

# ***CENTRAL STRAIT DRAINAGES***

## ***EAST WRIA 19***

- ***Deep Creek***
- ***East Twin River***
  - ***E. Fork East Twin & Sadie Creek***
- ***West Twin River***
- ***Lake Crescent / Lyre River System***
- ***Murdock Creek***
- ***Field, Whiskey & Colville Creeks***
- ***Salt Creek***

# *State of the Waters ~ Deep Creek*

## ***General Description:***

The Deep Creek watershed drains a basin area of 17.3 square miles, with elevation changes from the estuary to 3,400 feet, flowing from forest land into the Central Strait of Juan de Fuca. Although relatively small, Deep Creek is known for its former productive anadromous fish runs. The drainage has historically been managed for commercial timber production, but the core is unlogged intact habitat, protected under the Northwest Forest Plan (late successional reserve). All but 5% of the land is in U.S. Forest Service, Department of Natural Resources or private timber company ownership. Timber harvest occurred in the 1920-30's, in the 1950's and again in the 1970-80's, all of which caused significant impacts. This resulted in numerous mid-slope roads using side-cast construction in the headwaters, which is prone to failure and mass wasting, as well as clearcuts on steep slopes. Fire in the early 1930's resulted in significant mass wasting. Sedimentation is the major limiting factor for Deep Creek, and the channel is severely degraded as a direct result of the mass wasting history. A dam break occurred in November 1990, scouring out the upper channel, with a network of scour and subsequent slope failures occurring. Debris flows have resulted in extensive channel incision and instability. LWD is lacking and the conversion of riparian vegetation from old conifers to hardwood or open areas will result in a future lack of LWD, as well as high water temperatures. The lack of old trees is thought to increase the frequency and severity of peak flow events, resulting in water velocities and channel incision. Channel incision has contributed to floodplain impacts, such as a lack of off-channel habitat, and this has severely impacted all salmonid species in the creek. Excessive sedimentation has also impacted the estuary, where the delta has increased in recent years. Significant creek restoration has occurred in the basin since 1997, and the watershed was adopted into the IMW Program in 2004 (see Glossary). Signs of improvement in habitat parameters and some fish recovery have been recorded.

## ***What do the health ratings mean to people?***

Water quality appears healthy, however, the large-scale timber harvests that trigger flooding events may present problems to humans living in

the watershed, as well as limit fishing opportunities.

## ***What do the health ratings mean to fish?***

Deep Creek supports coho, fall chum and winter steelhead. All stocks of salmon have been severely impacted; in particular, chum numbers have collapsed since the 1990 flood described above. Because of severely degraded habitat condition, treaty and sport fisheries closures have occurred. Fine sediment in streams fills up the "interstitial" spaces between the gravel that fish need for spawning, incubation and feeding, and there-

fore negatively impacts the survival success of salmon. Salmon need cold temperatures and lots of dissolved oxygen to thrive, and these poor conditions will add to the stress caused by other environmental factors in these systems. Lack of off-channel habitat especially impacts juvenile winter refuge rearing for fall coho and winter steelhead, and early juvenile rearing needs of fall chinook, fall coho and steelhead.

**Current Overall Health Based on Information Below:**

***Deep Creek—COMROMISED/IMPAIRED***

**1. Water quality conditions according to CCWQI = HEALTHY**

Deep Creek RM 0.0 = 4.5 (healthy)  
 4.5 = 4.0 (compromised)  
 7.4 = 5.0 (healthy)

OVER-ALL CCWQI CONFIDENCE RATING (FOR WATERSHED): HIGH CONFIDENCE

On the 303(d) list for fine sediment and temperature violations.

**2. Biological conditions according to B-IBI = AMPLE DATA DO NOT EXIST**

**3. Habitat integrity overall for Deep Creek, according to the LFA WRIA 19, Status and CC Watershed Facts = IMPAIRED TO HIGHLY IMPAIRED**

***Habitat concerns include:***

- a. Impacts resulting from past and present watershed alterations
- b. Road construction and density, mass wasting, and excessive sediment input impacting streams
- c. Lack of sufficient and quality LWD
- d. Impacts of estuarine habitat alteration

OVER-ALL HABITAT INTEGRITY CONFIDENCE RATING : HIGH CONFIDENCE

**PARTICULAR CONCERNS**

- Impaired to highly impaired habitat
- Lack of data on biological conditions
- Impacts from high riparian road densities, excessive road-derived sedimentation & scour in some streams
- High stream temperatures
- Sediment transport and excessive water velocity from lack of LWD

