they made at that time, was to use the forest resources so that our tribal members could keep their jobs. For a short period, people were on 4-day work weeks. So, everyone took a 20% cut and we harvested timber like we had never done before. But at the end of the day, the majority of tribal members had their jobs and they could still survive. So, yes, we did do clear cutting but we can't go back and undo what we did with the natural resources back then. Those who sat at the table had to make a decision affecting tribal members' livelihood. It was the best decision they could make on behalf of our tribal members.

Response:
The Confederated Tribes of the Colville Reservation and its enterprises are the primary employer in the region. Since its inception in 2009, the Colville Tribal Federal Corporation has grown to become one of the largest, most diverse Native American businesses in northeastern Washington. The company currently manages 13 enterprises that include gaming, recreation and tourism, retail, construction, and wood products. The tribal government and its various enterprises benefit the Reservation community by providing employment opportunities as well as government services and facilities.

Comments:
I looked at the plan and it talks about clear cuts and leaving one or two trees. Two trees are not enough. We lost a lot of trees over the last two years now. Cutting our trees and leaving only two, that's just like a clear-cut. I went out and I was looking at those trees, and they are so darn

ugly. They're lucky to even grow or reseed or anything. They don't leave two healthy, good looking trees, they just leave those snags that look like they're ready to fall over.

🗣It states that regeneration harvesting has been approved already and to just leave two trees and I do not agree with that.

🗣There is a policy to leave big trees regardless of the alternative because of monetary concerns and this policy has never been fully implemented. Trees four feet or larger in diameter have been cut to meet the managed cut obligations and few remain, and of those taken most were cut into 8-ft lengths for ease of removal. Considerations of the best value of a tree must be considered because a large tree can be used for large beams worth much more than the value of 8 foot long 2x4s. It also states in the holistic goal that they want to have large trees.

Response:
The requirement to leave a minimum of two trees per acre is a provision in the Tribal Code. The IRMP and the Forest Management Plan, however, designate that a minimum of five dominant or co-dominant trees per acre be retained on every treated unit. For most silvicultural treatments, more trees than this will be retained. In some cases, where there is a limited number of large trees to choose from, the minimum of five will be sufficient.

Comment:
🗣I feel bad there's a lot of timber up there that didn't get salvaged after the fire, and now it's just dead.

Response:
The Forestry Program diligently tries to salvage as much dead timber as possible. Unfortunately, recent wildfire events were so large that it was impossible to harvest all of it before it deteriorated. The IRMP and the Forest Management Plan clearly states that it is the goal of the program to salvage dead timber as approved by the Tribal Council.

Comments:
🗣If they're going to go in there and plant trees, they need to clean it up a little bit. I tree planted, I had a crew out there and I was wondering where are they going to plant the trees? It's like London Bridge is falling down up there.

🗣I look at my trees that we planted, and they are tall as hell today. They didn't get burned. I looked at three plots that we did and I'm kind of proud of them, because most of the people that helped plant them are gone. We were talking and telling the stories. I was telling these kids, "You're going to be doing that," and they said, "Oh no, I don't think I want to work out here, it's scary now." I said, "Well, that's part of life. It's part of nature. Now we've got to figure out how to re-harvest it."

🗣Harvest waste must have a date by when, if unburned, it is removed. Piles of slash are still on the ground from harvest years ago increasing the risk of wildfires.

Response:
A variety of site preparation techniques are used to prepare stands for planting and natural regeneration. The IRMP and the Forest Management Plan have requirements to leave a varying amount of downed debris for soil stability and wildlife habitat. While it does make planting and reforestation efforts more difficult, it is required and important for other resources.

The planted trees and reforestation efforts are critical to long term sustained yield forestry. Most planted stands are planned for commercial thinning at roughly 60 years of age (depending on site quality and tree density), and will ultimately provide very high yields of timber for the Tribe.

Comment:
Whole tree logging does not limit soil disturbances. I see more trees harvested in the spring and summer than in the winter.

Response:
Best Management Practices in the IRMP and the Forest Management Plan provide guidance on harvest operations and BMPs to limit soil damage and erosion are specified in the Tribe's Forest Practices code. Site specific harvest plans are developed for each timbersale using this guidance. Stands with soils that are considered sensitive to compaction and disturbance will often have seasonal restrictions to limit harvest to frozen soil or dry soil conditions. Soil protection requirements vary by site and are usually developed at the project level by an interdisciplinary team of resource specialists.

Comment:
Salvage operations have resulted in sediment delivery to streams 50,000 times the normal levels. Flow, uninterrupted by trees and vegetation have increased stream flows causing localized flooding, landslides, and damages that must be considered in the analysis of the cost of current forestry practices and those proposed under alternative one and two.

Response:
Models used by hydrologists on recent wildfires suggest that suspended sediment delivery can increase drastically after fires. This comment seems to be referring to those models. The models analyzed wildfire disturbance, not salvage logging activity. Research is, however, being conducted to estimate the incremental amount of sediment that could be attributed to salvage harvest operations after a wildfire. The research so far hasn't indicated such a high level of incremental sediment delivery.

Forest Health
Comment:
In my trips across the country, all across the country, and hundreds of other reservations that I've been to, I can honestly say that of forests on reservations, ours is much healthier than others. Is it as healthy as it should be? No, but it's much healthier than most others I've seen. I can say that.

There's very specific historical reasons why there are really terrible practices on other reservations. So yes, we're better than other reservations in New Mexico, but I would say that's a really low bar to put ourselves at.

I feel like our forests are managed way better than the state forests around us. If you walk through our forest, you can see tree to tree to tree and see that they are healthy. But if you go just up to our north half, you can't even see through the trees. They are tiny and small because they are so clustered together.

Response:
Maintaining a healthy ecosystem is the driving force behind the IRMP. It results in a healthy and productive forest that benefits the Reservation community.

Comment:
We're going to clear-cut an area primarily because there's mistletoe. Well, mistletoe is a natural pathogen, it's always going to be there. We can't sterilize the ground and the system of nature and make mistletoe go away. But we can't be heard in that. Nobody listens.

Response:
Mistletoe is a common problem on Reservation forestlands, and has been severely exacerbated by past selective harvesting practices. Mistletoe is just one of many forest health issues that are evaluated when prioritizing harvest operations and determining which units to treat for implementation of long-term forest regulation goals and objectives.

Gathering
Comments:
When I go out in our woods, I go out for medicines and food. Last year I went up, they had clear-cut and everything was lying on the ground all over the berry bushes and there were no berries at all.

I am a huckleberry picker and if I pick up by Granite, there's a pesticide warning. I'm just wondering if there is a place to bring your huckleberries to test them? I don't want to feed my kids poison.

On the Alpine Loop Road, they're out there in an area where I used to pick my bitterroot and they massacred that whole area by logging. That was a beautiful patch of bitterroot down there on that corner. Not everybody knew, it was a family secret. Those family areas are slowly getting devastated, just like our huckleberry areas.

When we were kids, we would go up on the Sanpoil Ridge and pick anywhere. We didn't have to leave the Sanpoil. Now we have to leave the Sanpoil. We keep having to go further and further away. It's very fortunate that some people can find the huckleberries and can pick them, but with all of our population of tribal people, before long there won't be any and we will have to

limit people to a gallon or whatever, and that will have to include our ceremonies too, because our winter dances are still going on, and they are still very important to us today.

I started taking my kids to the woods as soon as they could walk and we've always fished, which we don't anymore because it's not there. They used to play with periwinkles and we can't find them anymore. I know that the water has changed a lot since I first started taking him into the woods to gather everything that we needed for the year.

As a child, I was raised as a gatherer, as a picker, and relied on wildlife for venison and dried meats, or the salmon from filleting it to drying it. To all the medicines that we collect out there. I look at what we did, what we learned, but then I have to remember that my grandmother was the one that was there to teach me, and before her it was her grandmother. If I go three generations back to my great-grandmother, they were there when the big change happened, when we were conquered and we had a full change of life. We no longer roamed in our entire ancestral territory. My grandmother, my mom and all her children were brought from Fort Spokane, along with everyone else. My mom made the point to take us there, she said this is when the change has happened. We were imprisoned there and she told all of us to never lose your way, understand what all the plants are, whether we eat them or use them for medicine, where we have berries and all the brothers and sisters that we rely on out there in the wild. She said that one of the things we would have to do is get our own education to make sure that we can protect our resources ourselves.

Comment:
I hear a lot of people say our logging impacts our cultural plants and makes it harder to find them, but for me personally, when I go gather, my best berry patches are where the forest has been harvested. I think harvesting can have an impact, but the plants return, they come back. I never go looking for cultural plants where the stands are so thick and dense because they haven't been managed. That's never where I find what I'm gathering. I more often gather in old logging units, that's where I find my best berry patches. I disagree with the idea that our timber harvesting is ruining all the huckleberries.

Response:
Huckleberries are found across a wide swath of the Reservation. They may be temporarily damaged by harvest operations, but come back readily on many acres a few years after harvest operations. The IRMP team organizes public meetings for each project to receive public input. This is the appropriate place to meet with the team and make recommendations on specific places that should be protected. It is impossible to protect every site across the Reservation, but specific family places for food and medicine can be protected if the team is made aware of them in public meetings.

Comment:
Our berry picking area went up in that 300,000-acre fire. Will we get our berries back in our areas? Will they ever be what they were before the fire? Had we been more preventive, had we had our Forestry Department out there thinning and burning that underbrush, we wouldn't have had an incinerator fire to the degree that we did. We need to be preventive, we need to make sure that our programs are given the resources they need in order to do that.

Response:
It is very difficult to determine when and where berries will re-establish after large scale fires. The IRMP discusses native plant management and the Natural Resource departments coordinate through the IRMP process to plant native species in areas that are devastated by fires. The department's ability to implement projects of this sort depends on available funding.

Comment:
When we are in the forests or in the rivers, it's a social time for interaction and it should also be a time we take for education. If you take 60 kids up there and no one has taught them when and how to pick, you're bound to have some kind of trouble and I see that happening. All the kids are out gathering rocks. My question is: Did you tell them the story of The Rock, of the Stone and what we believe that to be traditionally? I tell my kids to "talk to the Rock. They've been here forever and they know everything." Don't go out and collect them and bring them back and paint them, but that's what happens. They think that's a cultural activity. The cultural instructions need to supersede any type of activity out there. That's where education really needs to be part of any kind of impact statement. We need to do the teaching first.

Response:
The Tribes value cultural resources because they represent a physical link to the history of the Tribes and because of their role in traditional beliefs and activities that continue into the present day. The Tribes' cultural preservation efforts have helped to identify and protect numerous cultural resources that could be adversely affected by projects initiated on tribal lands.

The Tribes' History and Archeology program established a traditional cultural plant team composed of tribal members under professional supervision to study culturally significant plants. The team has collected over 400 different culturally important plant species that are considered to be of specific importance to the Tribes for various cultural and traditional uses. The list continues to expand as more collections and oral histories are gathered.

Current knowledge indicates that most native plant species had, and continue to have, a variety of traditional uses. Although tribal elders have extensive knowledge of medicinal plants or sustenance foods and berries, young people are not always aware of them. Loss of this knowledge hinders the continuity of culture.

Watersheds
Comments:
Every tree that's taken affects our watershed. Every time we take trees away the water gets less and less, the rain gets less and less, the snow gets less and less, and the air quality gets less and less.

Response:
The watersheds of the Reservation function naturally to provide clean water, regulate stream flows by cycling water through the soil, and provide fish and wildlife habitat, and cultural resources. Riparian zones lining stream courses and wetlands offer critical support for these functions, shading the water, supporting the food chain with leaf litter, strengthening stream banks with root systems, slowing runoff with absorbent soils, dissipating flood flows, and providing woody debris for aquatic habitat.

Most natural systems, including watersheds, have an ability to absorb a certain level of impact without suffering a long-term loss of resource values. Watersheds appear to have the capacity to recover fairly rapidly from natural catastrophic impacts such as wildfire, but the effects of land management activities are more likely to result in long-term changes in the energy balance of a watershed. Currently, not enough is known to determine with absolute certainty when the threshold of hydrologic sensitivity or capacity for a particular watershed has been reached or what the consequences are if this threshold is exceeded for either short or long periods of time. Research, however, indicates that measurable changes in a watershed occur when 20 to 30 percent of a drainage is in a disturbed condition.

The EIS assesses harvest treatments during the years 1990-2014. During this time, harvest treatments affected 159 of the 209 watershed management units (WMU) of the Reservation. The analysis indicates that 141 of the 159 WMUs had harvest activity that resulted in ground disturbances that were well within the watershed's ability to recover. Another 6 WMUs had harvest activity that resulted in ground disturbances near the limit of acceptable disturbance. The remaining 12 WMUs had harvest levels resulting in ground disturbances exceeding the acceptable threshold level. Of those, 11 were less than 25 percent over the threshold.

Surface Water Quality
Comment:
The water in Twin Lakes has some green slime growing in it and there's all these reeds and other stuff that wasn't there before.

Response:
Water quality and condition of Twin Lakes has been a concern for more than 30 years. Lakes accumulate and process nutrients, sediment and organic material much differently than flowing waters, in a process called eutrophication. Eutrophication, which may be evident by increasing amounts of algae and aquatic plants, can be accelerated due to increased inputs from residential yards and septic systems, roads, grazing and logging activities. In recognition of this threat to Reservation lakes, the IRMP includes provisions for Lake Management special emphasis areas where additional water quality protections will be implemented.

Comment:
🗣There is chemical pollution from Canada coming down the Columbia River. When you visit Canada and you can see what the fish look like coming into the river. All the locals there won't touch their fish. They don't want to get into the water.

🗣We have the uranium mines from the Keller mining up there. I mean all these things: the Teck Comico. I bet they're still dumping shit in our water. Then we've got the pulp mill, the biggest paper mill in the world and they're both dumping major contaminants into the river. And every time that water lowers down it's gets airborne and it goes into our water and our soils. That river is flowing into other creeks and it just goes on and on but that case needs to be mentioned in here because that's a very serious issue.

Response:
There are serious contamination issues related to industry in Canada and from mining, industrial, and agricultural sources affecting the Spokane and Okanogan Rivers. The Tribe has filed a lawsuit against the Canadian company Teck and is involved with natural resource damage claims and restoration/mitigation plans with the U.S. Environmental Protection Agency, the Washington Department of Ecology and the Spokane Tribe.

Comment:
🗣Buffalo Lake, Owhi Lake and Omak Lake aren't anything like they were when I was a young girl.

Response:
Lakes are not as static as they may seem. They respond over time to inputs of nutrients, sediment and organic material, inflows and outflows. Both Buffalo and Omak Lakes have no outlet so incoming materials simply accumulate. Over the last 20 years, some inputs from upland management activities have been reduced through changes to grazing, riparian exclosures, road decommissioning and drainage improvements but wildfire and drought have affected conditions in each lake's watershed. There is a need to do more to protect water quality for streams supplying water to the Reservation lakes. The IRMP includes provisions for Lake Management special emphasis areas where additional water quality protections will be implemented.

Comment:
Are impacts from agriculture on water quality addressed in the DEIS?

Response:
Yes. The EIS notes that under all alternatives, the expansion of agriculture on the Reservation will tend to increase the use of chemical fertilizers, pesticides and herbicides that will affect water quality as they drain into streams and boundary waters. Agriculture has the potential to increase the loss of topsoil, and potentially impact the limited supplies of water from smaller surface waters and aquifers.

