

# **Reconnaissance Lake Inventory**

of

## **Stump Lake**

**WSC: 320-520100-42900-40600-2580**

**Waterbody Identifier: 00553KETL**

Prepared for:

**Ministry of Environment, Lands and Parks  
Southern Interior Region**

Prepared by:

**Ken Hoffman and Brian Jantz**

Fisheries Technicians

Ministry of Environment, Lands and Parks

Fisheries Program

Penticton, B.C.

Approved by:

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D. Tesch, Fisheries Inventory Specialist

March , 1999

## Project Reference Information

FRBC Project Number	TOM98202
FDIS Project Number	03-THOM-2020001-1998
FRBC Region:	Thompson/Okanagan
MELP Region:	8
MELP District:	N/A
FW Management Unit:	8-12
Fisheries Planning Unit:	N/A
DFO Sub-District	29-K
Forest Region:	Kamloops
Forest District:	Penticton

## Watershed Information

Watershed Group:	Kettle Group
Watershed Code:	320-520100-42900-40600-2580
Waterbody Identifier:	00553KETL
UTM at Lake Outlet	11.341019.5504103
Order at Lake Outlet	1
Number of Tributaries	2
Drainage Area	163 ha
Magnitude	1
Elevation	1296 m
NTS Map	082E/11
Trim Map	082E.064
BEC Zone	MS
Air Photos	30BCC96030 No. 017

## Lake Sampling Summary

Lake Survey Type	Primary (98 RIC Standards)
Water Surface Area	7.5 ha
Max. Depth	6.9 m
Mean Depth	2.2 m
Secchi Depth	2.0 m
Volume	146,515 m <sup>3</sup>
Area Above 6m Contour	7.2 ha
Shoreline Perimeter	2218 m
Lake Length	360 m
Number of Islands	0
Species Present in Lake	NFC

## Contractor Information

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### ***Disclaimer***

This product has been accepted as being in accordance with approved standards within the limits of Ministry quality assurance procedures. Users are cautioned that interpreted information on this product developed for the purposes of the Forest Practices Code Act and Regulations, for example stream classifications, is subject to review by a statutory decision maker for the purposes of determining whether or not to approve an operational plan.

### ***Acknowledgments***

Funding for this inventory was provided by Forest Renewal BC.

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- Attachment I. Planning Documents  
i) Air Photo and Air Photo Enlargement
- Attachment II. Field Data  
i) Original field lake, stream & fish collection cards  
ii) Original field notes  
iii) Field working map  
iv) Paper sounding traces from bathymetric transects
- Attachment III. Photodocumentation  
i) Photo negatives

## **1.0 Introduction**

### **1.1 Project scope/Objectives**

A primary reconnaissance inventory of Stump Lake was undertaken on October 22, 1998. The purpose was to collect information which will be used to classify this lake under the Okanagan TSA Lake Classification Project, determine lake management goals and to set guidelines for forestry activities within the vicinity of this lake as set out by the Forest Practices Code Act standards. Funding for this project was provided by Forest Renewal B.C. (FRBC).

### **1.2 Location**

Stump Lake is situated within the Penticton Forest District and is located approximately 31 km by air southeast of Kelowna and 34 km by air northeast of Penticton. It is situated at an elevation of 1296 m above sea level. A location map is shown in Figure 1.

#### **1.2.1 Access**

Directions from Kelowna are as follows:

- From the Highway 97 intersection with Highway 33 turn east onto Highway 33. Set odometer to zero and continue driving east on Highway 33 past the Big White Mountain Ski Resort Rd. turnoff.
- At 38.2 km turn right onto the Okanagan Falls Weyerhaeuser R201 Forest Service (FS) Rd. Start of well maintained gravel logging road. You will be at the 80 km road marker.
- Drive to the 68 km road marker and turn left. Reset odometer.
- \* At 2.4 km turn left.
- At 2.8 km stay right.
- At 2.9 km turn right.
- At 3.6 km stop although road continues.
- Lake is visible to your right (west).
- Walk 50 m down to lake.

Directions from Penticton are as follows:

- From the intersection at Main Street and Carmi Ave. set odometer to zero and turn east onto Carmi Ave.
- Drive 4.6 km then turn right onto Beaverdell Rd.
- Drive 17.2 km on Beaverdell Rd.

- Turn left onto the Okanagan Falls Weyerhaeuser R201 FS Rd. You will be near the 37 km road marker. Continue on the R201 staying to the right near the 57 km road marker.
- Drive to the 68 km road marker and turn right. From here follow the same directions as indicated by an\* in directions above from Kelowna.

## **2.0 Resource Information**

### **2.1 Developments and Land Use**

The dominant land use in this area is forestry with a significant amount of logging having taken place in the general area and in close proximity to the lake. Logging has occurred at the southern part of the lake right up to the edge of the wetland area which surrounds much of the lake. Although active logging was not observed in the area while conducting the inventory caution should be exercised when driving into this lake. The R201 is an active logging main haul road and is also used extensively by the public to access a subdivision, area fishing resorts, private cabins and for access for various recreational pursuits. This lake has no campsite area and there was no evidence of angler use. The surrounding land is Provincial Crown land.

