OVERVIEW FISH AND FISH HABITAT INVENTORY

UPPER PROPHET AND BESA RIVER WATERSHEDS

February 2001

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PROJECT REFERENCE INFORMATION

FDIS Project Number	4136
MELP Region	07B
MELP District	Fort St. John
FW Management Units	7-42
Forest Region	Prince George
Forest District	Fort St. John & Fort Nelson
First Nations Claim Area	Treaty 8

WATERSHED INFORMATION

Watershed Group	Upper Prophet River
Watershed Name	Prophet River Besa River
Watershed Code	212-580800-04700
NTS Maps	94F/8 & 9, 94G/5-6, 12-14
BEC Zone	BWBS, SWB, AT
Access	Helicopter

CONTRACTOR INFORMATION

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ACKNOWLEDGEMENTS

This project was funded by the BC Ministry of Energy and Mines, as part of the Upper Prophet River and Besa River watershed pre-tenure planning process. The authors wish to thank Deborah Johnson, pre-tenure biologist (Energy and Mines) and Jeff Burrows, Fisheries Inventory Specialist (BC Environment) for their support. Special thanks to Kathy and Kim Donally of Nevis Creek Ranch for their hospitality.

1.0 INTRODUCTION

As a result of consensus reached at the Fort Nelson and Fort St. John Land and Resources Management planning tables, the Muskwa-Kechika Management Area (M-KMA) was formally designated through the M-KMA Act. This legislation requires that the management and development of Crown lands and natural resources within the M-KMA be carried out in accordance with the Muskwa-Kechika Management Plan. The Muskwa-Kechika Management Plan calls for the completion of pre-tenure plans as a prerequisite to the allocation or authorization of any oil and gas development within the M-KMA.

A pre-tenure planning process is currently under way for the Besa River and upper Prophet River watersheds (hereafter referred to as the Besa-Prophet). This pre-tenure planning area roughly corresponds to the Upper Prophet River Watershed Group as defined in the B.C. Watershed Atlas. With the exception of lake surveys completed on Redfern and Fairy Lakes, no fish habitat or fish distribution data existed for any portion of the planning area. The absence of information on aquatic habitats and fluvial fish populations was identified as a major limitation to effective planning of access and oil and gas development.

In August and September 2000, Diversified Environmental Services completed an *Overview Fish and Fish Habitat Inventory* (Overview Inventory) within the Besa-Prophet pre-tenure planning area.

2.0 PROJECT AREA

The project area lies to the west of the Alaska Highway, approximately 220 km northwest of Fort St. John, and includes all portions of the Besa River and Prophet River watersheds lying within the M-KMA (Fig. 1). As fisheries data existed previously for Redfern Lake and Fairy Lake they were excluded from the survey. The area lies completely within the Upper Prophet River Watershed Group, as defined by the B.C. Watershed Atlas, excluding only the Minaker River drainage, which occurs outside the east boundary of the M-KMA.

The Besa River and Prophet River drainages originate in the Rocky Mountains and flow eastward through the Eastern Muskwa Ranges and Muskwa Foothills ecosections of the Northern Boreal Mountains ecoprovince. The project area lies within the Alpine Tundra (AT), Spruce-Willow-Birch (SWB), and Boreal White and Black Spruce (BWBS) biogeoclimatic zones.

Topography within the western portion of the project area is extremely mountainous, with significant expanses of rock and ice. The much less severe terrain in the east is dominated by forested ridges and vegetated alpine. Mainstem and tributary drainage systems are characterized by moderate gradients and low turbidity.

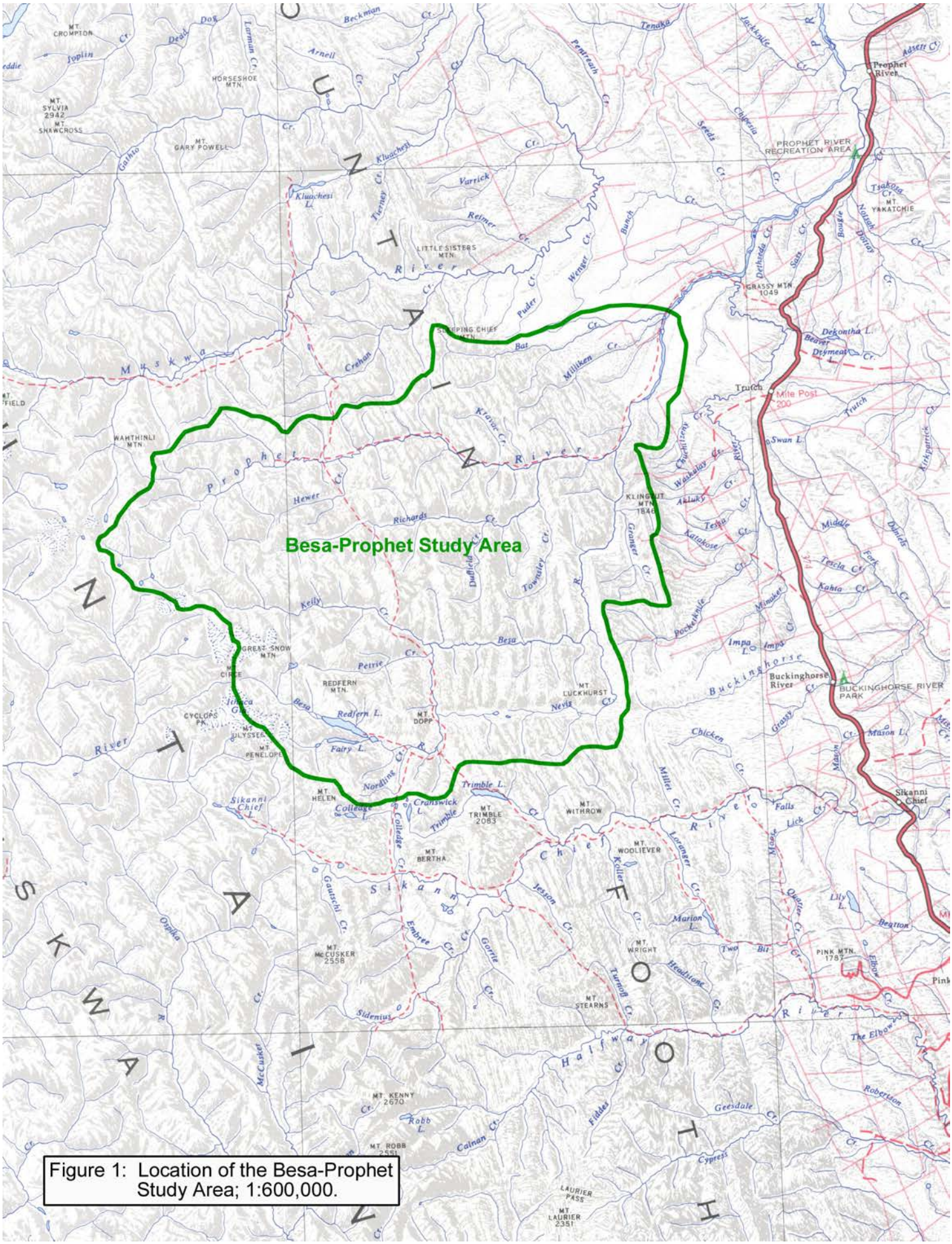

Figure 1: Location of the Besa-Prophet Study Area; 1:600,000.

The southern portion of the project area is accessible by snowmobile and all-terrain-vehicle (ATV) via the Redfern Lake Trail designated route, which originates from the Mile 178 Road. The remainder of the project area is accessible by foot, horseback, or aircraft.

Recreation is currently the primary land use. Commercial activities are associated with recreational use by both residents and non-residents, and include guide-outfitting, packing and wilderness accommodations. With the exception of limited seismic exploration there is currently no industrial land use.

3.0 METHODS

Historical fisheries information, including existing fish sampling data, anecdotal information and local knowledge, was reviewed prior to the commencement of fieldwork. Existing data was limited to sampling in Redfern and Fairy Lakes during lake surveys conducted by BC Environment and limited angling in the outlet to Fairy Lake during the lake survey (MELP 1981a, 1981b).

During the pre-field planning phase, 40 stream sample sites were initially selected within the project area using site selection guidelines detailed in *Overview Fish and Fish Habitat Inventory Methodology (RIC 1999)*. Minor modifications to account for fish distribution patterns unique to the region, anticipated species composition, and fall discharge rates were incorporated in order to maximize the efficiency of sampling. It was expected that a proportion of the sample sites would be shifted or deleted and others added, during the course of the fieldwork, as migration obstructions and habitat use patterns were identified and flow-dependent seasonal access limitations were noted Final site selection was also dependent on the availability of suitable helicopter landing sites. Site locations were adjusted in the field to increase the amount of fish habitat and distribution data collected.

All access was by Bell 206B helicopter. Nevis Creek Ranch, located on the Redfern Lake designated access route, was used as a base. Flight paths were generally low-level along significant stream channels or high-altitude over surrounding terrain, with specific avoidance of the activities of guide-outfitters and resident hunters.

A standard Resources Inventory Committee (RIC) Site Card was completed at each stream sample site, in accordance with *Reconnaissance 1:20,000 Fish and Fish Habitat Inventory: Standards and Procedures (RIC 1998, Errata March 1999).* Photographs of representative habitat and channel features were taken at each sample site, including upstream and downstream ground perspectives and aerial views. Representatives of "sport-fish" species were also photographed.

A fish species inventory was undertaken at each sample site using a Coffelt Mark X gas-generator, backpack electro-fisher. All electro-fishing was conducted using pulse frequency settings of 60 or Coffelt's CPS™ complex pulse setting. Output voltages of

250 to 300 volts were normally used, with adjustments made for water depth, conductivity, and length of fish being sampled. Juvenile rearing habitat was sampled during single-pass electro-fishing within each site. Angling with spoons, spinners, and roe was conducted in habitat likely to hold adult salmonids, including deep pools associated with bedrock confinement or large woody debris (LWD). Sample sites ranged in length from 100 m to 300 m.

To reduce handling stress, fish were anaesthetized in a 40 mg/l clove oil solution (0.3 ml clove oil dissolved in 1.0 ml ethanol, then dissolved in 8 litres of water). All fish were revived before release back into the stream.

Sampling method specifications, species, and fork length for all fish captured were recorded on RIC Fish Collection Forms and Individual Fish Data Forms (RIC 1999). Scale samples were taken from representatives of all age classes of Arctic grayling (*Thymallus arcticus)*, mountain whitefish (*Prosopium williamsoni*), rainbow trout (*Oncorhynchus mykiss*), and juvenile bull trout (*Salvelinus confluentus*). Scale samples were placed in scale envelopes and later mounted between glass slides and read on a Micron 780 microfiche reader. A pelvic fin ray was collected from all mature bull trout, mounted, and analyzed by North-South Consulting Inc., Winnipeg, MB.

No lakes were sampled, no water samples were collected for analysis from any streams, and no voucher specimens were collected during this inventory.

A list of sampling equipment used during field surveys appears in Table 1.

Table 1. List of field equipment used during the Besa-Prophet Overview Inventory.

Equipment	Parameter	Make and Model
Electro-fisher	fish species present	Coffelt Mark X
Abney Level	site gradient	Can-measure 5X
Meter Sticks	channel and wetted width, impasse height, pool depth	2-metre folding
Thermometer	water temperature	Fisher alcohol
Range Finders	channel and wetted width	Ranging 120, Ranging 620
Hip Chain	site length	Chainman II
Camera	photodocumentation	Pentax ME SLR w/50mm Canon SureShot A1 w/32mm
GPS Receiver	Field site-referencing	Garmin GPS II PLUS

4.0 RESULTS

Field assessments of 41 stream sample sites were completed between August 28 and September 15, 2000.

4.1 Logistics

All site access was by helicopter. Nevis Creek Ranch, located on Nevis Creek, was used as a base for field operations. Fuel was transported by pick-up truck to the closest vehicle access point, at the west end of the Mile 178 Road.

Fieldwork had to be temporarily discontinued on August 31 due to heavy snowfall and poor flying conditions. Fieldwork recommenced on September 12 after snow had melted from lower elevations and stream discharge rates had receded. Nighttime temperatures well below freezing resulted in unseasonably low water temperature for the remainder of the survey and may have affected seasonal fish distribution by triggering some downstream movement of rearing fish.

4.2 Habitat and Fish Distribution

Forty-one stream sample sites were established and evaluated in the field. These were distributed evenly throughout the project area, which consisted of all sub-drainages of the Prophet River watershed lying upstream of the confluence with Bat Creek.

Within the project area, available fish habitat is generally comprised of moderate gradient, riffle/pool configurations, with course granular substrates. Suspended sediment levels are typically low, with correspondingly high water clarity. Boulder cover and occasional deep pools account for the majority of rearing cover in tributary habitats, with large woody debris comprising only a minor component. On mainstem reaches, side channel habitats and cobble margins provide juvenile rearing habitat suitable for young-of-the-year (YOY) mountain whitefish, and deep pools and runs provide holding habitat for adult salmonids.

Impassible barriers (waterfalls and chutes) are common on both mainstem and tributary streams, especially in the western portion of the project area, and exclude fish from a significant proportion of suitable habitat in some sub-drainages, including the Prophet River, Besa River, Richards Creek, Keily Creek, Hewer Creek, Petrie Creek, and Nordling Creek. Reaches upstream of impassible barriers were sampled in several sub-drainages in order to confirm the presence or absence of upstream-resident populations. No fish were captured or observed upstream of the lowermost barriers on the Prophet River, Besa River, Hewer Creek, and Keily Creek. Potential for the existence of upstream resident populations (bull trout and slimy sculpin (*Cottus cognatus*)) is limited by low habitat complexity and multiple impasses. A summary of barriers to fish movement within the project area appears in Table 2.

Arctic grayling, mountain whitefish and bull trout were the only indigenous "sport-fish" species found within the project area and were relatively common throughout accessible portions of the system. All stream reaches accessible from the Prophet River or Besa River mainstems, and containing suitable seasonal rearing habitat, can be assumed to support one or more of these species. Rainbow trout were found in the Besa River mainstem immediately upstream of Redfern Lake and in the Besa mainstem and two

Table 2. Summary of barriers to fish movement within the Besa-Prophet Overview Inventory project area.

Stream Name	Watershed Code	NTS Map	Barrier Type	Height	UTM	Comments
Prophet River	212-580800-04700	94F/9	falls	6 m	10.430467.6387589	impassible barrier; upper limit of fish distribution on Prophet River mainstem
Prophet River	212-580800-04700	94F/9	falls	20 m	10.430054.6387479	impassable barrier immediately upstream of lowermost impasse
Prophet River	212-580800-04700	94F/9	falls	10 m	10.424747.6380586	impassable barrier on non fish-bearing reach
Prophet River	212-580800-04700	94F/9	falls	15 m	10.418143.6380586	impassable barrier on non fish-bearing reach
Bat Creek	212-580800-04700-59000	94G/13	falls	60 m	10.461980.6404627	impassable barrier; upper limit of fish distribution on Bat Creek
Trib to Bat Creek	212-580800-04700-59000-8500	94G/13	falls	60 m	10.462888.6404245	impassable barrier on small trib at headwaters of Bat Creek
Trib to Bat Creek	212-580800-04700-59000-8670	94G/13	falls	90 m	10.462430.6404532	impassable barrier on small trib at headwaters of Bat Creek
Besa River	212-580800-04700-66500	94F/8	chute	n/s	10.437364.6360793	impassable chute 6.3 km upstream of Redfern Lake; upper limit of fish distribution on Besa River mainstem
Besa River	212-580800-04700-66500	94F/8	falls	25 m	10.438150.6360657	impassable falls immediately upstream of impassable chute
Keily Creek	212-580800-04700-66500-5310	94G/5	cascade	15 m	10.440956.6371608	lowermost impassable barrier 22 km upstream from mouth; upstream limit of fish distribution
Keily Creek	212-580800-04700-66500-5310	94G/5	cascade	20 m	10.440378.6371344	impassable barrier on non fish-bearing reach
Keily Creek	212-580800-04700-66500-5310	94F/8	falls	50 m	10.431756.6373071	impassable barrier on non fish-bearing headwaters reach
Trib to Keily Creek	212-580800-04700-66500-5310-3560	94G/5	falls	40 m	10.448773.6370509	impassable barrier 1.6 km upstream from confluence with Keily Creek
Trib to Keily Creek	212-580800-04700-66500-5310-8510	94F/8	falls	40 m	10.431656.6372634	impassible barrier on non fish-bearing headwaters tributary
Petrie Creek	212-580800-04700-66500-5420	94G/5	falls	6 m	10.450060.6363567	impassable barrier 8.5 km upstream from mouth; upstream limit of fish distribution
Trib to Besa River	212-580800-04700-66500-6380	94G/5	falls	50 m	10.461093.6357348	impassable barrier on tributary draining "10-mile Lake" wetlands; upstream limit of fish distribution

Table 2 Con't. Summary of barriers to fish movement within the Besa-Prophet Overview Inventory project area.

Stream Name	Watershed Code	NTS Map	Barrier Type	Height	UTM	Comments
Nordling Creek	212-580800-04700-66500-7270	94G/5	falls	5 m	10.453540.6352031	impassable barrier in bedrock canyon 2 km upstream from mouth; upstream limit of fish distribution
Outlet to Fairy Lake	212-580800-04700-66500-7940	94G/5	falls	10 m	10.448917.6354857	impassable barrier immediately upstream of confluence with Besa River; RB introduced upstream
Outlet to Fairy Lake	212-580800-04700-66500-7940	94G/5	falls	8 m	10.448044.6354598	impassable barrier immediately downstream of Fairy Lake; RB introduced upstream
Richards Creek	212-580800-04700-70200	94G/12	rock ledge	1 m	10.465948.6382529	1 m rock ledge 14 km upstream of mouth; may restrict GR & MW movement; BT present upstream
Richards Creek	212-580800-04700-70200	94G/12	falls	5 m	10.445280.6381028	impassable barrier 22 km upstream from mouth; BT spawning immediately downstream
Richards Creek	212-580800-04700-70200	94G/12	falls	30 m	10.443666.6381098	impassable barrier on non fish-bearing reach
Richards Creek	212-580800-04700-70200	94F/9	falls	40 m	10.440007.6380097	impassable barrier on non fish-bearing reach
Trib to Duffield Cr	212-580800-04700-70200-2850-8090	94G/5	falls	5 m	10.462556.6371807	impassable barrier on south fork of Duffield drainage headwaters
Trib to Richards Cr	212-580800-04700-70200-8090	94G/12	falls	70 m	10.445569.6380790	impassable barrier immediately upstream of confluence with Richards Creek
Kravac Creek	212-580800-04700-72600	94G/12	falls	7 m	10.465625.6395499	Impassable barrier 6 km upstream from mouth
Hewer Creek	121-580800-04700-82300	94G/12	falls	10 m	10.447296.6386866	Impassable barrier 5 km upstream from mouth; upstream limit of fish distribution
Trib to Prophet River	121-580800-04700-87900	94F/9	chute	n/s	10.436120.6394702	Impassable barrier 5 km upstream from mouth; upstream limit of fish distribution
Trib to Prophet River	121-580800-04700-91800	94F/9	falls	50 m	10.431055.6386701	Impassable barrier 750 m upstream from mouth; upstream limit of fish distribution
Trib to Prophet River	121-580800-04700-98800	94F/9	falls	15 m	10.418301.6380636	impassable barrier on non fish-bearing reach in Prophet headwaters

tributaries immediately downstream of Redfern Lake (first 15 km). These are assumed to be members of a naturalized, self-sustaining population originally introduced into Redfern Lake and Fairy Lake in 1984. Slimy sculpin was the only other fish species captured.