The goals and objectives of the Agriculture Management Plan emphasize sustainable agricultural practices including the regulation of water runoff to minimize soil erosion. The plan also requires compliance with applicable chemical application standards.

Comment:
In the Holistic Goal, it mentions insects. Fish depend upon the aquatic insects in the water. They also are ecological indicators that tell us whether the quality of that water is good or not. What a lot of tribal people don't understand when they're out in the woods is that it is a whole ecosystem. Our ancestors recognized the whole. But we talk about dividing our culture and our identity up into pieces. The pieces of range and forestry, all these different pieces. When relations are directly connected, the insects that gave the fish life, told us that that water was good. When you're up in the mountain waters and you're looking at the little bugs underneath there that are still alive, those tell you that the quality of that water is safe to a certain level for me to go ahead and drink.

Response:
The Fish & Wildlife Department conducts habitat assessments, while the Environmental Trust Department focuses more on actual water quality. These different focuses are complementary. Both programs consider macroinvertebrate communities in the streams which are an important indicator of water quality.

Comment:
It's amazing how much water we have out there. And we have one little department, a little department trying to monitor all our water. I think our water quality needs to be addressed a lot more. Just to see those numbers and to think how big this land is and we're only looking at monitoring. I like what they've done so far, but I would like to see more.

Response:
The water quality protection program carried out by Environmental Trust is funded by the U.S. Environmental Protection Agency. The funding is limited. There is a need for additional funding that would support several additional employees to assess water impacts from projects and perform monitoring during project implementation to assure compliance with the Tribe's water quality protection codes.

Comment:
When I'm looking at the facts of the water quality that Father Joe Fortier came across on the Reservation in his studies, we don't have hardly any good water quality on the Reservation. We don't. The higher you go up into the mountains it's there. You can find it, where it's clean enough to have the little insect life that he wants to protect.

Response:
Water quality in Reservation streams, lakes and wetlands has been affected by logging, roads, livestock and feral horse grazing, other agriculture, development, wildfire and fire suppression. The Environmental Trust and other departments are working to reduce impacts from current projects, and to restore habitat and water quality degraded by past management. Turbidity from fine sediment is the most pervasive water quality concern in Reservation waters. Water temperatures have been rising since Environmental Trust

began monitoring in the early 1990's. Important streams within the Reservation with high bacteria levels include Omak Creek, Nespelem River, Sanpoil River, and Ninemile Creek. Knowledge of the extent of bacteria concerns is likely limited by the amount of monitoring the department is able to conduct.

Macroinvertebrate communities provide a way to assess stream health along with other water quality monitoring. Both the Fish & Wildlife and Environmental Trust departments are sampling macroinvertebrates as part of their habitat and water quality assessment programs.

Comment:
We know that the Republic septic went right into the Sanpoil River. Our Sanpoil is not being protected and neither is the water, either. Then there's the mine above that. We were trying to stop the Buckhorn mine, but the Council wouldn't do anything about it. What were they doing? They were using clean ground water to pollute. How are we not directly connected to the North Half? The Columbia River goes out to seven of the United States and two Canadian provinces. When I learned that, I could not believe it. That's just how small I was thinking of the Sanpoil and my relationship with the Columbia, but I began to realize how big it is and it's not a small river. It's the fourth largest river on the North American continent. And it goes out to seven of the United States and we are directly connected to it and a part of it. We're like an island that it goes around. Still, not everybody acknowledges that, but the river almost completely circles the Reservation. It feeds the groundwater and everything is directly connected to it.

Response:
The Environmental Trust Department has one position dedicated primarily to boundary water issues such as pollution of the Columbia River. There is a need to do more, however, this work has limited funding. The Fish & Wildlife staff also work on Columbia River and other boundary water issues associated with the Sanpoil, Kettle, Spokane, and Okanogan Rivers.

Comment:
Our tribe provides minimal funding for a small department to monitor our waterways. We have to weigh how we use our revenue, and if we're relying on our natural resources, the timber, for that revenue and you want more monitoring for the waterways, for the range, for the forest, in order to get that monitoring, then we have to do more, we have to take more of our timber to get funding for the monitoring. Because I believe with this IRMP we're going to have these guidelines in there but I think one of the weaknesses that we have with the existing IRMP is that we don't have anything for compliance, true compliance. So, we can have all the 100 compliance requirements for all the tribal departments, but if you're not funded for it, then what happens to the compliance? We have the water sampling and monitoring, but it's not enough. I doubt that we will ever have the resources to really monitor our water.

Response:
Both the Environmental Trust and the Fish & Wildlife departments perform waterway monitoring with Environmental Trust focusing more on water quality and Fish & Wildlife focusing more on aquatic habitat. The monitoring conducted by the

Environmental Trust Department is supported by grants from the U.S. Environmental Protection Agency, rather than tribal funds from timber sale receipts.

There are different types of monitoring, such as monitoring actual water quality versus monitoring compliance with Tribal codes during project activities and monitoring uplands for erosion which may impact water. The Environmental Trust Department receives funding for one person to monitor the entire Reservation for water quality impacts from resource management activities.

Additional compliance is needed regarding the Tribes' water protection codes. The IRMP emphasizes the effective implementation of best management practices and compliance with the water codes. Limited program funding and staffing makes it difficult to perform adequate compliance monitoring.

Comment:
The poison that is coming down from Canada in the river and the impact that it's having on our fish, our soils, on our people, the impact from Republic where they have their sewer discharging into the Sanpoil River, at Inchelium, where they have arsenic in their drinking water. Here in Omak, we have the sewer going into the river from the line that goes from the Omak side to the east Omak side. Yet we don't have any warnings to our tribal members. Our tribe really needs to look at that and address it in addition to our lakes and streams and other waterways.

Response:
The Environmental Trust Department does provide broadcast messages regarding water quality threats. However, sometimes there is a lag between a spill and subsequent notification to Environmental Trust, which can delay the broadcast warning.

Comment:
Our water is too precious for me to see cows coming in and polluting our water. I have a report from Father Joe from Keller. People are trying to say he's not qualified, but he's a professor. He knows what he's doing when he's taking those water samples. Fifteen of our creeks are being polluted by cows. Father Joe told me that children should not be down at the rodeo grounds where it’s real shallow. The mothers take their little toddlers there to swim because it's real shallow and gravelly. He said they shouldn't be down there, he said it's all polluted. It's terrible that they're being exposed to an environment that's not healthy.

Response:
The Environmental Trust Department water quality monitoring confirms undesirable levels of bacteria in several important waters of the Reservation, including Omak Creek, Nespelem River, Sanpoil River, and Ninemile Creek. The department's knowledge of the extent of bacteria concerns is likely limited by funding and the amount of monitoring the department is able to conduct. Several sources can cause high bacteria levels, including livestock, feral horses, failing onsite wastewater systems, and in some cases wildlife. Corrals sited to utilize streams for livestock watering are also a significant source.

Comment:
There is an island forming on the east end of Buffalo Lake from the cows wallowing in there every summer forming a little island where all the silt comes down. The lake is dying. It's smothering with all that junk, all that silt coming in from the creeks, all the algae, and the lake is so full there's hardly any water in it. It's too full and it's being smothered. There's lots of garbage that our fishermen dump in there. Alpine lake is just as bad. Every summer they are polluted. Our kids can't even go to the lakes that are near them. I tell the kids that the only place that's safe is Gold Lake, and maybe Omak Lake or Spring Canyon. When you go up to Buffalo Lake in the summer time, it's cows and cows. The cows are everywhere. They are even up on the west side of Buffalo Lake where the fisherman launch their boats. That's where the kids go swimming.

Response:
Livestock grazing has been limited around Buffalo Lake for a number of years and is not permitted at all on the west side of the lake. There is pressure on the lake and range areas from the feral horse population. Buffalo Creek was affected by a wildfire in 2000 that nearly burned the entire watershed. The stream is still somewhat unstable years after the fire and fire salvage, which contributes to the island forming. Burned Area Emergency Response work was performed after the fire to encourage stabilization, and the Environmental Trust Department performed additional stabilization work in 2015. Lakes don't, as a rule, process pollution very well. Consequently, the IRMP includes a special Lake Management review and process to provide better safeguards for incoming waters and lake shorelines.

Two range units border the recreation areas at Buffalo Lake. There have been complaints of cattle in the recreation areas, usually as a result of damage to fencing, which is often caused by feral horses. The Range Program has ongoing efforts to repair fencing and restrict livestock access to the recreation area.

Comments:
Our most important medicines are sun and water, and without them there's nothing, so if we don't protect the water, which is what the trees are doing, then what do we have for the future?

Riparian management areas need to be increased and protected from actions in them. As climate change decreases our streamflow and increases stream and lake temperatures, healthy riparian vegetation is needed to provide shade to protect our streams. Any tree that provides shade to water bodies needs to remain intact.

Response:
The Forest Practices chapter of the Tribal Code requires that Riparian Management Zones be established along all waters except forested wetlands. Only forest practices that maintain or enhance riparian function and Reservation resources are allowed within the zone. The chapter includes specific restrictions on harvest operations and road construction. The chapter also lists activities that are not allowed in the zone. Specific requirements for minimum zone width and placement by water type are included in the chapter.

Comment:
Chapter 4-10 of the Tribal Code (Water Resources Use and Permitting) states that "no agent of the Colville Tribes, the Colville Business Council, or the United States shall take any action or grant to recognize any right affecting the water resources of the Colville Reservation that in any way infringe or threatens to infringe the prior and supreme rights at interest for the Confederated Tribes of the Colville Reservation." Council can't dictate to allow pollution to occur to our waters.

Response:
The section of the Water Resources Use and Permitting chapter referenced in the comment, emphasizes the assertion of the Tribes' water rights by not allowing any action that might threaten or infringe upon the water rights at interest for the Tribes. The chapter also establishes a Water Administrator position to issue water permits and allows for various water uses including:

- Cultural and religious uses
- Domestic households
- Municipal uses (domestic, commercial and industrial)
- Livestock watering
- Fish and wildlife
- Agriculture
- Recreation
- Industry (including lumber, paper and allied products)
- Electric power generation
- Mining

Ground Water Quality
Comments:
🗣In the Inchelium district, we have arsenic in the water and in some places the water has a noticeable odor.

🗣Several wells in the Inchelium area are contaminated with arsenic, more information needs to be included around this problem.

🗣In Inchelium, the water smells bad. It has that bad looking orange stuff that affects all the sinks and everything. But they're washing in it, they shower in it, even though it has arsenic in it. Our tribal leadership is not even looking out for the safety of those tribal members when it's a known fact. When we talk about social impacts, to what degree have we studied the medical impacts on our membership? I've lost plenty of family members to cancer, leukemia. You know leukemia is a new thing and everyone is getting it. That hasn't been addressed. I know we're doing an IRMP, but there's impacts that stem from what is going on with our natural resources that directly impact us.

🗣Water has always been an issue with me. I knew something was wrong with it the minute I saw that water and how it was staining those houses. I have a lot of friends and family that live in

that area that are drinking that water. Then they find out the real truth today. How many of them are sick over there? How many are sick here? Our tribe will be in a world of trouble when they find out what's really wrong with our water.

🗣I live in Inchelium and have received a couple of notifications that there have been exceedances of the water quality standards for arsenic, but that the water is still safe to drink. It's just occasionally, maybe once every couple of years. Do you know how many times we've got notifications that our arsenic levels are over the standard? We always have arsenic in the water, but a couple of times we've gotten notifications that we actually exceed the standard, but we should be okay. You can still drink it.

Response:
Arsenic is a naturally occurring element in groundwater. Levels of arsenic in drinking water at Inchelium, Nespelem, and around Omak at times has exceeded the U.S. EPA standard set for drinking water. Because arsenic treatment systems are very expensive, water system managers have addressed the problem by developing new wells to source water with lower levels of arsenic. EPA's arsenic standard was lowered significantly from 50 parts per billion to 10 parts per billion in 2001 to protect water consumers from the effects of long-term, chronic exposure to arsenic.

Additional information is available from a study on arsenic by Aspect Consulting completed in 2008, funded by the Indian Health Service. The report is on file at Environmental Trust Department. The Washington Department of Health provides an on-line database regarding community water systems throughout the state including the Inchelium system. Results of water quality sampling are provided to WDOH and posted on-line at:
https://www.doh.wa.gov/DataandStatisticalReports/EnvironmentalHealth/DrinkingWaterSystemData

Much of the Reservation groundwater is moderately to very hard and contains naturally high levels of iron, manganese, and calcium. This produces the staining seen on houses and the mineral buildup on plumbing fixtures. It also raises the amount of soap or detergent needed for cleaning. Hard water isn't considered a health hazard and can actually contribute a small amount of calcium and magnesium toward dietary needs.

Comment:
🗣I'm almost out of water. I don't see those guys worrying about our water because the whole town of Nespelem is getting our water now. Nobody gets back when they say they were. They were going to get hold of the guy that does the water testing. I called once a month and asked, "Well, did you test it again?" He said, "Oh no, I can't do that. I'm doing something else."

🗣I check our well every 6 months, but they tell us we have to pour bleach down it. We never had to do that years ago. They tapped into our well to water the whole town of Nespelem, but I don't have any water. My water is barely coming out.

Response:
The Tribal Public Works Department monitors water quality for the Nespelem town water system following guidance from the Washington Department of Health.

Washington Department of Health recommends testing well water for bacteria and nitrate yearly. Nitrate does not seem to be a problem within the Reservation, based on limited monitoring performed by Environmental Trust.

Various entities operate public water systems on the Reservation. These include the Tribal Public Works Department, the towns of Omak, Okanogan, Coulee Dam, Elmer City, and the Inchelium Water District. Drinking water quality for these public water systems is monitored in compliance with Washington State Department of Health guidelines. The Indian Health Service provides support in terms of well siting, construction inspection, pump testing, and initial water quality analysis for individual wells. IHS also provides engineering and analysis for community facilities such as wastewater treatment facilities. For a problem with a community water system, contact the system manager (for Nespelem, it is the Public Works Department).

Comment:
🗣I'm trying to get a public system setup and get away from the individual wells, and the same near Omak in the Hayden Creek area, but I have to seek funding to do that through the Indian Health Service, and that's just the process that it is. But that is something that I am completely aware of and I don't like it.

Response:
The Indian Health Service provides support to connect homes where feasible, to community water systems. IHS also works with a number of other funding agencies to find and secure funding assistance for projects.

Air Quality
Comment:
🗣Was the air quality not updated for the air quality issues after the mill reopened? I know that we shut down in 2008 but they reopened and there were no current issues identified in here at that point.

Response:
The Colville Indian Precision Pine and the Colville Indian Plywood & Veneer mills were closed in 2009. The Colville Indian Plywood & Veneer mill was reopened by Omak Wood Products in October 2013. The EIS provides emissions data for the mills prior to their closure, as well as emissions during the years when the mills were closed and after the Plywood and Veneer mill was reopened.

Comment:
🗣There used to be ash from the mills on my car parked in front of my house. That was just from the treatment of the timber. Talk about pollution. Nobody did anything about it.

Response:
The air quality program in the Environmental Trust Department and the Director of Land and Property Management have worked closely with the Environmental Protection Agency (EPA) to ensure the mills do not produce higher than permitted emissions. The

mill has a Title V air quality operating permit that sets limits of emissions and defines control devises with standards for operation. These measures along with efficient operation of the wood fired boilers limits the smoke and ash produced.