**RECOMMENDATIONS**

- Reduce riparian road impacts and sediment inputs to lessen channel widening and pool filling
- Increase off-channel habitat and protect floodplain habitat
- Protect/replant conifers in riparian areas
- Prevent water withdrawals causing low flow conditions for salmonids
- Protect critical salmon habitat and address problem areas listed in box on left
- Reduce sources of turbidity
- Continue water quality monitoring
- Start monitoring biological conditions

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# ***State of the Waters ~ The Twin Rivers: West Twin & East Twin***

## ***General Description:***

The East and West Twin Rivers drain a basin area of 28.8 square miles, and enter the Central Strait of Juan de Fuca east of the Pysht River. Deep Creek, and the West and East Twin Rivers share similar physical characteristics, and the mouths of each stream are in close proximity to each other. The gradients in all three rivers are moderate to steep except in the lower 2 miles. These streams have high natural erosion rates due to a mixed geology, with less erodable basalt in their headwaters, glacial out-wash in the lower plain, and siltstones. The stream channels change quickly to variations in flow and sediment inputs. Most problems in this region are due to historic mid-slope roads that impact streams either directly, or through the input of excessive sediment. These streams have few roads in the floodplain. LWD is lacking throughout, and there is concern about sedimentation from roads. Fish passage is also an issue in the East Fork of the East Twin River. Estuarine impacts exist near the mouths of both the Twin Rivers—increased sedimentation has occurred, and historic gravel and clay removal has removed beach between the two rivers. These activities have resulted in a loss of eelgrass habitat, which is important for juvenile salmon. A major landslide exists between the Twin Rivers and Deep Creek that is close to smelt spawning areas, which are an important prey food for young salmon. The East and West Twin Rivers and Deep Creek are all in the IMW Program (see Glossary), and significant restoration is occurring in the East Twin.

## ***What do the health ratings mean to people?***

Water quality appears very healthy, however, impaired habitat indirectly impacts human uses such as recreational uses.

## ***What do the health ratings mean to fish?***

West and East Twin Rivers have major spawning areas for coho, but these rivers have never produced large numbers of fall chum. Winter steelhead are also found in the Twins. Limiting factors include lack of LWD, excessive sedimentation, blockages and estuarine impacts. Fine sediment fills up the “interstitial” spaces between the

gravel that fish need for spawning, incubation and feeding, and therefore negatively impacts the survival success of salmon. Lack of off-channel habitat especially impacts juvenile winter refuge rearing for fall coho and winter steelhead, and early juvenile rearing needs of fall chinook, fall coho and steelhead.

Habitat integrity impacts are similar to those on other streams along the Central Strait of Juan de Fuca.

### ***Current Overall Health Based on Information Below:***

## ***West & East Twin Rivers—COMPROMISED/IMPAIRED***

### **1. Water quality conditions according to CCWQI = HEALTHY**

West Twin	RM 0.4	= 4.5 (healthy)
	3.7	= 5.0 (healthy)
	6.1	= 5.0 (healthy)
East Twin	RM 0.3	= 5.0 (healthy)
	1.5	= 5.0 (healthy)
	@Sadie	= 5.0 (healthy)
	2.8	= 5.0 (healthy)
	4.6	= 5.0 (healthy)
	6.4	= 5.0 (healthy)
EF East Twin	@ 3040 Rd	= 5.0 (healthy)
Sadie Creek	@ E. Twin	= 5.0 (healthy)
	@ 3040 Rd	= 5.0 (healthy)

OVER-ALL CCWQI CONFIDENCE RATING (FOR WATERSHED): HIGH CONFIDENCE

### **2. Biological conditions according to B-IBI = AMPLE DATA DO NOT EXIST**

### **3. Habitat integrity overall for the Twin Rivers, according to the LFA WRIA 19 and CC Watershed Facts = COMPROMISED TO IMPAIRED**

#### ***Habitat concerns include:***

- a. Impacts resulting from past and present watershed alterations
- b. Road construction and density, mass wasting, and excessive sediment input impacting streams
- c. Lack of sufficient and quality LWD
- d. Impacts of estuarine habitat alteration