Adult Arctic grayling were found to be widely distributed throughout accessible mainstem and tributary habitats, particularly where deep-pool holding cover occurs. The project area appears to support a significant summer-resident, adult population with little evidence of spawning or juvenile rearing, which is assumed to take place downstream in lower portions of the Prophet River system.

Bull trout populations within the project area are likely migratory, with adults over-wintering in the lower Prophet River mainstem and moving upstream to spawning habitats by late summer. Three bull trout spawning locations were identified through the presence of mature, spawning fish and/or moderate to high densities of YOY and yearling juveniles. These are located on Petrie Creek, Duffield Creek, and upper Richards Creek. Sub-adult bull trout were found to be widely scattered at low densities throughout the remainder of the project area.

Mountain whitefish appear to spawn in the Prophet and Besa River mainstems within the project area, as indicated by relatively high densities of YOY juveniles in mainstem sample sites. Other age-classes, including post-yearling juveniles, sub-adults, and adults, were found to be widely distributed in a variety of mainstem and tributary habitats throughout the remainder of the project area. These fish likely concentrate in deeper pools in the Prophet and Besa River mainstems during winter.

Slimy sculpin appear to exist as local populations in all accessible portions of mainstem and tributary drainages where suitable over-wintering capability exists.

Additional species, including burbot (*Lota lota*), longnose sucker (*Catostomus catostomus*), lake chub (*Couesius plumbeus*), and longnose dace (*Rhinichthys cataractae*) have been recorded in portions of the Prophet River system downstream of the project area. Although these species may be seasonally present at low densities within the project area, their preference is for the warmer, lower-gradient habitats of the Boreal Plains ecoprovince.

A summary of fish sampling results from the 41 stream sample sites appears in Table 3. Site data cards, sampling specifications, individual fish data, and site photographs appear in Appendices I through XLI. A project overview map summarizing fish species distribution is included in Appendix XLII. A brief description of fish distribution and general habitat values for each sub-basin sampled is presented below.

4.2.1 Prophet River

The Prophet River mainstem is approximately 245 km in length from its headwaters to its confluence with the Muskwa River. The upper 105 km of mainstem lies within the Besa-Prophet project area. A series of impassable barriers exists on the upper mainstem. The

Table 3. Summary of fish sampling results from stream sample sites in the Besa-Prophet Overview Inventory project area.

Stream Name	Site #	Fish Species	Comments
Prophet River	37	MW CCG (BT GR)	
Prophet River	35	MW CCG (BT GR)	
Prophet River	28	NFC (NF)	upstream of impassable barrier
Bat Creek	16	MW GR CCG (BT)	
Bat Creek	18	NFC (MW BT CCG)	
Trib to Bat Creek	15	CCG	
Milliken Creek	17	CCG (GR)	suitable rearing habitat for Arctic grayling
Besa River	09	GR MW CCG (BT)	
Besa River	03	BT MW GR RB CCG	
Besa River	26	RB	upstream of Redfern Lake; below impassable barrier
Besa River	27	NFC (NF)	upstream of impassable barrier
Nevis Creek	08	MW GR (BT CCG)	
Nevis Creek	05	MW GR CCG (BT)	
Nevis Creek	02	NFC (CCG BT)	bull trout and slimy sculpin assumed seasonally present
Trib to Nevis Creek	07	NFC (BT CCG)	bull trout and slimy sculpin assumed seasonally present
Trib to Nevis Cr Trib	06	NFC (BT CCG)	bull trout and slimy sculpin assumed seasonally present
Trib to Nevis Creek	01	CCG (BT)	bull trout assumed seasonally present
Keily Creek	11	MW GR BT CCG	
Keily Creek	13	MW GR BT CCG	immediately downstream of impassable barrier
Keily Creek	12	NFC (NF)	upstream of impassable barrier
Trib to Keily Creek	10	BT	
Petrie Creek	38	BT MW	suspected bull trout spawning stream
Petrie Creek	14	BT MW	downstream of barrier; suspected bull trout spawning stream
Trib to Besa River	04	BT MW GR RB	immediately downstream of impassable barrier
Nordling Creek	25	RB	downstream of impassable barrier
Richards Creek	20	MW BT CCG (GR)	downstream of 1 m rock shelf
Richards Creek	32	BT	1 m rock shelf downstream may restrict MW GR CCG
Richards Creek	34	BT	bull trout spawning area
Townsley Creek	22	MW CCG (BT)	bull trout assumed seasonally present
Townsley Creek	24	NFC (BT)	bull trout assumed seasonally present
Trib to Townsley Creek	23	NFC (BT)	bull trout assumed seasonally present
Duffield Creek	21	BT	suspected bull trout spawning stream
Duffield Creek	39	BT	suspected bull trout spawning stream
Trib to Duffield Creek	40	NFC (BT)	bull trout assumed seasonally present
Trib to Duffield Creek	41	NFC (BT)	bull trout assumed seasonally present
Trib to Richards Creek	33	NFC (BT)	bull trout assumed seasonally present
Kravac Creek	19	NFC	access restricted by subsurface flow in lower 1 km of mainstem
Hewer Creek	36	BT CCG (MW)	downstream of impassable barrier
Hewer Creek	31	NFC (NS)	upstream of impassable barrier
Trib to Prophet River	30	MW BT CCG	
Trib to Prophet River	29	MW BT CCG (GR)	

GR=Arctic grayling BT=bull trout MW=mountain whitefish CCG=slimy sculpin NFC=no fish caught NF=non fish-bearing
( )=assumed presence

lowermost of these barriers consists of a 6 m and 10 m falls within a bedrock confinement, approximately 85 km upstream of the east boundary of the project area (Plate 1). This barrier defines the upstream limit of fish distribution within the system. No fish were captured or observed during sampling in the remaining 20 km of mainstem upstream of the lower barrier, and all species are assumed absent. Bull trout, mountain whitefish, and slimy sculpin were captured downstream of the lower impasse. Moderate densities of young-of-the-year mountain whitefish were sampled in the Prophet mainstem, suggesting mainstem spawning. No evidence of bull trout or Arctic grayling spawning in the Prophet River mainstem was noted. Bull trout appear to make limited use of the Prophet River, upstream of Richards Creek. Although no Arctic grayling were sampled, adults are assumed to use both summer and overwintering habitat in the mainstem (Plate 2).

4.2.2 Bat Creek

Bat Creek originates on Sleeping Chief Mountain and flows eastward to join the Prophet River at the eastern boundary of the project area (Plate 3). No barriers occur between the mouth and a dramatic 60 m vertical face, 32 km upstream at the headwaters. Mountain whitefish, Arctic grayling, and slimy sculpin were found in abundance in the lower portion of the stream. No fish were captured in the upper portion of the stream, however, suitable summer rearing habitat exists. No rearing juvenile bull trout or other evidence of bull trout spawning was noted, but sub-adult bull trout may make occasional use of this stream during the summer.

4.2.3 Milliken Creek

Milliken Creek is a low to moderate gradient tributary system that originates in the lower portion of the project area and enters the Prophet River immediately upstream of the east M-KMA boundary. No barriers were observed along the mainstem. Slimy sculpin were captured. While no Arctic grayling were captured, suitable rearing and limited spawning habitat is available.

4.2.4 Besa River

The Besa River is the largest tributary to the Prophet River and is comparable in size to the upper Prophet. No barriers exist between the mouth and a point 6.3 km upstream of Redfern Lake, where an impassable chute and 25 m waterfall define the upstream limit of fish distribution (Plate 4). No fish were captured or observed during sampling upstream of these barriers and only one rainbow trout was sampled between the impasse and Redfern Lake.

Plate 1: Prophet River.
Upstream limit of fish distribution on mainstem – 6m and 20 m falls.
(CD 3 Im 153)

Plate 2: Prophet River.
Upstream aerial view of Prophet River valley from near the mouth
of Hewer Creek. (CD 3 Im 186)

Plate 3: Bat Creek.
Upstream aerial view toward headwaters from near sample site 15.
(CD 2 Im 77)

Plate 4: Besa River.
Upstream aerial view toward headwaters from 6 km upstream of Redfern Lake.
(CD 2 Im 131)

The remainder of the mainstem, downstream of Redfern Lake (Plate 5), appears to support populations of mountain whitefish, Arctic grayling, bull trout, and slimy sculpin. Suitable summer rearing and overwintering habitat is available. Numerous juvenile mountain whitefish, including young-of-the-year, were captured, suggesting mainstem spawning. Only 1 YOY grayling was captured. Sub-adult bull trout (age 3+) were sampled but no rearing juveniles were observed in the mainstem. A proportion of Besa River bull trout appear to spawn in Petrie Creek, where moderate to high densities of rearing juvenile bull trout were found. Although little evidence of Arctic grayling spawning was noted in the Besa mainstem, it may be an important summering area for adults spawning in lower Prophet tributaries. Rainbow trout, introduced to Redfern and Fairy Lakes in 1984, appear to be colonizing the Besa River upstream and downstream of Redfern Lake. Rainbow trout were captured in the Besa mainstem at site 3 and in two tributaries within the first 15 km downstream of Redfern Lake (sites 4 and 25). Rainbow trout were not sampled in any portion of the project area lying further downstream.

4.2.5 Nevis Creek

Nevis Creek is one of 2 major tributaries to the Besa River, the other being Keily Creek. Large adult Arctic grayling comprised the majority of the Nevis Creek sample, indicating its possible importance as a summering area for mature fish that may spawn in lower Prophet River tributaries. Adult mountain whitefish were also sampled but no juveniles of either species were observed. Although no bull trout of any age class were found in Nevis Creek during the current assessment, local residents report angling sub-adult and maturing fish (30-40 cm) in bedrock pools immediately downstream of the lower designated route crossing, and occasionally observing larger bull trout during the early fall spawning period (Donally, pers. comm.). Based on this anecdotal evidence, some spawning activity appears probable, however, the absence of YOY and yearling juveniles during this assessment suggests spawning may be limited. No barriers exist between the headwaters and the confluence with the Besa River.

4.2.6 Keily Creek

Keily Creek comprises the second of two major tributaries to the Besa River (Plate 6). The mainstem stretches approximately 38 km from mouth to headwaters, with an impassable barrier occurring 22 km upstream from the mouth. Sampling between this barrier and another, located 9 km upstream, indicate that all portions of the drainage upstream of the lower barrier are non fish-bearing (Plate 7). The lower portion of the drainage was found to support bull trout, mountain whitefish, Arctic grayling, and slimy sculpin. Moderate to high quality summering habitat for adult and sub-adult grayling and mountain whitefish is present throughout, but no juvenile grayling or mountain whitefish were captured. Two precocious male bull trout, in spawning condition, were sampled at site 13 and one yearling juvenile was captured at site 10, suggesting limited bull trout reproduction. However, quality spawning habitat and tributary rearing habitat for juvenile bull trout is in low abundance.

Plate 5: Besa River.
Upstream aerial view toward Redfern Lake from immediately downstream of Nordling Creek. (CD 2 Im 126)

Plate 6: Keily Creek.
Upstream aerial view of Keily Creek valley from confluence with the Besa River. (CD 1 Im 64)

Plate 7: Keily Creek.
Downstream aerial view of Keily Creek valley from near site 12.
(CD 1 Im 56)

Plate 8: Richards Creek.
One-metre rock ledge approximately 14 km upstream of mouth; view upstream.
(CD 2 Im 103)

4.2.7 Petrie Creek

Petrie Creek enters the Besa River immediately upstream of the mouth of Keily Creek. This drainage is approximately 18 km in length and has an impassable barrier 8.5 km upstream from its mouth. The portion of the drainage lying upstream of the barrier was assumed to be non fish-bearing due to low habitat diversity and lack of suitable over-wintering potential. Moderate to high densities of juvenile bull trout were sampled at 2 sites located downstream of the barrier, suggesting significant spawning activity occurs. Mountain whitefish between 3 and 5 years of age were also numerous.

4.2.8 Unnamed Tributary to Besa River (WSC 212-580800-04700-66500-6380)

This unnamed Besa River tributary drains a wetland complex along the Redfern Lake designated route, known locally as "10-Mile Lake". The stream has a 50 m impassable barrier, approximately 3.7 km upstream from the Besa River, and was assumed to be non fish-bearing beyond this point. Bull trout, mountain whitefish, Arctic grayling, rainbow trout, and slimy sculpin were all sampled in a 200 m stretch of stream immediately downstream of the falls, indicating the presence of high quality seasonal rearing habitat.

4.2.9 Nordling Creek

Nordling Creek enters the Besa River approximately 6 km downstream of Redfern Lake. A bedrock canyon and impassable barrier occur 2 km upstream from the mouth. Suitable seasonal rearing habitat for "sport-fish" species is present downstream of the barrier. No potential for upstream-resident populations appears to exist above the impasse. Juvenile rainbow trout were captured at site 25.

4.2.10 Richards Creek

Richards Creek is a major tributary to the upper Prophet River. Tributaries to Richards Creek include Townsley Creek and Duffield Creek. A 1 m rock ledge occurs on the Richards Creek mainstem, approximately 14 km upstream from the mouth, just below the Duffield Creek confluence (Plate 8). Bull trout, mountain whitefish, Arctic grayling and slimy sculpin were all captured downstream of this ledge. Bull trout were the only species sampled upstream of the ledge, suggesting that it may be a barrier to other species. An impassable 5 m waterfall is located 21 km upstream of the rock ledge (approximately 35 km upstream of the mouth). Spawning adult bull trout and rearing juveniles were captured immediately downstream of the falls (site 34). All portions of the drainage upstream of the 5 m impasse are assumed to be non fish-bearing due to low habitat complexity, low winter flow, and multiple barriers (Plate 9). Two additional barriers (30 m and 40 m waterfalls) occur upstream of the 5 m impasse.

4.2.11 Townsley Creek

Townsley Creek was found to have low to moderate seasonal rearing potential for juvenile "sport-fish." One juvenile mountain whitefish and 1 slimy sculpin were captured. No evidence of bull trout spawning was noted. No barriers to fish movement were observed.

4.2.12 Duffield Creek

Duffield Creek enters Richards Creek immediately upstream of a 1 m rock ledge that appears to form a partial barrier to all species except bull trout. All portions of Duffield Creek appear accessible to bull trout with the exception of the south fork of the extreme headwaters, where a 5 m waterfall occurs. Young-of-the-year, yearling, and 2-year-old juvenile bull trout were sampled in the Duffield mainstem, indicating it is likely important bull trout spawning and rearing habitat. Plates 10 and 11 show upstream and downstream aerial views of the Duffield Creek drainage.

4.2.13 Kravac Creek

Kravac Creek enters the Prophet River mainstem upstream of the mouth of Richards Creek. A 7 m impassable waterfall occurs approximately 6 km upstream of the mouth. Although limited rearing habitat was found in the vicinity of site 19, immediately below the impasse, no fish were captured and seasonal access was restricted by subsurface flow on the lower mainstem. At the time of the assessment, no surface discharge was present within 1 km upstream of the confluence with the Prophet River. This condition precludes fall spawning in Kravac Creek and severely limits seasonal use by rearing juveniles.

4.2.14 Hewer Creek

Approximately two-thirds of the Hewer Creek drainage is inaccessible to fish due to an impassable 10 m waterfall located 5 km upstream of the mouth (Plate 12). Low to moderate rearing potential was found downstream of the impasse. One sub-adult bull trout and 1 slimy sculpin were captured. No fish were captured or observed upstream of the impasse (site 31).

4.2.15 Unnamed Tributary to Prophet River (WSC 212-580800-04700-87900)

This unnamed stream is a significant tributary to the upper Prophet River and enters the mainstem 11 km downstream of the upper limit of fish distribution. As is common on many similar sized tributaries within the project area, the upper two-thirds of the drainage is not accessible to fish due to an impasse. An impassable chute is located approximately 5 km upstream of the mouth. Bull trout, mountain whitefish, and slimy sculpin were captured downstream of the barrier (site 30) and fish are assumed to be absent upstream.

Plate 9: Richards Creek.
Upstream aerial view of upper Richards Creek above site 34.
(Note: 40 m waterfall at top of frame).
(CD 3 Im 178)

Plate 10: Duffield Creek.
Aerial view of Duffield Creek valley, downstream toward Richards Creek
from near site 41. (CD 3 Im 207)

Plate 11: Duffield Creek.
Aerial view of headwaters of Duffield Creek, upstream from near site 41. (CD 3 Im 206)

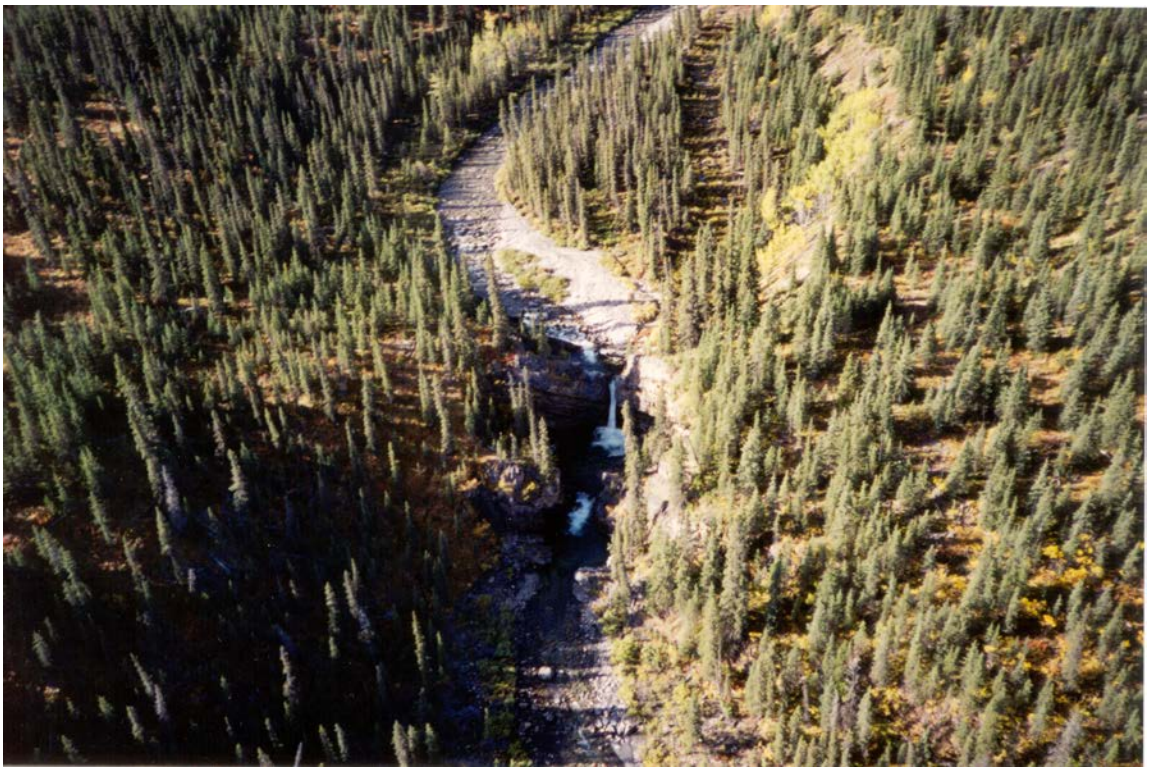

Plate 12: Hewer Creek.
Impassible 10 m waterfall, forming the upstream limit of fish distribution in Hewer Creek. (CD 3 Im 191)

4.3 Fish Age and Growth

Fork lengths and aging structures were collected from representatives of four "sport-fish" species within the Besa-Prophet *Overview Inventory* project area between August 28 and September 15, 2000. These were rainbow trout, bull trout, Arctic grayling, and mountain whitefish.