### **2.2 Lake Drainage**

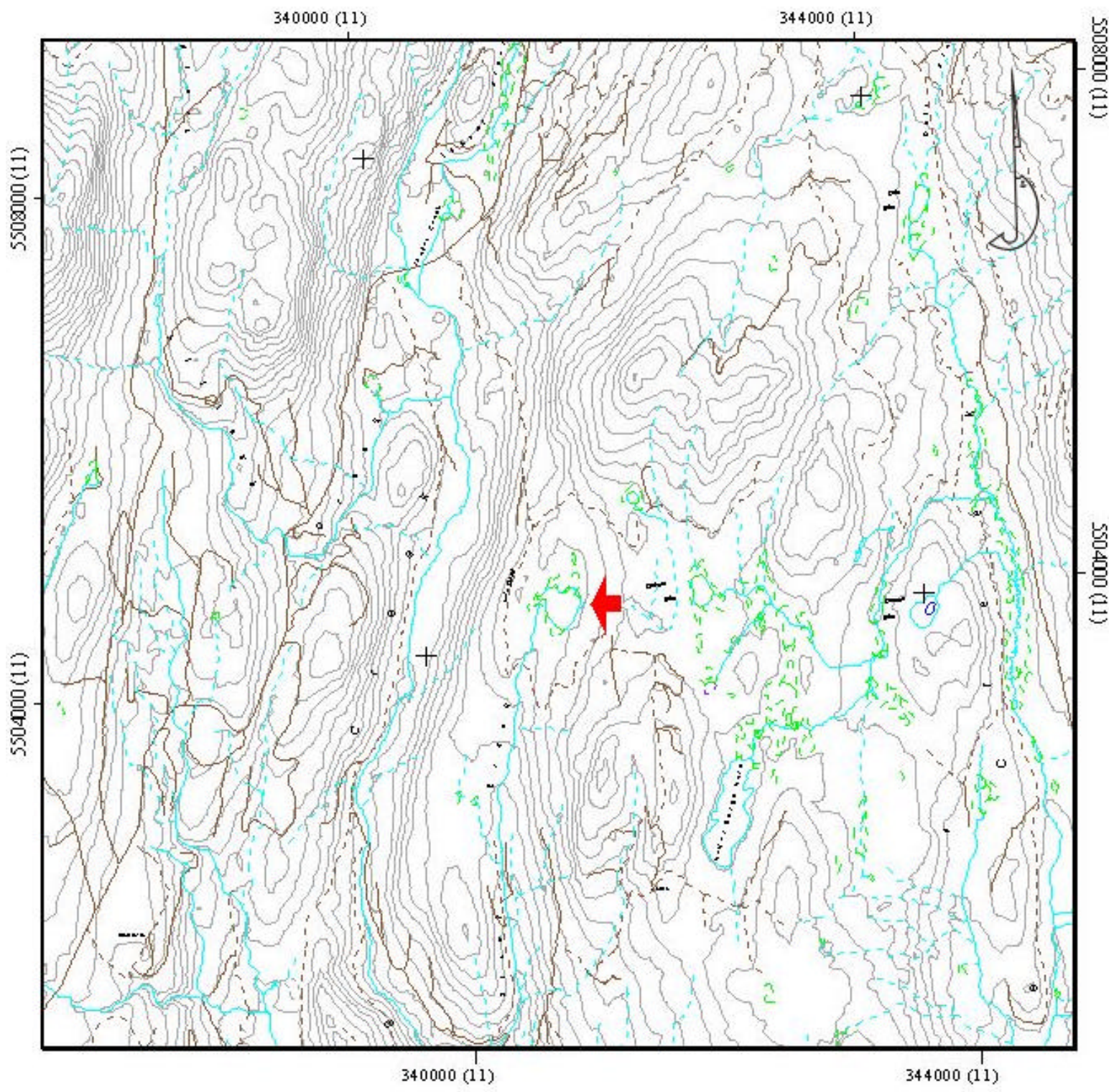
Stump Lake > Stump Creek > Sterling Creek > Wilkinson Creek > West Kettle River > Kettle River > USA > Columbia River > Pacific Ocean.

#### **2.2.1 Inlets**

There was one dry intermittent inlet stream found during the survey which flows into the north end of the lake. The stream is not gazetted. From the lake the inlet stream channel flows in a straight pattern through a large wetland area of marsh grass, low willow shrubs and the odd coniferous tree. The channel braids into a few smaller arms approximately 100 m from the lake. The streambed consisted of a muddy bottom with no apparent gravels for spawning habitat. At the time of the survey it was a record dry and hot summer in the Okanagan Valley.

#### **2.2.2 Outlets**

There is one main outlet stream which flows out of the wetland area on the west side of the lake and then due south. This stream is gazetted as Stump Creek. The wetland area and outlet were dry at the time of the survey and it appears that the outlet stream only flows during higher water levels when the wetland becomes inundated with water. A large spruce tree has fallen over at



Scale 1:50,000

TRIM Mapsheet: 082E.064

**Figure 1.** Location map of Stump Lake study area.

the mouth of the stream channel where it becomes defined from the wetland. This tree appears to have partially blocked the flow although water has gone around and under the tree. This may affect fish passage. At freshet adult spawners may not be able to leave and return back to the lake.

From this location a large area of blowdown has occurred making access to inspect this section of the outlet very difficult. Approximately 100 m d/s of the lake immediately below the area of blowdown a Site Card was completed (see Appendix 1 and Figures 11 & 12). The gradient here is approx. 1% with a good mix of pool and riffle habitat suitable for fish rearing. Although there was no flow occurring at the time of the survey there were standing pools of water in this section of the stream channel. Fish cover is abundant in the form of undercut banks, overhanging shrubs and large woody debris (LWD). The stream bed consisted of ample small gravels suitable for spawning habitat.

### **2.3 Aquatic Invertebrates**

Water Boatmen (*Corixidae sp.*), aquatic beetles (*Coleoptera sp.*), leaches (*Placobdella*) and Dragonfly nymph's were captured in the minnow trap sets. Hyalella shrimp were also observed in the lake.