OVER-ALL HABITAT INTEGRITY CONFIDENCE RATING: MODERATE CONFIDENCE

### **PARTICULAR CONCERNS**

- Compromised to impaired habitat
- Lack of data on biological conditions
- Sediment transport and excessive water velocity from lack of LWD
- Lack of off-channel habitat areas
- Impacts to estuary

### **RECOMMENDATIONS**

- Reduce road impacts and sediment inputs to lessen channel widening and pool filling
- Increase off-channel habitat and protect floodplain habitat
- Protect/replant conifers in riparian areas
- Protect critical salmon habitat and address problem areas listed in box on left
- Continue water quality monitoring
- Start monitoring biological conditions

# ***State of the Waters ~ Lake Crescent/Lyre River System & Murdock Creek***

## ***General Description:***

The Lyre River has a total length of 16.8 miles, with a basin covering 66.1 square miles. The Lyre is the only watershed in the region that is fed by a natural lake, Lake Crescent, resulting in a unique flow, temperature and water chemistry regime. Lake Crescent, located at RM 5.2, is a large, deep lake of 4,700 acres with a depth of 640 feet. The Lake and surrounding land lies within the Olympic National Park. Below the park boundary the Lyre River is managed primarily for commercial timber production and low-density rural residences. A natural falls at RM 2.7 limits salmon access above it. In general, the LWD levels in the river are good, except in the lower reaches which are lacking in large wood. The lower reaches are surrounded by a riparian habitat that will no longer supply future LWD necessary to allow sediments to accumulate, raising the streambed to enable the floodplain to connect with the river. The lowest mile of the mainstem has been channelized and bulk-headed, and valuable LWD has been removed. Of the major tributaries, Susie Creek provides good salmon habitat. Major historic landslides on Boundary Creek continue to introduce fines into the Lyre. As a tributary to Lake Crescent, Barnes Creek is a major spawning stream for trout in Lake Crescent. The Limiting Factors Analysis did not describe habitat and water quality conditions in Lake Crescent. While the Lyre estuary is minimal, estuary-dependent fish such as chum are found there, as well as a documented surf smelt spawning area west of the mouth. Major limiting factors in the watershed are fine sediments, altered riparian areas, lack of large wood, mainstem channelization, and “stream cleaning” of LWD. Murdock Creek is an independent stream west of the Lyre, with spawning steelhead habitat in the lower mile. An on-going problem is the deposit of road spoils along Hwy. 112 adding to the sediment load. Development on the east side is also a concern, related to the basin hydrology.

## ***What do the health ratings mean to people?***

The Lyre River is used as a domestic water supply for some residents in the Joyce area.

## ***What do the health ratings mean to fish?***

The Lyre produces fall chum, fall coho and winter steelhead. Hatchery planting of winter and summer steelhead occurs. Low numbers of chinook and pink salmon have also been reported in the Lyre River. Lake Crescent has unique salmon and trout, some which move downstream into the Lyre

to spawn. These include kokanee, Lake Crescent cutthroat and Beardslee trout. Domestic water supplies withdrawn from the Lyre have the potential to impact streamflows needed by fish. Lack of off-channel habitat especially impacts fall coho and winter steelhead juvenile winter refuge rearing.

**Current Overall Health Based on Information Below:  
Lyre River, Barnes Creek & Murdock Creek—  
COMPROMISED**

**1. Water quality conditions according to CCWQI = COMPROMISED**

Lyre River RM 0.0 = 4.5 (healthy)  
5.0 = 3.5 (compromised)

Barnes Crk. RM 0.0 = 5.0 (healthy)

Murdock Crk. RM 0.0 = 4.5 (healthy)

OVER-ALL CCWQI CONFIDENCE RATING (FOR WATERSHED): MODERATE CONFIDENCE

**2. Biological conditions according to B-IBI = COMPROMISED**

Barnes Crk. RM 0.0 = 35.3 (compromised)

OVER-ALL B-IBI CONFIDENCE RATING: MODERATE CONFIDENCE

**3. Habitat integrity in the lower reaches of the Lyre River and tributaries, and in Murdock Creek, according to LFA 19, CC Watershed Facts & Status = COMPROMISED**

**Habitat concerns include:**

- a. Excessive sediment input impacting streams
- b. Lack of sufficient and quality LWD
- c. Channelization in lower reaches
- d. Impacts of estuarine habitat alteration