A meaningful analysis of growth is precluded by small sample sizes, absence of representatives from numerous age classes and, in the case of bull trout, variability in the combined sample due to the probable existence of sub-populations within the project area. Limited information on the life history of each species can be gleaned from general age class distribution within the watershed. A brief discussion of each of the four species follows. Where possible, length-frequency and age-at-length plots are presented, however, the limitations of sample size and sampling bias should be acknowledged.

4.3.1 Rainbow Trout

Eight rainbow trout were captured within the project area, all in the Besa River and tributaries, within 15 km of Redfern Lake. All fish were juveniles (3 YOY, 4 yearlings and 1 age 2+).

Rainbow trout were introduced into Redfern and Fairy Lakes in 1984. The presence of these age classes indicates either the establishment of a limited fluvial population in the Besa River mainstem, the presence of an outlet spawning adfluvial population, or both.

4.3.2 Arctic Grayling

Nineteen Arctic grayling were captured within the project area in mainstem and tributary habitats. The majority of these fish (68%) were adults (age classes 4+ to 6+). The YOY and yearling age classes appear virtually absent from the project area, indicating that spawning and juvenile rearing likely takes place in lower Prophet River tributaries, downstream of the project area. The only representative of these two age classes was a single YOY captured immediately downstream of Redfern Lake. This fish may indicate the presence of a limited adfluvial population. The only other juvenile grayling sampled were several 2+ fish captured in Bat Creek, which is the furthest downstream tributary in the project area. Over-summering adults accounted for all other Arctic grayling use. Adult grayling are assumed to move into the project area beginning in late May, after spawning in warmer, more turbid tributaries downstream. They are also assumed to vacate much of the project area by mid October, as water temperatures drop, in preference for larger mainstem over-wintering habitat. Data from comparable watersheds within the Halfway River and Sukunka River systems suggest similar patterns (BC Environment 1999a, 1999b, unpubl. data). Figure 2 and Table 4 represent length-frequency and length-at-age plots for Arctic grayling sampled during the assessment.

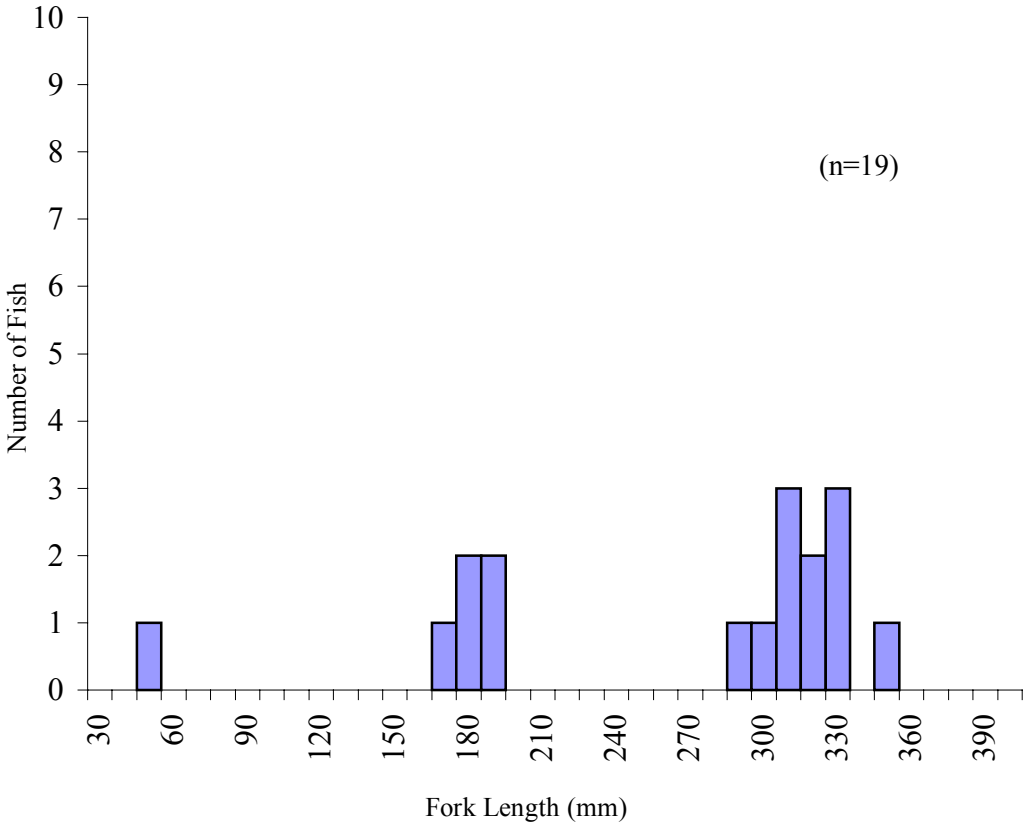

Figure 2. Length-frequency relationship of Arctic grayling captured in the Besa-Prophet Overview Inventory project area between August 28 and September 15, 2000.

Table 4. Age-length relationship of Arctic grayling captured in the Besa-Prophet Overview Inventory project area between August 28 and September 15, 2000.

	Assigned Age						
	0+	1+	2+	3+	4+	5+	6+
Mean Fork Length (mm)	57	-	184	-	312	332	352
Range (mm)	-	-	117-197	-	292-329	306-375	-
n =	1	0	5	0	3	8	1

4.3.3 Mountain Whitefish

A total of 115 mountain whitefish were captured within the project area in both mainstem and tributary habitats. The majority of these fish (54%) were YOY juveniles sampled in the Prophet River and Besa River mainstems. No YOY juveniles and few yearlings were captured in tributary streams. Post-yearling juveniles, sub-adults, and adults, ranging in age from 2+ to 7+, were common in tributary habitats, including Bat Creek, Nevis Creek, Keily Creek, Petrie Creek, Richards Creek, and two unnamed Prophet River tributaries. Figure 3 represents the length-frequency relationship of the combined sample while Table 5 summarizes age-at-length for 90 samples to which ages were assigned.

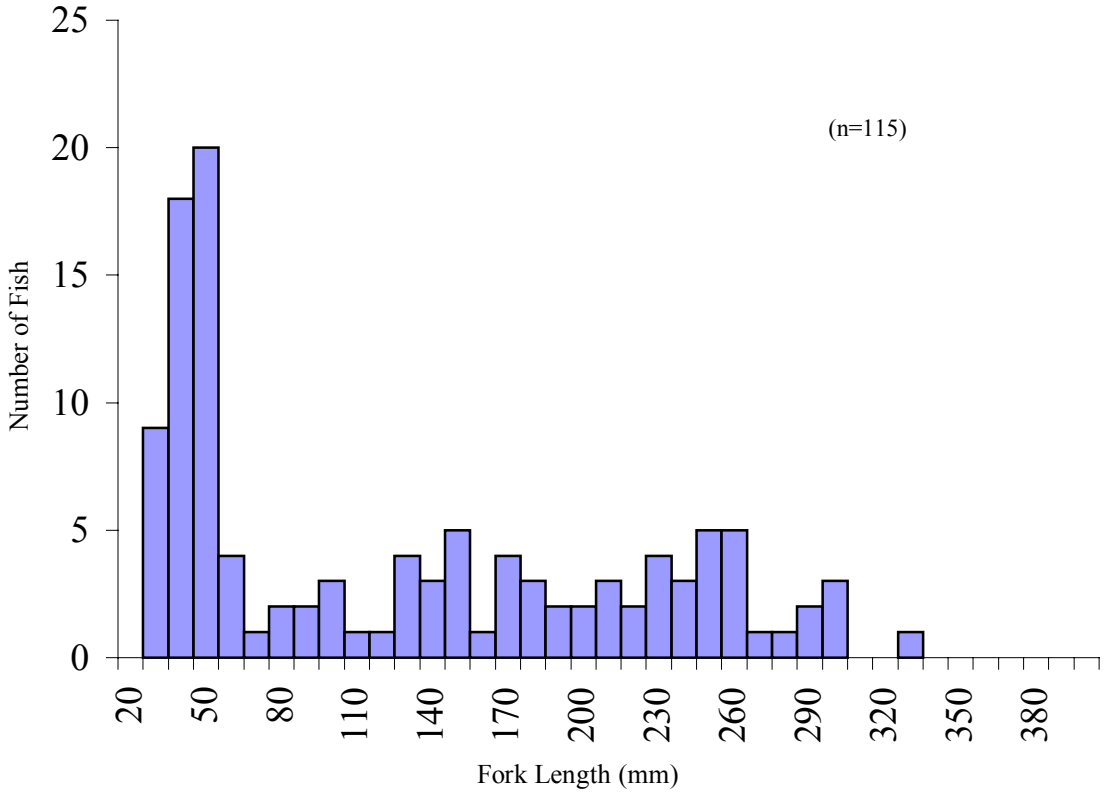

Figure 3. Length-frequency relationship of mountain whitefish captured in the Besa-Prophet Overview Inventory project area between August 28 and September 15, 2000.

Table 5. Age-length relationship of mountain whitefish captured in the Besa-Prophet Overview Inventory project area between August 28 and September 15, 2000.

	Assigned Age							
	0+	1+	2+	3+	4+	5+	6+	7+
Mean Fork Length (mm)	47	111	145	191	216	254	268	339
Range (mm)	32-61	93-137	109-180	163-237	191-248	222-305	236-290	-
n=	49	6	13	8	3	5	5	1

Mountain whitefish appear to spawn in the Prophet and Besa River mainstems within the project area, as indicated by relatively high densities of young-of-the-year juveniles. Post-yearling juveniles, sub-adults, and adults were widely distributed throughout a variety of mainstem and tributary habitats during the assessment.

4.3.4 Bull Trout

Sixty-four bull trout were captured within the project area, almost all in tributary habitats. Rearing juveniles captured in Petrie Creek, Duffield Creek, and Richards Creek accounted for the majority of the sample (67%). Five mature, ripe males ranging in age from 5+ to 9+ were sampled in upper Richards Creek (site 34). A limited number of rearing juveniles and 2 precocious, ripe males were sampled in Keily Creek. The remainder of the sample consisted mainly of age 3+ to 5+ sub-adults. Figure 4 represents the length-frequency relationship of the combined sample, while Table 6 summarizes age-at-length for 49 fish to which ages were assigned.

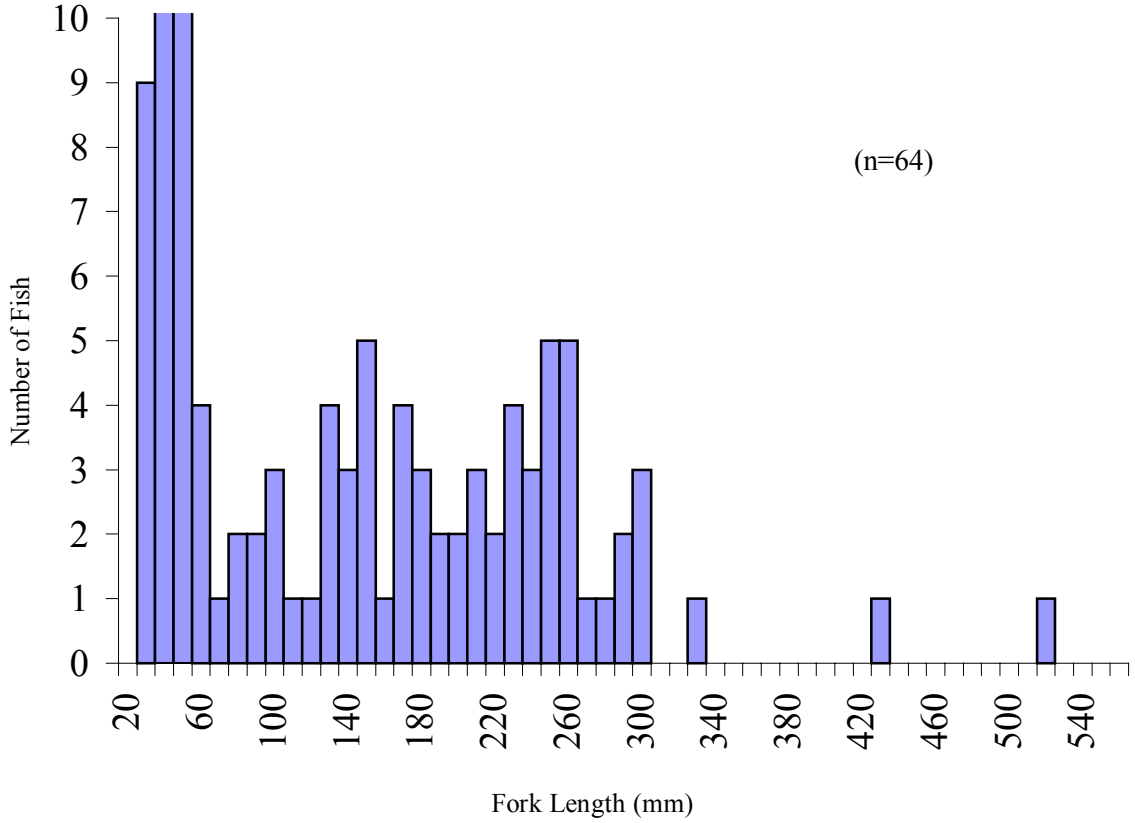

Figure 4. Length-frequency relationship of bull trout captured in the Besa-Prophet Overview Inventory project area between August 28 and September 15, 2000.

Table 6. Age-length relationship of bull trout captured in the Besa-Prophet Overview Inventory project area between August 28 and September 15, 2000.

	Assigned Age									
	0+	1+	2+	3+	4+	5+	6+	7+	8+	9+
Mean Fork Length (mm)	48	99	157	215	259	315	-	435	400	525
Range (mm)	48-49	72-119	115-180	165-330	-	315-315	-	-	-	-
n=	2	15	15	11	1	2	0	1	1	1

4.4 Significant Features and Fisheries Observations

Due to their blue-listed (i.e., vulnerable) status in British Columbia and large-scale declines over their North American range, bull trout are of special management concern in the Besa-Prophet. Bull trout are much more specific in their spawning habitat requirements than spring spawning species or fall broadcast spawners, such as Arctic grayling and mountain whitefish. As a result, they are often unable to successfully reproduce in habitats suitable for spawning grayling and whitefish. Once deposited and buried, bull trout eggs must incubate in the gravel of the streambed for up to eight months (Sept-April) before hatching. During this period, redd sites must remain silt-free and receive a constant supply of oxygenated water regardless of surface flow conditions. Ground-water upwelling within the stream channel appears to play a role in maintaining this consistency (McPhail and Baxter 1996, Baxter 1997, Service 1998) and may be important in spawning habitat selection.

Bull trout populations within the project area are likely migratory, and may consist of more than one sub-population. Adults are assumed to over-winter in the lower Prophet River mainstem and move upstream into spawning tributaries by late summer. Three potentially important bull trout spawning locations were identified through the presence of mature, spawning fish and/or moderate to high densities of YOY and yearling juveniles. These are located on Petrie Creek, Duffield Creek, and upper Richards Creek. There also appears to be limited bull trout reproduction in Keily Creek.

The current assessment was conducted after the assumed peak of spawning activity. As a result, specific critical spawning locations could not be identified. No mature, spawning fish were captured in Petrie or Duffield Creeks, but juvenile densities suggest significant spawning success. Only mature males remained in Richards Creek at the time of the assessment.

Potential impacts to bull trout from industrial development in the Besa-Prophet include increased siltation on spawning/incubation sites, disruption of winter ground-water patterns, and increased access and angling pressure on migrating, staging and spawning adults.

Mainstem and tributary streams within the study area appear to provide important post-spawning, summer refuge for adult Arctic grayling from the broader Prophet River watershed. Mature Arctic grayling (age 5+ to 8+) are sensitive to over-harvest and can be significantly affected by increased human access to key summer holding habitats.

Mountain whitefish are widely distributed throughout the project area and may be the most abundant fish species present. This species is generally less affected by human development due to their less stringent spawning habitat requirements, their general preference for larger streams, and their lower appeal to anglers.

4.5 Future Research Recommendations

In the face of proposed industrial development in portions of the upper Prophet and Besa River drainages, it is important to further define critical bull trout spawning areas in identified tributaries and determine their relative importance to the overall Muskwa-Prophet bull trout population. Possible methods to collect this information include aerial survey of redds and spawning adults on identified streams during the peak spawning period and short-term radio-telemetry to determine over-wintering areas, migration timing, and critical staging areas.

Information on seasonal movements and critical over-wintering, spawning, and juvenile rearing habitat for Arctic grayling using summer habitat within the upper Prophet and Besa River drainages is required to understand the protection requirements of all life phases of this species.

PERSONAL COMMUNICATIONS

Kathy and Kim Donally, Nevis Creek Ranch, Nevis Creek.

REFERENCES CITED

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APPENDIX I

PROPHET RIVER
(212-580800-04700)

Sample Site 37

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Prophet River									GPS COORDINATES					
LOCATION	7 km upstream of Besa confluence														
NID MAP #	94G/11	NID #		004	WATERSHED CODE	212-580800-04700									
REACH #		SITE #	37	SITE UTM	10	475783	6390511	SITE LENGTH	300	METH	HC	ACCESS	H		
DATE	9/14/2000	TIME	1035	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	72.00	90.00	78.00	44.00	65.00	86.00	72.50	meth	AL
WETTED WIDTH	RF	45.00	36.00	43.00	32.00	64.00	60.00	46.67	1.0	
RES POOL DEPTH	MS	1.50	0.26	0.58	0.90	0.45	0.86	0.76	1.0	
Wb DEPTH	1.60	1.20	1.40	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	4.5	TURBIDITY	
Ph		Lightly Turbid	

COVER

	COVER Total	Moderate (5-20%)					
type	SWD	LWD	B	U	DP	OV	IV
amt	T	S	S	N	D	N	N
loc	P	P	P	P	P	P	P

LWD FNC	Few	DIST	Even
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobble/Bdrock
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Young Forest	STAGE	Young Forest

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS	1.2 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	50
D (cm)	50
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Irregular Wandering
ISLANDS	Irregular
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate to good quality rearing, summering and over-wintering habitat: bedrock confined deep pools, side channel rearing for juveniles and boulder/cobble cover on margins.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP11	23	wd	d	view d/s from bottom
BP11	24	wd	u	view u/s from bottom
BP11	25	wd	u	view u/s from top
BP12	1	wd	d	view d/s in side channel
BP12	3	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose		

COMMENTS

C	
CX1	Electro-fishing effort: 436 seconds @ 250 volts. Mountain whitefish and slimy sculpin captured.
CX2	YOY mountain whitefish abundant.