### **2.4 Wildlife Observations**

A muskrat (*Ondatra zibethica*) was observed swimming in the lake during the time of the survey. A cow and bull moose were observed 25 m from the vehicle while unloading the boat and equipment. Some moose and deer tracks were observed in the area around the outlet and inlet streams.

### **2.5 Previous Surveys**

- There was no record of any previous lake surveys in the Penticton MOELP Regional Fisheries files.
- Stump Lake was classified as a Class C Lake in the Okanagan TSA Lake Classification Project in 1996/97. The management goal is noted as General and the comments noted a fisheries inventory is required which can now be updated. There is opportunity here to establish a fishery and therefore the Class C status should be changed.

### **2.6 Previous Fish Presence**

Hatchery records indicate that Stump Lake received 4 releases of rainbow trout between 1963 and 1968. It is not known whether these fish were able to survive for any length of time and provide a fishery but they apparently were not able to reproduce and sustain a population.

### 3.0 Methods

#### 3.1 Limnology

A limnological sampling station was established near the deepest part of the lake. See annotated air photo on page 6 for sampling location. Measurements included pH, conductivity, dissolved oxygen and temperature profiles, as well as a laboratory analysis for general water chemistry parameters taken from a sample 0.5 m below the surface.

**Table 1. Limnological and Bathymetric Methods Used**

• Dissolved Oxygen	YSI Model 54
• Water Temperature	YSI Model 54
• Air Temperature	YSI Model 54
• pH (field)	LaMotte Wide Range Model P-5085
• Specific Conductance	LaMotte Model TDS 3
• Water Sampler	Van Doorn
• Laboratory Used	Environment Canada-Pacific Environmental Science Centre
• Sounding Device	Lowrance X-16 Computer Sonar
• Boat	12 ft. Smokercraft
• Motor	4.5 hp Mercury
• Contour interpolation software	ARC/INFO
• Platform	PC
• Boat Speed for soundings	1.0 m/sec.
• Camera	Pentax K1000 35mm
• Elevation Source	Trim map

**Table 2. Field Conditions**

• Date:	1998/10/22	• Wind velocity:	light
• Time:	1150 hr.	• Wind Direction:	southwest
• Air Temp. (C)	7.0	• Surface condition:	light ripple
• Cloud Cover:	0/10	• Water colour:	colourless
• Secchi Disc: (m)	2.0	• Water temp. (C)	6.0

## **3.2 Fish Population Sampling**

### **3.2.1 Netting**

Two standard MOELP 300m six (6) panel variable mesh gill nets, one floating and one sinking were set in the lake to determine fish presence, and to obtain samples of the fish population. The mesh sizes of the nets and their order are 25, 76, 51, 89, 38 and 64 mm. The floating net was set for 5.6 hours and the sinking net was set for 5.4 hours. The net set locations are shown on the annotated air photo.

### **3.2.2 Minnow Traps**

Four (4) Gee minnow traps were set in the lake to determine fish presence. The traps were set at an average depth of 0.5 m using canned cat food as bait. The minnow traps were set for an average of 5.6 hours. The minnow trap locations are shown on the annotated air photo.

## **4.0 Results and Discussion**

### **4.1 Logistics**

There were no logistical problems encountered during this survey except that the boat and equipment had to be carried down to the lake through a timbered area which made it difficult. A trail was cut down to the lake to make this task easier and safer.

### **4.2 Immediate Shoreline/Shoal**

The lake is entirely surrounded by a riparian zone of widths varying from 1 to 75 m. The vegetation consists mainly of aquatic sedges/grasses (*Carex sp.*) and willows (*Salex sp.*). There is very little overhanging vegetation along any of the immediate lakeshore. There are only a few scattered deadfalls along the western shoreline. Mature coniferous trees are located close to the lake only in the area between the two wetland areas on the north end of the lake and along the eastern side of the lake. The lake is quite shallow with two distinct areas of deeper water as seen on the annotated air photo. The shallower shoal areas are covered by emergent aquatic plants dominated by Yellow Water Lily (*Nuphar variegatum*), Potomageten and *Carex sp.* The substrate of the lake is predominantly mud and organic.

### **4.3 Surrounding Country**







The lake is situated on a rolling mountain plateau which has been heavily logged into cutblocks of varying sizes and shapes. A large clear-cut section at the south end of the lake has been reforested or has regenerated naturally with Lodgepole Pine seedlings