Comment:
🗣The mills were there my entire life and if we get the mills again, the pollution is something that causes concern about the health problems in our community.

Response:
Emissions from the mills are regulated by EPA under the Clean Air Act by issuing Title V air quality operating permits. High concentrations of fine particulate matter (PM2.5) do pose health problems to portions of the population that are considered to be at risk. These are people with any form of lung/heart disease, asthma suffers, COPD and any problem that might be exacerbated by poor air quality. EPA created the Air Quality Index to express health concerns based on PM2.5 concentrations. To learn more about this index please see https://www.airnow.gov/. The air quality program manages three PM2.5 monitoring sites on the Reservation with data available at the AirNow site.

Comment:
🗣What I didn't see in the EIS was the effect we're going to see from the Teck Cominco pollution coming down into our water and our air. Because it's coming down from the north and that impact should have been part of this study because it's not new, and the Teck Cominco thing has been going on for a long time. Once it is in the water, it gets into the soil and when the soil dries, it puts that contaminant into our air. The air quality doesn't just affect the habitat in the region, it affects the fauna and the flora both. Because when it goes up in the air it comes back down as rain. So, it's transporting it all the way across our region.

Response:
There are serious contamination issues related to industry in Canada and from mining, industrial, and agricultural sources affecting the Spokane and Okanogan Rivers. The Tribe has filed a lawsuit against Teck and is involved with natural resource damage claims and restoration/mitigation plans with the U.S. Environmental Protection Agency, the Washington Department of Ecology and the Spokane Tribe. The EIS for the IRMP is required to assess potential impacts resulting from the implementation of the IRMP. As such, the issues concerning Teck are outside the scope of the EIS.

Forest Access Roads
Comments:
🗣Road density increased over the last 15 years because, even though we had a standard that said we would try to maintain a road density of 4 miles per square mile on watersheds that were not considered extreme, we have unfortunately seen an increase of roads of over 1,500 miles in the last 15 years. We have about 7,000 miles of road right now and over 1,500 of them were built in the last 15 years. Under the management that we are expecting to do this year, we can expect to have about 8,500 miles of roads at the end of this round. And it's something to consider because roads are very important for watershed health.

The total and open road densities have trended away from what the goals were. Density has increased and that needs to be discussed in depth and a pathway to meeting these goals developed, not lowering the bar by increasing or throwing out the standard altogether.

The biggest concern is that even when a road is closed, it impacts wildlife and it impacts watersheds, it impacts our water. We know from facts that we have been able to keep on record, which is a lot, that roads are the underlying water quality problem on this Reservation. It is the biggest issue for water, for watersheds, and one of the biggest issues for wildlife, if not the biggest issue. It's bigger than the actual removal of trees, because trees will come back, but roads, especially roads that are poorly located cause ongoing problems for the Reservation and for people of the Reservation for decades.

Response:
The IRMP sets goals and objectives concerning roads and road management. The Forest Management Plan also provides best management practices for the design of new roads and the improvement of existing roads. The IRMP team works closely together at the project level to meet the road goals outlined in the plan, but conflicts between meeting the road density objectives and harvest volume goals arise as projects are developed. A range of alternatives are considered by the Tribal Council to provide options for meeting objectives. Meeting these objectives is related to the site-specific harvest operation requirements and the availability of funding to deal with obsolete roads. Conflicts will arise, but the IRMP team works to balance all resource objectives in compliance with the IRMP.

Projects implemented under the IRMP also provide the opportunity to improve many of the roads that are causing stream quality issues. The Forestry Program works closely with the IRMP team resource specialists to identify problem roads and implement improvements to these roads as a part of timber sale projects, to mitigate many of the road issues. These road improvements can often be paid for by the logging operation. The IRMP provides interdisciplinary guidance to the Forestry Program on improved road management strategies that can mitigate many of the ongoing road issues that were not recognized as problems in earlier planning documents.

Comment:
For tribal members who go up and pick, if there is a road that makes it easier for you to go there or to a new territory, you don't necessarily want that road closed. Tribal members I think favor that more. So yes, there are a great deal more roads out there, but would the tribal members necessarily want them all put back to what they were before? I don't think so.

Response:
The IRMP recognizes that forest access roads are important to many tribal members for hunting, gathering and other uses. The IRMP team will develop project level road plans under the IRMP to provide adequate access, while closing roads that will not be needed for forestry operations in the near future. The interdisciplinary team approach considers all resource needs and designs road management plans to minimize resource impacts of roads while maintaining adequate public access.

Comment:
For the 2015 to 2029 planning period, there is $5,000,000 allocated in there for the road management, is that just timber roads, or is it all government roads?

Response:
This is funding for a Forest Roads Management Program that would provide management and maintenance for forest access roads.

Comments:
There's two buckets for road management. The BIA road system gets federal funding for management, and they don't get sufficient funding, which is something our tribal government needs to actively pursue, so we can get that fixed. We never get enough money to take care of them. The other roads come under forestry. When they go out to harvest timber, they are authorized to put roads in. The roads are needed to harvest and get the logs out. When they are done, they have to do their remediation.

I know that the management team does what it can to protect the resources that are important to the tribal members. We make a lot of money off our resources, but we impact the environment. I just wish that the tribe would decide to put a little more money into creating better roads so they have less impact. I definitely like the financial rewards, but sometimes we have to give something back. I would like to see better road construction in the first place.

Money from forest practices must also be used to maintain the roads that are constructed as part of each harvest sale.

Forestry is only funded to a point. Restoring roads after the harvesting is done there's not enough money for them to remedy the roads in the manner that they would like. If they are not funded, they cannot put those roads back to the way they were before. They cannot restore it back without the budget. The only way they could is if the tribe provided additional funds from stumpage that would allow them to bring it back close to what it was before, but it will never be what it was before.

Response:
The Forestry Program uses all available funding sources to manage and maintain the Tribes road system, but most of the work is accomplished as part of timber sale compliance. Road management objectives are outlined in the IRMP and Forest Management Plan, and the program works closely with the IRMP team and other resource advisors to implement best management practices on all roads. Funding availability for a Forest Road Management Program will play a big role in providing management and maintenance of forest access roads in between timber sales.

Comment:
About 6 or 7 years ago, they started closing a lot of the timber sale roads that were harvested, for instance, the Trail Creek and Jim Creek area on my side of the Reservation. I was flabbergasted that we paid probably close to $200,000 on Omak and Jim Creek, where bridges were put in, and then the following year, they went up and closed the road, and I said, "What was the bridge for?"

Response:
The Forestry Program works closely with other resource specialists to determine which roads to close after forestry operations are complete. This integrated approach is outlined in the IRMP. Many roads are closed temporarily for wildlife needs or other resource concerns. Bridges and other infrastructure placed behind these closed roads will be used on future timber sales and are still an important part of maintaining a working forest road system. Many of these roads will be re-opened 10 to 15 years later when the next timber sale occurs.

Comment:
🗣My dad built those old CC trails up to the lookouts and he brought us out there and showed us where he built those roads and trails. Because in his days they had to build roads to keep the fires from going everywhere. He said that our firefighters need those roads to get out to the fires, so that's what he was doing. That's how come I know a lot about the woods out there, I've been out there so many times. When they say the road's closed, I'll go out there and nobody's going to stop me. I don't care what the police department or the signs say. I'll go there. Because I've been out there and I've walked those woods with my grandma and my dad and I've been everywhere with them.

🗣The Forestry Department is responsible for most of the road construction. They walk away from maintenance and management, leaving the other departments to find and expend their funds to take care of the problem.

Response:
The Forestry Program works closely with other resource specialists to determine which roads to close after forestry operations are complete. This integrated approach is outlined in the IRMP. Wildfire management is one of many issues that are evaluated when determining which roads to close. Many roads are closed temporarily for wildlife needs or other resource concerns. The IRMP team tries to maintain enough open roads to provide public access and adequate firefighting access, but not every road can be left open when other resource concerns exist. It is a balancing act.

Comment:
🗣I'm working on the long-range transportation plan. We are very concerned about fish passages on the watersheds, and the cleanliness of the water. Climate change is real and it's just going to get worse, so we need to put bigger culverts in to handle all the water. I need to get all the roads, every road in the inventory so it's covered and maintained by BIA. I'm getting somewhere, but the problem is getting all the departments to work together.

Response:
The IRMP is a good step towards better coordination between resource management programs. The IRMP team develops projects with an interdisciplinary approach utilizing the IRMP for guidance. All resource specialists with concerns participate to help develop a road plan for each project and address site-specific concerns related to road condition and management.

Soils and Erosion

Comments:

🗣As we can see from the last year, there are a great deal of impacts to the soil from the tribal departments or the Bureau of Indian Affairs harvesting the natural resource, or the cattlemen utilizing the lands. But Mother Nature has shown us that she, too will have a direct impact on our soil and our water. I think that's one thing in the IRMP, we can't really predict what Mother Nature will do. You know the runoff that we had this year did more damage to all the roads, to all the waterways, than all the programs out there doing their work to manage the natural resources.

🗣The impacts to the soils are affected by Mother Nature. Forestry didn't go out and do the damage to those roads intentionally. Range doesn't go out and do the damage to those roads intentionally. We don't go out there and intentionally do damage to those roads. There is no way anyone could predict the runoff this year. There's no way anyone could fix the damage that happened to our roads and our creeks.

Response:

Heavy rainfall increases the amount of soil erosion, especially from forest access roads that are poorly designed and maintained. The Tribes' have formalized road construction standards and best management practices to reduce the impact of wet winters on forest roads. The IRMP includes goals and objectives to "manage road use to protect the roadway and resources, and provide for a sustained maintenance program." Forest road maintenance has been lacking in the past due to funding limitations. The Tribal Council is evaluating revenue sources that could provide long-term funding for forest road maintenance and closure.

Mill Closure

Comments:

🗣The mill is closed, so what happens to that lumber?

🗣I thought the Omak Mill wasn't in production anymore.

🗣The EIS stated that we are deriving funds and our tribal members are working for Omak Wood Products and Precision Pine and way at the end of it they said they've closed. You should state that right in the beginning and not let people think we have two mills working. Why say that at the end when the fact should be at the beginning? Today, those mills are not working.

Response:

When the IRMP was prepared and the EIS was nearing completion, the Omak Wood Products Mill closed. The Tribes' hope to find a new lessee to reopen the mill as soon as possible. In the meantime, there are other mills in the region that will take the Colville lumber. The analysis in the EIS assumes that the mill will be reopened, which is likely.

Economics

Comments:

🗣We have all these other businesses, so why do we have to harvest resources that we need to live on? Seven generations from now, we are going to need them.

🗣The Tribes have other revenue resources that could offset the revenue, to some extent, that we rely on from our natural resources.

🗣We have the four variations of our revenue and forests are our natural resource that contributes 49%. There are other revenue sources that are not considered in this and perhaps we wouldn't have to be so reliant on our forest for our revenue. If we were to reduce our reliance on forest products, then our forest revenue perhaps might not be 49%, especially if our forests aren't able to sustain the production that is projected in this IRMP.

Response:

The Tribes' business activities have become more diverse in recent years, which has provided more economic resilience from fluctuations in the forest products market. However, as the EIS shows, timber harvesting still typically provides half of the Tribes' operating revenue. The IRMP recognizes the need (and legal requirement) to manage forest resources sustainably. This includes conducting forest management activities that address overstocking, insects, disease, and other forest health issues.

The socioeconomics impact analysis in the EIS estimates the regional impacts associated with each of the five alternative management scenarios identified in the IRMP. As such, the analysis does not evaluate or provide an opinion on scenarios that are not specifically defined by the IRMP.

Comment:

🗣We're still obligated to this mill that doesn't justify it. The antique mill that we had in Nespelem made more profit than that other mill can ever bring into the future. We could rape our land and take every bit of the timber and it would still never fulfill the obligations to that mill if we set the numbers too high.

Response:

Business decisions involving contracts and obligated delivery quotas with a mill can change over time. The EIS assumes that obligations to a mill under the new IRMP will be similar to the past planning period with a sustainable harvest level.

Comments:

🗣Isn't 10% of the revenue from forest products used for land acquisition?

🗣As a result of harvesting all that timber, we have acquired land to make our Reservation a non-checkerboard reservation.

Response:

The Tribes' set aside $10 per thousand board feet of stumpage revenue for land acquisition.

Comment:
🗣We are venturing into agriculture on a commercial level. Once that gets out of a development stage, that would be another source of revenue other than our forest products. Agricultural income wasn't considered in the revenue stream presented in the document.

Response:
The Tribes' commitment to expanding agriculture on the Reservation is new to the IRMP. The management strategy is only in the preliminary stages. Consequently, the potential economic benefits are unknown and might not be realized for several years.

Employment
Comments:
🗣Most of the loggers now on this Reservation are not even tribal members. Most of the people employed are not tribal members. This isn't benefiting our tribes.

🗣Back in the day, my uncles and my grandparents and everybody were loggers. My son was as well, though he isn't right now. But the younger kids are not going to the forest anymore. So, that's the reason we have loggers from the outside.

🗣All my grandparents, my parents, my father, my uncle, my cousins, worked in the forests and provided for their families. I might not have gone to college if I didn't have that support from my family that they gained through our resources. So, I know that's important to our communities.

🗣I can remember in high school, coming to the tribal office and there were only 30 employees. How many do we have today? All of us benefit from our natural resources by providing employment to our membership. All of our children and grandchildren, they benefit from it. Our education is provided by it. I too would like to see it the way it was when my great-grandmother was here, but is that something that is really feasible? What we need to do is strive to do best practices today. How we balance that is where I think the issues come up. I've been in meetings and heard different program staff come in and share their concerns, but our tribe does hire expertise, and for whatever reason, they do provide the management direction, they do carry out what they have been instructed to do. I don't think anyone in any of our tribal programs comes to work each day to not do their job. I just don't believe that.

🗣Natural resource revenue funds 803 full and part-time jobs. I would say the majority of those positions are tribal, some are non-member, but I think the way we use our natural resources to make 803 jobs for those families, that if we didn't have that, then what would those membership families do for a job?

Response:
The socioeconomic analysis does not differentiate between tribal and non-tribal members. The analysis is designed to estimate the total economic impact (direct and indirect) that results from expenditures that occur within the study region (i.e., Ferry County and Okanogan County) as a result of each of the alternative management scenarios. Expenditures made by tribal and non-tribal members thus have equal weight

in the analysis. It is likely true that many of the jobs created by each of the management alternatives will be filled by tribal members since all of the jobs will be located in Ferry County and Okanogan County.

Comment:
Does the delivered log rate on the Impact Analysis of Revenues and Expenditures chart relate to jobs? Aren't loggers and truckers paid through the Sort Yard?

Response:
The payor of truckers and loggers in this analysis is not relevant, whether it is the mill, the Tribes, the Sort Yard, or some other party. To estimate the total economic impact to the study region (i.e., Ferry County and Okanogan County), all that matters is if loggers and truckers are paid to perform services within the study region. The model also assumes that these workers reside and consume goods and services within the study region. This assumption may or may not be true for all workers included in the analysis, but it is a necessary and conventional assumption.

Comment:
The chart should show the additional funding taken in the stumpage allocation plan itself that is recaptured by the bureau or the tribe to pay for the underlying clean ups and the compliance issues that are out there after the forest is logged. For instance, the mechanical piling and clean up that they do. What's the 10% cover now? It's not covering all the compliance. But this other additional money, that's pulled per MBF harvest, is paid additionally to the tribe for the excavation piling and the compliance issues. The additional funding that comes out of stumpage creates new jobs there. The chart is not correct.