FISH COLLECTION FORM - page 1 of 2

STREAM NAME	Prophet River								LAKE	X	STREAM		WETLAND
LOCATION	7 km upstream of Besa confluence					WATERSHED CODE	212-580800-04700						
WATERBODY ID			ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N		
PROJECT ID	Besa-Prophet Overview		REACH #		SITE #	37	FISH PERMIT #	SC2000-021					
DATE	9/14/2000	to	9/14/2000	AGENCY	Diversified Environmental Services		CREW	BC/TE		RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
37	94G/11	004	10.475783.6390511	EF	1	4.5		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
37	EF/1	1	MW	NS		22	41	106	Rearing	
37	EF/1	1	CCG	NS		9	39	99	Rearing	

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	37	EF/1	1	1040	1051	436	300	46.7	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	37	EF/1	1	MW	53							
	37	EF/1	1	MW	53							
	37	EF/1	1	MW	59							
	37	EF/1	1	MW	54							
	37	EF/1	1	MW	46							
	37	EF/1	1	MW	56							
	37	EF/1	1	MW	61							
	37	EF/1	1	MW	49							
	37	EF/1	1	MW	51							
	37	EF/1	1	MW	51							
	37	EF/1	1	MW	46							
	37	EF/1	1	MW	52							
	37	EF/1	1	MW	51							
	37	EF/1	1	MW	57							
	37	EF/1	1	MW	52							
	37	EF/1	1	MW	47							
	37	EF/1	1	MW	106							
	37	EF/1	1	MW	52							
	37	EF/1	1	MW	55							
	37	EF/1	1	MW	48							
	37	EF/1	1	MW	41							
	37	EF/1	1	MW	55							

INDIVIDUAL FISH DATA - page 2 of 2												
C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	37	EF/1	1	CCG	52							
	37	EF/1	1	CCG	79							
	37	EF/1	1	CCG	99							
	37	EF/1	1	CCG	65							
	37	EF/1	1	CCG	46							
	37	EF/1	1	CCG	78							
	37	EF/1	1	CCG	52							
	37	EF/1	1	CCG	52							
	37	EF/1	1	CCG	39							

Prophet River
Site 37: View downstream from bottom of site.
(Roll BP11 - Exp 23; CD 3 - Im 192)

Prophet River
Site 37: Upstream aerial view.
(Roll BP12 - Exp 3; CD 3 - Im 196)

APPENDIX II

PROPHET RIVER
(212-580800-04700)

Sample Site 35

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Prophet River									GPS COORDINATES					
LOCATION	400 m downstream from mouth of Hewer Creek														
NID MAP #	94G/12	NID #		006	WATERSHED CODE	212-580800-04700									
REACH #		SITE #	35	SITE UTM	10	446918	6391659	SITE LENGTH	300	METH	HC	ACCESS	H		
DATE	9/14/2000	TIME	850	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	70.00	65.00	50.00	47.00	48.00	45.00	54.17	meth	AL
WETTED WIDTH	RF	28.00	24.00	23.00	19.00	16.00	28.00	23.00	1.0	
RES POOL DEPTH	MS	1.00	0.75	0.40	0.25	0.60	0.45	0.58	1.0	
Wb DEPTH	1.60	1.40		STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	5.5	TURBIDITY	
Ph		Lightly Turbid	

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	S	N	N	D	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Few	DIST	Even
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Gravel/Cobble	TEXTURE	Gravel/Cobble
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Mature Forest	STAGE	Mature Forest

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS	0.3 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	15
D (cm)	8
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Irregular Wandering
ISLANDS	None
BARS	Side
COUPLING	Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing potential.
- spawning in mainstem unlikely due to high proportion of fines.
- overwintering potential

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP11	13	wd	u	view u/s from bottom
BP11	14	wd	u	view u/s from centre
BP11	15	wd	d	view d/s from top
BP11	20	wd	u	upstream aerial view
BP10	6	wd	u	lower falls
BP10	5	wd	u	lower falls
BP9	23	wd	u	aerial view of lower falls

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Elk tracks		

COMMENTS

C

CX1 Electro-fishing effort: 769 seconds @ 250 volts. Mountain whitefish and slimy sculpin were captured.

FISH COLLECTION FORM

STREAM NAME	Prophet River								[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	400 m downstream from mouth of Hewer Creek					WATERSHED CODE	212-580800-04700				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	35	FISH PERMIT #	SC2000-021				
DATE	9/14/2000	to	9/14/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE	[ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
35	94G/12	006	10.446918.6391659	EF	1	5.5		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
35	EF/1	1	MW	NS		14	80	200	Rearing	
35	EF/1	1	CCG	NS		8	32	75	Rearing	

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	35	EF/1	1	0855	0920	769	300	23.0	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	35	EF/1	1	MW	200				Scale	35-1	regen	
	35	EF/1	1	MW	84							
	35	EF/1	1	MW	80							
	35	EF/1	1	MW	34							
	35	EF/1	1	MW	37							
	35	EF/1	1	MW	36							
	35	EF/1	1	MW	41							
	35	EF/1	1	MW	39							
	35	EF/1	1	MW	41							
	35	EF/1	1	MW	39							
	35	EF/1	1	MW	52							
	35	EF/1	1	MW	46							
	35	EF/1	1	MW	45							
	35	EF/1	1	MW	43							
	35	EF/1	1	CCG	75							
	35	EF/1	1	CCG	51							
	35	EF/1	1	CCG	51							
	35	EF/1	1	CCG	65							
	35	EF/1	1	CCG	69							
	35	EF/1	1	CCG	61							
	35	EF/1	1	CCG	48							
	35	EF/1	1	CCG	32							

Prophet River
Site 35: View upstream from bottom of site.
(Roll BP11 - Exp 13; CD 3 - Im 183)

Prophet River
Site 35: Upstream aerial view.
(Roll BP11 - Exp 20; CD 3 - Im 186)

APPENDIX III

PROPHET RIVER
(212-580800-04700)

Sample Site 28

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Prophet River									GPS COORDINATES					
LOCATION	12 km u/s of lower falls														
NID MAP #	94F/9	NID #		001	WATERSHED CODE	212-580800-04700									
REACH #		SITE #	28	SITE UTM	10	423530	6380387	SITE LENGTH	300	METH	HC	ACCESS	H		
DATE	9/13/2000	TIME	1130	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

		meth						avg	GRADIENT %	
CHANNEL WIDTH	RF	60.00	44.00	77.00	50.00	43.00	45.00	53.17	meth	AL
WETTED WIDTH	RF	17.00	20.00	7.50	16.00	14.00	13.50	14.67	2.0	
RES POOL DEPTH	MS	0.22	0.09	0.14	0.11	0.52	0.32	0.23	1.5	
Wb DEPTH	0.90	0.65	0.72	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	3.5	TURBIDITY	
Ph		Clear	

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	N	D	S	S	N	N
loc	P	P	P	P	P	P	P

LWD FNC	None	DIST	
LB SHAPE	V-shaped	RB SHAPE	Sloping
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS: 0.5 m - debris

BED MATERIAL

Dominant	Gravel (2-64 mm)		
Subdom.	Cobble (64-256 mm)		
D95 (cm)	30	D (cm)	15

Morph.: Riffle-pool

DISTURBANCE INDICATORS

O1	**B1**	**B2**	B3	**D1**	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	**S4**		

PATTERN	Irregular Wandering
ISLANDS	Frequent
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094F.009	002	F	10	GE	R	9	F	19	Impasse 1100 m d/s of site	10	424747	6380586
	094F.009	004	F	15	GE	R	9	F	14	Impasse 5 km u/s of site	10	418143	6380586
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing potential for bull trout.
- low bull trout spawning potential: high proportion of fines in substrate.
- no access: multiple impassable barriers on downstream reaches.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP9	12	wd	u	upstream aerial view of headwaters trib from 10.422700.6376537
BP9	14	wd	u	upstream aerial view of mainstem impasses 5 km u/s of site
BP9	15	wd	d	view d/s from top
BP9	16	wd	u	view u/s from centre
BP9	17	wd	u	view u/s from bottom
BP9	18	wd	u	upstream aerial view
BP9	19	wd	u	upstream aerial view of 10 m falls 1100 m d/s of Site 28
BP9	22	wd	u	10 m impassable falls 1100 m d/s of Site 28

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Approximately 30 moose, caribou		

COMMENTS

C	
CX1	Electro-fishing effort: 399 seconds @ 250 volts. No fish were captured or observed.
CX2	Impassable falls 5 km u/s of site and impassable bedrock canyon with 10 m falls 1100 m d/s.

FISH COLLECTION FORM

STREAM NAME	Prophet River			[ ] LAKE	[X] STREAM	[ ] WETLAND	
LOCATION	12 km u/s of lower falls			WATERSHED CODE	212-580800-04700		
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	28	FISH PERMIT #	SC2000-021
DATE	9/13/2000 to 9/13/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	CON	TURB	COMMENTS
28	94F/9	001	10.423530.6380387	EF	1	3.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
28	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	28	EF/1	1	1135	1205	399	300	14.7	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS

Prophet River
Site 28: View upstream from bottom of site.
(Roll BP9 - Exp 17; CD 2 - Im 140)

Prophet River
Site 28: Upstream aerial view.
(Roll BP9 - Exp 18; CD 2 - Im 141)

APPENDIX IV

BAT CREEK
(212-580800-04700-59000)

Sample Site 16

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Bat Creek										GPS COORDINATES				
LOCATION	8.5 km u/s of mouth														
NID MAP #	94G/14	NID #		002	WATERSHED CODE	212-580800-04700-59000									
REACH #		SITE #	16	SITE UTM	10	482454	6407729	SITE LENGTH	200	METH	HC	ACCESS		H	
DATE	9/12/2000	TIME	0847	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	61.00	63.00	78.00	74.00	65.00	48.00	64.83	meth	AL
WETTED WIDTH	RF	21.00	8.00	14.50	36.00	32.00	24.00	22.58	1.0	
RES POOL DEPTH	MS	0.70	0.18	0.25	0.22	0.55	0.13	0.34	1.5	
Wb DEPTH	1.30	1.60	1.40	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	4.5	TURBIDITY	
Ph		Lightly Turbid	

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	S	S	S	N	D	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Abundant	DIST	Even
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION: Algae

MORPHOLOGY

FLOOD SIGNS	0.8 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	18
D (cm)	20
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Irregular Wandering
ISLANDS	Irregular
BARS	Side and Mid-stream
COUPLING	Decoupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate to good quality juvenile rearing and adult oversummering habitat for Arctic grayling.
- side channel rearing habitat present.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
15	21	wd	u	view u/s from bottom
15	22	wd	u	view u/s from centre
15	23	wd	d	view d/s from top
15	24	wd	u	upstream aerial view
BP6	5	wd	u	aerial view west toward Bat Creek headwaters from 10 km u/s of Site 16

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, wolf tracks		

COMMENTS

C	
C1	Also significant proportion of fines.
CX1	Electro-fishing effort: 592 seconds @ 250 volts. Arctic grayling, mountain whitefish and slimy sculpin were captured.

FISH COLLECTION FORM - page 1 of 2

STREAM NAME	Bat Creek						LAKE	X	STREAM		WETLAND
LOCATION	8.5 km u/s of mouth				WATERSHED CODE	212-580800-04700-59000					
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	16	FISH PERMIT #	SC2000-021				
DATE	9/12/2000	to	2000-09-12	AGENCY	Diversified Environmental Services	CREW	BC/TE		RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
16	94G/14	002	10.482454.6407729	EF	1	4.5		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
16	EF/1	1	MW	NS		14	108	305	Rearing	
16	EF/1	1	GR	NS		5	171	197	Rearing	
16	EF/1	1	CCG	NS		8	42	88	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	16	EF/1	1	0852	0927	592	200	22.6	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	16	EF/1	1	MW	305				Scale	16-1	5+	
	16	EF/1	1	GR	197				Scale	16-2	2+	
	16	EF/1	1	MW	237				Scale	16-3	3+	
	16	EF/1	1	GR	171				Scale	16-4	2+	
	16	EF/1	1	MW	145				Scale	16-5	2+	
	16	EF/1	1	MW	135				Scale	16-6	2+	
	16	EF/1	1	MW	109				Scale	16-7	1+	
	16	EF/1	1	GR	180				Scale	16-8	2+	
	16	EF/1	1	GR	194				Scale	16-9	2+	
	16	EF/1	1	GR	182				Scale	16-10	2+	
	16	EF/1	1	MW	198				Scale	16-11	3+	
	16	EF/1	1	MW	153				Scale	16-12	2+	
	16	EF/1	1	MW	134				Scale	16-13	2+	
	16	EF/1	1	MW	150				Scale	16-14	2+	
	16	EF/1	1	MW	136				Scale	16-15	2+	
	16	EF/1	1	MW	140				Scale	16-16	2+	
	16	EF/1	1	MW	110				Scale	16-17	1+	
	16	EF/1	1	MW	108				Scale	16-18	1+	
	16	EF/1	1	MW	149				Scale	16-19	2+	
	16	EF/1	1	CCG	82							
	16	EF/1	1	CCG	88							
	16	EF/1	1	CCG	84							

INDIVIDUAL FISH DATA - PAGE 2 of 2												
C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	16	EF/1	1	CCG	69							
	16	EF/1	1	CCG	66							
	16	EF/1	1	CCG	60							
	16	EF/1	1	CCG	42							
	16	EF/1	1	CCG	43							

Bat Creek
Site 16: View upstream from bottom of site.
(Roll 15 - Exp 21; CD 2 - Im 73)

Bat Creek
Site 16: Upstream aerial view.
(Roll 15 - Exp 24; CD 2 - Im 76)

APPENDIX V

BAT CREEK
(212-580800-04700-59000)

Sample Site 18

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Bat Creek									GPS COORDINATES					
LOCATION	27 km u/s of mouth														
NID MAP #	94G/13	NID #		001	WATERSHED CODE	212-580800-04700-59000									
REACH #		SITE #	18	SITE UTM	10	466445	6404168	SITE LENGTH	160	METH	HC	ACCESS	H		
DATE	9/12/2000	TIME	1125	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	12.10	11.90	9.60	11.50	16.00	9.90	11.83	meth	AL
WETTED WIDTH	RF	9.10	11.90	9.60	7.50	11.30	9.90	9.88	2.0	
RES POOL DEPTH	MS	0.12	0.14	0.12	0.18	0.65	0.09	0.22	2.5	
Wb DEPTH	0.60	0.62	0.70	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	4.0	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Trace (5%)			
type	SWD	LWD	B	U	DP	OV	IV	CROWN CLOSURE
amt	T	T	D	T	S	N	N	
loc	P	P	P	P	P	P	P	

CROWN CLOSURE	0%	1-20%	21-40%	41-70%	71-90%	>90%
	0	1	2	3	4	5

LWD FNC	Few	DIST	Even
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobble/Boulder	TEXTURE	Cobbles
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	0.3 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	40
D (cm)	22
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Occasional
BARS	Side
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094G.013	004	F	60	GE	R	6	F	8	Impassable falls upstream of site	10	461980	6404627
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for bull trout, some spawning potential for bull trout and over-summering potential for Arctic grayling and mountain whitefish.
- fish may have already moved out with temperature drop.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP6	11	wd	u	view u/s from bottom
BP6	12	wd	u	view u/s from centre
BP6	13	wd	d	view d/s from top
BP6	14	wd	u	upstream aerial view
BP6	6	wd	u	60 m falls on trib u/s of site
BP6	7	wd	u	90 m falls on trib u/s of site
BP6	8	wd	u	falls on Bat Creek mainstem 4.5 km u/s of Site 18
BP6	9	wd	u	view u/s to headwaters from 2 km above Site 18

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose		

COMMENTS

C	
C1	Low proportion of fines
CX1	Large falls at top of reach above site.
CX2	Electro-fishing effort: 504 seconds @ 250 volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Bat Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	27 km u/s of mouth				WATERSHED CODE	212-580800-04700-59000				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED		[X] Y	[ ] N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	18	FISH PERMIT #	SC2000-021			
DATE	9/12/2000 to 9/12/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
18	94G/13	001	10.466445.6404168	EF	1	4		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
18	EF/1	1	NFC			0				

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	18	EF/1	1	1130	1152	504	160	9.9	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	

Bat Creek
Site 18: View upstream from bottom of site.
(Roll BP6 - Exp 11; CD 2 - Im 82)

Bat Creek
Site 18: Upstream aerial view.
(Roll BP6 - Exp 14; CD 2 - Im 85)

APPENDIX VI

UNNAMED TRIBUTARY TO BAT CREEK
(212-580800-04700-59000-5090)

Sample Site 15

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Bat Creek									GPS COORDINATES					
LOCATION	500 m u/s of mouth														
NID MAP #	94G/14	NID #		001	WATERSHED CODE	212-580800-04700-59000-5090									
REACH #		SITE #	15	SITE UTM	10	474140	6404644	SITE LENGTH	150	METH	HC	ACCESS	H		
DATE	8/30/2000	TIME	1725	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	7.40	8.20	7.50	8.30	7.90	6.10	7.57	meth	AL
WETTED WIDTH	RF	7.40	5.30	7.50	5.20	6.10	6.10	6.27	1.0	
RES POOL DEPTH	MS	0.32	0.47	0.12	0.08	0.12	0.26	0.23	1.5	
Wb DEPTH	0.48	0.52	0.44	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	6.5	TURBIDITY	
Ph		Lightly Turbid	

COVER

	COVER	Total			Moderate (5-20%)			
type	SWD	LWD	B	U	DP	OV	IV	
amt	S	S	S	S	D	S	T	
loc	P	P	P	P	P	P	P	

LWD FNC	Abundant	DIST	Even
LB SHAPE	V-shaped	RB SHAPE	Sloping
TEXTURE	Fines	TEXTURE	Fines
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Young Forest	STAGE	Young Forest

CROWN CLOSURE	0%	1-20%	21-40%	41-70%	71-90%	>90%		
	0	1	2	3	4	5		

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	0.5 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	28
D (cm)	15
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Irregular Wandering
ISLANDS	None
BARS	Side and Mid-stream
COUPLING	Decoupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing potential. Possible water quality limitation - very strong sulpher smell.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP5	1	wd	u	view upstream from bottom
BP5	2	wd	u	view upstream from centre
BP5	3	wd	d	view d/s from top
BP5	5	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose		

COMMENTS

C	
C1	Fines also significant.
CX1	Electro-fishing effort: 538 seconds @ 250 volts. Slimy sculpin were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Bat Creek									LAKE [ ]	STREAM [X] WETLAND [ ]
LOCATION	500 m u/s of mouth						WATERSHED CODE	212-580800-04700-59000-5090			
WATERBODY ID			ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N		
PROJECT ID	Besa-Prophet Overview		REACH #		SITE #	15	FISH PERMIT #	SC2000-021			
DATE	8/30/2000	to 8/30/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
15	94G/14	001	10.474140.6404644	EF	1	6.5		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
15	EF/1	1	CCG	NS		2	84	111	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	15	EF/1	1	1730	1755	538	150	6.3	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	15	EF/1	1	CCG	111							
	15	EF/1	1	CCG	84							

Unnamed tributary to Bat Creek
Site 15: View upstream from centre of site.
(Roll BP5 - Exp 2; CD 1 - Im 70)

Unnamed tributary to Bat Creek
Site 15: View downstream from top of site.
(Roll BP5 - Exp 4; CD 1 - Im 71)

APPENDIX VII

MILLIKEN CREEK
(212-580800-04700-59200)

Sample Site 17

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Milliken Creek									GPS COORDINATES					
LOCATION	11 km u/s of mouth														
NID MAP #	94G/14	NID #		003	WATERSHED CODE	212-580800-04700-59200									
REACH #		SITE #	17	SITE UTM	10	481439	6403830	SITE LENGTH	150	METH	HC	ACCESS	H		
DATE	9/12/2000	TIME	1030	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg		
CHANNEL WIDTH	RF	15.50	15.50	10.90	15.00	9.90	12.00	13.13	meth	AL
WETTED WIDTH	RF	6.50	15.00	10.90	7.80	5.40	8.50	9.02	3.0	
RES POOL DEPTH	MS	0.56	0.19	0.80	0.75	0.32	0.27	0.48	2.5	
Wb DEPTH	0.65	0.70	0.45	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

GRADIENT %

WATER

EMS		COND	
TEMP (°C)	4.5	TURBIDITY	
Ph		Lightly Turbid	

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	S	S	T	N	D	T	N
loc	P	P	P	P	P	P	P

LWD FNC	Few	DIST	Even
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Cobbles	TEXTURE	Gravels
RIP. VEG.	Mixed C & D	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Mature Forest

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS	0.65 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	22
D (cm)	9
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate to good quality juvenile Arctic grayling rearing, overwintering unlikely.
- high fines component may limit suitability for spawning.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
15	25	wd	u	view u/s from bottom
BP6	2	wd	u	view u/s from centre
BP6	3	wd	d	view d/s from top
BP6	4	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose tracks		

COMMENTS

C	
C1	Occassional boulders, high fines.
CX1	Electro-fishing effort: 328 seconds @ 250 volts. Slimy sculpin were captured.
CX2	No barriers noted downstream.