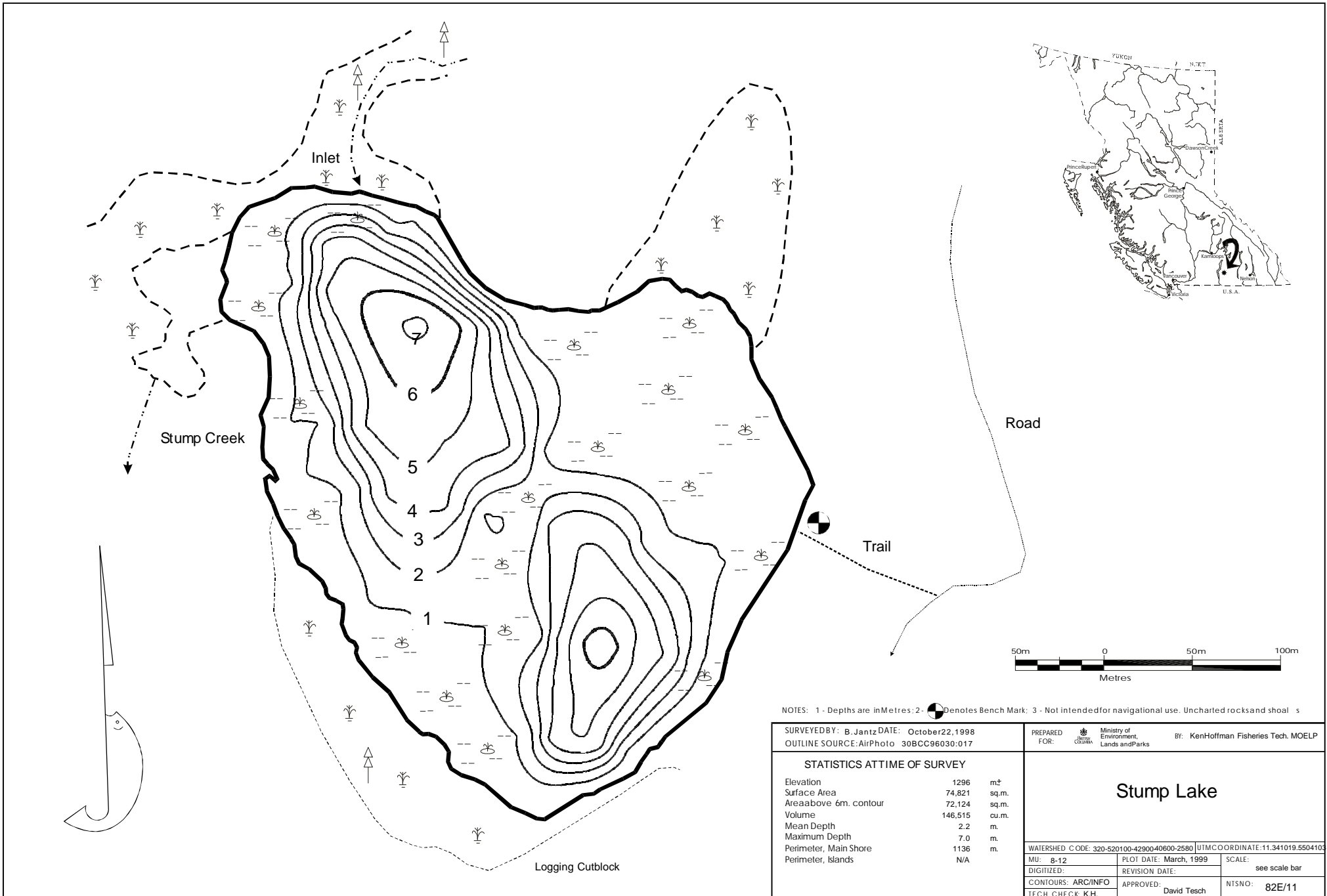
one metre or more in height. Here logging has occurred right up to the riparian area leaving only a thin band of mature coniferous trees intact. The rest of the lake and beyond the riparian areas are surrounded by a mixed mature coniferous forest. This forest consists of Lodgepole Pine (*Pinus contorta*), Englemann Spruce (*Picea engelmannii*), Subalpine Fir (*Abies lasiocarpa*) and Western Larch (*Larix occidentalis*). Slopes surrounding the lake are relatively flat or gentle. The lake is located within the Montane Spruce (MS) Biogeoclimatic Zone.

#### **4.4 Summary of Data Collection**



**Figure 2.** Annotated air photo of Stump Lake.  
 Airphoto Number: 30BCC96030 017  
 Scale: 1:1,500 (approx.)

- |   |   |  |
|---|---|--|
|  Photo Number and Location |  Gillnetting Site and Number |  MT1 Minnow Trap and Number |
|  Limnology Site            |  Stream Flow Direction       |  Benchmark                  |



NOTES: 1 - Depths are in Metres; 2 - Denotes Bench Mark; 3 - Not intended for navigational use. Uncharted rocks and shoals

SURVEYED BY: B. Jantz DATE: October 22, 1998 OUTLINE SOURCE: AirPhoto 30BCC96030:017		PREPARED FOR:  Ministry of Environment, Lands and Parks BY: Ken Hoffman Fisheries Tech. MOELP	
<b>STATISTICS AT TIME OF SURVEY</b>			
Elevation	1296	m.†	
Surface Area	74,821	sq.m.	
Area above 6m. contour	72,124	sq.m.	
Volume	146,515	cu.m.	
Mean Depth	2.2	m.	
Maximum Depth	7.0	m.	
Perimeter, Main Shore	1136	m.	
Perimeter, Islands	N/A		
<b>Stump Lake</b>		WATERSHED CODE: 320-520100-4290040600-2580   UTM COORDINATE: 11.341019.5504103	
MU: 8-12	PLOT DATE: March, 1999	SCALE: see scale bar	
DIGITIZED:	REVISION DATE:		
CONTOURS: ARC/INFO	APPROVED: David Tesch	NTSNO: 82E/11	
TECH. CHECK: K.H.			



# FDIS Lake Form

2000/04/28

Reach # 1  
ILP Map #  
ILP #

Watershed Code: 320-520100-42900-40600-2580-0000-000-000-000-000-000

## WATERBODY

Waterbody Type Primary Sample Type Primary Project ID 03-THOM-982020001-1998  
 Lake Name STUMP LAKE Local Name Fish Form?   
 Watershed Code 320-520100-42900-40600-2580-0000-000-000-000-000-000-000  
 Reach # 1.0 Air Photo Ref. 30BCC96030 017 Ref. Comment  
 Waterbody ID 00553KETL ILP Map # ILP # Magnitude 1  
 NID Map # 82E.064 NID # 60 UTM 11 341019 5504103

TRIM Map #	Year	Surface Area	Source	Method
82E.064	1997	7.5	BT	BT
		Elevation 1296	O	O
		Biogeoclimatic Zone MS		

## TERRAIN CHARACTERISTICS

Setting MP Aspect S  
 Hillslope Coupling DC Basin Genesis GS  
 Land Use NO AG FB FR MI PR UD OT  
 Percentage 80 20

## SHORELINE CHARACTERISTICS

Shoreline Type i ii iii iv v  
 Percentage 50 50  
 Cover SP Resorts Camps Boatlaunch  
 Rec. Features 0 0 0

## INLETS / OUTLETS

# Inlets (Perm.) 0 Inlets (Other) 1 Outlets: 1 Spawning hab. present?   
 I/O Watershed Code ILP Map # ILP # Comments  
 O 320-520100-42900-40600-2580-0000-000-000-000-000-000-000 Stream was dry at the  
 I 320-520100-42900-40600-2580-0000-000-000-000-000-000-000 Stream was dry at the

## SURVEY INFORMATION

Date 1998/10/22 to 1998/10/22  
 Agency C168 Crew B.J./K.H.

