

APPENDIX B: TRIBUTARY EXISTING CONDITIONS & REACH-SCALE LIMITING FACTORS

Brezee Creek

Physical/Riparian/Channel Habitat Condition: The Brezee Creek watershed has a drainage area of ~9.17 km². Current land cover in the drainage is primarily pasture and forest land, with an expanding area of urban development in the lower watershed around the city of La Center, and rural residential development throughout the drainage. For much of its length, Brezee Creek flows in a narrow, steep-sided canyon with intact riparian forest. Upland areas are largely cleared or open. Stormwater inputs to Brezee Creek consist of an expanding network of piped urban storm sewers in the lower watershed, within the town of La Center, and limited roadside ditches in the unincorporated upper watershed. Road density above the index reach is ~4.35 km/km² (2001 data). The index reach is located near the mouth of Brezee Creek, approximately 90 m upstream of its confluence with the East Fork Lewis River. The reach is characterized by pool-riffle morphology and a low gradient (1.9%), but is also fairly straight with a low sinuosity of 1.2. Mean wetted width at baseflow was ~3.4 m in 2002, with an estimated discharge of <1 cfs (Clark County 2003). Both the Lockwood Road crossing and Mill Dam which is located ~60 m upstream of the road crossing are significant fish passage barriers.

Fish Passage: Based on a review of SSHIAP 2008 and Clark County Public Works (PW), there are at least 12 stream crossings on the mainstem channel and tributaries (SSHIAP 2008, Clark PW 2008, Wade 2000) many of which are fish passage barriers. Binford dam and reservoir (located at the headwaters of the easternmost tributary) is likely a passage barrier (Table 1).

Table 1. Fish Passage potential barriers on Brezee Creek

Location	Description	Status
Mainstem		
NE Lockwood Creek Rd	Road crossing	barrier
14 th Ave	Dam	barrier
NE 23 rd Ave	Road crossing	barrier
NE 351 st	Road crossing	barrier
NE 369 th	Road crossing	barrier
NE 379 th	Road crossing	barrier
Headwaters	Ponds/reservoirs	not surveyed, may not provide passage
Tributaries		
NE 23 rd Ave	Road crossing	barrier
Private Road	Road crossing	not surveyed
NE 369 th	Road crossing	barrier
Headwaters	Ponds/reservoirs	not surveyed, may not provide passage

Water quality: The headwaters of Brezee Creek are largely intact and 7DMAX temperatures at the mouth have been recorded as high as 20.5°C (Clark County PW). Brezee Creek has exceeded DEQ water quality criteria for fecal coliform (Clark County Unpublished Data) from Station BRZ010 (Brezee Creek upstream of LaCenter Bridge) with a geometric mean of 652CFU/100 mL from six samples collected in 2002. Urban stormwater runoff may contribute to pollution and sediment in the lower river and is being evaluated by Clark PW. The Clark PW

monitoring site is near its outlet to the East Fork. At this site, the stream health is rated poor, mainly based on high harmful bacteria counts. Otherwise it would rate fair.

Water Diversions: There are approximately 8 documented surface water withdrawals and 1 documented reservoir withdrawal identified by WDOE (2008). A newly adopted Instream Flow Rule for WRIA’s 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Flow: Spot flow measurements conducted at the County Road 42 crossing in 1998 estimated flow at 0.7/1.0/1.9 cfs in September/October/November respectively (IFIM 1998, as found in WDFW 2001).

EFWG Comments: Clark PW is currently evaluating the replacement of the Lockwood Creek road culvert. The only Tier 1 reach is behind the Mill Dam due to the small reservoir behind the dam. Restoration actions should be sequenced to occur during or after the fish passage problems at the Lockwood Road culvert and Mill Dam have been repaired. Cooler summer stream temperatures may provide thermal refuge opportunities (to the extent fish can get in during summer low flows).

Past/Current Restoration Activities: Clark PW is evaluating the replacement of the Lockwood Road culvert.

Additional Information Needs: Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants). Monitor juvenile and adult fish use throughout the tributary. Consider conducting stream habitat surveys in the upper basin.

Tier 1 Reaches: Brezee Creek 2, Description: Culvert to Dam, Length: 0.05 mi

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 inactive Age-0 active rearing	Key habitat quantity Key habitat quantity	Oct-Mar Mar-Oct	74/26	High
Winter Steelhead	Egg incubation Fry colonization Spawning	Sediment Habitat Diversity Habitat Diversity	Mar-Jul May-Jul May-Oct	31/69	Low

Dean Creek

Physical/Riparian/Channel Habitat Condition: Physical habitat information is limited to data gathered on the lower section of stream within the EF Lewis valley floor (CFS 2004). Dean Creek was surveyed from the intersection with J. A. Moore Road downstream 0.7 km. Land ownership within the survey reach is private agricultural and industrial. The right descending bank is entirely in farmland and the left descending bank is owned by Storedahl & Sons (Daybreak Mine), though much of the land is under agricultural usage. Below JA Moore Road, Dean Creek is low gradient and is within an unconfined valley. The stream itself has downcut into the streambed leaving itself entrenched. The upstream end of the survey area has been manually channelized as indicated by severe entrenchment and a lack of stream sinuosity. The mean wetted width in Dean Creek riffles is only 1.3 m. The wetted depth is very shallow, and consequently few deep pools are available, however much of the habitat is comprised of slow water ponds created by beaver dams. LWD recruitment potential is low but LWD presence is fair and largely derived from beaver ponds. Sandy substrate dominates the lower channel and embeddedness was as high as 75% (CFS 2004).