FISH COLLECTION FORM

STREAM NAME	Milliken Creek								[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	11 km u/s of mouth					WATERSHED CODE	212-580800-04700-59200				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	17	FISH PERMIT #	SC2000-021				
DATE	9/12/2000	to	9/12/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE	[ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
17	94G/14	003	10.481439.6403830	EF	1	4.5		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
17	EF/1	1	CCG	NS		8	29	118	Rearing	

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	17	EF/1	1	1034	1055	328	150	9.0	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	17	EF/1	1	CCG	118							
	17	EF/1	1	CCG	29							
	17	EF/1	1	CCG	77							
	17	EF/1	1	CCG	85							
	17	EF/1	1	CCG	86							
	17	EF/1	1	CCG	72							
	17	EF/1	1	CCG	70							
	17	EF/1	1	CCG	78							

Milliken Creek
Site 17: View upstream from centre of site.
(Roll BP6 - Exp 2; CD 2 - Im 79)

Milliken Creek
Site 17: Upstream aerial view.
(Roll BP6 - Exp 4; CD 2 - Im 81)

APPENDIX VIII

BESA RIVER
(212-580800-04700-66500)

Sample Site 9

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Besa River										GPS COORDINATES				
LOCATION	34 km u/s of mouth														
NID MAP #	94G/6	NID #		005	WATERSHED CODE	212-580800-04700-66500									
REACH #		SITE #	9	SITE UTM	10	473272	6366586	SITE LENGTH	300	METH	HC	ACCESS		H	
DATE	8/29/2000	TIME	1300	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	45.00	70.00	65.00	58.00	65.00	65.00	61.33	meth	AL
WETTED WIDTH	RF	27.50	22.00	20.00	25.00	25.00	26.00	24.25	2.0	
RES POOL DEPTH	MS	1.50	1.20	1.30	1.40	0.65	0.55	1.10		
Wb DEPTH	1.50	1.30	1.45	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	8.0	TURBIDITY	
Ph		Lightly Turbid	

COVER

	COVER Total	Abundant (>20%)					
type	SWD	LWD	B	U	DP	OV	IV
amt	T	T	S	N	D	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Few	DIST	Clumped
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Fines
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Mature Forest	STAGE	Young Forest

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	1.5 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	95
D (cm)	15
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Irregular
BARS	Side
COUPLING	Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- abundant cover (deep pools/boulders) for adult Arctic grayling, bull trout and mountain whitefish.
- limited rearing habitat present (side channels).
- no granular substrates suitable for spawning.
- schools of MW fry (23-30 per school) in sidechannels.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP2	6A	wd	u	upstream aerial view
BP2	8A	wd	u	view u/s from bottom
BP2	9A	wd	u	view u/s from centre
BP2	10A	wd	d	view d/s from top

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Elk tracks		
MAM	Caribou tracks		

COMMENTS

C	
CX1	Electro-fishing effort: 431 seconds @ 250 volts. Arctic grayling, mountain whitefish and slimy sculpin.

FISH COLLECTION FORM

STREAM NAME	Besa River							[ ] LAKE	[X] STREAM	[ ] WETLAND	
LOCATION	34 km u/s of mouth				WATERSHED CODE	212-580800-04700-66500					
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	9	FISH PERMIT #	SC2000-021				
DATE	8/29/2000	to	8/29/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE [ ]	RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
9	94G/6	005	10.473272.6366586	EF	1	8		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
9	EF/1	1	MW	NS		14	38	184	Rearing	
9	EF/1	1	GR	Adult		1	332	332	Rearing	
9	EF/1	1	CCG	NS		10	52	94	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	9	EF/1	1	1305	1330	431	300	24.2	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	9	EF/1	1	MW	174				Scale	9-1	3+	
	9	EF/1	1	MW	184				Scale	9-2	3+	
	9	EF/1	1	MW	96				Scale	9-3	1+	
	9	EF/1	1	MW	93				Scale	9-4	1+	
	9	EF/1	1	GR	332		M		Scale	9-5	regen	
	9	EF/1	1	MW	39							
	9	EF/1	1	MW	52							
	9	EF/1	1	MW	47							
	9	EF/1	1	MW	42							
	9	EF/1	1	MW	43							
	9	EF/1	1	MW	48							
	9	EF/1	1	MW	52							
	9	EF/1	1	MW	47							
	9	EF/1	1	MW	39							
	9	EF/1	1	MW	38							
	9	EF/1	1	CCG	94							
	9	EF/1	1	CCG	62							
	9	EF/1	1	CCG	52							
	9	EF/1	1	CCG	67							
	9	EF/1	1	CCG	65							
	9	EF/1	1	CCG	59							
	9	EF/1	1	CCG	68							
	9	EF/1	1	CCG	59							
	9	EF/1	1	CCG	66							
	9	EF/1	1	CCG	60							

Besa River
Site 9: View downstream from top of site.
(Roll BP2 - Exp 10A; CD 1- Im 38)

Besa River
Site 9: Upstream aerial view.
(Roll BP2 - Exp 6A; CD 1- Im 39)

APPENDIX IX

BESA RIVER
(212-580800-04700-66500)

Sample Site 3

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Besa River											GPS COORDINATES					
LOCATION	14 km d/s of Redfern Lake																
NID MAP #	94G/5	NID #		003	WATERSHED CODE	212-580800-04700-66500											
REACH #		SITE #	3	SITE UTM	10	458065	6356372	SITE LENGTH	300	METH	HC	ACCESS	H				
DATE	8/28/2000	TIME	1655	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	30.00	30.00	45.00	26.50	37.00	35.00	33.92	meth	AL
WETTED WIDTH	RF	28.00	20.00	21.00	18.50	16.20	17.50	20.20	1.8	
RES POOL DEPTH	MS	0.30	0.25	0.60	0.15	0.36	0.40	0.34	2.0	
Wb DEPTH	0.65	0.73	0.56	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	9.0	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Moderate (5-20%)			
type	SWD	LWD	B	U	DP	OV	IV	
amt	S	N	S	N	D	N	N	
loc	P	P	P	P	P	P	P	

LWD FNC	Few	DIST	Clumped
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Gravels	TEXTURE	Cobbles
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Mature Forest

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS	0.3 m - debris
BED MATERIAL	
Dominant	Gravel (2-64 mm)
Subdom.	Cobble (64-256 mm)
D95 (cm)	16
D (cm)	5
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Irregular
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for juvenile Arctic grayling and mountain whitefish in side channels and margins of mainstem.
- little or no SWD and LWD cover for juvenile bull trout.
- limited deep pool cover within site.
- site lies within braided section that is not entirely representative of the reach: braiding isn't evident u/s or d/s of site.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
T5	22	wd	u	view u/s from bottom
T5	23	wd	u	view u/s from centre
T5	24	wd	d	view d/s from top
T5	25	wd	u	upstream aerial view
T6	21	wd	object	rainbow trout; 220 mm and bull trout; 186 mm

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose and elk tracks		

COMMENTS

C

CX1 Electro-fishing effort: 813 seconds @ 250 volts. Rainbow trout, bull trout, slimy sculpin, mountain whitefish and Arctic grayling were captured.

FISH COLLECTION FORM

STREAM NAME	Besa River						[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	14 km d/s of Redfern Lake				WATERSHED CODE	212-580800-04700-66500			
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	3	FISH PERMIT #	SC2000-021		
DATE	8/28/2000 to 8/28/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE	

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
3	94G/5	003	10.458065.6356372	EF	1	9		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
3	EF/1	1	RB	NS		7	59	220	Rearing	
3	EF/1	1	BT	NS		2	186	201	Rearing	
3	EF/1	1	CCG	NS		11	47	90	Rearing	
3	EF/1	1	MW	NS		2	49	50	Rearing	
3	EF/1	1	GR	NS		1	57	57	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	3	EF/1	1	1700	1745	813	300	20.2	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	3	EF/1	1	RB	220				Scale	3-1	2+	
	3	EF/1	1	BT	186				Scale	3-2	3+	
	3	EF/1	1	BT	201				Scale	3-3	3+	
	3	EF/1	1	RB	125				Scale	3-4	1+	
	3	EF/1	1	RB	118				Scale	3-5	1+	
	3	EF/1	1	RB	122				Scale	3-6	1+	
	3	EF/1	1	RB	71				Scale	3-7	0+	
	3	EF/1	1	RB	74				Scale	3-8	0+	
	3	EF/1	1	RB	59				Scale	3-9	0+	
	3	EF/1	1	GR	57				Scale	3-10	0+	
	3	EF/1	1	MW	49				Scale	3-11	0+	
	3	EF/1	1	MW	50				Scale	3-12	0+	
	3	EF/1	1	CCG	73							
	3	EF/1	1	CCG	90							
	3	EF/1	1	CCG	68							
	3	EF/1	1	CCG	61							
	3	EF/1	1	CCG	71							
	3	EF/1	1	CCG	86							
	3	EF/1	1	CCG	82							
	3	EF/1	1	CCG	53							
	3	EF/1	1	CCG	76							
	3	EF/1	1	CCG	47							
	3	EF/1	1	CCG	72							

Besa River
Site 3: View upstream from centre of site.
(Roll T5 - Exp 23; CD 1- Im 13)

Besa River
Site 3: View downstream from top of site.
(Roll T5 - Exp 24; CD 1- Im 14)

Besa River
Site 3: Upstream aerial view.
(Roll T5 - Exp 25; CD 1- Im 15)

Besa River
Site 3: Rainbow trout; 220 mm and bull trout 186 mm.
(Roll T6 - Exp 21; CD 1- Im 33)

APPENDIX X

BESA RIVER
(212-580800-04700-66500)

Sample Site 26

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Besa River											GPS COORDINATES					
LOCATION	5 km u/s of Redfern Lake																
NID MAP #	94F/8	NID #		001	WATERSHED CODE	212-580800-04700-66500											
REACH #		SITE #	26	SITE UTM	10	439252	6359997	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	9/13/2000	TIME	945	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	74.00	80.00	63.00	89.00	58.00	67.00	71.83	meth	AL
WETTED WIDTH	RF	13.50	9.50	15.00	8.50	14.50	12.30	12.22	1.0	
RES POOL DEPTH	MS	0.12	0.28	0.28	0.48	0.14	0.18	0.25	1.5	
Wb DEPTH	0.62	0.72	0.68	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	2.0	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Trace (5%)				CROWN CLOSURE							
type	SWD	LWD	B	U	DP	OV	IV		0%	1-20%	21-40%	41-70%	71-90%	>90%		
amt	N	N	S	N	D	N	N									
loc	P	P	P	P	P	P	P									

LWD FNC	None	DIST		0	1	2	3	4	5			
LB SHAPE	Sloping	RB SHAPE	Sloping									
TEXTURE	Cobbles	TEXTURE	Cobbles	INSTREAM VEGETATION								
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D									
STAGE	Young Forest	STAGE	Young Forest									

MORPHOLOGY

FLOOD SIGNS	0.3 m - debris
BED MATERIAL	
Dominant	Gravel (2-64 mm)
Subdom.	Cobble (64-256 mm)
D95 (cm)	40 D (cm) 18
Morph.	Riffle-pool
DISTURBANCE INDICATORS	

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Irregular Wandering
ISLANDS	Irregular
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094F.008	005	F	25	GE	R	8	F	16	Impassable falls 1.5 km u/s of site	10	438150	6360651
	094F.008	007	CH			R		F		1.3 km u/s of site	10	437364	6360793
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low to moderate quality rearing: low cover and low productivity.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP8	16A	wd	u	upstream aerial view of impassable falls above site 26
BP9	1	wd	u	view u/s from bottom
BP9	2	wd	u	view u/s from centre
BP9	3	wd	d	view d/s from top
BP9	4	wd	u	upstream aerial view
BP9	5	wd	u	upstream aerial view falls and valley from 1.5 km upstream of site

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, caribou		

COMMENTS

C	
CX1	Electro-fishing effort: 394 seconds @ 250 volts. Rainbow trout were captured.
	Angling effort: 15 minutes of fly fishing in bedrock pool. No fish were captured.
CX2	25 m falls 1.5 km u/s of site; chute 200 m d/s of falls.

FISH COLLECTION FORM

STREAM NAME	Besa River							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	5 km u/s of Redfern Lake					WATERSHED CODE	212-580800-04700-66500			
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	26	FISH PERMIT #	SC2000-021			
DATE	9/13/2000 to 9/13/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
26	94F/8	001	10.439252.6359997	EF	1	2.0		C	
26	94F/8	001	10.439252.6359997	AG	1	2.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
26	EF/1	1	RB	NS		1	127	127	Rearing	
26	AG/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	26	EF/1	1	0949	1010	394	200	12.2	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	26	EF/1	1	RB	127				Scale	26-1	1+	

Besa River
Site 26: View upstream from centre of site.
(Roll BP9 - Exp 2; CD 2 - Im 128)

Besa River
Site 26: Upstream aerial view.
(Roll BP9 - Exp 4; CD 2 - Im 130)

APPENDIX XI

BESA RIVER
(212-580800-04700-66500)

Sample Site 27

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Besa River									GPS COORDINATES					
LOCATION	3 km u/s of impassable barrier														
NID MAP #	94F/8	NID #		006	WATERSHED CODE	212-580800-04700-66500									
REACH #		SITE #	27	SITE UTM	10	436249	6363033	SITE LENGTH	200	METH	HC	ACCESS	H		
DATE	9/13/2000	TIME	1030	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	18.00	13.50	13.20	16.00	13.50	16.50	15.12	meth	AL
WETTED WIDTH	RF	13.00	6.60	7.20	9.00	7.50	7.00	8.38	4.0	
RES POOL DEPTH	MS	0.30	0.18	0.20	0.30	0.25	0.40	0.27	3.5	
Wb DEPTH	0.55	0.45	0.65	STAGE	Light	No Vis Chan			Dry/Int	1
						Dewater			Tribs	

WATER

EMS		COND	
TEMP (°C)	4.0	TURBIDITY	
Ph		Clear	

COVER

	Total	Trace (5%)						CROWN CLOSURE							
type	SWD	LWD	B	U	DP	OV	IV	0%	1-20%	21-40%	41-70%	71-90%	>90%		
amt	N	N	D	N	S	N	N								
loc	P	P	P	P	P	P	P								

LWD FNC	None	DIST		0	1	2	3	4	5		
LB SHAPE	Sloping	RB SHAPE	Sloping								
TEXTURE	Fines	TEXTURE	Fines/Gravels	INSTREAM VEGETATION			Algae				
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs								
STAGE	Shrub/Herb	STAGE	Shrub/Herb								

MORPHOLOGY

FLOOD SIGNS	0.45 m - debris
BED MATERIAL	
Dominant	Gravel (2-64 mm)
Subdom.	Cobble (64-256 mm)
D95 (cm)	90 D (cm) 26
Morph.	Riffle-pool

DISTURBANCE INDICATORS

1	O1	**B1**	B2	B3	D1	D2	D3	C1	C2
2	C3	C4	C5	S1	S2	S3	**S4**		

PATTERN
ISLANDS
BARS
COUPLING
CONFINED

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM	
						R		F				
						R		F				
						R		F				

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low seasonal rearing potential, no overwintering.
- access precluded by 2 impassable barriers downstream.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP9	7	wd	u	view u/s from bottom
BP9	8	wd	u	view u/s from centre
BP9	9	wd	d	view d/s from top
BP9	10	wd	u	upstream aerial view of site
BP9	11	wd	u	upstream aerial view of site and valley from 1 km u/s of site

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Boulders also abundant in lower portion.
C2	Extensive bar and braiding upstream of site.
CX1	Electro-fishing effort: 240 seconds @ 250 volts. No fish were captured.
CX2	Upstream of impassable barriers.

FISH COLLECTION FORM

STREAM NAME	Besa River		[ ] LAKE [X] STREAM [ ] WETLAND
LOCATION	3 km u/s of impassable barrier	WATERSHED CODE	212-580800-04700-66500
WATERBODY ID		ILP MAP	ILP #	SITE/LAKE CARD ATTACHED [X] Y [ ] N
PROJECT ID	Besa-Prophet Overview	REACH #	SITE # 27	FISH PERMIT # SC2000-021
DATE	9/13/2000 to 9/13/2000	AGENCY	Diversified Environmental Services	CREW BC/TE	[ ] RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	CON	TURB	COMMENTS
27	94F/8	006	10.436249.6363033	EF	1	4.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
27	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	27	EF/1	1	1035	1052	240	200	8.4	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	SAMPLE #	AGE	COMMENTS

Besa River
Site 27: View upstream from bottom of site.
(Roll BP9 - Exp 7; CD 2 - Im 133)

Besa River
Site 27: Upstream aerial view.
(Roll BP9 - Exp 10; CD 2 - Im 136)

APPENDIX XII

NEVIS CREEK
(212-580800-04700-66500-2760)

Sample Site 8

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Nevis Creek											GPS COORDINATES					
LOCATION	10 km u/s of mouth																
NID MAP #	94G/6	NID #		004	WATERSHED CODE	212-580800-04700-66500-2760											
REACH #		SITE #	8	SITE UTM	10	480508	6360337	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	8/29/2000	TIME	1120	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	28.00	22.00	16.00	25.00	21.00	18.00	21.67	meth	AL
WETTED WIDTH	RF	16.00	11.00	11.50	15.00	11.00	16.00	13.42	1.0	
RES POOL DEPTH	MS	0.25	0.16	0.12	0.22	0.15	0.23	0.19	1.5	
Wb DEPTH	1.10	1.30	0.90	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)		TURBIDITY	
Ph			

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	T	D	N	S	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Few	DIST	Even
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobbles
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION: Algae

MORPHOLOGY

FLOOD SIGNS	
BED MATERIAL	
Dominant	
Subdom.	
D95 (cm)	D (cm)
Morph.	

