

### 3.9 COAL AND DEEP CREEKS SUBBASINS

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### PHYSICAL DESCRIPTION

#### SUBBASIN

Coal (09.0126) and Deep creeks (09.0142) are grouped together in this report because of their close geographical location and their influence on groundwater. Neither of the creek systems are directly linked by surface connection to the mainstem Green River, and both drain into small lakes that do not have surface water outlets.

However, their importance to anadromous salmonids lies in the theory that water from these lakes seeps underground and surfaces as perched springs and/or riverbed springs in the Green River streambed in the vicinity of RM 48 – 50. Other lakes in the vicinity (i.e., Muskrat Lake) may also contribute to these springs.

#### STREAM COURSE AND MORPHOLOGY

##### COAL CREEK

Coal Creek is approximately 9.2 miles long. Its 15 tributaries have approximately 8.0 miles of combined additional stream length. The mainstem of Coal Creek empties into Fish Lake (which is only 3,500 feet west of Deep Lake). Fish Lake is located 729 feet above sea level, encompasses 16.5 surface acres, and has a maximum depth of 22 feet (Wolcott 1973). The basin lies largely below 2,500 feet in elevation and is subject to rain or snow events.

##### DEEP CREEK

Deep Creek is approximately 4.8 miles long. Its three small tributaries add approximately 1.5 additional stream miles. This creek drains into both Hyde and Deep Lakes. It is believed that both lakes are important groundwater source to the mainstem Green River (Wolcott 1973; Williams 1975).

Hyde Lake (sometimes referred to as Elizabeth Lake) is located approximately 2,300 feet north from Deep Lake at approximately 800 feet in elevation with a surface area of 5.4 acres (Wolcott 1973). The only water supply is from Deep Creek is via a small stream channel. Wolcott (1973) theorized the lake's outlet is subsurface to springs along the Green River.

Deep Lake is fed by Deep Creek and is located at approximately 770 feet in elevation with a surface area of 39.0 acres, a maximum measured depth of 76 feet. It is approximately 3,500 feet east of Fish Lake (Wolcott 1973). Wolcott (1973) and Williams (1975) theorized the lake's outlet is subsurface to the springs along the Green River between RM 48-50.

## **SALMONID USE**

### **COAL CREEK**

Cutthroat trout have been observed (Phil Schneider, WRIA 9 map info) and reported to use Coal Creek (Don Finney pers. comm.). Locations of the observations are noted in the report Appendix.

### **DEEP CREEK**

No observations were recorded for Deep Creek as part of the WRIA 9 mapping effort.

## **FACTORS OF DECLINE**

### **FISH PASSAGE**

Fish Passage information on these systems is limited at this time.

### **RIPARIAN CONDITION**

The commercial timber in the middle reaches of both the Coal and Deep creek subbasins have largely been logged and replanted at various times in the last 25 years (Kerwin 2000). Fire scars are also present along some hillsides. Deep Lake State Park affords some protection for the riparian zone around the lake.

### **LARGE WOODY DEBRIS**

LWD information on these systems is limited at this time.

## **HYDROLOGY**

### **COAL CREEK**

Coal Creek serves as the water source for Fish Lake and the lake does not have a surface water outlet. During seasonal low flows, water flows in Coal Creek are subsurface in some locations. No surface flows were observed in Coal Creek at the culvert immediately upstream of Fish Lake on October 30, 2000 (Kerwin, 2000). As the flows in Coal Creek diminish, the water surface elevation of Fish Lake begins to drop. These water surface elevations in fluctuate substantially from full pool at 729 mean sea level (m.s.l.) during the springtime to nearly empty at 694 m.s.l (Higgins 2000) during late summer and early fall. Water flows from Icy Creek Springs also begin to decrease throughout summer months and reach their lowest levels when the water surface elevation in Fish Lake is lowest (Mercer 2000).

Observations of the stream channel in the vicinity of Fish Lake and at the Cumberland-Kanaskat Road on October 30, 2000 indicate that the stream was deeply incised and was capable of carrying sizeable high flows.

