

White River originates from the White River Glacier located on the eastern flanks of Mt. Hood. The White River is about 49 miles in length and the watershed drains primarily east to northeast to its confluence with the Deschutes River about 5.25 miles downstream from the city of Maupin, Oregon. Elevation in the watershed ranges from 6,525 feet to 800 feet. Precipitation amounts range from 100 inches to 12 inches per year. Primary forest ecotypes include sub-alpine fir/mountain hemlock in the Cascade crest zone, grand fir/Douglas-fir in the mid elevations zone and xeric ponderosa pine/Oregon white oak in the lower elevation zone along the eastern Mt. Hood National Forest Boundary (White River Watershed Analysis, 1995).

The White River Watershed starts to become segmented about one mile from its confluence with the Deschutes River by a series of falls with the upper most falls, White River Falls at RM 2.0. White River Falls stands at about 180 feet and is impassable to all upstream migrating fish. Below this point, MCR summer steelhead trout, MCR spring chinook salmon and bull trout have access. Above the falls, only native resident interior redband trout, sculpin *Cottus spp.*, non-native resident rainbow trout (hatchery stocks), and brook trout *S. fontinalis* are present.

There are about 9.4 miles of stream channels in the planning area. About 5.6 miles of these streams are fish bearing streams/waterways, of which about 2.0 miles are located in the Frog Creek irrigation ditch. Review Map 7 for additional fish distribution in the planning area. Frog Creek is the primary stream that flows through the planning area. Multiple unnamed fish bearing tributaries of Frog Creek are present in the planning area. Frog Creek irrigation ditch flows in southern direction along the eastern edge of the planning area before it connects with Clear Creek.