Additional existing habitat data was gathered based on a review of aerial photos (Google 2008). Dean Creek enters the EF Lewis CMZ downstream of the Ridgefield pits and travels north along the ponds through a narrow channel that is crossed by dirt roads and has little riparian canopy. Once the tributary gets above NE JA Moore Road, the riparian habitat improves slightly, although the channel is incised and riparian cover is spotty as it runs through a farm where blackberry and reed canary grass are dominant and a gravel quarry may be contributing to fines. The riparian cover improves with mature hardwoods and conifers until it nears NE 82nd Ave where the channel size and riparian cover diminish significantly as it runs through private property. Once the channel crosses NE 82nd, it splits. The mainstem channel goes west (Dean Creek 4) until it is turned into ponds, the east channel (Dean Creek LB Trib B) runs through private farms where it is turned into a series of ponds/reservoirs.

Fish Passage: Based on a review of SSHIAP and Clark PW, there are at least 6 stream crossings on the mainstem channel and LB Trib B and a series of ponds (SSHIAP 2008, Clark PW 2008). The two public road crossing at JA Moore Road were partial barriers but were replaced in 2008 (Clark County Conservation District). Two private culverts on 299th were replaced in 2008. Potential low-flow and thermal barrier passage problems near the mouth (TAG Members). Mid- and late-summer flow is often subterranean in heavy gravel deposits just downstream of J.A. Moore Rd (TAG Members) (Table 2).

Table 2. Fish passage potential barriers on Dean Creek

Location	Description	Status
JA Moore Road bridges	Road crossing (2)	Former barrier, improved in 2008
NE 66 th Road	Road crossing	Former barrier, improved in 2007
299 th (Nitowskie)	Road crossing (2)	Former barrier, improved in 2008
NE 82 nd Avenue	Road crossing	unsurveyed
NE 96 th Avenue	Road crossing	unsurveyed
NE 289 th Street	Road crossing	not barrier
Mainstem and LB Trib B	Ponds/dams	don't appear to provide fish passage

Water Quality: Temperature conditions in summer are unlikely to support salmonid rearing and may cause passage barriers at the mouth of Dean Creek where 7DMAX temperatures of 25.3°C have been recorded. Temperatures at JA Moore Road have been recorded at 22.67°C (7DMAX). Other water quality parameters have not been monitored. The riparian corridor is significantly altered with large sections of poor riparian cover. Sections of mature hardwoods and conifers exist but are spotty. The headwater tributaries of LB Trib B have been extensively ponded/dammed which is likely to reduce summer flow and contribute to summer stream temperatures. Agriculture and development in the headwater may be contributing to sediment, pollutants, and temperature problems.

Water Diversions: There are approximately 9 documented surface water withdrawals and 7 documented ground water source withdrawals identified by WDOE (WDOE 2008). Multiple ponds exist at the headwater of Dean Creek (Google Earth 2008). A newly adopted Instream Flow Rule for WRIA’s 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a)..

Flow: unknown

EFWG Comments: Potential for land acquisition of large parcels southwest of current mouth of Dean Creek. Potential to re-align channel back into historic location. Invasive species removal (blackberries). Work with landowners to use BMP’s.

Past/Current Restoration Activities: Two private culverts (299th) were replaced in 2008. An impassable culvert at NE 66th was replaced in 2007. The two public road crossing at JA Moore Road were partial barriers but were replaced in 2008 (Clark County Conservation District). LCFEG has received funding for work in lower Dean Creek. Potential for land acquisition of large parcels southwest of current mouth of Dean Creek.

Additional Information Needs: Evaluate sediment and pollutant sources. Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants). Monitor juvenile and adult fish use throughout the tributary.

Tier 1 Reaches: Dean Creek 1A (Mouth to Canyon, Length: 0.87 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg Incubation Age-0 active rearing Age-0 inactive rearing	Sediment Key habitat quantity Key habitat quantity	Oct-May May-Oct Oct-Mar	93/07	High
Winter Steelhead	Age-0 active rearing Egg Incubation Fry Colonization	Temperature Sediment/Temp. Temperature	Mar-Jul Mar-Jul May-Jul	46/54	Low
Chum	Egg Incubation Prespawn holding	Sediment Key habitat quan/Div	Oct-Apr Oct-Dec	52/48	Low

Tier 2 Reaches: Dean Ck 3 (Culvert 2 - Culvert 3, Length: 0.13 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg Incubation Age 0 active rearing Age 0 inactive rearing	Sediment Key habitat quantity Key habitat quantity	Oct-May May-Oct Oct-Mar	87/13	Medium

Dyer Creek

Physical/Riparian/Channel Habitat Condition: Stream habitat surveys have not been conducted on Dyer Creek, therefore limited physical data is available. Based on a review of aerial photos, the potential useable fish habitat has been significantly shortened by the development of private ponds/reservoirs on the mainstem channel above NE 259th Street which do not appear to provide fish passage. Downstream of NE 259th, the stream travels through marginal riparian cover interspersed with dense blackberry and reed canary grass. The entire tributary has been heavily altered due to agriculture and development. The two small tributaries are crossed by a number of roads and private drives and, in both cases, their headwaters have been dammed and ponded for private use. A series of springs/wetlands at the headwaters have been altered. The channel within the EF CMZ is deeply incised and has limited flow during the summer months. Dyer is unlikely to provide much summer habitat currently but may provide winter habitat for coho and steelhead.

Fish Passage: Based on a review of SSHIAP and Clark PW, there is at least 1 stream crossing and 1 reservoir located on the mainstem channel (SSHIAP 2008, Clark PW 2008) (Table 3).

Table 3. Fish Passage potential barriers in Dyer Creek

Location	Description	Status
NE 259 th St	Road crossing	barrier
Houser Reservoir	Dam	barrier

Water Quality: The riparian corridor is significantly altered with large sections of poor riparian cover. Sections of mature hardwoods and conifers exist infrequently and most of the channel is dominated by blackberry and reed canary grass. The headwaters of the mainstem and tributaries have been extensively ponded/dammed which is likely to reduce summer flow and contribute to summer stream temperatures. Agriculture and development in the headwater may be contributing to sediment, pollutants, and temperature problems.