Response:
The chart has been revised to provide additional details of expenditures, and employment effects are also updated for the Final EIS. Forest management deductions (10% of stumpage) fund planting, pre-commercial thinning, cone collection, some excavator piling, broadcast burning for site preparation, stocking surveys, and other forest development related activities. The Colville Tribal Sort Yard deposits some additional funding to a “special project” account to pay for excavator piling expenses. Excavator piling is a responsibility of the Sort Yard in the contract, but tribal forest development staff are better suited to handle the contract bid, award, and administration of those activities. An additional $5 per thousand board feet of stumpage is dedicated to environmental clean-up activities.

Comment:
Under alternative 5, all employment positions related to the management of Reservation resources would be eliminated with the exception of jobs created by the forest roads. It said that forest and range management would decrease, but Fish and Wildlife, Environmental Trust, Parks and Recreation positions for resource management on the Reservation would not be impacted. Forestry and range are not the only departments that manage Reservation resources. This needs to be corrected to include all tribal resource related positions.

Response:
The socioeconomic analysis shows an assessment of the jobs that would be created under each of the alternatives. Employment positions that would exist regardless of which alternative is considered are not included in the analysis. Specifically, the analysis only considers employment positions that fit into one of the following categories:

- Logging operations
- Truckers
- Sort Yard
- Milling Facilities
- Tribal/BIA Forestry
- Forest Development/Mechanical Site Preparation
- Forest Road Management
- Range Management.

Employment positions associated with Fish and Wildlife, Environmental Trust, and Parks and Recreation will continue to exist under Alternative 5, but since they aren't generated by Alternative 5, they are not shown in the employment tables or included in the socioeconomic impact analysis for Alternative 5.

Comment:
🗣Forestry and range positions could be replaced with other opportunities for employment. A diverse economy will reduce the reliance on the current economic structure and open new opportunities.

Response:
This may be true. The Tribes' businesses have become more diverse over time. Any additional business opportunities, however, would have to be substantial to reduce or eliminate the need for revenue provided by the Tribes' forest products businesses.

Wildlife
Comment:
🗣I've seen the game go down and come back up and that's awesome. There was a lot of game this year. There were a few years where the game just left.

Response:
Elk, deer, moose, and bighorn sheep are an important part of Colville tribal culture, providing subsistence and spiritual values to tribal members and their families. The Fish & Wildlife Department conducts big game aerial surveys during years when winter weather is favorable for observing animals and when funding is available. These surveys provide population composition and species abundance data for white-tailed deer, mule deer, elk, moose, bighorn sheep, and feral horses on the Colville Reservation. The surveys indicate that deer, elk and moose are showing a gradual increase in populations over time.

Comment:
On McAllister, we're not supposed to go into the bird habitat, because their sensitivity is extreme. We are never supposed to touch them, never supposed to go in there and log, and yet these activities still continue to go on today.

Response:
There are currently no restricted areas on McAllister. The Fish & Wildlife Department designates buffer zones around nests for raptors such as the Northern Goshawk and Great Gray Owl when they are identified. The other resource management departments are notified of these buffer zones to avoid any management activity that may affect these priority species. The buffer zones are in effect for identified nesting sites during the nesting season (October-February).

Comment:
Down below Moses Mountain, we were told that they were planting blue spruce, but they were spraying all the willows to kill them. Deer eat the leaves off the willows. So, I asked if this goes down into the roots, and they said it probably did. It seems they don't know everything about those herbicides they're using. These are paid professionals that are supposed to be managing our resources.

Response:
Spraying for harvest site preparation and planting has not occurred on the Reservation since the late 1990's. It is not the policy of the Tribes to spray willow trees in riparian areas.

Comments:
We go to Roaring Creek and we've seen hunters coming down there. They'll have a hunter standing on the back of a pickup with the rifle and someone else driving it. Our own people need those deer, or elk, or moose, and they're coming down here and taking them. I would like to see a gate going clear across the north side so they can't enter. If you go up to Okanagan National Forest, they have gates to close it off. I would like us to have a totally fenced off Reservation with major fencing. And then we could have "Checkpoint Charlie's," like the Yakama's do.

People think they can just come in and do whatever they want to do. I understand they're going into the Hell Gate area to camp, and during hunting season it gets to be a great big old party place. We've got to have strict rules somewhere.

Response:
The Tribes regulate the harvest of wildlife resources within the aboriginal territory of the Colville Tribes. In regulating wildlife and recreation resources of the Reservation, tribal members are afforded the greatest possible freedom to use and enjoy these resources, consistent with the preservation and improvement of these resources for future generations. Wildlife found on the Reservation may be taken only at such times, in such places, and in such a manner as provided by tribal law.

Tribal members may exercise fishing and hunting rights on-Reservation, on the North Half and off-Reservation pursuant to tribal regulation. Non-members may exercise the

privilege to hunt and fish on the Colville Reservation only pursuant to tribal regulation and only after first obtaining the required permit or license. Permits for hunting by non-tribal members are issued only pursuant to special regulations approved by the Business Council. Violators of tribal fish & wildlife regulations are trespassing and are subject to tribal and federal sanctions. Enforcement of wildlife regulations is primarily the responsibility of police officers and other tribal law enforcement personnel.

The Parks & Recreation Program provides enforcement of the Tribes' codes for camping, boating, off-road vehicles and natural resource codes that apply to all persons who hunt, fish, engage in recreational or related activities on the Reservation and other traditional areas. The program also enforces tribal codes regulating watercraft registration, land use and development, cultural resource protection, and feral horses.

Comment:
Beaver are an important species because they can cool the temperatures of the waters and that's a big struggle that we've been having. Fish and wildlife is trying to get an NRCS grant to bring beaver in and spread them out into areas that are really in need of dams and beaver activity. Sometimes departments turn on each other so there's not a large amount of support out of the Fish and Wildlife department for that. The director feels the beavers are a problem because he was out in one watershed and saw what he thought was a problem. But we are looking at a bigger picture, and in that big picture beavers are needed, and it's a very necessary resource. Those ponds and everything that comes from that is a bonus for us in future harvesting, for wildlife, culture, and everything. Here's a picture of the Sanpoil River today, and you can see that there's not a very diverse species of trees. Here's what it used to look like and you can see the large cottonwood trees in this picture and that's what we need. Beavers can help do that.

Response:
Beaver (*Castor canadensis*) are a tribal priority wildlife species and their importance to the ecosystem is recognized by the Fish & Wildlife Department. The department is currently preparing a Beaver Management Plan that will conduct surveys to monitor population numbers. Currently, the population of beaver on the Reservation is sufficient enough to allow trapping during the winter months, however, there are few trappers taking advantage of the opportunity.

Comment:
While the increased forest activity of alternatives three and four will have the greatest impact to wildlife, the harvest levels in alternative one and two will also cause habitat loss and fragmentation.

Response:
The Wildlife program works to support and maintain abundant wildlife populations through annual wildlife surveys, habitat restoration and population augmentations. These efforts promote a balance of biodiversity important to the Reservation community. With expertise in habitat protection and restoration, the Fish & Wildlife Department provides fencing, planting, and maintenance of native vegetation throughout the Reservation. In addition, the staff protects and monitors vital native

vegetation to ensure essential wildlife habitat such as big game winter range, fawning and calving habitat and travel corridors.

Under the Status Quo Alternative 1 and the preferred Enhanced IRMP Alternative 2, the efforts of the Fish & Wildlife Department will continue and can be expected to result in continued stability and growth of monitored game species. The effects of the forest road system and disruptions from timber harvest activities will continue, however, the use of the Project Proposal Process (3P), adaptive management practices, ongoing restoration activities, and the maintenance of game reserves and mitigation lands should ensure habitat viability.

Fish

Comment:

🗣We are spending millions of dollars on salmon reintroduction and on sending them over the Grand Coulee Dam, and we want to bring the salmon home. But what are we bringing the salmon home to but poisoned waters? We know that they're poisoned. It just seems ridiculous at this point that we're investing so much money to bring something into what we know is contaminated habitat.

Response:

Metals and other contaminants have been identified in the Upper Columbia from Canadian sources. Studies are ongoing to identify contaminants in the river system to determine whether they pose a health risk to humans. The Washington Department of Health recommends a safe level of consumption of salmonids in the Upper Columbia and Lake Roosevelt of up to 3 meals per week of Kokanee and 2 of Rainbow trout. It is reasonable to assume that anadromous salmonids would be as safe to consume should passage over the dams become a reality.

Comment:

🗣I noticed a lot of people went out and cleared out our creek up there and it's actually got fish this year for the first time. But I noticed they are dying.

Response:

The comment does not specify the creek referenced. The Fish & Wildlife Department has ongoing habitat restoration and fish passage projects. The Department is unaware of any major fish kills occurring recently in Reservation waters.

Comment:

🗣My son worked for Fish and Wildlife, working on a stream, planting trees to rebuild the stream beds, and he's been doing that for many years and I wonder why we're not getting it here? Why are we not rebuilding our streams that have been damaged in so many places. I think that should be included and added. Rebuild our streams.

Response:

The Fish & Wildlife Department has several programs to enhance the Reservation's fisheries, with efforts to improve water quality in lakes, control non-native predator

species, and to mitigate losses of anadromous fish caused by the construction and operations of the Chief Joseph and Grand Coulee Dams. Habitat restoration and protection activities, such as restoring fish passage barriers, fencing, riparian planting, stream bank and habitat restoration have been implemented and are monitored.

The Lake Roosevelt Habitat Improvement Project has been ongoing since 1990 and has implemented extensive habitat restoration and fish passage projects in the Sanpoil River Watershed and Lake Roosevelt tributaries on the eastern portion of the Reservation. Similar restoration work for anadromous salmonids has occurred in the Okanogan Basin since the late 1990's as well.

In addition, Environmental Trust is conducting watershed restoration treatments that include replacement of fish blocking or otherwise deficient culverts and decommissioning of roads that affect streamflow and water quality.

Comments:
I really do believe that we have to think about what we are doing out there, because if our waters are warming and the fish are no longer able to thrive, and if the cattle and the wild horses are out there, then our wildlife, the four-legged creatures out there, are the ones that we want to make sure have the resources that they need to survive out in the woods. I'm hoping that this document, and our plan for it, will look out for them.

Fish and Wildlife don't want to have to maintain the status quo, they want to return anadromous fish to the upper Columbia and associated historic habitats. This requires increased riparian vegetation and deciduous trees to provide and protect habitat and reduce sediment loading affecting habitat. Forest actions can negatively impact this goal.

Response:
The IRMP under the Holistic Goal recognizes the importance of maintaining diverse habitats for fish and wildlife. Project planning, environmental assessment, habitat restoration and Best Management Practices address environmental issues and provide mitigation measures to ensure that the Reservation has sustainable and diverse habitats.

The Fish & Wildlife Department has ongoing restoration activities. A new, prioritized restoration plan for the Sanpoil and Upper Columbia tributaries also includes riparian restoration and protection, among other prescribed treatments.

Wildfire
Comments:
I've seen what devastation can happen from fire if we don't take care of our forested area. We weren't very aggressive and we lost a huge area, and I do believe if we had gotten out there and did more of our thinning and burning, maybe it wouldn't have been so bad. But on the other hand, mother nature takes care of herself. She sent that fire for a reason. She sent that water this winter for a reason. They tell us get ready, look at the signs. I do believe that maybe we need to be a little more aggressive and get out there and make sure that the low-lying stuff which is fuel for a fire to consume is removed. We walked out there and saw what it did over north of our

home. It was an incineration. Did it have to be? I don't think so. I think for my own self, I would like to see if we have that type of program that we enforce it, that we comply with it.

The timber people need to get out there and really take care of the low-lying fire fuels. That needs to be addressed and we need to be more aggressive. Had that been taken care of, maybe the wildfire wouldn't have burned as hot and as extreme as it did. People are very concerned that we do preventive maintenance and that there is accountability.

Response:
Forest residue and fuel management practices can be effective in lowering the fire hazard on particular sites. Effective fuel management treatments include the removal of light surface fuels with prescribed fire and the thinning of crown fuels by mechanical means. These treatments are only temporarily effective and require repeated treatments over time. Considering the overwhelming buildup of hazardous fuel on the Reservation, the Tribes are faced with an enormous long-term challenge.

Recommended fuel treatments in fire management zones include mechanical thinning, hand thinning, mechanized-piling, hand piling, and prescribed burning. Fuels treatments vary in how long they are effective, depending upon the local conditions.

The IRMP includes a goal to support an aggressive wildland fire prevention program. Under this goal are objectives to:

- Maintain a comprehensive fuel management program that addresses multi-disciplinary fire applications.
- Conduct a fuels inventory that will integrate with the GIS database and provide for long term trend monitoring.
- Attend district meetings and general membership meetings of the Colville Tribes to keep the membership informed.

Livestock Grazing
Comments:
Why is grazing important or is it important? Are there any benefits to cows grazing?

Response:
The IRMP emphasizes the importance of stewardship of the range resource, the need for integration of multiple uses on rangelands, and the opportunity for tribal members and the Reservation community to benefit economically from the range resource. With proper rangeland management, range health can be maintained or improved while accommodating other tribal objectives. These objectives include fish and wildlife habitat, culturally significant plants and animals, water quality, and fuel treatments to prevent wildfires.

When managed properly, livestock can be instrumental in reducing fuel loads for wildland fires. When grass land communities are left un-grazed, it can lead to a build-up of previous years plant material (known as thatch), which can increase wildland fire fuel loads and reduce the productivity and health of native plant communities by crowding

out native plant seedlings. Large amounts of dead plant material can also increase the intensity at which a wildland fire will burn. Rangelands will recover more quickly with a low-moderate burn severity.

Grasslands are adapted for grazing animals. The absence of grazing for long periods of time can convert grasslands to a more shrub dominated plant community. Well managed livestock grazing will often increase the diversity of habitats that are available to wildlife; healthy, diverse grasslands are important to ungulates, such as deer and elk. Livestock grazing can increase the vigor of plants by stimulating them to create new shoots. Grazing has been directly correlated to an increase in wildlife numbers, and wildlife prefer the fresh new shoots that come up after livestock have grazed an area.

Livestock also incorporate dead plant material and seeds back into the soil via “hoof action.” Manure adds nutrients back into the soil. In addition, livestock watering points provide wildlife with access to water. Wildlife activity is often observed around these livestock watering areas. Livestock create trails that are also used by wildlife as they provide easier access through forests and rangelands.

Comments:

We don't own the non-member cows. They're in business for themselves. They're in there to make money off of us, ruining our environment while they're doing it. It's illegal to bring other people's cows in, but they're doing that. The Reservation was not set up for the benefit of non-members.

They pushed back on non-member cattle on the Reservation, but I can see a whole bunch of them come back out.

Non-member leaseholders are more often living on the coast or other areas distant from the Reservation and don't monitor their cattle or their impacts. If members wanted to stop allowing off-Reservation ranchers from leasing range units, then it should have been incorporated into the preferred alternative.

Cattle owned by nonmembers are allowed to run rampant, harassing tribal members on their own property while the owners remain off the Reservation and unresponsive to the members needs and complaints.

Cattle grazing is how most of us started out after we were put on the Reservation, because we were made to be farmers and ranchers. It seems good that we want to set properties aside for tribal members to use for grazing, but they are paying so much less than the other people with livestock.