Bear Knoll Planning Area
Fish Distribution

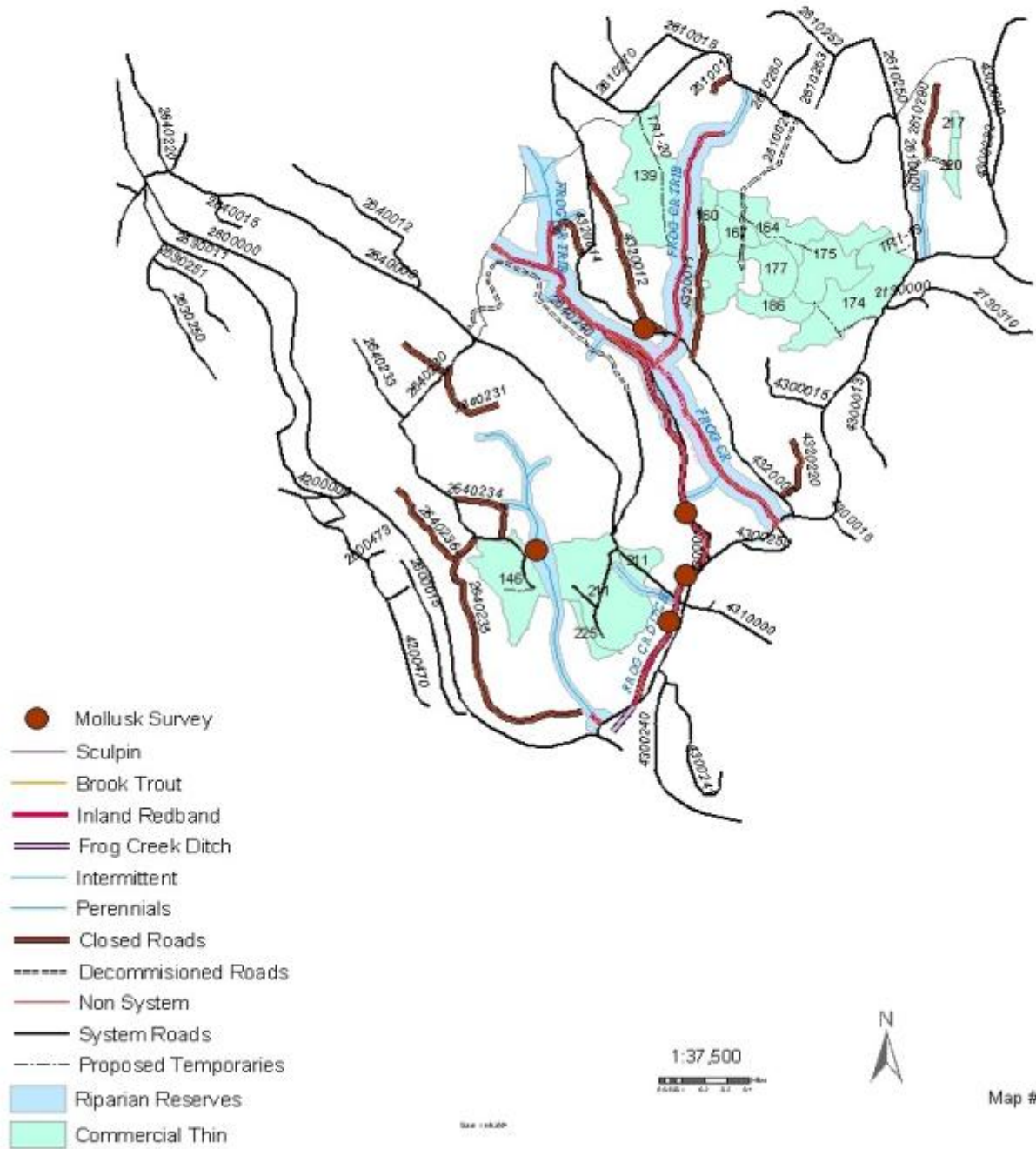


Table 8. Stream channel habitat indicators for Frog Creek in the Planning Area.							
Stream	Reach	Reach Length (ft)	Average Width (ft)	Average Bankfull Width (ft)	Bankfull width/depth ratio	Mean Gradient %	Dominate. Substrate
Frog Cr.	1	9300	16.9	14.4	15.3	2.0	Gravel (GR)
Frog Cr.	2	10080	23.4	9.1	13.6	1.5	GR
Frog Cr.	3	6971	24.3	21.95	35.4	2.0	GR
Frog Cr.	4	9181	8.8	8.8	13.7	1.5	GR

Segments of Reaches 2 and 3 are located in the planning area.

The LRMP standard for LWD is 106 pieces per mile (see Table 9 that are at least 35 feet long, and greater than 12 inches in diameter at the small end of the log (LRMP FW-094 and 095). Stream survey data from 1997 shows Frog Creek reaches 2 and 3 are located in the planning area. Both Reach 2 and 3 are well below the LRMP standard.

Table 9. LWD, Pools, Primary Pools for Frog Creek in the Planning Area.								
Stream	Reach	Percent Surface fines <1 mm- (LRMP Standard <20%)	LWD/Mi	LWD LRMP Standard	Primary Pools (3'+)/Mi	Pools/Mi LRMP Standard (3'+) by channel width	Pools all depths/Mi	Rosgen Channel Type
Frog Cr.	1	36*	40	106	0.6	52.4	17.6	B4
Frog Cr.	2	46	25	106	0.0	82.9	6.8	B4c
Frog Cr.	3	49	30	106	0.8	34.4	12.9	B4
Frog Cr.	4	40	40	106	0.0	87.7	17.8	B4c

Segments of Reaches 2 and 3 are located in the planning area.

* = Average percent fines from two sites in Reach 1 of Frog Creek between RM 0.0-2.5

Pool habitats are very important to salmonids during all life stages. Salmonids will utilize pools for both spawning and rearing activities. Spawning adult salmonids will use the clean gravel areas located in the pool tail crest for building redds (egg nest), as well as both juveniles and adults utilize pools for feeding, resting, and hiding from predators.

Pool habitat quality in Frog Creek is considered low, because pools are not well defined due to low residual depths. Fine gravels and sediment are the primary pool substrates. Due to the stream having a low, gradient step pool sequences are non-existent. Hydraulic controls were comprised by substrates 63% of the time, 20% from wood, and 17% from a combination of wood and substrates. Review Table 9 for primary and total pool density per mile in Frog Creek.