Water Diversions: There are approximately 2 documented surface water withdrawals and 2 documented ground water source withdrawals identified by WDOE (WDOE 2008). Multiple ponds exist at the headwaters of Dyer Creek (Google Earth 2008). A newly adopted Instream Flow Rule for WRIA's 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Flow: Unknown

EFWG Comments: Group had little knowledge of Dyer Creek.

Past/Current Restoration Activities: None identified

Additional Information Needs: Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants). Monitor juvenile and adult fish use throughout the tributary. Identify and protect important wetland/spring habitat in the headwaters.

Tier 1 Reaches: Dyer Creek 1 (Mouth - Dyer Ck. LB Trib., Length: 0.14 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg Incubation Age-0 active rearing	Sediment/channel stability Temp/Key habitat quality	Oct-May Mar-Oct	87/13	High
Winter Steelhead	Age-0,1 inactive Age-1 active	Habitat Diversity Habitat Diversity	Oct-Mar Mar-Oct	24/76	Low
Summer Steelhead	Age-0,1 inactive rearing Age-2+ active rearing	Habitat Diversity Habitat Diversity	Oct-Mar Mar-Oct	0/100	Low

Tier 2 Reaches: Dyer Creek 2 (Dyer Ck. LB Trib. to Dyer Ck. Canyon, Length: 0.49 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg Incubation Age-0 active rearing	Sediment/channel stability Temp/Key habitat quant.	Oct-May Mar-Oct	83/17	Medium
Winter Steelhead	Age-0,1 inactive Age 1 active	Habitat Diversity Habitat Diversity	Oct-Mar Mar-Oct	0/100	Low
Summer Steelhead	Age-0,1 inactive rearing Age-2+ active rearing	Habitat Diversity Habitat Diversity	Oct-Mar Mar-Oct	15/85	Low

Tier 2 Reaches: Dyer Creek 4 (Top of Canyon to Dyer Creek Dam (end of presumed coho use), Length 0.39)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 active rearing Age-0 Inactive rearing	Sediment Key habitat quantity Key habitat quantity	Oct-May Mar-Oct Oct-Mar	90/10	Medium

Jenny Creek

Physical/Riparian/Channel Habitat Condition: Stream habitat surveys have not been conducted on Jenny Creek. Based on a review of aerial photos, the stream channel appears to be well shaded with mature hardwood and conifer in the riparian and upland corridors, although there are short sections where the stream runs through agricultural property and has poor riparian cover. A barrier falls exists at RM 0.13 which naturally limits salmon and steelhead production. Limited water

quality data indicates that Jenny Creek may provide summer temperature refuge from the mouth to the barrier falls.

A brief survey (Interfluve/CFS 2008) of the County owned land from the mouth to the barrier falls noted that substrate was highly embedded with fines and dominated by cobble sized angular rock (likely native basalt from canyon). Spawning habitat appeared to be very limited due to sediment load and size of substrate. Some limited rearing habitat is available in the summer. The channel may provide some winter flow refugia from the mainstem EF Lewis. Non native invasive species such as reed canary grass, bamboo, and Himalayan blackberry dominate the riparian understory. Salmonids (not ID'd) were observed in the channel below the falls.

Fish Passage: A barrier falls exists at RM 0.13 which naturally limits salmon and steelhead distribution. Based on a review of SSHIAP and Clark PW, there are at least 12 road/stream crossings on the mainstem channel (Clark PW 2008, SSHIAP 2008). It appears that some of the road/stream crossings have not been surveyed, but many others have been identified as barriers (Table 4).

Table 4. Fish passage potential barriers on Jenny Creek

Location	Description	Status
RM 0.13	Road crossing	barrier falls
NW Pacific Highway	Road crossing	barrier
NW 14 th Avenue	Road crossing	Barrier
Cedar Creek. Rd	Road crossing	barrier
NW 359 th Street	Road crossing	barrier
NE 8 th Avenue/NW Jenny	Road crossing	barrier
private drive	Road crossing	unsurveyed
private drive	Road crossing	unsurveyed
NE 378 th	Road crossing	barrier
NE Jenny	Road crossing/ small concrete dam	barrier
NE 12 th	Road crossing	barrier
NE Jenny	Dam/Berm	unsurveyed
NE 389 th Street	Road crossing	unsurveyed

Water Quality: Largely unknown. Water temperatures appear to be cooler than in other Lower Basin tributaries. WDEQ conducted temperature monitoring at the Pacific Highway road crossing. 7DMAX was 19.97°C in 2003 and 19.6°C in 2005.

Water Diversions: There are 11 surface water withdrawals, and 1 ground water source withdrawal from the Jenny Creek Watershed (WDOE). A newly adopted Instream Flow Rule for WRIA's 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Flow: unknown

EFWG Comments: Evaluate the potential for thermal refuge during mainstem EF Lewis summer low flows?

Past/Current Restoration Activities: Unknown

Additional Information Needs: Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants). Monitor resident

(rainbow and cutthroat) juvenile and adult fish use throughout the tributary and presence/absence above the barrier falls.

Tier 1 Reach: Jenny Creek (Mouth to Barrier Falls, Length: 0.13 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 in active rearing	Sediment Habitat Diversity	Oct-May Oct-Mar	82/18	High
Winter Steelhead	Egg Incubation	Sediment/temperature	Mar-Jul	07/93	Low