Very few of our people are cattlemen. But there's massive amounts of acreage being leased and a massive amount of cows. We know for a fact that they are bringing in cows from Moses Lake and they make money on the side. This has been going on for many years.

Response:
Tribal members and non-tribal livestock producers who live within the boundaries of the Reservation are permitted to graze livestock on range units based on allocated stocking capacities. Rotational grazing practices are utilized to promote overall rangeland health. If there is no grazing permit application for a range unit, or if the Fish & Wildlife Department permits the range unit for wildlife use, it is rested from livestock grazing. Additionally, a range unit will be rested if it has been disturbed by wildfire, depending on the intensity and size of the burned area. In some cases, grazing will be delayed to protect culturally important plants.

The current fee rate for tribal members is a base rate of $1.20 per Animal Unit Month (AUM) and for non-members residing within the Reservation boundaries, the fee rate is $10.00 per AUM (approximately market rate). All permittees pay $10.00 per AUM on allotment range units. Range unit grazing permits are subject to the provisions of the Rangeland Management chapter of the Tribal Code and the Code of Federal Regulations.

Permittees may only graze livestock they own and that bear their brand. Grazing livestock owned by non-tribal, off-Reservation ranchers is not allowed on the Tribes' range units. Some permittees may have alternative grazing areas outside of the Reservation that they move their livestock to for periods of time.

Comments:
The DEIS says there were four over grazed units. Are they in the Omak District or all over the Reservation? Is that the current situation?

With the recent wildfires, we have found it difficult to rest grazing units impacted by wildfires for even a year. The same range units are being used over and over without any rest. Rotation of grazing units may require ranchers to move their stock to less utilized units. Who is to bear the costs of this? Ranchers complain, and are allowed to continue using the same units. Rotational use must be enforced, especially in fresh burn areas.

I believe that wildlife contribute to some of the over grazing out there, but I don't think they contribute to the extent that the wild horses do.

Climate change will impact the ability of land to grow forage, decreasing the amount of AUMs per acre and may not support an increase in livestock. The Range Program should conduct an assessment of how many AUMs will be available under predicted climate change.

Response:
Overgrazing damages the long-term productivity of rangeland forage and allows noxious weeds, such as cheat grass, to invade. Out of forty-eight range units, only four have been identified as heavily grazed. These range units are on the west side of the Reservation in lower elevation sage brush steppe ecological sites that are infested with cheat grass. The Range Program is currently developing management strategies for these units including reduction of livestock numbers and treatments to reduce the cheat grass infestation.

Based on the 2015 range inventory, the Reservation range units produce over 273,000 tons of forage each year. Not all of this forage is accessible for grazing due to steep slopes and lack of water points. Only about 25% of shrub-steppe and 50% of forest forage are considered to be accessible for livestock grazing. In addition, the Range Program maintains a forage utilization standard called "take half/leave half" that reserves forage and habitat for wildlife.

Allowing for these factors, the Reservation could potentially support over 47,000 head of cattle. This would, however, require intensive management with extensive fencing, watering facilities, and sufficient manpower to manage rotational grazing practices. For these reasons, the maximum amount of livestock permitted under the IRMP was reduced to approximately 13,000 head of cattle, which was the amount of livestock grazed during the 1960s. Since that time, the number of livestock on the Reservation's range units has steadily declined. In 2015, less than 3,800 cattle were actually permitted on the Reservation's range units (another 400 head of cattle are on leased tracts). In some cases, permittees and lessees pay for, but don't graze all the livestock they could in order to reserve a range unit for their sole use. In addition, ranchers are retiring and not passing their operations on to the next generation. Ranching profits are down due to the increasing cost of operation, and young people are not as interested in cattle ranching.

Comments:

The EIS says 58% of our tribal members voted no on the cows. But they are out there. When they did the survey, they asked the membership to make a comment on whether they wanted cows on the Reservation. It was 58% and it was published in the IRMP and it's not in here now. Where is the survey?

I'm not fond of cattle, but there were many Indian women that were cattle women, very strong cattle women. But when they ran their cattle, they relied on that resource out there and they made their livelihood on it. So, I won't say anything negative about them. None of us are able to live the way that our great-grandmothers did, our grandmothers, even my mother. We are never going to be able to turn the clock back and have that life again. Going forward though, it would be our hope that for my great-grandchildren, that this great 1.4 million acres will be something that will sustain them.

We were cattle people at one time, my mom's grandma became a cattle woman. Historically in the documents over there she’s next to Lewis Huffington and was one of the successful cattlemen and cattlewomen on the Reservation. Not enough tribal people own the cattle in my opinion.

This is true of my family, too, and they were very successful cattlewomen. That being said, we still know what cattle do to the water. We don't support it.

Our tribe does not get that much revenue from cattle. There's a very few, a little tiny group that benefits from them. So, I personally would recommend that we could eliminate cattle and not be detrimental to what we are doing with the IRMP.

🗣We should have at least four range riders in these districts, simply because we have 1.4 million acres, 700,000 of it in forest land and a lot of these cows are in our forest land.

🗣We should take into consideration the revenue that we get for the cattle and the expenditures we make to administer it. Considering the damage that they do, we would almost be better off to have no cattle, and just deal with the wild horses and the wildlife.

🗣If we eliminated livestock grazing and the damage from cattle, the Range staff could concentrate on bringing the vegetation back and mitigating all the weeds that are out there.

🗣What if we bought out all the grazing leases? We couldn't dictate on allotments, but if we just bought out all the leases from the cattlemen, and not have the cattle there, we'd still be ahead.

Response:
The Reservation community responded to a number of questions about livestock grazing in the 2014 Community Survey. Results are available on the Tribes' IRMP webpage. Both the IRMP and the EIS present the following survey results regarding livestock grazing on the Reservation:

Question 27: How do you feel about cattle grazing on the Reservation?	**Percentage Agreeing**
Grazing is an important source of income for tribal ranchers and allotment owners.	34%
Grazing is part of the Reservation culture and should be continued.	23%
Grazing should be discontinued on the Reservation.	21%
Livestock and wildlife grazing are essential to maintain the health and productivity of the Reservation rangelands.	34%
Cattle can impact streams and wetlands when they are allowed to remain in one place for too long.	58%
Heavily grazed range units should not be grazed every year.	49%

Grazing was established on the Reservation to provide economic opportunities for the Reservation community. As the cost of livestock operations has increased over time, fewer people are involved in cattle ranching and the number of livestock on the range units has been greatly reduced. This, and the fact that tribal members qualify for grazing fees significantly below market rates, results in minimal revenue to the Tribes' general fund. Grazing fees and federal funding do not cover all the costs of managing the Tribes' rangelands and must be supplemented by the Tribes from other revenue.

The Tribes could feasibly choose to discontinue livestock grazing on tribal trust lands (as is considered in Alternative #5, or with a permit buyout), but this would not apply to allotments or private fee lands. Discontinuing grazing would preclude tribal members from benefitting from the rangeland resource and may conflict with the BIA's fiduciary responsibility to ensure that the Reservation's resources are used for the benefit of the tribal community.

Buying out livestock grazing leases on tracts administered by the BIA Realty Department would have little effect on the number of livestock on the Reservation. Trust leased areas are often used for livestock that are permitted on the range units. The livestock may be rotated from range units to leased tracts and private fee parcels (that may be on or off the Reservation).

Currently, Realty requires that moving permits be included in all Pasture/Grazing leases. This allows Realty to keep track of how many animals are transported on and off the Reservation. These compliance measures ensure the safety and integrity of the leases, and are carried out in a manner consistent with the goals and objectives of the IRMP, tribal codes and project review processes.

Comments:

The Tribes have spent a lot of money to install range management infrastructure, only to have the owner cut fences and open gates to allow their cattle into streams and placing salt blocks right next to streams. We need enforcement of the regulations we have.

Enforcement of existing regulations and best management practices are needed and a plan to deal with livestock trespass is needed, including a holding pen as a way to harvest meat from confiscated animals that can be delivered to the membership.

Alternative 4 would increase the number of livestock grazing on the Reservation rangelands. An increase in livestock will also lead to an increase in livestock in our streams and our waters. Without additional infrastructure to protect those areas, the results could be devastating.

I was on a field trip in the spring, and they said this was all fenced off, but they cut the fence so they can get their cows in the riparian area. I've been going on field trips for 25 years, and almost every place we went to, that's what happened: they cut fences. I asked the Tribal Council "Why aren't they being fined?" Cow's will get in our creeks and they stay there all summer. They're in the mud and that's how they ruined our fish beds. The Natural Resource chairman said, "Oh no, we don't need to fine them." We've got our Tribal Council, we've got our natural resource people, our IRMP people, but they just kind of slough off everything.

We only have 16 people working in the Range Program. We want them to make sure all the fences are out there on the 50 range units, of which 10 are inactive right now, 40 are active. The fire burned 300,000 acres and there's no way that that a 16-person staff can go out there and put all those fences back up. Those folks are not in the office, they're out there. I work right down the hallway from them and they are out there. Once the season turns, they are out there doing the best job that they can, but they're just like many of the other programs, they are given a responsibility. The plan is good, the intention is good, but if they do not have the funding and they do not have the resources, what can they do?

Response:

The Range program uses many different funding sources to help with the cost of installing infrastructure, including the Farm Service Agency, Burned Area Emergency Response, and Natural Resource Conservation Service funding. The Range Program uses its range riders to enforce the laws and use best management practices on the range

units. It is the responsibility of the permittee to maintain the fences on their range units. Permittees are required to fix fences and establish salting locations in compliance with best management practices.

When livestock are in trespass, the Range program contacts the permittee to move their livestock out of trespass. If the permittee does not comply within a reasonable amount of time, the Range Program removes the livestock and impounds them. The Range Program is not allowed to donate meat for food distribution.

Feral Horses

Comments:

The feral horse herd is getting larger and they seem to be more detrimental to our natural resources. I know from other reservations that it can get really detrimental. Are we doing anything about it?

I'm hoping that the horse mitigation is going to be substantial.

There are a lot of feral horses out there. To spend the time and effort and money to go out and capture all these feral horses and put them up for adoption or something else, would make a lot more sense than to say "These ones are ok," and kick them back out there. Because it doesn't fix the issue. It just allows them to breed and breed until they are out of control again.

During the last feral horse capture, it was a minority group that came in and stopped it. But if you go to Yakama or Warm Springs, you see what has happened. There it is out of control. We still have the opportunity to stop ours. Our herd could easily be back to what it was before. One year they did what they said they were going to do, but the second time they didn't get to follow all the way through. So, our herd and all the effort is like a wash now. If we don't do something soon, our berries out there and our Indian foods are not going to be there.

I have been down to the valley and you see them fighting or starving each other out, or they don't have any water. The horses will rip the vegetation out of the dirt to eat, but a cow will chew it sideways and leave something there to grow again, like the wild grasses. They stay in the same area and continue to go around until everything is completely gone.

There's a big complaint about over grazing, but nobody complains when they see 25 horses out there. They don't realize the horses are eating our plants and the native foods for our culture and our people, but they're tramping all over and going back and forth across it and they run with no purpose and they eat wherever.

We own the horses, handed down to us when our people first came here from Moses Lake, Wenatchee, all the different areas when we moved to this Reservation. We own them, not the BIA, not the foresters, not the Fish & Wildlife. Nobody owns them but us. I think it's a violation of our rights that they are targeting them for removal. They say they're tearing up all kinds of land and everything, but now guess who's there? Non-member cows.

🗣I have just a few cattle, but I sure have two or three dozen wild horses running through my range, running through my property that I don't appreciate. They are not my horses and if they're yours, you come and take them and you take care of them. People are not being responsible for what they have out there.

🗣I'm very hopeful that the plan that we have in this document will address the feral horse problem. I want all those wild horses gone. They are a big contributor to the damage to our grasses and our open areas.

Response:
Feral, free roaming horses are under the jurisdiction of the Tribes and are managed as part of the natural resources of the Reservation. They are protected from unauthorized capture, branding, undue disturbance and destruction. They and their habitat are to be managed and controlled in a manner designed to achieve and maintain a feral horse herd on the Colville Indian Reservation. The Tribal Code requires that the herd be maintained in numbers that will insure the perpetuation of the herd, but at the same time will not unduly interfere with the use of rangelands for other purposes.

The IRMP and the Feral Horse Management Plan provide management direction for wild, feral, and abandoned horses on the Colville Indian Reservation. As the horse population increases, they cause significant damage to the areas they inhabit. These areas are overgrazed, which contributes to the spread of invasive species, compaction, and erosion. Horses also compete with local big game animals and permitted range animals for forage. Horse populations can quickly exceed the carrying capacity of the areas they inhabit, which in turn, impacts the health of the feral horse herds themselves.

In 2014, the Range Program along with the Fish & Wildlife Department, conducted a helicopter capture. This effort was successful in removing approximately 400 horses from the Reservation. However, objections from tribal members have prevented subsequent captures. Tribal members are allowed to apply for chase and capture permits for feral horses, however, this has not proven successful in controlling the number of feral horses.

Noxious Weeds
Comments:
🗣Weeds are a concern everywhere. Is it important for people working in their yards to eliminate these noxious weeds? Because almost all our yards are nothing but weeds. I mean, we wouldn't have yards, you know, there wouldn’t be anything green out there if it wasn't for weeds. Lately there's one that really seems to be prolific and is taking over the yard. I'm just wondering if there's any importance in what we're doing with our yards or are you just concerned with noxious weeds in the forest and stream areas?

🗣When my uncle was still alive he began learning what the cattle digestive system was doing to the water, lowering the quality, but also the infestation of weeds. You look clear across the Reservation and we have a lot of weeds that they've helped contribute to out there, the bull thistle and all the trefoil and cockle burrs. I'm leaving my neighbors to deal with that down here and

have been hinting to them that it's coming. My mom noticed that it was coming her way and I've been trying to keep it out of my area, but its surrounding me.

Response:
Weed control at home-sites and high use areas is an important part of weed control on the Reservation, because weeds can easily spread from these areas into natural areas. Weeds spread by attaching to vehicles, animals, livestock and people. If you have any questions on weed identification and control methods, please contact the Land Operations office. The program focuses treatments on “new invader” species, to help prevent these from spreading further. Biological controls are used when available on large infestations of weeds. The Land Operations weed program is also available for onsite consultations for weed identification and to determine appropriate weed control methods specific to the site.

Comment:
🗣Do we know what the invasive weed impact is to our woods and our water and the regrowth? If you go out now, not just out in the timber regions, but even the lowlands where there's been barely any timber, the invasive weeds must be affecting our water and the survival of the trees because they're vying for the same water sources and invasive weeds are everywhere. It looks really beautiful when they're all in bloom, but they are weeds, and I don't know where they came from. I've seen fields and fields of weeds that are now cheat grass that were just grass before, but now there are just colorful weeds everywhere.

Response:
There are a variety of factors that affect the survivability of timber seedlings and one of those factors is invasive species. Cheat grass for example, can move into an area that has had heavy disturbance (fire, vehicles and overgrazing). If you have questions on specific areas with invasive species problems please contact the Land Operations Office.

Comments:
🗣Back in 79 or 80, there was a big decision made by our Tribes to use chemicals to treat invasive weeds. But it was a chemical that stays in the ground. So, it was decided not to use that to treat our weeds anymore, but we're constantly trying to do catch up and it's something we've have to do, but there again, it's all about funding.