The LRMP standards for pools per mile require a minimum three-foot deep pool, every five to seven bankfull widths for cobble-dominated streams. The White River Watershed Analysis, 1995 (WRWA) displayed that this is far outside the range of natural conditions (RNC) for this watershed, being more characteristic of anadromous, west side streams. The WRWA did define the importance of measuring all pools but did not give a RNC for the watershed, stating that the RNC should be calculated by stable channel morphology and stable channel forms. Pool frequency will typically increase with increased stream gradient. A B4 stream channel type with a gradient <2% will typically have a pool-to-pool spacing of 3-4 bankfull channel widths, and a B4c stream channel type will typically have a pool to pool spacing of every 4-5 bankfull channel widths (Rosgen 1996). Reach 2 of Frog Creek has been identified as a B4c channel type, and therefore, should range between 116 and 145 pools per mile. Reach 3 of Frog Creek has been identified as a B4 channel type, and therefore, should range between 60 and 80 pools per mile.

The WRWA (p. 6-11 par. 7) recommends giving Frog Creek irrigation ditch a riparian area land allocation. As stated in the WRWA, “Establish a perennial fish-bearing Riparian Reserve on any ditches that use natural channels and are fish-bearing. The purpose of such a reserve is to maintain a suitable water temperature for fish using the natural channels. This Reserve along the constructed portion of the ditch is not intended to prohibit maintenance to protect its function as a water transmission corridor. This Reserve is intended to be consistent with the management strategy of the MT. Hood Forest Plan (see FW-085, FW-086, FW-706, FW-707, FW-708, B7-049, and B7-050).”

Frog Creek irrigation ditch is a perennial fish-bearing ditch, and flows into a natural fish bearing stream channel (Clear Creek). Therefore, the LRMP mandates the forest place a perennial fish-bearing Riparian Reserve on the constructed ditch in order to maintain a suitable water temperature for fish using Clear Creek. Brazier and Brown (1973) state that, “Direct solar radiation can be transmitted, absorbed, or reflected.” Ice (2000) concluded, “Only direct solar radiation (not diffused) can possibly affect stream temperatures.” Therefore, the riparian reserve widths along irrigation ditches on Forest, which flow back into natural stream channels only require enough area to provide shade to the water channel, such as two sight potential tree heights, which in this area of the planning area is about 200 feet.

Large woody debris in Frog Creek irrigation ditch is undesirable due to high maintenance costs to remove the LWD and the damage, which could occur from LWD being in the ditch, such as blowing out the dirt fill berm. Future recruitment of LWD in the ditch is also undesirable.

The primary tributary to Clear Creek is Frog Creek, which contributes about 10% of the total flow. Summer low flow for Frog Creek is 1 to 2 cubic feet per second (cfs). Frog Creek is a Class I, 2nd order stream. At about RM 4.75 (Frog Creek Reach break for reaches 2 and 3) the diversion structure (headgate) for Frog Creek irrigation ditch, diverts up to 80% of Frog Creek to the ditch, which then feeds into Clear Creek. At this point the Clear Creek ditch begins, currently diverting about 70% of the stream flow from Clear Creek into the ditch, with 100% flow diversion permitted. These perennial flowing ditches alter the bankfull (channel maintenance flows) discharge in both Frog and Clear Creeks. This may impact fish spawning and foraging habitat by reducing the ability of fine sediment from being seasonally flushed through the system, which is inherent to mountain streams (Clear Creek riparian survey, 1990 and Rosgen, 1996). Review Table 12 for LRMP standards for fine sediment levels in Frog Creek.

As of 1998, the Oregon Department of Environmental Quality (ODEQ) has placed Clear Creek (RM 0 to 15.1) and White River (RM 0 to 12) on the 303(d) list for water temperature. However, the 7 day running average has not exceeded ODEQ standards from 1996 through 2003 at any of the two data collecting sites located in Clear Creek during the spawning or incubation period. Frog Creek is the largest tributary to Clear Creek and currently meets Oregon state water quality standards. Frog Creek irrigation ditch is only managed to meet Oregon state water quality standards for water temperature. Water temperature data taken in Frog Creek ditch upstream of the confluence to Clear Creek was recorded only in 2003 with the maximum 7-day average

maximum being 10.5 degrees C. A summer drought was experienced in 2001 and an extreme low snow pack was experienced in 2003, while 2002 was considered to have a normal water year. Water temperature met ODEQ standards in 2001 and 2002 by exceeding 17.8 °C for only 6 consecutive days in 2001 and 0 days in 2002. In 2003, water temperature did exceed ODEQ standards for 14 consecutive days. Review Table 10 for additional information.