Lockwood/Riley Creek

Physical/Riparian/Channel Habitat Condition: Stream surveys are limited to the lower reaches of Lockwood Creek. Physical habitat surveys were conducted on Lockwood Creek from stream mile 0.8 to 1.3 in 2004 (CFS 2004). Landownership within the survey reach is private rural residential. Land use within the stream valley is mostly unmanaged, with some small scale agriculture and timber uses. There is one residence near the stream at the upstream end of the surveyed segment. Lockwood Creek is comprised primarily of pools with a significant amount of small gravel/cobble riffles and beaver ponds. A majority of the surveyed portion of Lockwood Creek has a pool-riffle morphology. The downstream end of the survey area is dominated by beaver ponds. Upstream of the beaver ponds there are clearly defined pools and riffles (CFS 2004). Lockwood Creek is low gradient and unconfined throughout the survey area, though it has undergone some entrenchment that may be related to anthropogenic influences. The valley bottom maintains a broad wetland that probably historically received overflow from Lockwood Creek on an annual basis. With the current entrenchment, the wetland is likely inundated less frequently than historically. The wetland may have functioned as an important over-winter rearing area in the past. Riffles are shallow and average 5.5 m wide. There are 23.4 pools per kilometer, but few of those are greater than 1 m deep (CFS 2004). There were 35 pieces of LWD per kilometer in the surveyed section of Lockwood Creek. Small pieces made up the largest portion among size classes, followed by medium and then large pieces. There was 1 log-jam and 1 rootwad per kilometer (CFS 2004). Characterization of substrate based on visual observation showed that the dominant and subdominant substrate classes in pools is gravel and sand, respectively. The same is true in riffles, except the percentage of substrate as gravel is greater. Sand makes up 38% of the substrate in pools and 18% of the substrate in riffles (CFS 2004).

Based on a review of aerial photographs the riparian area above the survey area, has variable riparian cover/shading with extensive sections of mature hardwood and conifer and other sections which run through developed and agricultural lands. Invasive Himalayan blackberry and reed canary grass are common along agricultural lands.

Fish Passage: Based on a review of SSHIAP and Clark PW, there are multiple public and private road/stream crossings on Lockwood Creek (7) and its tributaries (12) (Clark PW 2008, SSHIAP 2008). A small dam was found to block 0.8 miles of potential winter steelhead and coho habitat on Riley Creek (Clark County Passage

Assessment). A partially blocking/impassable culvert was located at the Taylor Valley Road crossing on Tributary 1 and this was replaced in 2001 (SSHIAP, Clark County Public Works). A series of cascades below this culvert may limit fish distribution. It is recommended that a survey for coho above the cascades be completed prior to any repair or modifications to the culvert (WDFW 2001). Buckbee Dam/Reservoir on Riley Creek is a complete fish passage barrier (Table 5).

Table 5. Fish passage potential barriers on Lockwood Creek

Location	Description	Status
Mainstem		
NE 315 th	Road crossing	not a barrier
NE Lockwood Creek Road	Road crossing	partial barrier (SSHIAP)
private drive	Road crossing	unsurveyed
private drive, NE Lester Avenue	Road crossing	not a barrier
private drive	Road crossing	unsurveyed
private drive	Road crossing	partial barrier (SSHIAP)
private drive	Road crossing	unsurveyed
NE Sorenson	Road crossing	barrier
headwater tributary's above known/assumed fish use	stream crossings and ponds	unknown
Riley Creek		
NE Johnson Creek Road	Road crossing	not a barrier
NE Finalburg Road	Road crossing	replaced (Clark PW)
NE 52 nd	Road crossing	barrier
headwater tributary's above known/assumed fish use	stream crossings and ponds	unknown
Tributary 1		
NE Lockwood Creek Rd	Road crossing	barrier
NE 379 th	Road crossing	not surveyed
Buckbee Dam/Reservoir	Dam/Reservoir	barrier
Tributary 2		
NE 379 th	Road crossing	barrier
NE Lockwood Creek Rd	Road crossing	partial barrier (SSHIAP)
private drive	Road crossing	not surveyed
private drive	Road crossing	not surveyed
NE 339 th Street	Road crossing	barrier
Tributary 3		
NE Taylor Valley Rd	Road crossing	not a barrier
NE 379 th	Road crossing	barrier
Tributary 4		
NE Taylor Valley Rd	Road crossing	replaced 2001
NE Sorenson	Road crossing	barrier

Water Quality: Water temperatures in lower Lockwood Creek have been as high as 22.15°C (7DMAX) and 26.1°C (7DMAX). There are several ponds/reservoirs located in the mainstem and tributaries to Lockwood Creek. These ponds may reduce flow and contribute to elevated temperatures in the summer. Clark County rates Lockwood Creek as fair (degraded but may support residential/aquatic life and recreation). Lockwood Creek exceeded water quality criteria for fecal coliform standards based on surveys conducted in 1991 and 1992 (Hutton) at the Lockwood Creek Road Station. There are a number of sediment/pollutant source opportunities at each road crossing and via the small tributaries which run through agricultural land.

Water Diversions: There are approximately 22 documented surface water withdrawals, and 7 documented ground water source withdrawals, and 1 dam withdrawal (Buckbee Reservoir) from the Lockwood Creek Watershed (WDOE 2008). Multiple ponds exist at the headwater of both Lockwood and its tributaries (Google Earth 2008). A newly adopted Instream Flow Rule for WRIA’s 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Flow: Spot flows measurements conducted at County Road 42 crossing in 1998 estimated flow at 0.7/1.4/5.9 cfs in September/October/November respectively (IFIM 1998, in WDFW 2001).

EFWG Comments: The intact riparian area of the headwaters of Lockwood should be preserved.

Past/Current Restoration Activities: Recent activities include riparian planting (50 acres) and LWD placement from Lockwood Road to the mouth, creation of a coho rearing pond near Lockwood road, pulling banks back (610 m) and replanting. In addition, a total of 0.64 km of diking on the left bank only has now been removed on lower Lockwood Creek, lowering the known total length of diking to 10 km (currently identified) in the East Fork Lewis River subbasin (WDFW 2001). A concrete fishway was installed below the Johnson road culvert by CCPW in 1994. An impassable culvert at Finalburg Road crossing was replaced on Riley Creek in 2001 (Clark PW). The Taylor Valley road crossing on Tributary 4 was replaced in 2001. The Taylor Valley Road crossing has been corrected by Clark County Public Works (CCPW) in 2001. A channel structure and riparian restoration project is underway above Lockwood Road (2008 LCFEG). CCPW added log weirs below Lockwood Creek Rd culvert in 1993. Additional funding has been acquired to replace an impassable culvert on Riley Creek.