OVER-ALL HABITAT INTEGRITY CONFIDENCE RATING: HIGH CONFIDENCE

**PARTICULAR CONCERNS**

- Compromised biological and habitat conditions
- Impacts from historic mass wasting in the Lyre
- Sediment transport and water velocity from lack of LWD; riparian conditions which will not lead to available LWD in the future
- Impacts from channelization (lack of off-channel habitat, increased velocities, degraded habitat)

**RECOMMENDATIONS**

- Increase off-channel habitat and protect floodplain habitat
- Protect/replant conifers in riparian areas
- Protect critical salmon habitat and address problem areas listed in box on left
- Continue water quality monitoring
- Continue biological conditions monitoring
- Prevent increased water withdrawals which might impact streamflows

# ***State of the Waters ~ Field, Whiskey & Colville Creeks***

## ***General Description:***

Field, Whiskey and Colville Creeks are small, salmon-producing streams flowing into the Central Strait of Juan de Fuca, that have moderately steep gradients in the lower reaches. Lack of LWD, a conversion of the riparian zone to alder or to open areas, wetland conversion, culverts and excessive sedimentation are believed to be problems in all these streams. All have limited salmon production, except Colville, which has excellent coho production potential, although a collapsed trestle blocks four miles of salmon and cutthroat trout habitat on the stream. On Whiskey Creek, part of the sedimentation is natural, due to the area geology, but part is also likely a result of extensive logging, and from a railroad grade. Lower Whiskey Creek reaches are in poor shape, lacking LWD, with an incised channel, creating inner slope failures contributing to sediment loads. The excessive sedimentation and scour in Field Creek, (which also has a naturally high sediment load), is likely the result of extensive logging due to land conversion, as well as development activities in the area. The upper portions have patchy amounts of LWD, with very few pieces of LWD in the lower reaches. Colville Creek is incised upstream and the streambed widens into a valley in the downstream reaches. Dredging has occurred in this valley, resulting in an unstable, channelized stream that needs meanders. Livestock have stream access, leading to water quality problems including sediment inputs. Sedimentation from Field Creek degrades offshore eelgrass bed habitat. Bulkheads have been constructed near the mouth of Whiskey Creek. Freshwater Bay, offshore from Colville Creek, is the site of a large kelp bed with considerable diverse habitat, and eelgrass, which together are important resources for both juvenile and adult salmon.

## ***What do the health ratings mean to people?***

Compromised water quality and impaired habitat indirectly impact humans, for example, as recreational

uses become limited.

## ***What do the health ratings mean to fish?***

Field, Whiskey and Colville Creeks provide steelhead and coho production; sedimentation is a problem in all three creeks. Fines have been such a severe problem in Whiskey Creek that chum could not be successfully incubated. Fine sediment in streams fills up the “interstitial” spaces between the gravel that fish need for spawning, incubation and feeding, and therefore negatively impacts the survival success of salmon.

Salmon need cold temperatures and lots of dissolved oxygen to thrive, and these poor conditions will add to the stress caused by other environmental factors in these systems. Lack of off-channel habitat especially impacts juvenile winter refuge rearing for fall coho and winter steelhead, and early juvenile rearing needs of fall chinook, fall coho and steelhead.



*Streamkeeper volunteer collecting sam-*



***Current Overall Health Based on Information Below:  
Field, Whiskey & Colville Creeks—IMPAIRED***

**1. Water quality conditions according to CCWQI = COMPROMISED**

Field Creek RM 0.0 = 4.5 (healthy)

Whiskey Creek RM 0.0 = 5 (healthy)

Colville Creek RM 0.0 = 5 (healthy)  
@ Ranger Rd. = 3 (impaired)

OVER-ALL CCWQI CONFIDENCE RATING (FOR WATERSHED): MODERATE CONFIDENCE

**2. Biological conditions according to B-IBI = AMPLE DATA DO NOT EXIST**

**3. Habitat integrity in Field, Whiskey and Colville Creeks, according to LFA 19 = IMPAIRED TO HIGHLY IMPAIRED**

***Habitat concerns include:***

- a. Excessive sediment input impacting streams
- b. Lack of sufficient and quality LWD
- c. Impacts of estuarine habitat alteration
- d. Animal access to streams
- e. Blockages and constrictions

OVER-ALL HABITAT INTEGRITY CONFIDENCE RATING: LOW CONFIDENCE

**PARTICULAR CONCERNS**

- Compromised water quality
- Impaired to Highly Impaired habitat
- Lack of data on biological conditions
- Impacts from excessive sedimentation in some streams
- Riparian conditions which will not lead to available LWD in the future
- Bulkheading near the mouth of Whiskey Creek