Table 10. Stream Temperature Summary		
Stream	Location	Days over Max 7 Day Average >17.8 °C in multiple years from 1996 through 2003
Clear Creek	Above confluence of Camas Creek	0 (1998), 0 (1999)
Clear Creek	At Keeps Mills Campground	0 (1996, 1997, 1998, 1999, 2001, 2002, and 2003)
Frog Creek	At confluence of Frog Creek	0 (1997), 0 (2003)
Frog Creek	Frog Creek Ditch before diversion of clear Creek ditch	0 (2003)
McCubbins Gulch	About 1.75 miles upstream of McCubbins Gulch Campground	6 (2001), 0 (2002), 14 (2003)
Clear Creek Ditch	In Clear Creek Ditch just below the headgate diversion	0 (2001), 0 (2002), 0 (2003)

Interior redband trout throughout the Oregon interior basins, which originally derived from the Columbia River system are well known to be hereditary resilient to high water temperatures, and interior redband trout have been found in water temperatures over 28 °C (Behnke R., 1992). Interior redband trout spawn in Frog Creek and Clear Creek during the latter half of April. Fry are believed to leave the gravel in late June, depending on water temperatures.

Fish and Aquatic Mollusk Presence/Absence

Table 11. Aquatic Species Survey Results			
Threatened			
Species	Suitable Habitat	Presence	Surveys
Mid-Columbia River Steelhead Trout (ESU)	N	N	Y
Columbia River Bull Trout (ESU)	N	N	Y
R6 Sensitive Species			
Interior Redband Trout	Y	Y	Y
Columbia duskysnail <i>Lyogyrus spp.</i>	Y	Y	Y
Essential Fish Habitat			
Chinook and Coho	N	N	N/A ¹

1 N/A = Not Apply

Threatened Species

Mid-Columbia River steelhead trout (NMFS)

Mid-Columbia River steelhead trout are not present in the planning area, but are present about 20 miles downstream below a 180 feet long-standing natural falls called White River Falls at RM 2. There is no substantiated historical or present evidence that steelhead have ever been above White River Falls.

Columbia River Bull Trout (USFWS)

There is no evidence of Columbia River bull trout use in the planning area, or above White River Falls. Bull trout have been found in neighboring basin (Hood River).

R6 Sensitive Aquatic Species

Interior Redband Trout

Presence of interior redband trout has been documented in the White River watershed and in the planning area. Interior redband trout are known to be present up to RM 7.75 in Frog Creek, as well as its major unnamed tributaries. Access is available for interior redband trout for the entire length of Frog Creek ditch. Interior redband trout are known to be present up to RM 12.8 of Clear Creek, as well as, Clear Creek ditch (entire length), and one unnamed tributary to Clear Creek (RM 0.25) located about 0.5 mile downstream of Frog Creek Confluence to Clear Creek (outside of the planning area). Suitable rearing habitat is present in other unnamed intermittent tributaries to both Frog and Clear Creeks. I believe that interior redband trout may use these tributaries during times of the year that running water is present. This would be expected to be during the winter and spring months. Review map 7 for further detailed information on interior redband distribution in the planning area.

Columbia duskysnail

The Columbia duskysnail *Lyogyrus* n. sp. 1. is a Forest Service R6 sensitive species. Surveys were conducted during 2000 and 2001 at multiple locations throughout the planning area. The Columbia duskysnail was present in the planning area. They were found in multiple habitat types such as springs, seeps, tributaries to Frog and Clear Creeks, and the Frog Creek ditch. Review Map 7 for further information.

Essential Fish Habitat

Chinook and coho essential habitat (designated by NMFS) stops at White River Falls. No documented historical use of chinook or coho salmon is known to occur above the White River Falls.