Additional Information Needs: Evaluate sediment and pollutant sources in Lockwood and Riley. Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings which intersect with known fish use. Monitor stream temperature and water quality (pollutants). Monitor juvenile and adult fish use throughout the tributary, especially above the falls on the tributary.

Tier 2 Reaches: Lockwood 1 (Mouth – Riley Ck., Length: 1.39 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg Incubation Age-0 active rearing	Sediment/channel stability/ Key habitat quantity	Oct-May Mar-Oct	87/13	Low
Winter Steelhead	Age-0,1 inactive rearing	Habitat diversity	Oct-Mar	52/48	Low
Chum	Egg Incubation Prespawn holding	Sediment/channel stability Key habitat quantity/diversity	Oct-Apr Oct-Jan	47/53	Medium

Manley Creek

Physical/Riparian/Channel Habitat Condition: Stream habitat surveys have not been conducted on Manley Creek. Based on a review of aerial photos, the lower channel is forced against the south valley wall by levees and berms and a private drive brackets the channel on the other side. A large private pool/pond existed near the mouth of the tributary but was removed and a natural channel design was created (Fish First 2008). The channel then meanders through the EF Lewis CMZ through a number of private properties with roads that criss-cross the creek. The riparian conditions within the CMZ are very poor and sometimes non-existent. At the Manley Road crossing the channel enters into more mature riparian conditions but the channel conditions may be affected by the adjacent TEBO gravel mine. The channel then meanders through private land with some sections of mature riparian habitat interspersed with no riparian cover until the stream reaches its headwater source.

Fish Passage: Based on a review of SSHIAP and Clark PW, there are at least 16 road/stream crossings on the mainstem channel (SSHIAP 2008, Clark PW 2008). Many were found to be full or partial barriers. Clark County PW is currently evaluating the culvert at NE 259th. Neither coho or steelhead have been observed in the upper reaches (Reach 2) (Table 6).

Table 6. Fish passage potential barriers on Manly Creek

Location	Description	Status
NE Septan	Road crossing	barrier
private road	Road crossing, gravel ford	unsurveyed
NE 259 th	Road crossing	barrier (Clark PW evaluating)
NE 257 th	Road crossing	barrier
NE 257 th	Road crossing	barrier
NE 257 th	Road crossing	barrier
NE Manley	Road crossing	barrier
NE Manley	Road crossing	barrier
NE Manley	Road crossing	barrier
NE 92 nd Avenue	Road crossing/ small concrete dam	barrier
TEBO gravel road	Road crossing	barrier
NE 92 nd Avenue	Road crossing	barrier
private road	Road crossing	unsurveyed
NE 108 th	Road crossing	barrier
NE 112 th Avenue	Road crossing	unsurveyed

Water Quality: The riparian corridor is significantly altered with large sections of poor riparian cover. Sections of mature hardwoods and conifers exist infrequently and much of the riparian has been landscaped. The TEBO gravel mine likely contributes fines into the stream. Agriculture and development in the headwater may be contributing to sediment, pollutants, and temperature problems. Temperature monitoring at the mouth has recorded 7DMAX of as high as 25.2°C (Clark PW).

Water Diversions: There are approximately 9 documented surface water withdrawals, and 2 documented ground water source withdrawals from the Manly Creek Watershed (WDOE 2008). Some private ponds exist in the headwaters (Google Earth 2008). A newly adopted Instream Flow Rule for WRIA's 27/28

regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Flow: unknown

EFWG Comments: Manly Creek used to enter near RM 11 and was diverted to avoid agricultural land. There is a berm that keeps the creek in its current channel. The tree farm in Reach 1C may contribute to water quality (pesticide) issues. Manly has a series of springs near the mouth in reach 1A that may provide cold water inputs. TEBO gravel mining may contribute to water quality issues (temperature and fine sediment). Clark PW is evaluating 259th culvert.

Past/Current Restoration Activities: Fish First is currently working on improving channel structure at the mouth of the tributary (pond filling and placement of structure and gravel in Reach 1A). Fish First is also working with private landowners in lower Manly Creek to identify possible stream crossing improvement projects. There is a small cement dam, remnants of an old water wheel, on private property just downstream from 92nd Ave on Manley Creek.

Additional Information Needs: Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants). Monitor juvenile and adult fish use throughout the tributary

Tier 1 Reaches: Manly 1A (Mouth to Manly Ck. Culvert 1, Length: 0.15 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 active rearing Egg incubation Age-0 inactive rearing	Key habitat quality/temp Sediment/Channel stability Key habitat quality/diversity	Oct-Mar Oct-May Mar-Oct	92/08	High
Winter Steelhead	Egg Incubation Age-0,1 inactive rearing	Habitat diversity Habitat diversity	Oct-Mar Mar-Oct	40/60	Low
Chum	Prespawm holding Egg Incubation	Habitat diversity/quality Sediment/channel stability	Oct-Dec Oct-Apr	72/28	Low

Tier 1 Reaches: Manly 1D (Culvert 3 - Culvert 4, Length: 0.13 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 active rearing Fry colonization	Sediment/Channel stability Key habitat quality/temp Key habitat quality	Oct-May Oct-Mar Mar-Oct	93/07	High
Winter Steelhead	Egg Incubation Age-0,1 inactive rearing	Sediment/temperature Temp/oxygen/pathogen	Oct-Mar Mar-Oct	50/50	Low
Chum	Prespawm holding Egg Incubation	Habitat diversity/quality Sediment/channel stability	Oct-Dec Oct-Apr	72/28	Low

Tier 1 Reaches: Manly 1E (Culvert 4 - Culvert 5, Length: 0.24 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 active rearing Egg incubation Age-0 inactive	Key habitat quality/temp Sediment/Channel stability Key habitat quality	Oct-Mar Oct-May Oct-Mar	91/09	High
Winter Steelhead	Egg Incubation Age-0 active rearing	Sediment/temperature Temp/oxygen/pathogens	Mar-Jul May-Oct	55/45	Low
Chum	Prespawm holding Egg Incubation	Habitat diversity/quality Sediment/channel stab.	Oct-Jan Oct-Apr	72/28	Low