## ACCESS

Air  FW  H Road  V2  V4 Auto within .1  
 Off Road  FT  ATV  V4 Distance .1  
 Trail?  Distance .1  
 Closest Community Penticton or Kelowna

## AQUATIC FLORA

EMERGENT VEG. SUBMERGENT VEG.  
 Sparse  OR 50 % Sparse  OR %  
 Floating Algae?   
 Voucher Specimen

## Comments

From Kelowna access to lake is via the Okanagan Falls FS Rd. off Hwg 33. Turn left at 68 km road marker then drive 2.4 km and turn left and at 2.8 km stay right. Stop at 3.6 km (road continues) and walk 50 m to lake on your right (west).

Type	Dom. Species
EMERGENT	YELLOW WATER LILY (NUPHAR VARIEGATUM)
EMERGENT	POTOMAGETEN SP.
EMERGENT	CAREX SP.

## LAKE BATHYMETRY

Type of Survey FL Littoral Area 96 % Method BT Max. Depth 6.9  
 Benchmark Height 2.4 Max Water Level 2.1  
 Benchmark Type/Location 6" spike with flagging tape in Spruce Tree near trail cut to lake  
 Comments

## PHOTO DOCUMENTATION

# FDIS Lake Form

2000/04/28

Reach #      ILP Map #      ILP #

1

Watershed Code:      320-520100-42900-40600-2580-0000-000-000-000-000-000

Photo (R/F)	Foc Lg	Dir	NID Map #	NID #	UTM (zone/easting/northing)			Method	Comments
7 / 10	ST	E	82E.064	62	11	341114	5504248	GIS	Centre of lake - view east
7 / 11A	ST	S	82E.064	63	11	341114	5504248	GIS	Centre of lake - view south
7 / 12A	ST	W	82E.064	64	11	341114	5504248	GIS	Centre of lake - view west
7 / 13	ST	NS	82E.064	65	11	341248	5504193	GIS	Benchmark Tree
7 / 9A	ST	N	82E.064	61	11	341114	5504248	GIS	Centre of lake - view north

## AQUATIC WILDLIFE OBSERVATIONS

### Observations

MAM	Cow and bull moose observed near lake as well as tracks observed around the lake
MAM	Muskrat observed swimming on lake
INV	Water Boatmen observed in lake
INV	Hyaella shrimp observed in lake

## LIMNOLOGICAL STATION WATER QUALITY

Station No.      1      Date      1998/10/22      Time:      11:50  
 Location UTM      11      341065      5504345      EMS #      E234354

### METHOD USED

### WATER SAMPLE

			# Samples	Depth	Requisition #
Secchi Depth	2		1	0.5	50024568
Water Color	NC	VE			
pH (surf/bottom)	6.4	6.4	COLOUR	TES	
Ice Depth	0	T			

## DISSOLVED OXYGEN, TEMPERATURE PROFILE AND CONDUCTIVITY

Depth	DO (d)	T(C)	DO (a)	T (C)	Cond.
1.0	7.6	6.0	7.4	6.0	40
2.0	7.5	5.5	7.4	5.5	
3.0	7.5	5.0	7.3	5.0	
4.0	7.4	5.0	7.1	5.0	
5.0	6.7	5.0	6.4	5.0	
6.0	1.5	5.0	1.5	5.0	

H2S:      0

## EQUIPMENT USED

pH      FD      Water Temp      T4      Conductivity      S4      Dis. Oxygen      D2

## COMMENTS

Section	Comments
WEATHER	Clear, sunny calm. Light breeze from the S.W. at times in the P.M.
SHORELINE CHARACTERISTICS	The lake is surrounded by a riparian zone of depths varying from 1 to 75 m. There is little overhanging vegetation along any of the immediate lakeshore and only a few scattered deadfalls along the western shoreline.
TERRAIN	The lake is situated on a mountain plateau. A mixed mature coniferous forest surrounds the most of the lake beyond the riparian areas and consist's of Lodgepole Pine, Engelmann Spruce, Subalpine Fir and Western Larch.