Determination of Effects

Issues and Analysis Methodology

The following LRMP standard and guidelines were used to guide the analysis methodology:

- Spawning habitat (e.g. pool tailouts and glides) shall maintain < 20% fine sediment (i.e. particles <1 mm in diameter) on an area weighted average, FW-097.
- At least 90% of potential and naturally occurring in-channel large woody debris (LWD) shall be maintained, FW-092.
- Retention of multi-piece accumulations of LWD and fallen trees with attached root wads should be emphasized, FW-093.
- Conifer and hardwood trees necessary for stream bank stability, long term wood input, and diversity of wildlife and plant communities should be maintained, FW-135. Note this is recognized for Class IV (non fish-bearing intermittent) streams, seeps, springs, and headwaters.
- Seven (7) day moving average of the daily maximum water temperature shall not exceed 64 °F (17.8 °C) unless specifically allowed under a Department-approved basin surface water temperature management plan (Oregon State Water Quality Standard for water temperature, OAR 340-41), as well as LRMP.

Direct and Indirect Effects of Alternative I, No Action

Short and Long-Term Effects

Short-term direct and indirect effects are those that could occur during project implementation and in five years after projects are completed. Long-term direct and indirect effects are those that could occur between 5 and 50 years after the projects are completed.

There should be no short-term direct or indirect effects to aquatic habitat or individuals by implementing this alternative. There would be no soil disturbance because logging operations, road construction/closing, or prescribed fire activities would not occur. No riparian vegetation would be disturbed, including removal of noxious weeds. The existing stream channel and aquatic habitat conditions should stay the same until the next high flow event occurs. Amounts of LWD throughout the planning area and fine sediment levels in Frog Creek would still not meet MHFP standards and guidelines as covered under FW-092, FW-135, and FW-097.

There should be no noticeable long-term effects to aquatic habitat or individuals. Stand conditions over the landscape would not be improved, and thus desirable stand conditions mentioned in the purpose and need would not be met. Natural tree mortality would increase LWD and move the area towards meeting standards and guidelines for LWD. Noxious weeds would still be present.

Cumulative Effects

There should be no cumulative effects by implementing this alternative.

Irreversible and Irrecoverable Effects

There would be no irreversible or irretrievable effects to aquatic habitat or resources as a result of implementing this alternative.

Species Specific Effects Determinations of Alternative I: No Action:

Threatened, Endangered, and Proposed Species

Threatened Species (NMFS)

Mid-Columbia River Steelhead Trout

A “**No Effect**” (NE) determination is warranted to Mid-Columbia River steelhead trout. Mid-Columbia steelhead trout upper limits are at White River Falls.

Threatened Species (USF&WS)

Columbia River Bull Trout

A “**No Effect**” (NE) determination is warranted to Columbia River bull trout. Bull trout upper limits are at White River Falls.

R6 Sensitive Aquatic Species

Interior Redband Trout

A “**No Impact**” (NI) determination is warranted to interior redband trout. Existing conditions would be maintained by implementing alternative I: No Action.

Columbia Dusksnail Aquatic Mollusks

A “**No Impact**” (NI) determination is warranted to Columbia dusksnail. Existing conditions would be maintained by implementing alternative I: No Action.

Essential Fish Habitat

Chinook and Coho Salmon

A “**No Effect**” (NE) determination is warranted to chinook and coho essential habitat. Chinook and coho essential habitat stops at White River Falls.

Direct and Indirect Effects of Alternative II

Short and Long-Term Effects

Alternative II actions at the White River watershed 5th field scale and the Clear, Frog, and White River Gorge 6th field watershed scales, and project level scale would have a negligible increase of fine sediment (<1mm in diameter) to fish spawning and rearing habitat, as well as to aquatic mollusk or their habitat. With all riparian reserves in place

and no timber stands proposed for harvest in riparian reserves. I believe, as long as the design layout and best management practices being adhered to, there would be no short or long-term direct or indirect effects to fish or their spawning and rearing habitat, as well as to aquatic mollusks or their habitat from fine sediment to the stream channels located in or outside of the planning area.

Alternative II actions would maintain the LRMP for LWD as covered under FW-092 and FW-135 for both the short and long-term. This is due to no riparian reserves being entered in this proposed action. There would be no short or long-term direct or indirect effects to LWD loading in either the 5th or 6th field watershed scales from implementing Alternative II. Therefore, LWD would maintain or increase pool habitat in the stream channels located in planning area.