Tier 1 Reaches: Manly 1F (Culvert 5 - Culvert 6, Length: 0.11 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 active rearing Egg incubation Fry colonization	Key habitat quality/temp Sediment/Channel stability Key habitat quality	Oct-Mar Oct-May Oct-May	90/10	High
Winter Steelhead	Egg Incubation Fry colonization	Sediment/temperature Habitat diversity/temp	Mar-Jul May-Oct	59/41	Low
Chum	Prespawm holding Egg Incubation	Habitat diversity/quality Sediment/channel stability	Oct-Jan Oct-Apr	72/28	Low

Tier 1 Reaches: Manly 1G, (Culvert 6 - Culvert 7, Length: 0.03 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Fry colonization	Sediment/Channel stability Key habitat quality	Oct-May Mar-May	73/27	High
Winter Steelhead	Egg Incubation Fry colonization	Sediment/temperature Habitat diversity/quality	Mar-Jul May-Jul	50/50	Low
Chum	Prespawm holding Egg Incubation	Habitat diversity/quality Sediment/channel stability	Oct-Jan Oct-Apr	72/28	low

Tier 2 Reaches: Manly 1B (Culvert 1- Culvert 2, Length: 0.44 mi), Manly 1C(Culvert 2 - Culvert 3, Length 0.42mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 active rearing Egg incubation Age-0 inactive rearing	Key habitat quantity/temp Sediment/Channel stability Key habitat quantity	Oct-Mar Oct-May Mar-Oct	91/09	Medium
Winter Steelhead	Egg Incubation Age-0 active rearing	Habitat diversity Temperature/flow	Oct-Mar May-Oct	30/70	Low
Chum	Prespawm holding Egg Incubation	Habitat diversity/quantity Sediment/channel stability	Oct-Dec Oct-Apr	72/28	Low

Mason Creek

Physical/Riparian/Channel Habitat Condition: Stream habitat surveys have not been conducted on Mason Creek. Clark County describes Mason Creek as, “originating in rolling uplands near the View and Fargher lakes areas. For most of its length, Mason Creek flows through a gravelly canyon. Once it leaves the canyon at J. A. Moore Road, it flows approximately one mile across the East Fork Lewis River flood plain. Nearly half of Mason Creek’s drainage area is fields, pastures, and other cleared land. About 40 percent is forest. Overall stream health for Mason Creek is rated fair. This is based on early 1990s data for stream insects, bacteria, and water quality data collected near its confluence with the East Fork. Much of the creek lacks large trees to provide shade and wood for stream habitat. Small ponds are fairly common in the upper parts of Mason Creek. These ponds can result in warmer stream temperatures and increases in nutrients. Loss of forest and increasing development threaten to further degrade Mason Creek. Rural residential development will likely increase runoff” (Clark County 2002).

Based on a review of SSHIAP and Clark PW, there are at least 15 public and private road/stream crossings on Mason Creek and its tributaries (Clark PW 2008, SSHIAP 2008). Many of the road crossings are listed as impassable. The culvert at N.E. 102nd is considered passable but needs additional assessment to determine its status (Clark County Public Works). Clark County Public Works identified 3 impassable culverts on Mason Creek tributary; one at Underwood Road crossing, one at Peart Road crossing, and one in between these two roads. 1.57 miles of potential habitat affected (WDFW 2001) (Table 7).

Table 7 Fish passage potential barriers on Mason Creek

Location	Description	Status
Mainstem		
Private Road	Road crossing, bridge	not a barrier
NE JA Moore Road	Road crossing, bridge	not a barrier
Private drive to residence	Road crossing	unsurveyed
NE JR Anderson Road	Road crossing, bridge	not a barrier
NE 102 nd Ave	Road crossing	passable but needs further assessment
NE 127 th Ave	Road crossing	barrier
Underwood Road	Road crossing	impassable
private road	Road crossing	unsurveyed
Peart Road	stream crossings and ponds	impassable
NE Shamrock	Road crossing	barrier
NE 359 th	Road crossing	barrier
NE 379 th	Road crossing	barrier
NE 135 th	Road crossing	barrier
Tributary 1		
NE JR Anderson Road	Road crossing	barrier
NE 82 nd Ave	Road crossing	barrier

Water Quality: Many of the headwater tributaries have been ponded or dammed. These headwater ponds likely increase stream temperatures in summer. Agriculture and development in the headwater may be contributing to sediment and pollutant sources. There are two years of temperature monitoring information. Clark County collected daily temperature data at JA Moore Road in 2004 and recorded a 7DMAX

of 21.7°C (Clark PW). TMDL monitoring in 2005 recorded a 7DMAX of 17.75°C below Heitman Creek (aka SwansonCreek) (DEQ 2005) confluence with Mason Creek. Additional temperature data will be available from Clark County in the summer of 2008. Elevated fecal coliform was detected at the JA Moore monitoring station (Hutton 1995).

Water Diversions: There are approximately 8 documented surface water withdrawals, 2 documented ground water source withdrawals, and one dam withdrawal (Tsugawa Brothers) from the Mason Creek Watershed (WDOE 2008). Multiple ponds exist at the headwater of Mason Creek (Google Earth 2008). A newly adopted Instream Flow Rule for WRIA’s 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Flow: Spot flows measurements conducted at 11th Ave crossing in 1998 estimated flow at 0.3/0.6/5.1 cfs in September/October/November respectively (IFIM 1998, as found in WDFW 2001).

EFWG Comments: Lower Mason Creek has flow issues from Anderson road to mouth. Cutthroat and salmon (not specified) are present in the upper basin. Mason Creek has a rearing pond located on Heitman Creek (aka Swanson Creek) that is used by Fish First.