🗣I asked whether they still use herbicides, but I never got a comment from our Tribal Council. They just evaded the issue.

Response:
Herbicides are used as a component of weed control. Other methods are also used such as biological controls, re-seeding and mechanical means. Under the IRMP, Land Operations are to use best management practices to avoid damage to desirable plant species when using herbicides to control noxious weeds. If you have any specific questions on the weed control program, contact the Land Operations office.

Comment:
🗣Huckleberry pickers have words to share that they had gone to the old sites that were burnt two years ago, and they saw nothing. The berries and the Indian foods were gone and the Indian medicines were gone They said that the wild weeds had taken over their old gathering sites and they are really frustrated. They found berries at other sites, but not like they did in those old areas. They really counted on those old areas on this side of the Reservation.

Response:
It is very difficult to determine when and where berries will re-establish after large scale fires. The IRMP includes objectives for native plant management and the Natural Resource departments coordinate to plant native species in areas that are devastated by fires. The ability to implement these projects is dependent upon available funding.

Comments:
🗣I was on a field trip up in Friedlander Meadows and learned they were going to spray the area for knapweed, but there's Indian carrots there. Herbicides go into the ground and stay there for 3 years. But that's where our Indian carrots are, they are in the ground. We have other medicines that come from roots, so whenever they use herbicides, it's going down to those roots. On Keller Butte they put a sign up that says not to pick any of these huckleberries because they've been sprayed with herbicide. They have probably done that in other places and people think that they're getting healthy ones and they're not.

🗣The weeds are way out of control out there. I can remember the year that our tribe passed the resolution to stop using that very poisonous herbicide that stays as a poison in the ground. So now what do we do? What do we do to remedy the weeds on our Reservation? We don't have an army, it's 1.4 million acres. The new little crew that they have there is working very hard. They try the best they can to get the outside resources to come in here, but there again we are not funded, it's an unfunded agenda.

🗣Why are our range lands so full of cheat grass and noxious weeds?

Response:
Invasive species generally invade an area that has had past disturbance, but they can also invade "natural" areas. Cheat grass and other noxious weeds are readily spread by many means, including wind, water, animals, vehicles, and contaminated seed. Invasive species have a huge advantage over native plants because the diseases and insects that suppress them in their native locations, generally do not come with the plant when it is moved to another area of the world. Consequently, controlling the spread of noxious weeds requires the use of alternative methods.

The Tribes have no plans to spray knapweed at Friedlander meadows and herbicides are not used to treat weeds in huckleberry patches by the Land Operations Program. Herbicides may be used along roadways in these areas to help prevent invasive species from spreading into natural areas. Biological controls (insects targeted for specific weed control) are used heavily across the Reservation to help control numerous weed species including knapweed.

There is a significant amount of private timber land on the Reservation that is owned by the Hancock Timber Resource Group. The company is known to use herbicides in the management of their land to control weeds, and it is likely that the comment refers to this activity on those private fee lands.

Comment:
The application of chemicals (pesticides, herbicides, insecticides, fertilizers, etc.) into the natural environment cumulatively adversely impacts human rights by degrading human health (particularly farmers and agricultural workers, communities living near agricultural lands, Native communities, pregnant women and children, and consumers) and fostering negative environmental impacts. I recommend banning all aerial chemical applications on the Reservation, and the use of atrazine, neonicotinoids, and glyphosate; and instead encourage the CCT and the Colville Agency to adopt environmental policies exemplifying the precautionary principle (if an action or policy has a suspected risk of causing harm to the public or the environment, in the absence of scientific consensus, the burden of proof falls on those taking the action or policy to demonstrate that it is not harmful).

Response:
Under the IRMP and the Integrated Weed Management Plan, both prevention and treatment are used to control invasive weeds. The first principle of both prevention and treatment is not applying herbicides or even biological control, but establishing and maintaining a healthy native plant community. Under integrated weed management, all treatment methods or combinations are considered. Based on specific site conditions and socio-economic constraints, various treatment techniques are integrated to promote weed control and enhance desirable species simultaneously.

Integrated management maximizes the use of natural control factors, including ecological diversity, competition and succession. In addition, integrated weed management utilizes manual, mechanical, biological, cultural, chemical, and habitat modification techniques in combination, as appropriate. Herbicides used by the Land Operations Program are considered safe when used in compliance with federal requirements. The EPA has a Tribal Circuit rider who covers the Colville Reservation to ensure that pesticides are used safely in compliance with federal laws and regulations. Aerial applications are currently not used by the Land Operations Program.

Best Management Practices (BMPs)
Comments:
What makes a Best Management Practice? I come from the field of Education, and there are best practices and they go through a series of criteria before they can become a best practice. So, what is that in natural resources or what's that process? Who determines the criteria? Can you define it? If you look to the federal administration, there's no such thing as climate change. If they are the people who determine what are the best practices, it would be very different from what my mom would determine are the best practices.

How have Best Management Practices mitigated for the environmental impacts of grazing and agriculture? I have seen none of this.

🗣How have Best Management Practices mitigated for the environmental impacts of timber harvesting? I have seen none of this. Timber harvest practices have not changed.

Response:
Best Management Practice is a term used to describe industry best practices for controlling pollution. The term is used in the U.S. Clean Water Act. Effectiveness of BMPs have often been tested by university or agency research or trials. A number of the Tribe's codes require BMPs during resource management operations, including the Forest Practices and Hydraulic Projects codes.

Best Management Practices in the Forest Management Plan and the Range Management Plan provide guidance on forest and range management activities, including harvest operations and grazing practices. The BMPs were reviewed and updated during the IRMP process, using current scientific knowledge and are referred to and utilized in resource management and during project development. Site-specific harvest plans are developed for each timber sale using this guidance, as are range unit conservation plans.

Open Ground Equivalency (OGE) Thresholds
Comment:
🗣Does this analysis take into account the non-tribal logging?

Response:
Yes, the permitted treatment areas on fee lands within the Reservation boundaries were included in the OGE threshold analysis. Geocoded harvest data by treatment type, sale area, and year was provided for use in the analysis. This data was aggregated with tribal harvest data and evaluated at the watershed management unit level.

Comments:
🗣The only problem with the open ground equivalency analysis is that you have to include all harvests, not just the harvests that just recently took place, but the harvest that took place within the 30-year prior because it takes time for forest coverage to recover. So that if you don't do the previous timber harvest, you don't have an accurate number and it really shouldn't be used for any analysis whatsoever.

🗣There's not enough change over the 15 years to make an adequate accommodation. Particularly because the timber harvest activity changed substantially between prior to the IRMP, and after the first IRMP. Prior to the IRMP, clear-cuts were allowed and they happened en masse and the 1980s had tremendous clear cuts and so there are a substantial number of WMU's that exceeded their OGE in the 1980s that haven't had time to recover. So, when you go into the next entry, during this IRMP, they still haven't recovered from the first time. So, of course they're going to exceed the OGE now. Without including the 1980s clear-cuts we're not accurately assessing the OGE.

Response:
Hydrologic recovery rates within individual watershed management units can differ considerably depending on the type and extent of disruptive activity. Clearcut and regeneration harvesting methods have a recovery period of about 80 to 90 years, and overstory removal and uneven age management techniques have a recovery period of 20 years, and finally, invasive commercial thinning harvesting methods have a recovery period of about 10 years. In general — as stated in the 2014 Hydrology Report — it is assumed that the average recovery rate for mixed treatments is about 70%. Based on this assumption it isn't absolutely necessary to account for harvest activities that occurred more than 30 years ago when calculating the present Open Ground Equivalency (OGE) conditions in any given watershed management unit.

The most conservative approach to estimating the legacy effect of forest treatments that occurred between 1990 and 2000 on OGE conditions at the end of 2015, is to assume that WMUs do not recover over time in terms of hydrologic function. Imposing this assumption means that any OGE acre created at any point between 1990 and 2015 cannot be retreated multiple times during the 25-year period. Under this assumption, the total number of OGE-adjusted productive forest acres treated between 1990 and 2015 must not exceed the total number of allowable OGE-adjusted productive forest acres as indicated by the aggregation of the Low End OGE Thresholds for all WMUs. Even assuming zero-hydrologic recovery, this means the total number of OGE acres created by harvest activities between 1990 and 2015 was 17,332 OGE acres under the aggregate Low End Threshold and 54,672 OGE acres under the High End OGE Threshold. These figures indicate it is plausible that the harvest activities that occurred between 1990 and 2015 could have been achieved without causing any individual WMU to exceed its OGE Threshold.

Further WMU-specific analysis has also been undertaken and is included in the Final EIS. This additional analysis looks at harvest activities by treatment type, between 1990 and 2015. It concludes that the net effect on OGE thresholds from harvest activities occurring between 1990 and 1999 (as compared to 2000 to 2015) was to push one additional WMU (i.e., Swimptkin Creek) over the high end OGE threshold. In total, 12 WMUs had harvest levels resulting in ground disturbances exceeding the high end OGE threshold. Of those, 11 were less than 25 percent over the high end threshold.

Comment:
Serious areas have been brought up by staff regarding the open ground equivalency methodology. OGE must be done to determine compliance with the Tribes' standards. The problems were not addressed and in fact, have been further distorted to gloss over impacts to the hydrology of the Reservation. This is not compliant with NEPA requirements and could leave the Tribes open to litigation. We cannot say that 95 of the watersheds are in compliance with OGE when the analysis was never done.

Response:
The analysis is not designed to definitively determine which WMUs are currently under or over the OGE thresholds. Rather, the analysis is used to estimate the OGE impacts of the preferred alternative by comparing it to the OGE impacts that actually occurred over

the previous 15-year planning period since the preferred alternative is, in essence, a continuation of the previous planning period's management. This analysis in no way precludes the need for contemporary WMU-specific OGE threshold analyses for future harvest activities.

Land Use

Comment:

How much of the Reservation do we own today?

Response:

The Reservation consists of 1,449,268 acres. The Tribes' trust lands amount to approximately 1,063,200 acres, of which 1,023,700 acres are tribal lands and 39,500 acres are allotted lands. The EIS has further information in the Land Use Plans section.

Comment:

Our past tribal government, our past tribal programs contributed to the tune of ninety million dollars that has been spent acquiring land back on our Reservation. So that is a tangible asset that has come from our stumpage.

Response:

The Tribes dedicate $10 per thousand board feet of stumpage revenue for land acquisition.

Comment:

I wish you to consider designating the Omak Lake area as an International Dark Sky Reserve to preserve the unique cultural heritage of the landscape, see: http://www.darksky.org/idsp/reserves/.

Response:

This is beyond the scope of the EIS. Designating dark sky reserves is a land use decision that should be presented to the Tribes' Planning Department and the Tribal Council.

Carbon Sequestration

Comment:

Have the Tribes considered carbon sequestration instead of timber harvesting?

Response:

The Tribes have considered carbon sequestration. The forest resource revenue that would be derived from carbon sequestration would be far less than the Tribes receive from timber harvesting. In addition, the Tribes would still have significant expenditures for forest health treatments.

Climate Change

Comments:

I wish that climate change considerations were kicked in a little bit further.

This past winter we finally had a winter that I was accustomed to growing up. We had much more moisture. Our roots, our berries, all of our Indian medicines out there, all the timber, all flourished. Then that made these brothers and sisters flourish. Again, we can't predict what mother nature will do. Instead of having moisture we can rely on, the type of moisture that we were accustomed to in our region, we're going to a more arid condition. We won't get as much water and that's something we have no control of. Do we have the means to put the money in so we can replenish ourselves? I know we can't predict it. We don't know if we're going to have that type of a climate or have another winter that will provide the water that our plants, our animals and our fish need.

Our Reservation, since I was young, has turned a corner and it's more arid now. So, our forest naturally will not grow the way they did before. Our roots and berries don't thrive like they used to because of Mother Nature.

Climate change will lead to increases in insects and disease problems in our forests. Some areas may no longer support certain species that are now present, this will impact the ability of the forest to support the level of harvest under alternative one and two.

I believe that climate change is, and will have, the greatest impact on our civilization. Please do not approve alternatives which have no climate change projection into them. Changes in the water cycle and temperatures will not be the same in the next 50 years, much to our detriment. I recommend that the IRMP be an adaptive management plan that will integrate the future climate scenario data as a part of 100-200 year timescale landscape management.

Response:

The Colville Tribes are already experiencing the effects of climate change on the Reservation and the region. Drought conditions and severe wildfires are already impacting the natural and economic resources of the Reservation and the Tribes' ability to respond.

As increases in temperature reduce the growth of some species in dry forests and perhaps increase the growth of others in high-elevation forests, the Forestry Program is already adapting reforestation strategies to anticipate changing environments. Ground disturbance impacts to the hydrologic functions of the Reservation watersheds will likely be exacerbated by drought and storm conditions associated with climate change under four alternatives, especially Alternative 4. Adaptive management of harvest schedules, mitigating ground disturbance and road densities will all be increasingly important in the future.

The Tribes are currently developing a Climate Change Vulnerability Assessment that will provide a basis for a subsequent Climate Change Adaptation Plan. The Climate Change Adaptation Plan will provide up-to-date management guidance and policies for appropriate response to climate change and to ensure the protection of human health

and safety. The plan will be consistent with the Department of Interior's Climate Change Adaptation Plan, the President's Climate Action Plan and this Integrated Resource Management Plan.

The Tribes' departments and programs are addressing climate change issues under the IRMP. Climate change priorities include:

- Developing and maintaining a Climate Change Adaptation Plan.
- Accessing best available science regarding climate change and regional forecasts.
- Managing natural resources utilizing state-of-the-art best management practices.
- Maintaining and enhancing wildfire prevention and response capabilities.
- Coordinating with the Department of Interior and Bureau of Indian Affairs on initiatives addressing climate change impacts affecting the Colville Tribes and the Reservation's natural and cultural resources.

Comment:
🗣This document has chosen to accept the Tribes' climate change steering committee's adaptive management plan for climate change assessments. The problem with this is that forestry and range have chosen not to participate in the committee.

Response:
The Land Operations/Range Program has a representative who attends the Climate Change Steering Committee meetings. The Forestry Program is compiling a large amount of data for use in climate change analysis. The program works closely with the Climate Change team to review documents, provide data and input as needed. Forestry has also contracted an analysis of the Tribes' LIDAR data, maintains continuous forest inventory data and has developed a forest wide stand-based inventory that can be used to analyze the impacts of climate change and detect forest change over time. These projects are ongoing and are available to other resource programs for research and analysis.

Poaching and Illegal Dumping
Comments:
🗣We don't regulate our woods enough for people leaving the Sanpoil. They can jump right on the ferry and nobody would even know they were in the woods. I've taken photographs one after another of different trucks leaving the Reservation with horse trailers. They go into the woods and they fill their horse trailers up to top level and they're taking it right off. There's no regulation. We need to protect our Reservation a little bit more.

🗣We don't have enough people to keep people that shouldn't be out there from utilizing our resources. We just don't. Our enforcement people, who are supposed to know who goes up there and what they are doing, have the same challenge as the Range Program. How can they do that when they are only a handful of people managing 1.4 million acres?

The ferry boat workers say they see non-members come in with loads of garbage and go back with loads of wood. They wonder what they should do. Maybe they could have some instructions to follow on how to report that and what to do, because they are seeing it constantly.