Water temperature would be maintained for both the short and long-term with no direct or indirect effects to Frog and Clear Creeks and their tributaries, as well as Frog Creek irrigation ditch from implementing this alternative. Riparian reserve vegetation under alternative II would be left in place. Removal of noxious weeds in the riparian reserves would have negligible effects to water temperature due to the minimum if any shade supplied to the water from the noxious weed plants. Water temperature at the 5th and 6th watershed scales would be maintained from implementing Alternative II.

Cumulative Effects

The 5th and 6th field watersheds found in the planning area has been managed during the past century for grazing, irrigation, timber harvesting, road building, fires, recreational activities, such as off highway vehicles (OHV) and campgrounds, exotic fish introduction, and restoration activities. Cumulative effects from these activities in the White River watershed has had both a direct and indirect connection to the level of water quality and quantity, which can influence the health of the native resident interior redband trout and Columbia duskysnail populations that are present in the two watersheds. Alternative II would maintain the over all riparian conditions at the 5th and 6th field watershed scale, while maintaining or improving other resource uses in the watershed.

The Aggregate Recovery Percentage (ARP) model is used by the Mt. Hood National Forest to model the possible cumulative effects, from a base and peak flow standpoint, for a given watershed from proposed activities. The ARP calculated for 2005 at the Frog Creek/Lower Rock Creek Subwatershed scale is at about 71.6%, and alternative II should only decrease that slightly by about 1.2%. The Upper White River 5th field watershed scale, as of 2005 is at about 78.2%. The threshold of concern for the Upper White River (5th field watershed) using the ARP calculation is 65%. Implementing Alternative II action would decrease the ARP value by 0.5% in 2005.

Cumulatively, watershed conditions in the short-term may be slightly decreased by harvest activities, but would be improved in the long-term by improving the number, type and health of the trees and stands over the long-term.

Irreversible and Irrecoverable Effects

There would be no irreversible or irretrievable commitment of aquatic resources as a result of selecting the alternative II action. Potential changes in habitat conditions described above would recover over time. Fish, aquatic mollusk, and insect populations fluctuate naturally, but any fluctuations caused by selecting alternatives II action would not result in local extinctions.

Species Specific Findings of Alternatives II

Threatened, Endangered, and Proposed Species

Threatened Species (NMFS)

Mid-Columbia River Steelhead Trout

A “**No Effect**” (NE) determination is warranted to Mid-Columbia River steelhead trout. Mid-Columbia steelhead trout upper limits are at White River Falls, which is a long-standing natural fish barrier.

Threatened Species (USF&WS)

Columbia River Bull Trout

A “**No Effect**” (NE) determination is warranted to Columbia River bull trout. Bull trout upper limits are at the White River Falls.

R6 Sensitive Aquatic Species

Interior Redband Trout

A “**No Impact**” (NI) determination is warranted to resident interior redband trout for the proposed action in alternative II. Following design layout and adhering to design features in the alternative action II there would be no impacts to spawning and rearing habitat, due to no riparian reserves being entered.

Columbia Dusksnail Aquatic Mollusks

A “**No Impact**” (NI) determination is warranted to Columbia Dusksnails. There would be no potential negative impacts to Columbia dusksnails and it’s habitat from alternatives II. The species habitat, life cycle, microclimate, or life support requirements at the 7th field or greater watershed scales would be maintained at existing conditions.

Essential Fish Habitat

Chinook and Coho Salmon

A “**No Effect**” (**No Effect**) determination is warranted to chinook and coho essential habitat. Chinook and coho essential habitat stops at White River Falls.

Direct and Indirect Effects of Alternative III

Short and Long-Term Effects

Alternative III actions at the White River 5th field and Clear, Frog, and White River Gorge 6th field watershed scales, and project level scale would have a negligible increase of fine sediment (<1mm in diameter) to fish spawning and rearing habitat, as well as to aquatic mollusk or their habitat. With all riparian reserves in place and no timber stands proposed for harvest in riparian reserves. I believe, as long as the design layout and best management practices being adhered to, there would be no short or long-term direct or indirect effects to fish or their spawning and rearing habitat, as well as aquatic mollusks or their habitat from fine sediment to the stream channels located in or outside of the planning area.