**Figure 5.** Center of Stump Lake, view north (photo 1 on annotated air photo).



**Figure 6.** Center of Stump Lake, view east (photo 2 on annotated air photo).



**Figure 7.** Center of Stump Lake, view south (photo 3 on annotated air photo).



**Figure 8.** Center of Stump Lake, view west (photo 4 on annotated air photo).

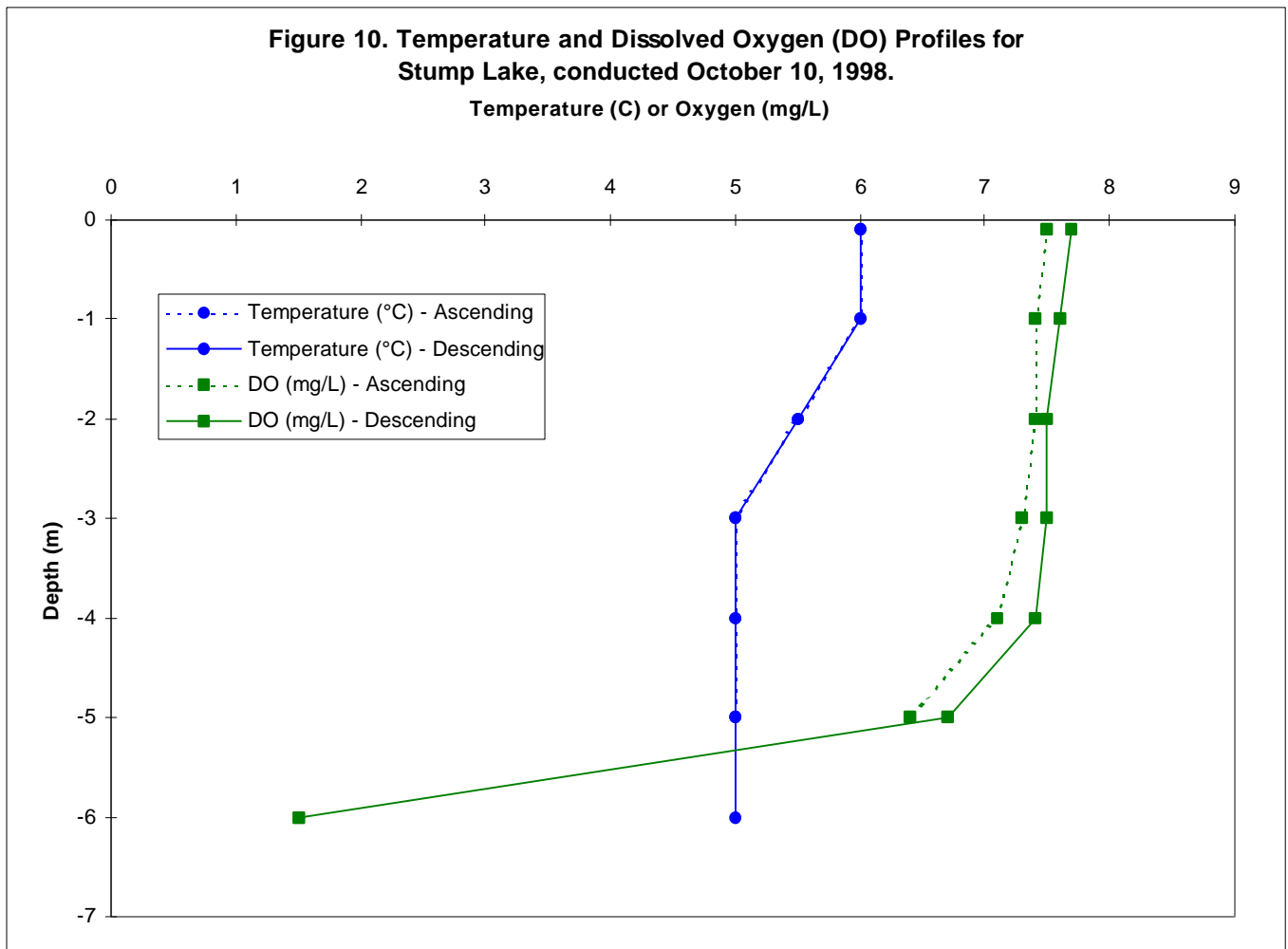


**Figure 9.** View of benchmark tree with arrow indicating location of spike (photo 5 on annotated air photo).

#### 4.4.5 Limnology Summary

The laboratory analysis of the water sample taken at 0.5 m indicated a pH of 7.00, Specific Conductance of 52 uS/cm, and TDS (residue filterable) of 60 mg/l. The complete analysis results are listed in Appendix 2. A temperature/dissolved oxygen profile is shown in Figure 10.

A thermocline was located at a depth of 5 to 6 m. The water temperature and oxygen profile suggests that fish would be able to utilize depths above 5 m in the lake.



#### 4.4.6 Fish Sampling Summary

**Table 3. Sampling summary for Stump Lake - October 22, 1998.**

Net Trap Summary						
Site No.	Method	Set		Pull		Species
		Date	Time	Date	Time	
Site 1	Floating Gill Net	Oct. 22	0910 hr.	Oct. 22	1459 hr.	NFC
Site 2	Sinking Gill Net	Oct. 22	0917 hr.	Oct. 22	1438 hr.	NFC
Site 1	Minnow Trap	Oct. 22	0851 hr.	Oct. 22	1508 hr.	NFC
Site 2	Minnow Trap	Oct. 22	0921 hr.	Oct. 22	1501 hr.	NFC
Site 3	Minnow Trap	Oct. 22	0924 hr.	Oct. 22	1443 hr.	NFC
Site 4	Minnow Trap	Oct. 22	0926 hr.	Oct. 22	1423 hr.	NFC

No fish were caught in the gill nets or the minnow traps. Minnow trap #1 caught 2 Water Boatmen and 1 aquatic beetle, minnow trap #2 caught 1 Dragonfly nymph, minnow trap #3 caught 1 Dragonfly nymph and 1 leach and minnow trap #4 caught 2 Water boatmen and 1 aquatic beetle.