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Occasional
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate rearing potential for adult and juvenile sport-fish.
- primarily riffle/run with boulder cover.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP2	1A	wd	d	view d/s near bottom
BP2	2A	wd	d	view d/s from top
BP2	4A	wd	u	view u/s from bottom
BP2	5A	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C

CX1 Electro-fishing effort: 555 seconds @ 250 volts. Arctic grayling and mountain whitefish were captured.

FISH COLLECTION FORM

STREAM NAME	Nevis Creek							LAKE [ ]	STREAM [X] WETLAND [ ]
LOCATION	10 km u/s of mouth				WATERSHED CODE	212-580800-04700-66500-2760			
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N		
PROJECT ID	Besa Prophet Overview	REACH #		SITE #	8	FISH PERMIT #	SC2000-021		
DATE	8/29/2000 to 8/29/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	CON	TURB	COMMENTS
8	94G/6	004	10.480508.6360337	EF	1	5.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
8	EF/1	1	GR	Adult		4	292	336	Rearing	
8	EF/1	1	MW	Adult		2	319	339	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	8	EF/1	1	1125	1150	555	200	13.4	O	200	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	8	EF/1	1	GR	328		M		Scale	8-1	5+	
	8	EF/1	1	GR	329		F		Scale	8-2	4+	
	8	EF/1	1	GR	336		F		Scale	8-3	5+	
	8	EF/1	1	GR	292		F		Scale	8-4	4+	
	8	EF/1	1	MW	219				Scale	8-5	3+	
	8	EF/1	1	MW	339				Scale	8-6	7+	

Nevis Creek
Site 8: View downstream near bottom of site.
(Roll BP2 - Exp 1A; CD 1 - Im 31)

Nevis Creek
Site 8: Upstream aerial view.
(Roll BP2 - Exp 5A; CD 1 - Im 35)

APPENDIX XIII

NEVIS CREEK
(212-580800-04700-66500-2760)

Sample Site 5

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Nevis Creek										GPS COORDINATES						
LOCATION	at Nevis Creek Ranch																
NID MAP #	94G/6	NID #		001	WATERSHED CODE	212-580800-04700-66500-2760											
REACH #		SITE #	5	SITE UTM	10	477540	6357210	SITE LENGTH	100	METH	HC	ACCESS	H				
DATE	8/29/2000	TIME	830	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	8.50	11.20	13.20	10.20	10.20	14.60	11.32	meth	AL
WETTED WIDTH	RF	8.00	11.20	10.50	8.50	9.10	12.10	9.90	0.5	
RES POOL DEPTH	MS	0.15	0.25	0.35	0.85	1.50	0.75	0.64	3.0	
Wb DEPTH	0.45	0.40	0.50	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	4.5	TURBIDITY	
Ph		Clear	

COVER

COVER	Total	Moderate (5-20%)

type	SWD	LWD	B	U	DP	OV	IV
amt	T	N	S	T	D	T	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE	0%	1-20%	21-40%	41-70%	71-90%	>90%		
	0	1	2	3	4	5		

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobbles
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

INSTREAM VEGETATION	Moss

MORPHOLOGY

FLOOD SIGNS	1.2 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	24
D (cm)	15
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Occasional
BARS	Side
COUPLING	Decoupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- good seasonal rearing for salmonids: deep pools, boulder cover and side channels.
- no smaller gravels for spawning.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP1	6	wd	u	view u/s from bottom
BP1	7	wd	u	view u/s from centre
BP1	8	wd	d	view d/s from top

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
CX1	Electro-fishing effort: 493 seconds @200 volts. Arctic grayling, mountain whitefish and slimy sculpin were captured.
	Residents of Nevis Creek ranch report angling and observing large bull trout occasionally.

FISH COLLECTION FORM

STREAM NAME	Nevis Creek							[ ] LAKE	[X] STREAM	[ ] WETLAND	
LOCATION	at Nevis Creek Ranch					WATERSHED CODE	212-580800-04700-66500-2760				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	5	FISH PERMIT #	SC2000-021				
DATE	8/29/2000 to 8/29/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
5	94G/6	001	10.477540.6357210	EF	1	4.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
5	EF/1	1	GR	NS		4	306	350	Rearing	
5	EF/1	1	MW	NS		1	303	303	Rearing	
5	EF/1	1	CCG	NS		2	77	157	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	5	EF/1	1	0835	0855	493	100	9.9	O	200	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	5	EF/1	1	GR	306		M		Scale	5-1	5+	
	5	EF/1	1	GR	350		M		Scale	5-2	5+	
	5	EF/1	1	GR	331		F		Scale	5-3	5+	
	5	EF/1	1	GR	316		F		Scale	5-4	5+	
	5	EF/1	1	MW	303				Scale	5-5	regen	
	5	EF/1	1	CCG	77							
	5	EF/1	1	CCG	157							

Nevis Creek
Site 5: View upstream from bottom of site.
(Roll BP1 - Exp 6; CD 1 - Im 20)

Nevis Creek
Site 5: View downstream from top of site.
(Roll BP1 - Exp 8; CD 1 - Im 22)

APPENDIX XIV

NEVIS CREEK
(212-580800-04700-66500-2760)

Sample Site 2

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Nevis Creek											GPS COORDINATES					
LOCATION	upper reach																
NID MAP #	94G/5	TRIM MAP #	002	WATERSHED CODE	212-580800-04700-66500-2760												
REACH #		SITE #	2	SITE UTM	10	468819	6355206	SITE LENGTH	150	METH	HC	ACCESS	H				
DATE	8/28/2000	TIME	1620	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

		meth							avg	GRADIENT %	
CHANNEL WIDTH	MS	4.30	3.60	4.60	5.20	2.20	2.70	3.77	meth	AL
WETTED WIDTH	MS	4.30	2.70	3.10	4.80	2.20	2.70	3.30	2.0	
RES POOL DEPTH	MS	0.09	0.17	0.14	0.24	0.19	0.25	0.18	2.0	
Wb DEPTH	0.26	0.30	0.36	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	1

WATER

EMS		COND	
TEMP (°C)	4.5	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Trace (5%)				CROWN CLOSURE								
type	SWD	LWD	B	U	DP	OV	IV		0%	1-20%	21-40%	41-70%	71-90%	>90%			
amt	T	N	D	T	S	S	N										
loc	P	P	P	P	P	P	P										
LWD FNC	None	DIST															
LB SHAPE	V-shaped	RB SHAPE	Sloping						0	1	2	3	4	5			
TEXTURE	Fines	TEXTURE	Fines						INSTREAM				Algae				
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs						VEGETATION				Moss				
STAGE	Shrub/Herb	STAGE	Shrub/Herb														

MORPHOLOGY

FLOOD SIGNS	0.45 m - debris
BED MATERIAL	
Dominant	Gravel (2-64 mm)
Subdom.	Cobble (64-256 mm)
D95 (cm)	60 D (cm) 15
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing potential for bull trout.
- only trace SWD, no LWD.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
T5	16	wd	u	view u/s from bottom
T5	17	wd	u	view u/s from centre
T5	18	wd	d	view d/s from top
T5	21	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose		

COMMENTS

C	
C1	Gravel/cobble with significant boulder component.
CX1	No barriers noted, flow eventually ceases upstream.
CX2	Electro-fishing effort: 296 seconds @ 200 volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Nevis Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	upper reach				WATERSHED CODE	212-580800-04700-66500-2760				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	2	FISH PERMIT #	SC2000-021			
DATE	8/28/2000 to 8/28/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
2	94G/5	002	10.468819.6355206	EF	1	4.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
2	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	2	EF/1	1	1625	1635	296	150	3.3	O	200	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS

Nevis Creek
Site 2: View upstream from bottom of site.
(Roll T5 - Exp 16; CD 1 - Im 6)

Nevis Creek
Site 2: Upstream aerial view.
(Roll T5 - Exp 21; CD 1 - Im 11)

APPENDIX XV

UNNAMED TRIBUTARY TO NEVIS CREEK
(212-580800-04700-66500-2760-4720)

Sample Site 7

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Nevis Creek					GPS COORDINATES		
LOCATION	1 km u/s of mouth							
NID MAP #	94G/6	NID #	003	WATERSHED CODE	212-580800-04700-66500-2760-4720			
REACH #		SITE #	7	SITE UTM	10 478209 6356097	SITE LENGTH	100	METH HC ACCESS H
DATE	8/29/2000	TIME	1030	AGENCY	Diversified Environmental Services	CREW	BC/TE	FISH FORM Y X N

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	MS	2.00	4.10	5.70	4.80	3.50	5.60	4.28	meth	AL
WETTED WIDTH	MS	2.20	3.10	5.10	4.80	3.50	4.90	3.93	2.5	
RES POOL DEPTH	MS	0.27	0.20	0.30	0.25	0.29	0.32	0.27	3.0	
Wb DEPTH	0.30	0.25	0.30	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	3.5	TURBIDITY	
Ph			Clear

COVER

COVER	Total	Moderate (5-20%)				
type	SWD	LWD	B	U	DP	OV	IV
amt	N	N	S	T	D	T	N
loc	P	P	P	P	P	P	P

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Fines	TEXTURE	Fines
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	**1**	2	3	4	5

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	none visible
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	75
D (cm)	25
Morph.	Riffle-pool
PATTERN	Sinuous
ISLANDS	None
BARS	None
COUPLING	Partially Coupled
CONFINED	Frequently Confined

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO		COMMENTS	UTM
						R	F		
						R	F		
						R	F		

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low to moderate seasonal rearing habitat: LWD and SWD absent, low temperature and no granular substrates for spawning bull trout or Arctic grayling.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP1	13	wd	u	view u/s from bottom
BP1	14	wd	u	view u/s from centre
BP1	15	wd	d	view d/s from top
BP1	16	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose tracks		

COMMENTS

C	
C1	Bedrock also present.
CX1	Electro-fishing effort: 463 seconds @ 250 volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Nevis Creek							LAKE		STREAM	X	WETLAND
LOCATION	1 km u/s of mouth					WATERSHED CODE	212-580800-04700-66500-2760-4720					
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	7	FISH PERMIT #	SC2000-021					
DATE	8/29/2000	to	8/29/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE		RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
7	94G/6	003	10.478209.6356097	EF	1	3.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
7	EF/1	1	NFC			0				

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	7	EF/1	1	1035	1055	463	100	3.9	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	

Unnamed tributary to Nevis Creek
Site 7: View upstream from bottom of site.
(Roll BP1 - Exp 13; CD 1 - Im 27)

Unnamed tributary to Nevis Creek
Site 7: Upstream aerial view.
(Roll BP1 - Exp 16; CD 1 - Im 30)

APPENDIX XVI

TRIBUTARY TO UNNAMED NEVIS CREEK TRIBUTARY

(212-580800-04700-66500-2760-4720-2830)

Sample Site 6

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Tributary to unnamed Nevis Creek tributary										GPS COORDINATES						
LOCATION	100 m u/s of mouth																
NID MAP #	94G/6	NID #		002	WATERSHED CODE	212-580800-04700-66500-2760-4720-2830											
REACH #		SITE #	6	SITE UTM	10	478355	6354626	SITE LENGTH	100	METH	HC	ACCESS	H				
DATE	8/29/2000	TIME	0950	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

WATER

CHANNEL (m)	meth							avg	GRADIENT %		EMS		COND	
CHANNEL WIDTH	MS	1.70	2.00	2.10	2.50	1.10	1.70	1.85	meth	AL	TEMP (°C)	2.0	TURBIDITY	
WETTED WIDTH	MS	1.70	2.00	2.10	2.50	1.40	1.70	1.90	2.0		Ph		Clear	
RES POOL DEPTH	MS	0.12	0.08	0.15	0.10	0.17	0.14	0.13	3.0					
Wb DEPTH	0.28	0.32	0.28	STAGE	Moderate		No Vis Chan		Dry/Int					
							Dewater		Tribs					

COVER

	COVER	Total			Trace (5%)			
type	SWD	LWD	B	U	DP	OV	IV	CROWN CLOSURE
amt	T	N	D	S	S	S	T	
loc	P	P	P	P	P	P	P	

CROWN CLOSURE	0%	1-20%	21-40%	41-70%	71-90%	>90%
	0	1	2	3	4	5

LWD FNC	None	DIST	
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	0.4 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	40
D (cm)	10
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	**B1**	B2	B3	**D1**	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Mid-stream
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low to moderate seasonal rearing: low temperature, moderate cover - mostly boulder, some undercut and very little wood.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP1	9	wd	u	view u/s from bottom
BP1	10	wd	u	view u/s from centre
BP1	11	wd	d	view d/s from top
BP1	12	wd	u	upstream aerial view from below confluence with Nevis Creek trib (site on west fork)

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose		

COMMENTS

C	
CX1	Electro-fishing effort: 169 seconds @ 250 volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Nevis Creek	[ ] LAKE [X] STREAM [ ] WETLAND	
LOCATION	100 m u/s of mouth	WATERSHED CODE	212-580800-04700-66500-2760-4720-2830
WATERBODY ID		ILP MAP	
ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N
PROJECT ID	Besa-Prophet Overview	REACH #	
SITE #	6	FISH PERMIT #	SC2000-021
DATE	8/29/2000 to 8/29/2000	AGENCY	Diversified Environmental Services
CREW	BC/TE	[ ] RE-SAMPLE	

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	CON	TURB	COMMENTS
6	94G/6	002	10.478355.6354626	EF	1	2		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
6	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	6	EF/1	1	1000	1015	169	100	1.9	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE	COMMENTS

Tributary to unnamed Nevis Creek tributary
Site 6: View upstream from bottom of site.
(Roll BP1 - Exp 9; CD 1 - Im 23)

Tributary to unnamed Nevis Creek tributary
Site 6: Upstream aerial view from below confluence with Nevis tributary (site on west fork).
(Roll BP1 - Exp 12; CD 1 - Im 26)

APPENDIX XVII

UNNAMED TRIBUTARY TO NEVIS CREEK
(212-580800-04700-66500-2760-7590)

Sample Site 1

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Nevis Creek										GPS COORDINATES						
LOCATION	300 m u/s of mouth																
NID MAP #	94G/5	NID #		001	WATERSHED CODE	212-580800-04700-66500-2760-7590											
REACH #		SITE #	1	SITE UTM	10	468985	6358074	SITE LENGTH	100	METH	HC	ACCESS	H				
DATE	8/28/2000	TIME	1525	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	MS	2.00	1.35	1.10	1.30	1.15	1.30	1.37	meth	AL
WETTED WIDTH	MS	2.00	1.60	1.30	1.70	1.55	2.00	1.69	<0.5	
RES POOL DEPTH	MS	0.25	0.27	0.35	0.17	0.34	0.26	0.27	<0.5	
Wb DEPTH	0.55	0.5	0.47	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	4.5	TURBIDITY	
Ph		Clear	

FLOOD SIGNS: 0.35 m - debris

COVER

COVER Total: Abundant (>20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	N	N	N	S	D	S	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	None	DIST	
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Fines	TEXTURE	Fines
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

INSTREAM VEGETATION: Algae

MORPHOLOGY

BED MATERIAL

Dominant	Gravel (2-64 mm)		
Subdom.	Fines (<2 mm)		
D95 (cm)	12	D (cm)	3
Morph.	Riffle-pool		

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Irregular Meanders
ISLANDS	None
BARS	None
COUPLING	Decoupled
CONFINED	Unconfined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- abundant seasonal rearing habitat for juvenile "sport-fish".

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
T5	11	wd	u/s	view u/s from bottom
T5	12	wd	u/s	view u/s from centre
T5	13	wd	d/s	view d/s from top
T5	14	wd	u/s	upstream aerial view
T5	15	wd	u/s	upstream aerial view north into source valley - no visible channel

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C

CX1 Electro-fishing effort: 214 seconds @ 250 volts. Slimy sculpin were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Nevis Creek							LAKE [ ]	STREAM [X] WETLAND [ ]
LOCATION	300 m u/s of mouth				WATERSHED CODE	212-580800-04700-66500-2760-7590			
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	1	FISH PERMIT #	SC2000-021		
DATE	8/28/2000 to 8/28/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
1	94G/5	001	10.468985.6358074	EF	1	4.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
1	EF/1	1	CCG	NS		7	63	116	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	1	EF/1	1	1530	1545	214	100	1.69	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	1	EF/1	1	CCG	116							
	1	EF/1	1	CCG	94							
	1	EF/1	1	CCG	89							
	1	EF/1	1	CCG	87							
	1	EF/1	1	CCG	63							
	1	EF/1	1	CCG	64							
	1	EF/1	1	CCG	111							

Unnamed tributary to Nevis Creek
Site 1: View downstream from top of site.
(Roll T5 - Exp 13; CD 1 - Im 3)

Unnamed tributary to Nevis Creek
Site 1: Upstream aerial view.
(Roll T5 - Exp 14; CD 1 - Im 4)

APPENDIX XVIII

KEILY CREEK
(212-580800-04700-66500-5310)

Sample Site 11

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Keily Creek										GPS COORDINATES				
LOCATION	13 km u/s of mouth														
NID MAP #	94G/5	NID #		007	WATERSHED CODE	212-580800-04700-66500-5310									
REACH #		SITE #	11	SITE UTM	10	449166	6371924	SITE LENGTH	200	METH	GE	ACCESS	H		
DATE	8/27/2000	TIME	1525	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	20.50	17.00	25.00	24.00	22.00	19.00	21.25	meth	AL
WETTED WIDTH	RF	13.50	13.00	23.00	16.00	21.00	17.00	17.25	2.0	
RES POOL DEPTH	MS	0.85	0.25	0.27	0.04	1.40	1.60	0.74	2.5	
Wb DEPTH	0.65	0.70	0.58	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	7.0	TURBIDITY	
Ph		Lightly Turbid	

COVER

COVER	Total	Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	N	S	T	D	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%		
0	1	2	3	4	5		

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Fines	TEXTURE	Fines
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	1.2 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	13
D (cm)	23
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- large, deep, bedrock controlled pools provide good adult cover.
- suitable juvenile rearing present in the form of side channels, back channels and cobble margins of mainstem.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP3	1	wd	u	view u/s from bottom
BP3	2	wd	u	view u/s from centre
BP3	3	wd	d	view d/s from top
BP3	4	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Elk and caribou tracks		

COMMENTS

C	
CX1	Electro-fishing effort: 417 seconds @ 250 volts. Slimy sculpin were captured. Angling effort: 1/2 hour. Bull trout were
	Angling effort: 1/2 hour. Bull trout were captured. Arctic grayling and mountain whitefish were observed rising in large pool.