We'd go out in the summertime and get maybe a cord or two of firewood, and we'd see truckloads of Mexicans out there taking firewood like crazy. It belongs to us, not anyone else. I know we have a few members that are married to Mexicans, but there's no one checking on these guys stealing wood. That's really wrong. They're probably selling it.

Response:
The Forest Protection chapter of the Tribal Code provides for the enforcement of forest related offenses such as unlawful timber harvesting, woodcutting, and arson. The code requires permits for forestry activities on trust lands and for timber salvage. Enforcement is the responsibility of all police officers, law enforcement officers, and all law enforcement agencies of the Tribes and BIA.

All peace officers, law enforcement officers, and law enforcement agencies of the Tribes and the BIA Special Agents, are empowered to require the driver of any motor vehicle being operated for the purpose of conducting forestry activity on any tribal land, tribal road, BIA road and any other land or highway within the Reservation, to stop and display his or her license or permit to conduct forestry activity, for which a license or permit is required by the Business Council, and/or to submit the motor vehicle being used to conduct forestry activity to an inspection for possible violations of the Tribes' forest protection codes. Violations of the Forest Protection codes are subject to civil penalties. Federal prosecution for trespass, theft of tribal assets, and unlawful cutting may also be initiated.

Response to Comments from Colville Tribal Forest Products

Background

Colville Tribal Forest Products (CTFP) submitted a review of the IRMP/DEIS prepared by Delphi Advisors entitled "Review of the Confederated Tribes of the Colville Reservation 2015 Draft Integrated Resource Management Plan" dated September 6, 2017.

Based on a review of the forest management portion of the IRMP and the Forest Management Plan, the CTFP asserts that none of the alternatives considered, including the preferred alternative, will achieve the desired results of addressing forest health issues while maintaining an ecologically resilient forest and providing economic benefits to the Colville Reservation. In their review, the company claims there is a variety of deficiencies in the IRMP and DEIS that need to be rectified before starting the process of developing a plan that addresses the legitimate concerns expressed to date through community input.

CTFP is a tribally owned business that works closely with the Tribal Council, the Tribes' Land and Property Management and the Forestry Program. As such, the company has been aware of the Tribes' efforts to prepare an Integrated Resource Management Plan (IRMP) and Programmatic EIS (DEIS) since at least 2013, when the planning process was formally begun.

The alternative management strategies were developed in 2014 by the IRMP Core Team with input from the natural resource programs, the Tribal Council, and the Reservation community. The preferred alternative that became the IRMP with Tribal Council endorsement, was prepared in 2015, and underwent numerous reviews. In 2016, the DEIS was prepared, incorporating information provided by all the natural resource departments. During this time, the CTFP had access to information and documentation prepared by the IRMP Core Team.

Throughout this multi-year planning process, the CTFP did not express any of the concerns outlined in their recent review to the IRMP Core Team. The development of the IRMP and the DEIS were a lengthy and expensive process. The CTFP suggests that both the IRMP and the DEIS should be revised with a new set of alternatives. Although the planning process could have been conducted with the company's input throughout the stages of development within the timeline and budget, the company is now suggesting the process be largely repeated at considerable cost and delay.

The CTFP review is focused on forest management and economic benefits. Except for a concern for forest health, the review does not address the habitat benefits that the forest provides to fish, wildlife, and human cultural activities. These are all affected by timber harvest operations. Habitat fragmentation and loss, soil erosion from harvest and road construction resulting in sediment transport to surface waters, and the loss of cultural plants, are all very important environmental and cultural concerns of the Reservation community. The IRMP must consider and balance multiple uses of forest and range resources and the EIS must consider these as well.

Comments and Responses

Annual Allowable Cut and Sustained Yield

Comment: Applying non-declining even-flow methodology as the standard of sustained yield management is inappropriate for a forest that has one-third of its acres beyond rotation age, overstocked, beset by significant forest health issues, and faced with an increasing catastrophic wildfire threat. Consequently, none of the alternatives considered adequately address the community issue of improving forest health. We suspect, because of the inappropriate application of the non-declining even-flow methodology, the significant forest age class gap in the current 20- to 60-year-old age class is impeding the treatment of currently aging, overstocked, insect- and disease- afflicted forest stands. New, more flexible alternatives need to be developed, in concert with community education regarding sustained yield management concepts applicable to the forest's present condition; this needs to occur to provide a suitable forest management plan. If not, selective cutting decisions made 20 to 60 years ago that failed to regenerate stands – and that are recognized as representing a significant contribution to the current forest health crisis – will continue to plague the forest for decades to come.

Response: The proposed alternatives were not developed to consider only forest health. The IRMP strives to provide a variety of stand structures, age classes, species composition, and diversity across the landscape to provide benefits for all resources. While the Tribes recognize there is a risk of loss associated with wildfire, insects, and disease, those risks were considered and acknowledged. Treatments of some diseased, high-risk stands may be delayed compared to a purely forest health-driven alternative. However, the risk of loss was considered acceptable in light of the other resource and ecologic benefits derived from a diverse forest. In addition, it should be noted that Alternative 4 allows for an annual harvest of up to 100 MMBF which would be very similar to the CTFP's proposed alternative.

Desired Future Conditions

Comment: While the plan refers to managing the forest toward a set of Desired Future Conditions (DFCs), there is no portrayal of how current conditions relate to those DFCs. The most frequent appeal to any gap is an allusion to today's overstocked forest compared to an open, park-like forest of large ponderosa pine and western larch. Both plant association group classifications (which are largely independent of species stocking) and recorded historical documentation suggest there are other relevant features on the forest landscape beyond the frequently cited open, park-like forest condition; rather, it seems appropriate that one-third of the forest would be managed toward such a self-perpetuating condition while the remaining two-thirds are managed toward a Douglas-fir/grand fir complex. Further, there is no description of forecasted forest conditions compared to DFCs for any of the alternatives. At a minimum projected age classes, projected inventories, and projected species mix should be provided, compared against DFCs, and used as a decision-making metric in the new alternatives plus any of the existing alternatives.

Response: The Tribes' Forestry Program is moving toward a stand based inventory that will identify specific stand structure characteristics on each acre. Those targets aren't intended to be an endpoint, but a management objective to continually manage towards

in a non-static forest. Open park like conditions are identified by the membership as a desired future condition, but they are a component of the total forest and will not exist on the same acres all the time. The Forest Management Plan identifies objectives for acres in each structure class and structure stage.

Timber Inventory Estimates

Comment: The current IRMP forest management plan is based on measurements of only one-half of the Continuous Forest Inventory (CFI) plots on the forest. Analysis of those results identified anomalies suggesting the per-acre forest inventory may be substantially higher than currently reported, with a total inventory of 6.3 billion board feet compared to the reported 5.8 billion. Forest inventory is the foundation of good forest management plans; thus, we urge the rest of the CFI plots be re-measured, and the inventory re-analyzed to either confirm the currently reported inventory or provide a more precise revised estimate. The new alternatives should then be analyzed with the revised inventory, along with reexamination of any current alternatives the community desires to continue considering.

Response: The Continuous Forest Inventory has been the standard used by the BIA to determine forest inventory and trends. The Tribes are currently working toward a stand based inventory that will allow for more detailed planning and inventory over time. Additionally, the 2015 fire season burned approximately 164,000 acres of commercial forest. The re-measurement has been done, and the analysis is under way.

Wildfire Threat

Comment: Both acres burned and burn severity have been increasing on the Reservation. The upward trend is indicative of the accelerating forest health issues. Overstocked stands lead to increased mortality, providing an abundance of dry fuels that pose heightened risk to live trees, infrastructure, wildlife and domestic animals, and human life. Deteriorating forest health conditions, coupled with the increasing risk of catastrophic fire, underscore the need for significant changes in forest management. Hence the need to develop new alternatives to the five presently considered in the IRMP.

Response: The Tribes certainly recognize the risk associated with wildfire and management activities across the landscape, and have been successful in mitigating some of that risk. Risk can't be eliminated entirely, but the forestry goals and objectives are aimed at lowering that risk over time. This is being accomplished through a combination of forest health and fuels reduction treatments.

DEIS Economic Impact

Comment: The baseline conditions defined for the analysis are flawed, hampering clear communication and apprehension of the implications of the economic impacts analyzed. Alternative 1, the status quo alternative, should represent the baseline.

Response: The status quo was not utilized as the baseline because of complications associated with modeling the indirect and induced effect of negative employment (i.e.,

any alternative that reduces employment from the status quo alternative) and the difficulty in understanding that concept. There are several model-related factors that support defining the baseline scenario as "no alternative." Further, the baseline is clearly described in the Baseline Conditions section of the DEIS and therefore should not pose a serious source of confusion.

The DEIS states that "the values reported here reflect the entirety of the regional output, employment, and labor income that can be traced back to the adoption of each specific resource management alternative. These figures should not be construed to represent a change from 2014 or 2015 regional output, employment, and labor income."

Comment: The Omak mill's value-added contribution is included in the analysis even though it is no longer operating. Even if it were operating, the calculated impact, which apparently is tied only to the 40 MMBF log supply agreement to the mill, is the same for Alternatives 1 through 4. Yet, Alternative 3's harvest plan is acknowledged to risk defaulting on the log supply agreement to the Omak mill, and so should have included a lower value attributable to the Omak mill than Alternatives 1 and 2. Conversely, Alternative 4's elevated harvest plan is not accorded additional value-added sales to the Omak mill despite the facility converting more than the 40 MMBF log supply agreement; thus, it should be reasonable to expect a higher value attributable to the Omak mill than in Alternatives 1 and 2. Regardless, the Omak mill should be dropped from the analysis.

Response: When the analysis began, the Omak Mill was in operation and even though it was closed prior to the completion of the DEIS (thereby relieving the Tribes of their resource delivery obligations) there was (and still is) reason to believe that a similar arrangement will be made with a future operator of the Omak Mill during the planning period. At the time of drafting the DEIS, it was the working assumption that mill closure was a short-term event and therefore did not warrant the complete redesign of the socioeconomic impact assessment study region and input values.

Based on information from the Tribes' resource managers, there was no definitive reason to believe the Omak Mill's 40 MMBF supply agreement could not be achieved under Alternative 3. For this reason, defaulting on the agreement was presented in the DEIS as a risk, not a certainty. It was also assumed that the unique attributes of the forest product sought by the Omak Mill (which was outfitted as a plywood and veneer mill) would preclude the Omak Mill from accepting and processing Colville Reservation timber beyond the 40 MMBF supply agreement. Additional harvest volumes therefore would be sold to mills outside of the study region and the associated impact of those mill-related expenditures also would be realized outside of the study region.

Comment: The Study Region, defined as Okanogan and Ferry Counties, excludes economic geographies that are relevant to the alternatives examined. This oversight contributes to an inherent bias against commercial timber production in the analysis. By excluding from the analysis mills that logically could (and do presently) receive harvested timber from the Reservation, but are located just outside the two-county Study Region, there is no value-added component included in the analysis for alternatives that generate harvest levels in excess of in-Study Region mill capacity.

Response: The study region was selected based on the logic that the Colville Indian Reservation is fully encompassed by and primarily composes Ferry and Okanogan counties in the state of Washington. There are undoubtedly linkages between the study region and other counties throughout the state of Washington and beyond, but inevitably a line must be drawn at some geography and therefore the geography that most concisely reflects the Colville Indian Reservation was selected. Assuming the mill is in operation (which was a warranted assumption at the time the analysis began), mill activity in Stevens County that could be directly tied to any of the management alternatives was of much less importance. Further, at the time of analysis, it was projected that a second mill (i.e., the Colville Indian Precision Pine mill, which was ultimately approved for reactivation by the Colville Business Council in 2016) could come into operation within the study region during the planning period and as a result, economic activity related to the processing of the Tribes' timber outside of the two-county region was expected to be minimal. If the Omak Mill closure was expected to be permanent and had it occurred prior to the completion of the Draft EIS, then yes, expanding the Study Region to include Stevens County may have been appropriate.

Timber-based Revenue

Comment: It is unclear from the descriptions in the DEIS whether the timber revenue utilized in the analysis includes all expenditures related to forest management; if not, then that is a deficiency in the analysis. In addition, the calculation methodology used to derive the real escalation rate used in the analysis is incorrect on several counts. Finally, using a single index as a real escalator for the variety of different types of revenue included in the calculation is inappropriate.

Response: The revenue analysis includes all expenditures related to logging operations, trucking, sort yard activities, milling facilities, tribal and BIA forestry departments, forest development and mechanical site preparation, and forest road management. These activities are assumed to comprise the primary modellable expenditures associated with forest management.

The Producer Price Index for lumber products (WPU08) as published by the Bureau of Labor Statistics was used to estimate an appropriate annual escalation factor for timber-related revenue. The average annual inflation rate for lumber products was in fact, measured to be 1.3% between 1996 and 2015 (2016 inflation data was not yet available since the analysis was undertaken in 2015).

The socioeconomics analysis only models revenue derived from two separate sources (not a variety): a) timber harvesting and processing activities; and b) range management activities. The average escalation rate for lumber products is only applied to the former revenue source. No escalation rate was applied to annual revenues generated through range management activities. The observation that a single index is inappropriate for use “as a real escalator for a variety of different types of revenue” is valid, but does not apply in this analysis. However, this observation does bring to light the fact that an

appropriate real escalator could justifiably be applied to range management revenues and the Final EIS reflects this.

Comment: The Overview of Economic Impacts table (DEIS Table 39) does not correspond to the reported analysis. In addition, the net present value (NPV) calculations reported in the Output/Production Table (DEIS Table 38) are unconventional and may be incorrect; if incorrect, they understate the outputs attributable to each alternative.

Response: Table 39 does have some inconsistencies. These have been corrected for the Final EIS as follows:

Table 39 Overview of Economic Impacts	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Annual allowable cut	77.1 MMBF	77.1 MMBF	58 MMBF	100 MMBF	0 MMBF
Livestock levels	79,594 AUMs	79,594 AUMs	79,594 AUMs	119,391 AUMs	0 AUMs
Average Annual Employment	803 jobs	803 jobs	737 jobs	937 jobs	6 jobs
*Full-Time**	690 jobs	690 jobs	634 jobs	806 jobs	5 jobs
*Part-Time**	113 jobs	113 jobs	103 jobs	131 jobs	1 jobs
Change in Labor Earnings *(gross)*	$399 million	$399 million	$342 million	$473 million	$43 million
Change in Regional Output *(npv)*	$995 million	$995 million	$885 million	$1,144 million	$68 million
*Estimated based on 2014 ratio of full-time to part-time positions					

Comment: The DEIS projects timber harvest-related revenue of $439.3 million ($29.3 million per year) under the preferred alternative during the 2015-to-2029 planning period. Because delivered-log prices were incorrectly used instead of stumpage prices as the basis for this projection, these revenue estimates are roughly 2.4 times higher than is defensible.

Response: Harvest-related revenue of $439.3 million is representative of the total revenue generated through the harvest of ~77.1 MMBF from the Colville Reservation annually and processing 40 MMBF of timber (within the study region). Of that, stumpage was calculated as $175.91 million (approximately 40% or $11.73 million annually). Delivered-log prices were used to determine the total possible revenue achievable from harvesting ~77.1 MMBF annually. A portion of that revenue was allocated to the Colville Tribal Sort Yard, logging and trucking activities, forest management, milling activities, and finally the Colville Tribes' general fund. Mill-related revenues/expenditures (unrelated to logging and trucking) associated with 37.1 MMBF annually were assumed to occur outside of the study region and therefore were excluded from the analysis.