# FDIS Fish Form

2000/05/02

Reach # 1  
ILP Map #  
ILP #

Watershed Code: 320-520100-42900-40600-2580-0000-000-000-000-000-000-000

## WATER BODY

Gazetted Name: STUMP LAKE Local:  
 WS Code: 320-520100-42900-40600-2580-0000-000-000-000-000-000-000 Lake/Stream: L  
 Waterbody ID: 00553KETL ILP Map #: ILP #:  
 Project ID: 03-THOM-982020029-1998 Reach #: 1  
 Fish Permit #: 99999 Date: 1998/10/22 To: 1998/10/22 Agency C168 Crew: B.J./K.H. Resample:

## SITE / METHOD

Site#	NID Map	NID #	UTM:Zone/East/North/Mthd			MTD/NO	Temp	Cond	Turbid	Comment
1	82E.064	66	11	341037	5504351	GIS GN	1			
2	82E.064	67	11	341019	5504266	GIS GN	2			
3	82E.064	68	11	341267	5504255	GIS MT	1			
4	82E.064	69	11	341134	5504357	GIS MT	2			
5	82E.064	70	11	341002	5504283	GIS MT	3			
6	82E.064	71	11	341092	5504070	GIS MT	4			

## A. GEAR SETTINGS

Site#	MTD/NO		H/P	Date In	Time In	Date Out	Time Out	Comment
1	GN	1	1	1998/10/22	09:10	1998/10/22	14:59	
2	GN	2	1	1998/10/22	09:17	1998/10/22	14:38	
3	MT	1	1	1998/10/22	08:51	1998/10/22	15:08	
4	MT	2	1	1998/10/22	09:21	1998/10/22	15:01	
5	MT	3	1	1998/10/22	09:24	1998/10/22	14:43	
6	MT	4	1	1998/10/22	09:26	1998/10/22	14:23	

## B. NET/TRAP SPECIFICATIONS

Site #	MTD/NO.		H/P	Net Type	Length	Depth	Mesh	Set	Habitat
1	GN	1	1	FL	90.0	1.2	ST	SU	PL
2	GN	2	1	SK	90.0	6.0	ST	VR	PL
3	MT	1	1			0.5		BT	L
4	MT	2	1			0.5		BT	L
5	MT	3	1			0.5		BT	L
6	MT	4	1			0.5		BT	L

## C. ELECTROFISHER SPECIFICATIONS

## FISH SUMMARY

Site#	MTD/NO	H/P	Species	Stage	Age	Total #	Lgth (Min/Max)	FishAct	Comment
1	GN	1	NFC			0			
2	GN	2	NFC			0			One leach attached to net
3	MT	1	NFC			0			Caught 1 Water Boatmen

# FDIS Fish Form

Reach #    ILP Map #    ILP #  
1

2000/05/02

Watershed Code: 320-520100-42900-40600-2580-0000-000-000-000-000-000

4	MT	2	1	NFC			0			Caught 1 dragonfly nymph
5	MT	3	1	NFC			0			Caught 1 dragonfly nymph and 1 leach
6	MT	4	1	NFC			0			Caught 2 Water Boatmen and 1 aquatic beetle

## INDIVIDUAL FISH DATA

## COMMENTS

## **4.5 Significant Features and Fisheries Observations**

### **4.5.1 Fish and Fish Habitat**

There was no gill net catch which indicates there are no fish present in Stump Lake. Earlier introductions of rainbow trout apparently were not able to sustain a population. Spawning habitat in the inlet stream appeared very marginal and access for adult spawners to reach spawning habitat in the outlet stream and back to the lake may be difficult due to the large tree across the stream channel. The field assessment indicated that the outlet stream 100 m d/s of the lake and below the large spruce tree across the channel likely would provide the best opportunities for spawning. Overall data from the inventory indicates that the lake would likely be able to support a fishery but this would need to be confirmed through stocking and monitoring.

### **4.5.2 Habitat Concerns**

#### **4.5.2.1 Restoration and Rehabilitation Opportunities**

A further investigation should be conducted into whether the large spruce tree which has fallen across the mouth of the outlet stream may affect fish passage. The lack of a defined channel from the lake to the outlet stream should also be investigated to see if this would limit fish production if fish were reintroduced into the lake. Although Stump Lake has low productivity (60 PPM TDS), based on the inventory information collected, the ability for this lake to support fish production appears adequate if a stocking program is initiated and maintained. In the event that a lake stocking program is considered efforts should also be made to protect the outlet stream from any future logging activities. Angling pressure could also be regulated by not upgrading the existing road access or constructing vehicle access right to the lake. Leaving the existing short walk in access is recommended.

## **Bibliography**

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Class Summary, September 12, 1997.

McTaggart Cowan, I. & Guiguet, C.J. (1978) *The Mammals of British Columbia* 414 pp.

## **Appendices**

### **Appendix 1. FDIS Tributary Summary Printout and Photographs**

# FDIS Site Card

Reach # 2- ILP Map # ILP Number Site 1

2000/05/02

Watershed Code: 320-520100-42900-40600-2580-0000-000-000-000-000-000-000

## PROJECT

Project Name Okanagan Small Lakes Inventory Project Code 03-THOM-982020029-1998  
 Stream Name (gaz.) WEST KETTLE RIVER  
 Project Watershed Code 320-520100-00000-00000-00000-0000-000-000-000-000-000-000

## WATERSHED

Gazetted Name STUMP CREEK Local Name  
 Watershed Code 320-520100-42900-40600-2580-0000-000-000-000-000-000-000  
 ILP Map# ILP # Reach # 2  
 Site # NID Map # NID # UTM(Zone/East/North/Method) Site Lg Method Access Fish Crd?  
 1 82E.064 72 11 340919 5504224 GIS 10 GE FT   
 Date 1998/10/22 Time 13:10 Agency C168 Crew B.J./K.H. Incomplete