FISH COLLECTION FORM

STREAM NAME	Keily Creek								[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	13 km u/s of mouth					WATERSHED CODE	212-580800-04700-66500-5310				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	11	FISH PERMIT #	SC2000-021				
DATE	8/29/2000	to	8/29/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE	[ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
11	94G/5	007	10.449166.6371924	EF	1	7		L	
11	94G/5	007	10.449166.6371924	AG	1	7		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
11	EF/1	1	CCG	NS		5	61	90	Rearing	
11	AG/1	1	BT	Adult		2	255	330	Rearing	

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	11	EF/1	1	1530	1555	417	200	17.2	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	11	AG/1	1	BT	255		M	Spawning	Fin ray	11-1	3+	
	11	AG/1	1	BT	330		M	Spawning	Fin ray	11-2	5+	
	11	EF/1	1	CCG	90							
	11	EF/1	1	CCG	61							
	11	EF/1	1	CCG	90							
	11	EF/1	1	CCG	63							
	11	EF/1	1	CCG	82							

Keily Creek
Site 11: View downstream from top of site.
(Roll BP3 - Exp 3; CD 1 - Im 47)

Keily Creek
Site 11: Upstream aerial view.
(Roll BP3 - Exp 4; CD 1 - Im 48)

APPENDIX XIX

KEILY CREEK
(212-580800-04700-66500-5310)

Sample Site 13

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Keily Creek											GPS COORDINATES					
LOCATION	immediately below lower impasse; 22 km u/s of mouth																
NID MAP #	94G/5	NID #		009	WATERSHED CODE	212-580800-04700-66500-5310											
REACH #		SITE #	13	SITE UTM	10	441075	6371779	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	8/29/2000	TIME	1630	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	65.00	75.00	80.00	63.00	65.00	45.00	65.50	meth	AL
WETTED WIDTH	RF	19.00	16.00	20.00	17.00	18.50	30.00	20.08	3.5	
RES POOL DEPTH	MS	0.60	0.80	1.20	0.30	0.50	0.24	0.61	1.5	
Wb DEPTH	0.85	0.60	0.57	STAGE	Light		No Vis Chan		Dry/Int	
					Moderate (5-20%)		Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	6.5	TURBIDITY	
Ph		Clear	

FLOOD SIGNS: 0.85 m - debris

COVER

COVER Total

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	S	S	T	D	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Few	DIST	Clumped
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Fines	TEXTURE	Fines
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION: None

MORPHOLOGY

BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	25
D (cm)	11
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Irregular
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094G005	010	F	15/40	GE	R	4	F	2A	Lower impassable barrier	10	440956	6371608
	094G.005	010	F	20/50	GE	R	3	F	14	Second impassable barrier	10	440378	6371344
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate quality rearing habitat: high fines in substrates, limited LWD and low temperature.
- Arctic grayling observed at falls pool.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP3	14	wd	u	second impasse 800 m u/s of first
BP3	15	wd	u	second impasse 800 m u/s of first
BP3	16	wd	u	upstream aerial view of site and lowermost impasse
BP4	2A	wd	u	upstream view from top (lower impasse)
BP4	1A	wd	d	view d/s from top at falls
BP4	3A	wd	u	view u/s from centre
BP4	4A	wd	u	view u/s from bottom
BP4	5A	wd	u	upstream aerial view from 3 km d/s of site
BP4	6A	wd	u	view u/s from mouth of Keily Creek

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Caribou, moose and bear		

COMMENTS

C	
CX1	Electro-fishing effort: 435 seconds @250 volts. Mountain whitefish, bull trout and slimy sculpin were captured.
	Arctic grayling observed in lower falls pools.

FISH COLLECTION FORM

STREAM NAME	Keily Creek								[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	immediately below lower impasse; 22 km u/s of mouth					WATERSHED CODE	212-580800-04700-66500-5310				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	13	FISH PERMIT #	SC2000-021				
DATE	8/29/2000	to	8/29/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE	[ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
13	94G/5	009	10.441075.6371779	EF	1	6.5		C	
13	94G/5	009	10.441075.6371779	VO	1	6.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
13	EF/1	1	MW	NS		6	163	262	Rearing	
13	EF/1	1	BT	NS		2	181	223	Rearing	
13	EF/1	1	CCG	NS		9	51	91	Rearing	
13	VO/1	1	GR	NS		3				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	13	EF/1	1	1635	1700	435	200	20.1	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	13	EF/1	1	BT	223				Fin ray	13-1	3+	
	13	EF/1	1	BT	181				Scale	13-2	3+	
	13	EF/1	1	MW	262				Scale	13-3	regen	
	13	EF/1	1	MW	210				Scale	13-4	4+	
	13	EF/1	1	MW	253				Scale	13-5	regen	
	13	EF/1	1	MW	191				Scale	13-6	4+	
	13	EF/1	1	MW	163				Scale	13-7	3+	
	13	EF/1	1	MW	171				Scale	13-8	3+	
	13	EF/1	1	CCG	91							
	13	EF/1	1	CCG	84							
	13	EF/1	1	CCG	86							
	13	EF/1	1	CCG	51							
	13	EF/1	1	CCG	62							
	13	EF/1	1	CCG	72							
	13	EF/1	1	CCG	75							
	13	EF/1	1	CCG	73							
	13	EF/1	1	CCG	57							

Keily Creek
Site 13: View upstream from bottom of site.
(Roll BP4 - Exp 4A; CD 1 - Im 57)

Keily Creek
Site 13: View downstream from top of site.
(Roll BP4 - Exp 1A; CD 1 - Im 59)

Keily Creek
Site 13: View upstream from top of site; lowermost impasse.
(Roll BP4 - Exp 2A; CD 1 - Im 60)

Keily Creek
Site 13: Upstream aerial view of site and lowermost impasse.
(Roll BP3 - Exp 16; CD 1 - Im 61)

APPENDIX XX

KEILY CREEK
(212-580800-04700-66500-5310)

Sample Site 12

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Keily Creek									GPS COORDINATES					
LOCATION	31 km u/s of mouth														
NID MAP #	94F/8	NID #		001	WATERSHED CODE	212-580800-04700-66500-5310									
REACH #		SITE #	12	SITE UTM	10	432424	6372813	SITE LENGTH	200	METH	HC	ACCESS	H		
DATE	8/29/2000	TIME	1430	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	34.00	42.00	52.00	36.00	42.00	58.00	44.00	meth	AL
WETTED WIDTH	RF	8.00	12.00	6.50	6.50	5.80	7.90	7.78	1.8	
RES POOL DEPTH	MS	0.28	0.50	0.33	0.16	0.14	0.21	0.27	1.5	
Wb DEPTH	0.42	0.68	0.57	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	5.5	TURBIDITY	
Ph		Clear	

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	S	S	T	T	D	N	N
loc	P	P	P	P	P	P	P

LWD FNC	Abundant	DIST	Even
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Gravels	TEXTURE	Gravels
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Young Forest

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS: 0.3 m - debris

BED MATERIAL

Dominant	Gravel (2-64 mm)		
Subdom.	Cobble (64-256 mm)		
D95 (cm)	16	D (cm)	15

Morph.: Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Occasional
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094F.008	002	R	50	GE	R	3	F	6	Third impassable barrier	10	431860	6372905
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate quality rearing habitat.
- upstream of impassable barrier on Keily Creek apparently barren.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP3	6	wd	u	upper Keily Creek falls immediatley u/s of site
BP3	7	wd	u	40 m falls on trib u/s of site
BP3	8	wd	d	view d/s from top
BP3	9	wd	d	view d/s from centre
BP3	10	wd	u	view u/s from bottom
BP3	12	wd	d	aerial view of Keily Creek valley downstream of site (10.432800.6372520)
BP3	11	wd	u	upstream aerial view
BP3	13	wd	u	upstream aerial view from 10.433000.6372500

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, caribou and grizzly		

COMMENTS

C	
CX1	Electro-fishing effort: 265 seconds @ 250 volts. No fish; impassable barriers downstream.

FISH COLLECTION FORM

STREAM NAME	Keily Creek							[ ] LAKE	[X] STREAM	[ ] WETLAND	
LOCATION	31 km u/s of mouth					WATERSHED CODE	212-580800-04700-66500-5310				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	12	FISH PERMIT #	SC2000-021				
DATE	8/29/2000 to 8/29/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
12	94F/8	001	10.432424.6372813	EF	1	5.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
12	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	12	EF/1	1	1435	1455	265	200	7.8	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	

Keily Creek
Site 12: View upstream from bottom of site.
(Roll BP3 - Exp 10; CD 1 - Im 49)

Keily Creek
Site 12: View downstream from centre of site.
(Roll BP3 - Exp 9; CD 1 - Im 51)

Keily Creek
Site 12: Upstream aerial view.
(Roll BP3 - Exp 11; CD 1 - Im 52)

Keily Creek
Site 12: 50 m falls upstream of site (57° 29.47' 124°08.38').
(Roll BP3 - Exp 6; CD 1 - Im 55)

APPENDIX XXI

UNNAMED TRIBUTARY TO KEILY CREEK

(212-580800-04700-66500-5310-3560)

Sample Site 10

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Keily Creek						GPS COORDINATES					
LOCATION	100 m u/s of mouth											
NID MAP #	94G/5	NID #	006	WATERSHED CODE	212-580800-04700-66500-5310-3560							
REACH #		SITE #	10	SITE UTM	10	448900	6371718	SITE LENGTH	150	METH	HC	ACCESS H
DATE	8/29/2000	TIME	1430	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X N

CHANNEL (m)	meth						avg	GRADIENT %	
CHANNEL WIDTH	MS	6.30	6.60	9.90	6.90	5.30	9.90	7.48	meth AL
WETTED WIDTH	MS	6.30	4.30	7.60	5.50	4.90	6.70	5.88	4.0
RES POOL DEPTH	MS	0.15	0.11	0.08	0.22	0.14	0.12	0.14	5.0
Wb DEPTH	0.38	0.48	0.42	STAGE	Moderate	No Vis Chan		Dry/Int	1
						Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	5.5	TURBIDITY	
Ph			Clear

COVER

COVER	Total	Trace (5%)				
type	SWD	LWD	B	U	DP	OV	IV
amt	T	T	O	T	S	N	N
loc	P	P	P	P	P	P	P

LWD FNC	Few	DIST	Even
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Cobble/Boulder	TEXTURE	Cobble/Boulder
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Young Forest

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
[0]	1	2	3	4	5

INSTREAM VEGETATION

MORPHOLOGY

FLOOD SIGNS	0.35 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	40
D (cm)	14
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	**[B1]**	B2	B3	D1	**[D2]**	D3	**[C1]**	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Occasional
BARS	Side
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094G.005	007	F	40	GE	R	2	F	11	Impassable barrier 1200 m upstream	10	448875	6370320
						R		F	12	of site			
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low to moderate seasonal juvenile rearing for bull trout - mostly boulder cover.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP2	12A	wd	u	aerial view of 40 m falls u/s of site
BP2	13A	wd	u	view u/s from bottom
BP2	14A	wd	u	view u/s from centre
BP2	15A	wd	d	view d/s from top
BP3	5	wd	u	aerial view upstream from mouth

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Also significant component of colluvial shale.
CX1	Electro-fishing effort: 468 seconds @ 250 volts. Bull trout were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Keily Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	100 m u/s of mouth				WATERSHED CODE	212-580800-04700-66500-5310-3560				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	Y [X]	N [ ]		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	10	FISH PERMIT #	SC2000-021			
DATE	8/29/2000 to 8/29/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
10	95G/5	006	10.448900.6371718	EF	1	5.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
10	EF/1	1	BT	NS		2	81	165	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	10	EF/1	1	1435	1500	460	250	5.9	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	10	EF/1	1	BT	165				Scale	10-1	3+	
	10	EF/1	1	BT	81				Scale	10-2	1+	

Unnamed tributary to Keily Creek
Site 10: View upstream from bottom of site.
(Roll BP2 - Exp 13A; CD 1 - Im 40)

Unnamed tributary to Keily Creek
Site 10: View downstream from top of site.
(Roll BP2 - Exp 15A; CD 1 - Im 42)

Unnamed tributary to Keily Creek
Site 10: Aerial view upstream from mouth.
(Roll BP3 - Exp 5; CD 1 - Im 43)

Unnamed tributary to Keily Creek
Site 10: Aerial view of 40 m falls upstream of site.
(Roll BP2 - Exp 12A; CD 1 - Im 44)

APPENDIX XXII

PETRIE CREEK
(212-580800-04700-66500-5420)

Sample Site 38

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Petrie Creek											GPS COORDINATES					
LOCATION	4 km upstream from mouth																
NID MAP #	94G/5	NID #		016	WATERSHED CODE	212-580800-04700-66500-5420											
REACH #		SITE #	38	SITE UTM	10	454009	6365273	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	9/14/2000	TIME	1100	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	14.50	13.00	19.00	20.00	13.20	19.00	16.45	meth	AL
WETTED WIDTH	RF	14.50	11.50	12.00	15.00	8.50	13.20	12.45	1.5	
RES POOL DEPTH	MS	0.08	0.08	0.12	0.18	0.07	0.10	0.11	1.5	
Wb DEPTH	0.38	0.62	0.46	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	T	D	N	S	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION

WATER

EMS		COND	
TEMP (°C)	6.5	TURBIDITY	
Ph		Clear	

MORPHOLOGY

FLOOD SIGNS: 0.75 m - debris

BED MATERIAL

Dominant	Cobble (64-256 mm)		
Subdom.	Gravel (2-64 mm)		
D95 (cm)	40	D (cm)	20
Morph.	Riffle-pool		

DISTURBANCE INDICATORS

O1	B1	**B2**	B3	**D1**	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	**S4**		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for bull trout juveniles: boulder cover, cobble and boulder shallow margins.
- spawning potential limited within site, but bull trout apparently spawn within system - numerous yearling BT.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP12	12	wd	u	upstream aerial view
BP12	13	wd	u	aerial view of mud slump at bottom of site
BP12	15	wd	u	view u/s from bottom
BP12	16	wd	u	view u/s from centre
BP12	17	wd	d	view d/s from top

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, elk and wolf		

COMMENTS

C	
C1	Also boulder and fines.
CX1	Electro-fishing effort: 662 seconds @ 250 volts. Bull trout and mountain whitefish were captured.
CX2	Clay slumping bank below site colouring lower portion of reach to mouth (short term).

FISH COLLECTION FORM

STREAM NAME	Petrie Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	4 km upstream from mouth				WATERSHED CODE	212-580800-04700-66500-5420				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	38	FISH PERMIT #	SC2000-021			
DATE	9/14/2000 to 9/14/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
38	94G/5	016	10.454009.6365273	EF	1	6.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
38	EF/1	1	BT	Juv		12	76	119	Rearing	
38	EF/1	1	MW	NS		3	175	245	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	38	EF/1	1	1105	1127	662	200	12.4	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	38	EF/1	1	BT	119				Scale	38-1	1+	
	38	EF/1	1	BT	116				Scale	38-2	1+	
	38	EF/1	1	BT	75				Scale	38-3	1+	
	38	EF/1	1	BT	73				Scale	38-4	1+	
	38	EF/1	1	BT	72				Scale	38-5	1+	
	38	EF/1	1	BT	68				Scale	38-6	-	poor scale sample
	38	EF/1	1	MW	245				Scale	38-7	3+	
	38	EF/1	1	MW	233				Scale	38-8	-	regen scale
	38	EF/1	1	MW	175				Scale	38-9	3+	
	38	EF/1	1	BT	89							
	38	EF/1	1	BT	80							
	38	EF/1	1	BT	89							
	38	EF/1	1	BT	76							
	38	EF/1	1	BT	82							
	38	EF/1	1	BT	87							

Petrie Creek
Site 38: View upstream from bottom of site.
(Roll BP12 - Exp 15; CD 3 - Im 197)

Petrie Creek
Site 38: View upstream from centre of site.
(Roll BP12 - Exp 16; CD 3 - Im 198)

Petrie Creek
Site 38: Aerial view of mud slump at bottom of site.
(Roll BP12 - Exp 13; CD 3 - Im 200)

Petrie Creek
Site 38: Upstream aerial view.
(Roll BP12 - Exp 12; CD 3 - Im 201)

APPENDIX XXIII

PETRIE CREEK
(212-580800-04700-66500-5420)

Sample Site 14

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Petrie Creek									GPS COORDINATES					
LOCATION	200 m d/s of falls														
NID MAP #	94G/5	NID #		012	WATERSHED CODE	212-580800-04700-66500-5420									
REACH #		SITE #	14	SITE UTM	10	450303	6363613	SITE LENGTH	200	METH	HC	ACCESS	H		
DATE	8/29/2000	TIME	1830	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	18.00	20.00	21.00	16.00	28.00	16.00	19.83	meth	AL
WETTED WIDTH	RF	7.60	7.00	5.70	6.00	6.10	8.20	6.77	2.5	
RES POOL DEPTH	MS	0.08	0.28	0.12	0.14	0.32	0.19	0.19	3.0	
Wb DEPTH	1.00	0.90	0.86	STAGE	Moderate		No Vis Chan		Dry/Int	1
	.				Trace (5%)		Dewater		Tribs	

WATER

EMS	
COND	
TEMP (°C)	5.5
TURBIDITY	
Ph	
	Clear

COVER

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	T	D	N	S	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Few	DIST	Even
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobbles
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS	0.35 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	52
D (cm)	24
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094G.005	013	F	6	GE	R	4	F	10	Impassable falls	10	450060	6363567
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for bull trout and mountain whitefish.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP12	10	wd	u	upstream aerial view
BP4	7A	wd	u	view u/s from bottom
BP4	8A	wd	u	view u/s from centre
BP4	9A	wd	d	view d/s from top
BP4	10A	wd	u	view u/s from top (impassable falls)

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Also a significant boulder component.
CX1	Electro-fishing effort: 863 seconds @250 volts. Bull trout and mountain whitefish were captured.
CX2	Impassable falls (6m) at top of site.