The socioeconomics model utilized in the DEIS was designed to estimate the total economic impact of harvest activities within the study region that occur as a result of the selected management alternative. Portraying stumpage as the total harvest-related revenue only captures the economic impact that is directly attributable to the Tribes' own expenditures.

Comment: An independent analysis, which follows the IRMP harvest plan while also incorporating stumpage prices, provides a more realistic estimate of $162.3 million (or $10.8 million/year on average) that could be available for distribution to the Tribe's General Fund.

Response: The portion of harvest revenue estimated to be distributed to the Tribes' general fund in the analysis conveyed in the DEIS was $158.32 million (or $10.55 million annually). These results do not differ significantly from the analysis produced by Delphi Advisors for the CTFP.

Comment: Inflexibly following the preferred-alternative's harvest plan regardless of future log-market conditions risks foregoing revenue that could accrue to the Tribe if, instead, harvest levels are allowed to increase when stumpage prices are expected to rise and reduced when log prices are expected to fall.

Response: The preferred alternative's harvest plan will certainly consider future log-market conditions. Actual harvest volumes are likely to differ year-to-year, depending on market conditions, forest inventory, forest health, and planning constraints. The preferred alternative's objective of harvesting 77.1 MMBF annually should be interpreted as an annual average, not a year-to-year quota or mandate.

Open Ground Equivalency Threshold Analysis

Comment: The Open Ground Equivalency metric is important but its application seems to trump almost all other considerations when applied to ground disturbance stemming from timber harvest. This is done without reference to any economic trade-offs while acknowledging that, in the case of catastrophic wildfire (which is more likely in scenarios with lower timber harvest), OGE exceedance is also virtually assured.

Response: The Open Ground Equivalency Threshold Analysis was designed to measure the amount of ground disturbance associated with timber harvesting during the last planning period on a watershed unit basis. The extent of ground disturbance resulting from wildfires over that period is also recorded. However, predicting the extent of ground disturbance from wildfires in the future, based on alternative harvest scenarios would be highly speculative.

Salvage Harvest

Comment: For any alternative in which timber harvest is included, harvest volumes in the annual allowable cut (AAC) should consist only of "green timber;" salvage volume should be counted as incidental to the AAC.

Response: Salvage (or loss to disturbance) has impacts to standing inventory and should be counted as removal or reduction in standing inventory. In addition, there are federal regulations requiring that salvage volume be counted toward the AAC.

Alternatives

Comment: Consideration of Alternative 3 seems curious since it represents in many ways a return to forest management that deemphasizes regeneration harvest. It is generally understood that such practices in the past contributed to the forest health issues seen today. Until the interpretation of sustained yield management is expanded beyond the current restrictions of non-

declining even flow and restrictive minimum rotation ages, higher timber production alternatives such as Alternative 4 will be perfunctorily dismissed as unviable despite providing superior options to address forest health issues. While Alternative 5 is recognized as potentially contributing to heightened forest health problems and catastrophic wildfire risk, the inevitability of those outcomes is addressed in a rather cavalier manner.

Response: The preferred management alternative and the four alternative management strategies were developed by the IRMP Core Team in compliance with the requirements of NEPA. The alternatives were developed to provide a range of management strategies, most significantly concerning harvest methods, annual allowable cut, and livestock grazing levels. These alternatives were informed by Tribal Council suggestions, resource manager expertise, a proposed strategic restoration plan, and community input, primarily from the Community Survey.

New Alternatives

Comment: To deal with the Colville Reservation's forest-health issues, an alternative definition of sustained yield management must be adopted. The management alternatives considered in the DEIS lack the flexibility, with respect to varying harvest and rotation length over time, that is necessary to successfully address the ongoing forest-health issues in the Reservation's forest. The situation of declining forest health that is unfolding at present will continue to spiral out of control until a more holistic perspective of sustained yield management replaces the notions of ever-increasing inventory, non-declining even-flow timber harvest, and net growth in excess of harvest. A fresh approach is required, in which new alternatives are developed that include the possibility of adjusting harvest levels up and down over time, coupled with forest-condition metrics that measure progress toward attaining a desired set of future conditions. We suggest a variety of characteristics that could be included as part of a collection of new alternatives. Also, we demonstrate how an example alternative begins moving the forest toward a healthier condition, without sacrificing its ability to be perpetuated for future generations, and while simultaneously providing additional revenue for the Tribe’s General Fund.

Response: The alternatives considered in the DEIS provide differing approaches to forest health issues, as well as a range of harvest levels (0 MMBF to 100 MMBF) and management. Most of the alternatives include the flexibility to vary harvest and rotation length over time. Importantly, the alternatives were also assessed regarding their effects on watersheds, fish and wildlife, and cultural resources. They also include adaptive management flexibility to allow the Tribes to react to changing resource concerns.

Fiduciary Responsibilities

Comment: Although the Reservation forest is a valuable capital asset, worth nearly $1 billion, the DEIS provides no benchmark of asset performance. We present a preliminary range of estimates (from 0.44% to 1.07%) for the return on asset value (ROAV), with an average of 0.73% per year. That return is essentially equal to the current average earnings before interest, taxes, depreciation and amortization (EBITDA) among institutional timber assets in the Pacific Northwest. However, owing to differing management objectives the CRF EBITDA returns are not supplemented by appreciation returns as is the case with institutional investors. We propose for

consideration several methods by which financial performance can be improved. These suggestions are the starting point for elements that should be included in any plan aimed at maintaining and improving the CRF's financial performance. Moreover, the ROAV should be estimated for each management alternative under consideration, and used as one of the key criteria when selecting from among alternatives. Finally, we recommend adopting metrics aimed at assessing "financial sustainability" as well as ecological sustainability.

Response: The merit of this type of analysis is recognized. However, such an analysis was not undertaken for two basic reasons. First, the financial returns associated with the unharvested portion of the Colville Reservation forests will not be realized during the planning period and therefore should not be modeled as though they will be. Second, while the value of the timber resource itself is easily monetized, the value of other considerations such as forest health, wildlife habit destruction, loss of cultural resources, water quality impairments, and soils stability are not. The substantial degree of disagreement among tribal constituents and forest users about the appropriate method by which to value the Reservation forests as an asset inherently compromises the results of any such undertaking. Highlighting the financial value of the Reservation forests cannot be done in the context of the EIS without obscuring or downplaying the forests' cultural and ecological value.

Response to Comments from Conservation Northwest

Comments: I am writing to provide comments on the Confederated Tribes of the Colville Reservation (CCT) Integrated Resource Management Plan (IRMP) Draft Environmental Impact Statement (DEIS). Conservation Northwest's mission is to protect and connect wildlife and their habitats from the Washington Coast to the British Columbia Rockies. Our programs involve restoring forest and watershed resilience, habitat preservation, highway crossing structures and other habitat connectivity, and transboundary wildlife recovery and monitoring. We've worked together with CCT Natural Resources and Wildlife staff in the Northeast Washington Forestry Coalition and the North Central Washington Collaborative, the Working for Wildlife Initiative, and other forums on topics ranging from habitat connectivity and climate change to Canada lynx, bighorn sheep, and sharp-tailed grouse conservation.

We are encouraged to see many themes from regional efforts reflected in the IRMP. We appreciate and support the IRMP's Desired Future Conditions for viable wildlife populations, resilient watersheds, and forests that more closely resemble those forests created historically by natural disturbances. The IRMP's goal to consider and manage for long-term alterations in ecological processes due to climate change is also important. In addition to maintaining large old trees, the IRMP's recognition of the need to reduce road effects on aquatic habitat, water quality and quantity is crucial, especially for maintaining ecologically resilient conditions in a changing climate. Equally important are objectives to restore or maintain habitat to support genetic interchange, emigration, and immigration within and between habitat blocks. The IRMP's programs for watershed, rangeland, wildlife, cultural plant and forest restoration are worthy efforts that offer opportunities for additional partnership.

Response: Thank you for your comments.

Response to Comments from the EPA

The U.S. Environmental Protection Agency (EPA) comments were provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations and the Clean Air Act, which directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Their review of the IRMP and DEIS considers the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.

The EPA supports the preferred Alternative 2 because it "enhances the holistic approach of the previous IRMP toward sustainable timber harvest levels and forest health objectives." The EPA further noted that they "acknowledge and appreciate the high quality planning effort and coordination that is reflected in a clear and informative Draft IRMP." The EPA rated the DEIS as "Adequate" because it "adequately set forth the environmental impacts of the preferred alternative." The EPA expressed the following environmental concerns regarding surface water quality.

Riparian Management Zones
Comment: We are concerned about exceedances of Tribal water quality standards for temperature and dissolved oxygen. We agree with the DEIS that these exceedances can be exacerbated by reduced riparian vegetation (whether from streamside area logging or clearing for homes, stream-adjacent roads, or overgrazing in riparian areas). Reduced riparian vegetation can lead to warmer water by, for example: reducing shade, increasing sedimentation that disconnects surface waters from colder groundwater, reducing large woody debris to retain sediment, and increasing solar radiation of soils leading to warmer groundwater.

Given ongoing temperature and temperature related water quality concerns, we recommend that the IRMP include an objective to review the adequacy of riparian area management on the Reservation. We specifically suggest a review of Riparian Management Zones within the Tribal Forest Practices Code. We are recommending a review of Riparian Management Zones because they may not provide adequate shade to achieve the IRMP's first Desired Condition, "Reservation and boundary waters meet Tribal Water Quality Standards." Our concern is based on EPA Region 10 analysis aimed at determining the maximum amount of shade loss associated with management that will not result in increases in stream temperature. Consider, for example, the 2013 EPA, U.S. Geological Survey, and Bureau of Land Management evaluation, "Effects of Riparian Management Strategies on Stream Temperature." (available online)

Because stream temperature response to riparian management is highly variable and we appreciate that such a review would best be conducted as part of a dedicated process, we are extending an offer of technical coordination (such as assistance with shade modeling).

Response: Riparian Management Zones are a cornerstone of water quality protection. In recognition of their importance and growing knowledge regarding the influence of riparian condition on water quality, the draft IRMP does include the following objective under Goal 3 Watersheds: “Assess riparian conditions at all stream water quality monitoring locations and assess riparian management zone effectiveness as well as

prioritize project planning and restoration efforts based on the results." Environmental Trust feels that EPA's recommendation can be encompassed by this objective, and would like to accept the offer of technical input by EPA in such an assessment.

An assessment of the overall effectiveness of riparian management zones relative to the current state of riparian science would be beneficial. The riparian zone requirements in the Forest Practices Code do not apply to other resource management activities such as grazing, or to non-forest lands. Riparian management zone effectiveness is often degraded by the existence of roads. Accordingly, the review will consider all riparian functions and existing conditions.

Tribal Code Compliance

Comment: We note that most of the 93 violations of natural resource codes between 2001 and 2015 were related to water and watersheds (e.g., unauthorized harvest activity in riparian zones, road erosion problems, unauthorized machinery in streams and wetlands). Because most violations were related to water, we recommend the addition of an IRMP objective that is supportive of improving the effectiveness of the Environmental Trust Department's water related code compliance, assurance and/or enforcement efforts. Consider including such an objective under IRMP Soil, Water, Air Goal 3: Watersheds.

Response: The first objective under Goal 3 for watersheds instructs the Environmental Trust Department to administer compliance with the Forest Practices and Hydraulic Project Permitting codes (among others) to help meet tribal water quality standards. In addition, Goal 4 of the Forestry Program includes an objective to ensure that harvest operations are compliant with tribal code requirements, including the protection of riparian zones.

Identification and documentation of violations are conducted by the Environmental Trust Department's Nonpoint Source Coordinator, a position funded by EPA. In addition, the Forestry Program's Timber Sale Administrator is responsible for ensuring that timber sale activities are in compliance with contract provisions requiring compliance with tribal natural resource codes and best management practices protecting riparian zones and surface waters on the Reservation.

As noted in the DEIS, 93 violations of tribal natural resource codes were documented during the 15-year planning period (averaging about 6 per year). Of these, 37 involved violations affecting either riparian and streamside zones or involved erosion problems from roads that could potentially affect surface waters (averaging less than 3 per year). During this time, there were over 70 timber harvest projects affecting 113 watershed management units for a total of 136,733 acres. Over 1,590 miles of roads were reconstructed and over 600 miles of new roads were constructed. This is a large workload but the Tribes' natural resource managers are committed to reducing or preferably eliminating the number of violations and will continue to consider and incorporate new strategies for achieving full code compliance.

Forest Road Management Plan
Comment: We agree with the DEIS that forest roads are a major source of sediment and can adversely alter drainage patterns, water yield and streamflow regimes. We also note that the Tribes' recent forest road inventory indicates that road densities have increased in the last 15 to 20 years and that, of the 3,377 stream crossings on the Reservation, almost 1,900 had one or more environmental issues, including fill erosion and culverts that are undersized or create fish blockage.

Given our shared concern about adverse impacts to water quality and aquatic resources from forest roads, we are supportive of the Draft IRMP's target to reduce forest road density and the Tribes' intention to, "...develop a management plan for forest access roads that protects watersheds and improves access for resource management and tribal member use."

To better leverage the IRMP's contribution toward the completion of a Forest Road Management Plan, we suggest including 'Develop a Forest Road Management Plan' as an explicit, stand-alone, objective in the IRMP. One of our aims for this recommendation is for the IRMP to address which Tribal Department would be primarily responsible, or what process will be used, to develop and complete this important and collaborative plan.

Response: An objective to develop a Forest Roads Management Plan has been added to the Forest Roads goals and objectives in the IRMP. The Tribes intend to establish an independent Forest Roads Management Program within the Natural Resource Division under the direction of the Land & Property Management Director. Establishment of the Forest Roads Program will be coordinated with the Tribal Council's efforts to designate a portion of tax revenues received from a fuel compact with the state of Washington to provide long-term funding for the program.

Range Management
We are concerned about "severely high" fecal coliform and turbidity measurements and acute exceedances of fecal coliform water quality standards occurring every year and in all water classes. Given these grazing related water quality concerns, as well as potential grazing impacts on water temperature and dissolved oxygen, we are pleased to see that the IRMP includes objectives to provide off-site watering infrastructure and emphasize deferred-rotation grazing. We agree that off-site watering infrastructure can reduce impacts to streams, wetlands and lakes and that deferred-rotation grazing can increase soil moisture retention and improve stream flow.

To help ensure that these measures effectively reduce exceedances of water quality standards, we recommend that BIA and the Tribes assess the amount of off-site watering infrastructure and/or details of deferred-rotation grazing that would be needed to make a meaningful difference on fecal coliform or other grazing related water quality concerns. We recommend that the findings of any off-site watering or deferred-rotation grazing assessment be disclosed in the Final EIS and reflected as objectives or sub-objectives within the IRMP or Range Management Plan for the Colville Reservation.

Response: The Range Program is currently in the process of developing conservation plans for the Reservation's range units. The plans will include inventories of the current

conditions of available forage and infrastructure. The information will be used to determine necessary improvements on a priority basis. The Range Program will coordinate with the Environmental Trust Department and the Tribes' Fisheries Program to address water quality issues involving fecal coliform and reduced riparian vegetation by installing riparian fencing, off-site watering sources and hard watering points or crossings. The conservation plans will also include appropriate deferred-rotation strategies based on range unit conditions. The Final EIS will include this information and a related objective and discussion will be included in the Rangeland section of the IRMP.