## CHANNEL

	method	width	width	width	width	width	width	width	width	width	width
Channel Width (m)	T	1.5	1.2	1.5	1.0	0.8	1.4	1.4			
Wetted Width (m)	T	0.5	0.4	0.7	0.6	0.4	0.7	0.9			
Pool Depth (m)	T	0.15	0.06	0.05	0.02	0.00	0.00	0.00			

Method I	grad	grad	method								
1.0			C								
Method II			C								
COVER			Total		A						
	SWD	LWD	B	C	DP	OV	IV				
	T	T	D	S	T	T	T				
Loc: P/S/O											
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LWD	F										
DIST	C										
LB SHP	U										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					
RB SHP	V										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					

Method I	grad	grad	method								
1.0			C								
Method II			C								
COVER			Total		A						
	SWD	LWD	B	C	DP	OV	IV				
	T	T	D	S	T	T	T				
Loc: P/S/O											
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LWD	F										
DIST	C										
LB SHP	U										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					
RB SHP	V										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					

Method I	grad	grad	method								
1.0			C								
Method II			C								
COVER			Total		A						
	SWD	LWD	B	C	DP	OV	IV				
	T	T	D	S	T	T	T				
Loc: P/S/O											
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LWD	F										
DIST	C										
LB SHP	U										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					
RB SHP	V										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					

Method I	grad	grad	method								
1.0			C								
Method II			C								
COVER			Total		A						
	SWD	LWD	B	C	DP	OV	IV				
	T	T	D	S	T	T	T				
Loc: P/S/O											
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LWD	F										
DIST	C										
LB SHP	U										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					
RB SHP	V										
Texture	<input checked="" type="checkbox"/> F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> C	<input type="checkbox"/> B	<input type="checkbox"/> R	<input type="checkbox"/> A					

## WATER

FLOOD SIGNS Req #  
 NO FLOODING SIGNS Method T EMS  
 Temp 7 Method T4 Cond. Method: S4  
 pH Method FD Turb.  T  M  L  C Method: NS

## MORPHOLOGY

BED MATERIAL Dominant B Subdom: C DISTURBANCE INDICATORS O1 B1 B2 B3 D1 D2 D3  
 D95: 35 D (cm): 0.1 Morph: RPCW         
 Pattern SI C1 C2 C3 C4 C5 S1 S2 S3 S4 S5  
            
 Islands N  
 Bars  N  SIDE  DIAG  MID  SPAN  BR  
 Coupling PC  
 Confinement EN

# FDIS Site Card

Reach #    ILP Map #    ILP Number    Site

2-

1

2000/05/02

Watershed Code: 320-520100-42900-40600-2580-0000-000-000-000-000-000

## FEATURE

TRIB     SC     FC     SWP/SLG     FL/BV

## HABITAT QUALITY

Name	Comments
Rearing Habitat	There was abundant habitat for rearing fish and cover is also abundant in the form of undercut banks, overhanging shrubs and LWD. There is a good mix of pool and riffle habitat. Passage may be affected by a large tree fallen across near the mouth.
Spawning Habitat	Although not flowing at the time of the survey there was water pooled in most areas. There was ample gravels for spawning habitat.

## PHOTO DOCUMENTATION

Photo	Foc Lg	Dir	Comments
7    F    7A	STD	D	Sample site on outlet approx. 100 m d/s of lake
7    F    8A	STD	U	Sample site on outlet approx. 100 m d/s of lake

## WILDLIFE

Group	Observations
MAM	Moose tracks observed in area near outlet stream

## COMMENT



**Figure 11.** Site Card sample site on outlet stream approx. 100 m d/s of lake, d/s view (photo 6 on annotated air photo).



**Figure 12.** Site Card sample site on outlet stream approx. 100 m d/s of lake, u/s view (photo 7 on annotated air photo).

## **Appendix 2. Water Chemistry Analysis for Stump Lake**

Environment Canada -Laboratories  
Pacific Environmental Science Centre  
1645 Dollarton Hwy.  
North Vancouver, B.C.  
17H 1V2 (604)924-2500

Lab Reference #  
9 8 6 7 2 3

01:18 07-Nov-98

F I N A L R E P O R T

Identification: STUMP LAKE @ CENTRE

Type of Sample: Fresh Water (General)

Submitted by: JANTZ, B  
BJANTZ@PENTICTON  
ENV ASSESSMENT  
EP PENTICTON  
BCMELP S. INTER.

Submission RefId: 50024568

Logged in: 26-Oct-98 (1 sample)

Completed: 06-Nov-98 (20 results)

Charged to: 7005-110  
+D5-FRBC-OKANAGAN-RECOVER

Analyzed for: INORGANICS, FIELD DATA

Authorized by: \_\_\_\_\_



Richard Strub  
QA Officer

## RESULTS FOR STUMP LAKE @ CENTRE SAMPLE

Parameter Analyzed	Units	986723-001
ACIDITY	mg/l	3
ACIDITY/PH 4.5	mg/l	<1
ALKALINITY	mg/l	23.0
CONDUCTIVITY	uS/cm	52
NITROGEN/AMMONIA	mg/l	.044
/NITRITE	mg/l	<0.002
/NITRITE+NITRATE	mg/l	.006
/TOTAL	mg/l	.44
PH	Rel.U.	7.00
PHOSPHORUS/TOTAL	mg/l	.016
/TOTAL DISSOLVED	mg/l	.006
RESIDUE/FILTERABLE	mg/l	60
BC SAMPLING AGENCY	EMScode	80
SITE IDENTIFIER/NUMBER		E234354
COLLECTION START DATE	y/m/d	98/10/22
UPPER DEPTH	metres	0.5
TEMPERATURE ON ARRIVAL	deg.C	12

### **Appendix 3. Bathymetric Map**

Please contact Kamloops MELP regarding an E size hardcopy mapsheet.