**RECOMMENDATIONS**

- Increase off-channel habitat and protect floodplain habitat
- Protect/replant conifers in riparian areas
- Protect critical salmon habitat and address problem areas listed in box on left
- Continue water quality monitoring
- Start monitoring biological conditions

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# ***State of the Waters ~ Salt Creek***

## ***General Description:***

Salt Creek enters saltwater on the east end of the Central Strait of Juan de Fuca. Sedimentation is a problem in Salt Creek, and is likely the result of heavy logging adjacent to west side tributaries in the 1980s. A few areas of Salt Creek have high LWD loadings, but upstream of RM 2 there is a particular lack of large wood. This area is also channelized and incised. The Camp Hayden Road is a riparian road constructed in the floodplain along the mainstem from RM 1-2. A private road cuts across the estuary, and prevents the lateral migration of Salt Creek, disconnecting it from potential wetlands and the tidally-influenced reaches of the creek, with an adverse impact to salmonid habitat. About 15 acres of tidal marsh have been lost to the road. Animal grazing along some of the banks could decrease water quality, as well as increase erosion. In addition, water quality issues for the Salt Creek/Crescent Bay area include residential runoff. Crescent Bay is comprised of an extensive eelgrass bed within the main bay, and lush diverse kelp beds fringing Tongue Point and extending west to Agate Point. The shallow eelgrass is important for sand lance and juvenile salmon, and the kelp is also important for salmon habitat. Major factors limiting salmon habitat in Salt Creek are lack of LWD, land conversion, loss of wetlands and salt marsh, and increased culverts, riparian degradation and stormwater.



*Streamkeeper volunteer monitors  
on Salt Creek*

## ***What do the health ratings mean to people?***

Water quality conditions appear healthy, but compromised biological conditions indicate problems exist. Human uses, particularly

recreation, are impacted when these conditions become degraded.

## ***What do the health ratings mean to fish?***

Salt Creek and its tributaries provide important coho salmon spawning and rearing habitat throughout the mainstem and tributaries downstream of a passable dam at RM 6.5. The creek used to support chum, now existing at very low levels. Chinook have not been documented there in recent years, and winter steelhead are declining. Lack of LWD impacts salmonid habitat by allowing the channel to be-

come destabilized, with a lack of pools and shade. The high value salt marsh and estuarine habitat provide important rearing and holding for salmon entering and leaving the stream, as well as for sand lance. Land conversion impacts riparian habitat, increases sedimentation and creates habitat loss in the watershed.

### ***Current Overall Health Based on Information Below:***

## ***Salt Creek—COMPROMISED***

### **1. Water quality conditions according to CCWQI = HEALTHY**

Salt Creek	RM	1.4 = 4.5 (healthy)
		1.5 = 4.5 (healthy)
		4.2 = 5.0 (healthy)
		5.4 = 4.5 (healthy)
		6.9 = 5.0 (healthy)

OVER-ALL CCWQI CONFIDENCE RATING (FOR WATERSHED): HIGH CONFIDENCE

### **2. Biological conditions according to B-IBI = COMPROMISED**

Salt Creek	RM	1.5 = 38 (compromised)
		4.2 = 45 (compromised)
		5.4 = 38 (compromised)

OVER-ALL B-IBI CONFIDENCE RATING: HIGH CONFIDENCE

### **3. Habitat integrity in Salt Creek, according to LFA 19 and CC Watershed Facts = COMPROMISED**

#### ***Habitat concerns include:***

- a. Excessive sediment input impacting streams
- b. Lack of sufficient and quality LWD
- c. Impacts of estuarine habitat alteration; loss of wetlands
- d. Road impacts

OVER-ALL HABITAT INTEGRITY CONFIDENCE RATING: MODERATE CONFIDENCE

### **PARTICULAR CONCERNS**

- Compromised habitat and biological conditions
- Sediment transport and excessive water velocity from lack of LWD
- Impacts from road constrictions
- Impacts from loss of wetlands and creek/estuarine tidal inter-connections
- Potential water quality impacts from future development

### **RECOMMENDATIONS**

- Increase wetland habitat and protect flood-plain habitat
- Protect/replant conifers in riparian areas
- Protect critical salmon habitat and address problem areas listed in box on left
- Continue monitoring water quality & biological conditions
- Follow recommendations in upcoming (2004) technical assessment (by LEKT and NOSC)