Alternative III actions would maintain the LRMP for LWD as covered under FW-092 and FW-135 for both the short and long-term. This is due to no riparian reserves being entered in this proposed action. There would be no short or long-term direct or indirect effects to LWD loading in either the 5th or 6th field watershed scale from implementing Alternative III. Therefore, LWD would maintain or increase pool habitat in the stream channels located in planning area.

Water temperature would be maintained for both the short and long-term with no direct or indirect effects to Frog and Clear Creeks and their tributaries, as well as Frog Creek irrigation ditch from implementing this alternative. Riparian reserve vegetation under alternative III would be left in place. Removal of noxious weeds in the riparian reserves would have negligible effects to water temperature due to the minimum if any shade supplied to the water from the plants. Water temperature at the 5th and 6th watershed scale would be maintained from implementing Alternative III.

Cumulative Effects

The 5th and 6th field watersheds found in the planning area has been managed during the past century for grazing, irrigation, timber harvesting, road building, fires, recreational activities, such as off highway vehicles (OHV) and campgrounds, exotic fish introduction, and restoration activities. Cumulative effects from these activities in the White River watershed have had both a direct and indirect connection to the level of water quality and quantity, which can influence the health of the native resident interior redband trout Columbia dusksnail populations that are present in the two watersheds. Alternative III would maintain the over all riparian conditions at the 5th and 6th field watershed scale, while maintaining or improving other resource uses in the watershed.

The Aggregate Recovery Percentage (ARP) model is used by the Mt. Hood National Forest to model the possible cumulative effects, from a base and peak flow standpoint, for a given watershed from proposed activities. The ARP calculated at the 6th field watershed scale, Frog Creek/Lower Rock Creek, as of 2005 is at about 71.6%, and alternative III action should only decrease that slightly, by about 0.5 percent. The Upper White River 5th field watershed scale, as of 2005 is at about 78.2%. The threshold of concern for the Upper White River (5th field watershed) using the ARP calculation is 65%. Implementing alternative III action would change the ARP value by an estimated 0.3%, in 2005.

Cumulatively, watershed conditions in the short-term may be slightly decreased by harvest activities, but would be improved in the long-term by improving the number, type and health of the trees and stands over the long-term.

Irreversible and Irretrievable Effects

There would be no irreversible or irretrievable commitment of aquatic resources as a result of selecting the alternative III action. Potential changes in habitat conditions described above would recover over time. Fish, aquatic mollusk, and insect populations fluctuate naturally, but any fluctuations caused by selecting alternatives III action would not result in local extinctions.

Species Specific Findings of Alternative III

Threatened, Endangered, and Proposed Species

Threatened Species (NMFS)

Mid-Columbia River Steelhead Trout

A “**No Effect**” (NE) determination is warranted to Mid-Columbia River steelhead trout. Mid-Columbia steelhead trout upper limits are at White River Falls, which is a long-standing natural fish barrier.

Threatened Species (USF&WS)

Columbia River Bull Trout

A “**No Effect**” (NE) determination is warranted to Columbia River bull trout. Bull trout upper limits are at the White River Falls.

R6 Sensitive Aquatic Species

Interior Redband Trout

A “**No Impact**” (NI) determination is warranted to resident interior redband trout for the proposed action in alternative III. Following design layout and adhering to design

features in the alternative action III there would be no impacts to spawning and rearing habitat, due to no riparian reserves being entered.

Columbia Dusksnail and Basalt Juga Aquatic Mollusks

A **“No Impact” (NI)** determination is warranted to Columbia Dusksnails. There would be no potential negative impacts to Columbia dusksnails and it’s habitat from alternative III. The species habitat, life cycle, microclimate, or life support requirements at the 7th field or greater watershed scales would be maintained at existing conditions.

Essential Fish Habitat

Chinook and Coho Salmon

A **“No Effect” (No Effect)** determination is warranted to chinook and coho essential habitat. Chinook and coho essential habitat stops at White River Falls.

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