Past/Current Restoration Activities: In 2008 LCFEG completed a bank erosion project on the Cushman property below J.R. Anderson Rd the project was designed to protect bank erosion and enhance salmon habitat. A FFFPP project was completed last summer on the Rashford Tree Farm crossing located above 102nd Ave on Mason Creek.

Additional Information Needs: Evaluate sediment and pollutant sources. Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants). Monitor juvenile and adult fish use throughout the tributary.

Tier 1 Reaches: Mason Creek Trib 1 (Mason Ck trib 1 to end of coho use, Length: 0.99 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 active rearing Egg incubation	Temp/key habitat quantity/ Sediment/channel stability	Mar-Oct Oct-May	99/01	High
Winter Steelhead	Age-0,1 inactive rearing Age-1 active rearing	Habitat diversity Habitat diversity	Oct-Mar Mar-Oct	00/00	Low

Tier 2 Reaches: Mason 1A (Mouth to Trib 1A Culvert, Length: 0.04 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Fry colonization	Sediment/channel stability Key habitat quant/qual	Oct-May Mar-May	69/31	High
Winter Steelhead	Fry colonization	Hab diversity/temp/flow	May-Jul	05/95	Low

Tier 2 Reaches: Mason 3 (Length: 1.0 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 active rearing Egg incubation	Temp/key habitat quantity Sediment/channel stability	Mar-Oct Oct-May	87/13	Medium
Winter Steelhead	Egg Incubation Fry Colonization	Sediment/temp Habitat diversity	Mar-Jul May-Jul	75/25	Low

Tier 2 Reaches: Mason 8 (Culvert 4 - Culvert 5, Length: 0.77 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Age-0 active rearing Egg incubation	Temp/key habitat quantity Sediment/channel stability	Mar-Oct Oct-May	84/16	Medium

McCormick Creek

Physical Habitat Condition: no stream surveys have been conducted above NW LaCenter Road crossing. Physical habitat surveys were conducted on the lower 1 km in 2004 (CFS 2004). Below LaCenter Road the channel condition is poor with pool frequency <20%, fines dominating the substrate, LWD rates <1.0, and LWD recruitment potential low (CFS 2004).

Riparian Condition: Based on a review of aerial photographs, most of the stream channel appears to be well shaded with mature hardwood and conifer except in two sections; the first is from RM 0 to 0.5. This lower ½ mile stretch has no riparian cover and is dominated by reed canary grass. The second section occurs along a ¼ mile section of private agriculture land above NW Spencer road. Invasive Himalayan blackberry and reed canary grass are common along the length of the riparian corridor.

Channel Condition: The channel within the EF CMZ is deeply incised with almost vertical slopes cutting through fine alluvium. Active channel width is 0.6 to 1.2 m and bank heights exceed 2.1 to 2.4 vertical meters in places. Fine sediment dominates the substrate. The channel meanders through dense reed canary grass and a few ash groves in the lowermost ½ mile before it reaches more mature hardwood cover. A series of beaver dams provide deep pools and cover but may also act as partial passage barriers during summer low flows (CFS 2004). Channel structure above NW LaCenter Road crossing is unknown.

Fish Passage: Based on a review of SSHAIP and Clark PW, there are at least 12 road/stream crossings on the mainstem channel and tributaries (SHIAP 2008, Clark PW 2008, Wade 2000). Many of the road crossings are identified as barriers (Clark

PW). The dam at Hilm Reservoir is a complete passage barrier. Resident fish passage upstream of Hilm Reservoir is unknown (Table 8).

Table 8. Fish passage potential barriers on McCormick Creek

Location	Description	Status
Mainstem		
319 th Street	Road crossing (2)	partial to total barrier (Clark County PW)
private road	Road crossing	not a barrier
NW 11 th Avenue	Road crossing	barrier
Hilm Reservoir	Dam/Road crossing	complete barrier
private road (between Hilm reservoir and Timmons Road)	Road crossing	unsurveyed
NE Timmons road	Road crossing	barrier
NE 289 th St	Road crossing	unsurveyed
NE 279 th	Road crossing	barrier
headwaters and tributaries	ponds/reservoirs	may not have passage
Tributary 1		
NW 310 st	Road crossing	barrier
NW 289 th	Road crossing	barrier
NW 279 th	Road crossing	barrier

Water Diversions: There are 7 surface water withdrawals, and 2 ground water source withdrawals from the McCormick Creek Watershed (WDOE website). The headwaters have been ponded/dammed, at least 4 ponds/reservoirs are present including Hilm Reservoir. Multiple ponds exist at the headwater of McCormick Creek (Google Earth 2008). A newly adopted Instream Flow Rule for WRIA’s 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Water Quality: Clark County rates McCormick Creek as poor (inferior health, poorly suited for aquatic life and recreation). McCormick Creek exceeded water quality criteria for fecal coliform standards based on surveys conducted in 1991 and 1992 (Hutton) at the NW LaCenter Road Station. There are a number of sediment/pollutant source opportunities at each road crossing and via the small tributaries which run through agricultural land. McCormick Creek is also listed as impaired relative to water temperature (Wade 2000). There are a series of ponds/reservoirs on the mainstem and a couple of the lower tributaries. These ponds may reduce flow and increase temperature conditions in the summer.

Flow: Spot flows measurements conducted at 11th Ave crossing in 1998 estimated flow at 0.2/0.4/2.4 cfs in September/October/November respectively (IFIM 1998).

EFWG Comments: consider realigning outlet/lower channel with relict channel along south bank near terrace. Connecting the large off-channel pond that dominates the center of floodplain is not advocated (currently used as productive swan habitat).

Past/Current Restoration Activities: Partial to total barrier culvert at the 319th Street crossing (Clark County Public Works) blocks 3.7 km of potential habitat for winter steelhead and coho (*O.kisutch*) (WDFW 2001).

Additional Information Needs: Stream Habitat Survey Information above NW LaCenter Road to headwaters. Evaluate sediment and pollutant sources in McCormick. Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants).