It has been theorized that the glacial drift that underlies Fish Lake is sufficiently permeable to allow for the total infiltration of lake water rather than the lake having a surface water outlet. Previous studies (CH2M, Hill/Long and Associates, 1991; Brown and Caldwell, 1989; TCW Associates, 1989) concluded that this infiltrated water reemerges as the large-volume springs along the eastern banks of the Green River between RM 48 and RM 50. These springs include the Fish Hatchery Springs at Icy Creek, Black Diamond Springs, Palmer Spring, and Resort Spring. The exact path that this infiltrated water takes is not known but is thought to be controlled by the glacial drift and the buried topography of the bedrock contact with the glacial drift.

Water from the Icy Creek Springs is utilized for fish propagation purposes by the Washington Department of Fish and Wildlife. During low flow periods the rearing ponds are able to capture all the water flowing from these springs and flow measurements are taken monthly as they exit the rearing ponds. During seasonal high flows, the piping system into the ponds is not capable of handling the entire spring flows and flows are estimated. The range of these flows are shown in the table ICY-1. Springflows typically peak during the winter months when precipitation and lake levels are the highest and are they are at their lowest in October and November when lake water levels are low and groundwater is being recharged. Water temperatures as measured at the hatchery rearing pond typically range from 42 F (February) to 50 F (August) (Mercer 2000).

<b>Month</b>	<b>Water Flows (gpm)</b>
January	3700 - 5300
February	3700 - 5300
March	4000 - 5450
April	5300 - 5800
May	2800 - 5100
June	2800 - 3100
July	2500 - 3100
August	2600 - 3300
September	1100 - 1580
October	700 - 915
November	1300 - 4500
December	3400 - 3900

The impacts on ground water hydrology at a proposed gravel surface mining operation in the vicinity of Fish Lake has caused some concerns about spring flow at the Icy Creek Spring.

No information on stream flows was located during the course of this investigation.

#### DEEP CREEK

The surface water elevation of Deep Lake is reported to fluctuate 12-15 feet with lower lake surface elevations reported during late summer and early fall during seasonal low flow conditions (Johnson 2000).

No information on stream flows was located during the course of this investigation.

## **SEDIMENT CONDITION**

Sediment conditions are not applicable given the unique situation of these two stream systems.

## **WATER QUALITY**

Water quality as monitored at the Icy Creek Springs and Black Diamond Springs indicates that both creeks meet or exceed all state water quality criteria for Class AA state waters.

## **LAND USE**

Land use within the upper and middle reaches of both creeks is primarily commercial timber production. In the downstream reach land use is rural residential with a mixture of single family homes and hobby farms. Deep Lake is surrounded by Deep Lake State Park.

## **NON-NATIVE SPECIES**

### **ANIMALS**

Fish Lake and the headwater lakes have been planted with non-native rainbow trout but as previously stated the lake does not have direct surface water contact with the Green River. With the unique situation of these stream systems, the presence of non-native animal species in upstream reaches does not appear to have any adverse impacts to anadromous stocks.

### **PLANTS**

The only non-native plant species observed in the vicinity of the Icy Creek and Black Diamond Springs was Himalayan blackberries.

## **Hydromodification**

The surface elevations of Fish, Deep, and Hyde lakes are naturally controlled. There are several road crossings where culverts are utilized, but these do not appear to be fundamental habitat-limiting factors.

Hydromodification is present at the spring intake systems at Icy Creek (for non-consumptive use) and Black Diamond Springs (for consumptive use). Both facilities use low-head dams to divert water.

## **KEY FINDINGS AND IDENTIFIED HABITAT-LIMITING FACTORS**

- The lakes provide an important function in maintaining springflows in the Green River between RM 48 – 50.
- No habitat-limiting factors were identified at this time.

## DATA GAPS

- Stream flows, lake elevations and their relationship with spring flows should be established.
- The proposed gravel surface mining operation in the vicinity of Icy Creek and its potential impact to spring water should be verified.

## LIST OF TABLES

Table Coal-1: Icy Creek Rearing Ponds and Springs (Mercer 2000).