Tier 1 Reaches: McCormick D (LB Trib to Culvert, Length: 0.03 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Fry colonization	Sediment Key habitat quantity	Oct-May Mar-May	55/45	High
Winter Steelhead	Egg Incubation Spawning	Sediment/temperature Key habitat quality	Mar-Jul Mar-Jun	02/98	Low

Tier 1 Reaches: McCormick G (Ponds Associated with Culvert 4, Length: 0.11 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 inactive rearing	Sediment Sediment	Oct-May Oct-Mar	55/45	High

Tier 1 Reaches: McCormick H (Ponds Associated with Culvert 5, Length: 0.10 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation	Sediment	Oct-May	85/15	High

Tier 2 Reaches: McCormick 1A (Mouth to Culvert 1, Length: 0.95 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 active rearing	Sediment/Temp/ key habitat quantity	Oct-May Mar-Oct	86/14	Low
Winter Steelhead	Egg Incubation	Sediment/temperature	Mar-Jul	35/65	Low
Chum	Egg Incubation Prespawm holding	Sediment/channel stab./Habitat diversity	Oct-Apr Oct-Jan	46/54	Medium

Tier 2 Reaches: McCormick 1C (Culvert 2 to LB Trib, Length: 0.43 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 active rearing	Sediment/Temp/key habitat quantity	Oct-May Mar-Oct	82/18	Medium
Winter Steelhead	Egg Incubation	Sediment/temperature	Mar-Jul	37/63	Low

Tier 2 Reaches: McCormick 1I (McCormick Ck 8 (pond) to end of potential coho use, Length: 0.13 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 active rearing	Sediment/Temp/key habitat quantity	Oct-May Mar-Oct	74/26	Medium

Mill Creek

Physical/Riparian/Channel Habitat Condition: Physical habitat information is limited to data gathered on the lower section of stream within the EF Lewis valley floor (CFS 2004). Based on a review of aerial photos, the riparian condition below NE 239th Road is good with mature riparian cover and good LWD recruitment potential. The riparian and headwater conditions of this small stream appear to be better than some of the other lower basin tributaries, although the amount of useable fish habitat is naturally limited by the small size of this tributary. There are some ponds/reservoirs in the headwater but they don't appear to be connected to the mainstem channel. A pebble count was conducted in a relatively steep portion of the stream as it cuts through the valley wall of the mainstem East Fork. It therefore does not represent substrate conditions that would be found further upstream on the plateau. The upper portions (plateau) of Mill reflects moderate inputs of fine sediment from upstream, with 11% sand and 25% embeddedness (CFS 2004).

Fish Passage: Based on a review of SSHIAP and Clark PW, there are at least 4 stream crossing on the mainstem channel (Clark PW 2008, SSHIAP 2008). The public road crossing at NE 259th is a passable fish ladder which may need periodic review for maintenance (Clark County CD). The private culvert on NE 59th is being replaced in 2009 (Table 9).

Table 9. Fish passage potential barriers on Mill Creek

Location	Description	Status
NE 259 th St	Road crossing , fish ladder	Passable, may need further review (Clark County)
NE 59 th (24713 NE 59 th)	Road crossing	barrier, being replaced in 2009 (Clark County)
NE 59 th (24203 NE 59 th)	Road crossing	barrier
NE 259 th St	Road crossing	barrier

Water Quality: Clark County rates Mill Creek as Poor (inferior health, poorly suited for aquatic life and recreation). Temperature in Mill Creek appears to be suitable for most summer rearing and may provide summer refugia.

Water Diversions: There are approximately 3 documented surface water withdrawals and 4 documented ground water source withdrawals and 1 dam identified by WDOE (WDOE 2008). Multiple ponds exist at the headwater of Mill Creek (Google Earth 2008). A newly adopted Instream Flow Rule for WRIA's 27/28 regulates withdrawals in streams and lists streams with protective closures and instream flow numbers (WDOE 2008a).

Flow: unknown

EFWG Comments: Heavy coho use this past year (100's of spawners). Temperature is good, multiple springs. Steep/high gradient until 259th and then it returns to lower gradient. Gradient at mouth may limit coho use in summer for mainstem fish. D. Brown owns the east side property at mouth.

Past/Current Restoration Activities: Wooldridge culvert at 24713 NE 59th Ave. will be replaced in 2009 with FFFPP. Funds have not been identified to replace the Lane culvert at 24203 NE 59th Ave. yet. A concrete fishway was installed by CCPW below the 259th St culvert in 1994.

Additional Information Needs: Evaluate possible undocumented water diversions (ponds). Evaluate fish passage at private and public road crossings. Monitor stream temperature and water quality (pollutants). Monitor juvenile and adult fish use throughout the tributary.

Tier 1 Reaches: Mill Creek 1C (Culvert 1 – Culvert 2, Length: 0.28 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation Age-0 active rearing	Sediment/Channel Stability Key habitat quantity	Oct-May Mar-Oct	84/16	High
Winter Steelhead	Age-0,1 inactive rearing Age-1 active rearing	Habitat diversity Habitat diversity	Oct-Mar Mar-Oct	0/100	Low

Tier 2 Reaches: Mill Creek 1A (Mouth – Mill Ck. fishway, Length: 0.34 mi)

Species Present	Life Stage (primary limiting)	Limiting Factor (primary)	Relevant Months	Rest. v. Pres. Value	Reach Importance to Pop. Recovery
Coho	Egg incubation	Sediment/Channel Stability	Oct-May	83/17	Low
Winter Steelhead	Age-0,1 inactive rearing Age-0 active rearing	Habitat diversity Habitat diversity	Oct-Mar May-Oct	24/76	Low
Summer Steelhead	Age-0,1 inactive	Habitat diversity	Oct-Mar	15/85	Low
Chum	Egg incubation Prespawn holding	Sediment/channel stability Habitat diversity/quantity	Oct-Apr Oct-Jan	53/47	Medium