FISH COLLECTION FORM

STREAM NAME	Petrie Creek							[ ] LAKE	[X] STREAM	[ ] WETLAND	
LOCATION	200 m d/s of falls					WATERSHED CODE	212-580800-04700-66500-5420				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	14	FISH PERMIT #	SC2000-021				
DATE	8/29/2000	to	8/29/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE [ ]	RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
14	94G/5	012	10.450303.6363613	EF	1	5.5		C	
14	94G/5	012	10.450303.6363613	AG	1	5.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
14	EF/1	1	BT	Juv		11	103	192	Rearing	
14	EF/1	1	MW	Adult		9	207	252	Rearing	
14	AG/1	1	GR	Adult		1	315	315	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	14	EF/1	1	1835	1930	863	300	6.8	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	14	EF/1	1	BT	192				Fin ray	14-1	No fin	
	14	EF/1	1	MW	227				Scale	14-2	5+	
	14	EF/1	1	MW	248				Scale	14-3	4+	
	14	EF/1	1	MW	207				Scale	14-4	3+	
	14	EF/1	1	MW	239				Scale	14-5	regen	
	14	EF/1	1	MW	216				Scale	14-6	5+	
	14	EF/1	1	MW	252				Scale	14-7	regen	
	14	EF/1	1	MW	246				Scale	14-8	5+	
	14	EF/1	1	MW	236				Scale	14-9	6+	
	14	EF/1	1	MW	222				Scale	14-10	5+	
	14	EF/1	1	BT	111				Scale	14-11	1+	
	14	EF/1	1	BT	112				Scale	14-12	1+	
	14	EF/1	1	BT	141				Scale	14-13	2+	
	14	EF/1	1	BT	152				Scale	14-14	2+	
	14	EF/1	1	BT	103				Scale	14-15	1+	
	14	EF/1	1	BT	118				Scale	14-16	1+	
	14	EF/1	1	BT	104				Scale	14-17	1+	
	14	EF/1	1	BT	115				Scale	14-18	2+	
	14	EF/1	1	BT	117							
	14	EF/1	1	BT	108							
	14	AG/1	1	GR	315				Scale	14-19	4+	

Petrie Creek
Site 14: View upstream from bottom of site.
(Roll BP4 - Exp 7A; CD 1 - Im 65)

Petrie Creek
Site 14: View upstream from top of site (impassable falls).
(Roll BP4 - Exp 10A; CD 1 - Im 68)

APPENDIX XXIV

UNNAMED TRIBUTARY TO BESA RIVER
(212-580800-04700-66500-6380)

Sample Site 4

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Besa River											GPS COORDINATES					
LOCATION	3.5 km u/s of mouth																
NID MAP #	94G/5	NID #		004	WATERSHED CODE	212-580800-04700-66500-6380											
REACH #		SITE #	4	SITE UTM	10	460985	6357381	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	8/28/2000	TIME	1805	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

WATER

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	5.70	5.90	4.50	5.40	4.60	6.30	5.40	meth	AL
WETTED WIDTH	RF	5.70	5.90	4.50	5.40	4.60	6.30	5.40	2.0	
RES POOL DEPTH	MS	0.08	0.15	0.28	0.23	0.12	0.10	0.16	2.0	
Wb DEPTH	0.32	0.36	0.38	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

EMS		COND	
TEMP (°C)	6.0	TURBIDITY	
Ph		Clear	

COVER

COVER	Total	Moderate (5-20%)						CROWN CLOSURE							
type	SWD	LWD	B	U	DP	OV	IV								
amt	T	T	D	T	S	T	N								
loc	P	P	P	P	P	P	P								
LWD FNC	Few	DIST	Even					0%	1-20%	21-40%	41-70%	71-90%	>90%		
LB SHAPE	V-shaped	RB SHAPE	V-shaped					0	1	2	3	4	5		
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles					INSTREAM				Moss			
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D					VEGETATION							
STAGE	Young Forest	STAGE	Young Forest												

MORPHOLOGY

FLOOD SIGNS	0.4 m - debris		
BED MATERIAL			
Dominant	Cobble (64-256 mm)		
Subdom.	Boulder (> 256 mm)		
D95 (cm)	36	D (cm)	10
Morph.	Riffle-pool		

DISTURBANCE INDICATORS									
O1	B1	B2	B3	D1	D2	D3	C1	C2	
C3	C4	C5	S1	S2	S3	S4			
PATTERN	Sinuous								
ISLANDS	None								
BARS	None								
COUPLING	Partially Coupled								
CONFINED	Frequently Confined								

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	94G/5	005	F	50	GE	R	1	F	4	Impassable barrier	10	461093	6357348
						R		F	5				
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate rearing habitat: boulder pockets with a few larger pools and no wood.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP1	1	wd	u	view u/s from bottom
BP1	2	wd	u	view u/s from centre
BP1	3	wd	d	view d/s from top
BP1	5	wd	u	view upstream to 50 m falls at top of site
BP12	8	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
CX1	Very stable channel.
CX2	Impassable barrier (50 m falls) at top of site.
CX3	Electro-fishing effort: 477 seconds @ 250 volts. Arctic grayling, rainbow trout, bull trout and mountain whitefish were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Besa River								[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	3.5 km u/s of mouth					WATERSHED CODE	212-580800-04700-66500-6380				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	4	FISH PERMIT #	SC2000-021				
DATE	8/28/2000 to 8/28/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
4	94G/5	004	10.460985.6357381	EF	1	6		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
4	EF/1	1	GR	NS		1	312	312	Rearing	
4	EF/1	1	MW	NS		8	175	302	Rearing	
4	EF/1	1	BT	NS		5	161	259	Rearing	
4	EF/1	1	RB	NS		4	145	227	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	4	EF/1	1	1810	1835	477	200	5.4	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	4	EF/1	1	GR	312		M		Scale	B04-1	5+	
	4	EF/1	1	MW	256				Scale	B04-2	5+	
	4	EF/1	1	BT	259				Fin ray	B04-3	4+	
	4	EF/1	1	MW	251				Scale	B04-4	4+	
	4	EF/1	1	BT	176				Scale	B04-5	3+	
	4	EF/1	1	BT	169				Scale	B04-6	2+	
	4	EF/1	1	BT	167				Scale	B04-7	2+	
	4	EF/1	1	RB	161				Scale	B04-8	2+	
	4	EF/1	1	MW	175				Scale	B04-9	3+	
	4	EF/1	1	RB	227				Scale	B04-10	2+	
	4	EF/1	1	RB	213				Scale	B04-11	2+	
	4	EF/1	1	BT	161				Scale	B04-12	2+	
	4	EF/1	1	MW	182				Scale	B04-13	3+	
	4	EF/1	1	MW	298				Scale	B04-14	6+	
	4	EF/1	1	MW	302				Scale	B04-15	7+	
	4	EF/1	1	RB	145				Scale	B04-16	2+	
	4	EF/1	1	MW	262				Scale	B04-17	regen	
	4	EF/1	1	MW	268				Scale	B04-18	5+	

Unnamed tributary to Besa River
Site 4: View upstream from bottom of site.
(Roll BP1 - Exp 1; CD 1 - Im 16)

Unnamed tributary to Besa River
Site 4: View downstream from top of site.
(Roll BP1 - Exp 3; CD 1 - Im 18)

Unnamed tributary to Besa River
Site 4: Upstream aerial view.
(Roll BP12 - Exp 8; CD 1 - Im 9)

Unnamed tributary to Besa River
Site 4: View upstream to 50 m falls at top of site.
(Roll BP1 - Exp 5; CD 1 – Im 19)

APPENDIX XXV

NORDLING CREEK
(212-580800-04700-66500-7270)

Sample Site 25

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Nordling Creek									GPS COORDINATES							
LOCATION	750 m u/s of mouth																
NID MAP #	94G/5	NID #		014	WATERSHED CODE	212-580800-04700-66500-7270											
REACH #		SITE #	25	SITE UTM	10	454119	6353351	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	9/13/2000	TIME	845	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	5.10	5.40	5.60	10.60	7.50	9.00	7.20	meth	AL
WETTED WIDTH	RF	5.10	5.40	5.20	8.60	7.20	9.00	6.75	3.5	
RES POOL DEPTH	MS	0.23	0.15	0.12	0.35	0.20	0.11	0.19	3.5	
Wb DEPTH	0.35	0.40	0.38	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

COVER

	COVER	Total			Trace (5%)			
type	SWD	LWD	B	U	DP	OV	IV	CROWN CLOSURE
amt	T	N	D	N	S	N	N	
loc	P	P	P	P	P	P	P	

0%	1-20%	21-40%	41-70%	71-90%	>90%		
0	1	2	3	4	5		

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Fines	TEXTURE	Fines
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

INSTREAM VEGETATION: Algae

WATER

EMS		COND	
TEMP (°C)	1.0	TURBIDITY	
Ph		Clear	

FLOOD SIGNS: none evident

MORPHOLOGY

BED MATERIAL

Dominant	Cobble (64-256 mm)		
Subdom.	Boulder (> 256 mm)		
D95 (cm)	54	D (cm)	15
Morph.	Riffle-pool		

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Occasional
BARS	Side
COUPLING	Decoupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094G.005	015	F	5	MAP	R	8	F	9A	Impassable falls u/s of site	10	453540	6352031
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low to moderate seasonal rearing potential.
- no overwintering or spawning potential within site.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP8	9A	wd	u	aerial view of bedrock canyon and impassable falls u/s of site
BP8	10A	wd	u	view u/s from bottom
BP8	11A	wd	u	view u/s from centre
BP8	12A	wd	d	view d/s from top
BP8	13A	wd	u	upstream aerial view
BP8	14A	wd	u	Besa River at Nordling confluence - aerial view u/s toward Redfern Lake and Upper Besa

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose tracks		

COMMENTS

C	
C1	Interstices between boulder and cobble filled with fine gravels 3.5 mm.
CX1	Bedrock canyon with multiple impasses upstream.
CX2	Electro-fishing effort: 317 seconds @ 250 volts. Rainbow trout were captured.
CX3	Falls 5 m upstream of site.

FISH COLLECTION FORM

STREAM NAME	Nordling Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	750 m u/s of mouth				WATERSHED CODE	212-580800-04700-66500-7270				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	25	FISH PERMIT #	SC2000-021			
DATE	9/13/2000 to 9/13/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	CON	TURB	COMMENTS
25	94G/5	014	10.454119.6353351	EF	1	1.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
25	EF/1	1	RB	Juv		4	99	161	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	25	EF/1	1	0850	0910	317	200	6.8	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	25	EF/1	1	RB	161				Scale	25-1	1+	
	25	EF/1	1	RB	114				Scale	25-2	1+	
	25	EF/1	1	RB	99				Scale	25-3	1+	
	25	EF/1	1	RB	112				Scale	25-4	1+	

Nordling Creek
Site 25: View upstream from bottom of site.
(Roll BP8 - Exp 10A; CD 2 – Im 121)

Nordling Creek
Site 25: Upstream aerial view.
(Roll BP8 - Exp 13A; CD 2 – Im 124)

Nordling Creek
Site 25: Aerial view of bedrock canyon and impassable falls upstream of site.
(Roll BP8 - Exp 9A; CD 2 - Im 125)

Nordling Creek
Site 25: Besa River at Nordling confluence - aerial view upstream towards Redfern Lake.
(Roll BP8 - Exp 14A; CD 2 - Im 126)

APPENDIX XXVI

RICHARDS CREEK
(212-580800-04700-70200)

Sample Site 20

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Richards Creek									GPS COORDINATES					
LOCATION	3 km u/s of mouth														
NID MAP #	94G/11	NID #		001	WATERSHED CODE	212-580800-04700-70200									
REACH #		SITE #	20	SITE UTM	10	472124	6386902	SITE LENGTH	250	METH	HC	ACCESS	H		
DATE	9/12/2000	TIME	1330	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	72.00	106.00	156.00	116.00	85.00	68.00	100.50	meth	AL
WETTED WIDTH	RF	33.00	38.00	32.00	38.00	36.00	28.00	34.17	1.0	
RES POOL DEPTH	MS	0.22	0.60	0.72	0.33	0.24	0.55	0.44	1.0	
Wb DEPTH	1.60	1.20	1.40	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	6.0	TURBIDITY	
Ph		Clear	
FLOOD SIGNS	1.0 m - debris		

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	T	S	S	T	D	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Few	DIST	Clumped
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Mature Forest	STAGE	Mature Forest

INSTREAM VEGETATION: None

MORPHOLOGY

BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	36
D (cm)	32
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	**B1**	**B2**	B3	D1	**D2**	D3	C1	C2
C3	C4	C5	S1	S2	S3	**S4**		

PATTERN	Irregular Wandering
ISLANDS	Frequent
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate to good quality juvenile rearing and adult summering. Abundant side-channel rearing habitat.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP6	24	wd	u	view u/s from bottom
BP6	25	wd	d	view d/s from centre (side-channel)
BP7	1	wd	u	view u/s from centre
BP7	2	wd	d	view d/s from top
BP7	3	wd	u	upstream aerial view
BP7	5	wd	u	1 m rock shelf near site (10.465948.6382538)
BP7	6	wd	object	GR under 1 m rock shelf (352 mm and 375 mm) near site (10.465948.6382538)

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, elk, wolf and grizzly		

COMMENTS

C	
C1	Wide flood plain with abundant high and dry LWD.
CX1	Electro-fishing effort: 553 seconds @ 250 volts. Bull trout, mountain whitefish and slimy sculpin were captured.

FISH COLLECTION FORM

STREAM NAME	Richards Creek						LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	3 km u/s of mouth				WATERSHED CODE	212-580800-04700-70200			
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	20	FISH PERMIT #	SC2000-021		
DATE	9/12/2000 to 9/12/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE	

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
20	94G/11	001	10.472124.6386902	EF	1	6.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
20	EF/1	1	MW	Adult		7	153	290	Rearing	
20	EF/1	1	BT	Adult		2	202	286	Rearing	
20	EF/1	1	CCG	Adult		1	122	122	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	20	EF/1	1	1335	1417	553	250	34.2	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	20	EF/1	1	MW	272				Scale	20-1	6+	
	20	EF/1	1	MW	257				Scale	20-2	5+	
	20	EF/1	1	MW	153				Scale	20-3	2+	
	20	EF/1	1	MW	290				Scale	20-4	6+	
	20	EF/1	1	MW	261				Scale	20-5	6+	
	20	EF/1	1	MW	263				Scale	20-6	5+	
	20	EF/1	1	MW	283				Scale	20-7	6+	
	20	EF/1	1	BT	286				Fin ray	20-8	3+	
	20	EF/1	1	BT	202				Scale	20-9	3+	
	20	EF/1	1	CCG	122							

Richards Creek
Site 20: View downstream from top of site.
(Roll BP7 - Exp 2; CD 2 – Im 100)

Richards Creek
Site 20: Upstream aerial view.
(Roll BP7 - Exp 3; CD 2 – Im 101)

APPENDIX XXVII

RICHARDS CREEK
(212-580800-04700-70200)

Sample Site 32

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Richards Creek									GPS COORDINATES					
LOCATION	25 km upstream from mouth														
NID MAP #	94G/12	NID #		008	WATERSHED CODE	212-580800-04700-70200									
REACH #		SITE #	32	SITE UTM	10	456741	6383061	SITE LENGTH	250	METH	HC	ACCESS	H		
DATE	9/13/2000	TIME	1415	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

WATER

CHANNEL (m)	meth							avg	GRADIENT %		EMS		COND	
CHANNEL WIDTH	RF	18.00	20.00	26.00	29.00	19.00	21.00	22.17	meth	AL	TEMP (°C)	6.0	TURBIDITY	
WETTED WIDTH	RF	9.90	9.50	12.00	13.50	8.00	17.00	11.65	1.0		Ph		Clear	
RES POOL DEPTH	MS	0.28	0.35	0.53	0.20	0.16	0.25	0.30	1.0		FLOOD SIGNS	0.4 m - debris		
Wb DEPTH	0.90	0.75		STAGE	Moderate		No Vis Chan		Dry/Int	1	BED MATERIAL			

COVER

COVER	Total	Moderate (5-20%)					Dewater		Tribs		Dominant	Gravel (2-64 mm)		
type	SWD	LWD	B	U	DP	OV	IV	CROWN CLOSURE			Subdom.	Cobble (64-256 mm)		
amt	S	S	T	S	D	T	N				D95 (cm)	18	D (cm)	14
loc	P	P	P	P	P	P	P				Morph.	Riffle-pool		

	0%	1-20%	21-40%	41-70%	71-90%	>90%			
	0	1	2	3	4	5			

LWD FNC	Few	DIST	Even
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

INSTREAM VEGETATION

MORPHOLOGY

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Irregular Wandering
ISLANDS	None
BARS	Side
COUPLING	Decoupled
CONFINED	Unconfined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate to good potential for juvenile rearing and adult summering (mountain whitefish, Arctic grayling and bull trout).
- mountain whitefish and Arctic grayling may be restricted by 1 m rock shelf 11 km downstream.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP10	18	wd	u	view u/s from bottom
BP10	19	wd	u	view u/s from centre
BP10	20	wd	d	view d/s from top
BP10	25	wd	u	downstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, elk, wolf		

COMMENTS

C

C1 Also significant fines component.

CX1 Electro-fishing effort: 355 seconds @ 250 volts. Bull trout captured.

FISH COLLECTION FORM

STREAM NAME	Richards Creek								LAKE		STREAM		WETLAND
LOCATION	25 km upstream from mouth					WATERSHED CODE		212-580800-04700-70200					
WATERBODY ID			ILP MAP		ILP #		SITE/LAKE CARD ATTACHED		X	Y		N	
PROJECT ID	Besa-Prohet Overview		REACH #		SITE #	32	FISH PERMIT #		SC2000-021				
DATE	9/13/2000	to	9/13/2000	AGENCY	Diversified Environmental Services		CREW	BC/TE		RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
32	94G/12	008	10.456741.6383061	EF	1	6.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
32	EF/1	1	BT	NS		1	176	176	Rearing	

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	32	EF/1	1	1418	1435	355	250	11.6	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	32	EF/1	1	BT	176				Scale	32-1	-	poor scale sample

Richards Creek
Site 32: View upstream from bottom of site.
(Roll BP10 - Exp 18; CD 3 - Im 163)

Richards Creek
Site 32: Downstream aerial view.
(Roll BP10 - Exp 25; CD 3 - Im 166)

APPENDIX XXVIII

RICHARDS CREEK
(212-580800-04700-70200)

Sample Site 34

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Richards Creek									GPS COORDINATES					
LOCATION	34.5 km upstream from mouth; immediately downstream of falls														
NID MAP #	94G/12	NID #		010	WATERSHED CODE	212-580800-04700-70200									
REACH #		SITE #	34	SITE UTM	10	445596	6381131	SITE LENGTH	250	METH	HC	ACCESS	H		
DATE	9/13/2000	TIME	1800	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	18.00	14.20	15.00	13.00	10.10	12.80	13.85	meth	AL
WETTED WIDTH	RF	5.90	9.70	9.20	7.00	6.20	8.10	7.68	3.0	
RES POOL DEPTH	MS	0.62	0.60	0.55	0.30	0.42	0.70	0.53	3.0	
Wb DEPTH	1.20	1.40	0.95	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	4.5	TURBIDITY	
Ph		Clear	

FLOOD SIGNS: 0.7 m - debris

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	N	N	S	N	D	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	None	DIST	
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Fines/Boulders	TEXTURE	Boulders
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION: None

MORPHOLOGY

BED MATERIAL

Dominant	Boulder (> 256 mm)		
Subdom.	Gravel (2-64 mm)		
D95 (cm)	80	D (cm)	36
Morph.	Step-pool b		

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Coupled
CONFINED	Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	94G/12	011	F	5	GE	R	11	F	11	Impassable falls immediately u/s of site	10	445280	6381028
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate rearing habitat for juvenile bull trout.
- limited spawning potential - bedrock with isolated pockets of gravel.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP11	7	wd	u	view u/s from bottom
BP11	8	wd	u	view u/s from centre
BP11	9	wd	d	view d/s from top
BP11	10	wd	u	view u/s from top
BP11	11	wd	u	lower falls 50 m u/s from site 34
BP11	12	wd	u	upstream aerial view
BP11	5	wd	u	lower falls 50 m u/s from site 34
BP11	6	wd	u	falls on trib entering at lower Richards Creek falls
BP11	3	wd	u	u/s from 10.443250.6380850
BP11	4	wd	u	middle falls (30 m) at 10.443720.6380925
BP11	1	wd	u	upstream aerial view from below falls
BP11	2	wd	u	upstream aerial view - 40 m upper falls (10.440020.6379900)

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Also cobble and bedrock substrates.
CX1	Electro-fishing effort: 273 seconds @ 250 volts - bull trout captured.
	Angling effort: 2 hours - bull trout captrued
CX2	Impassable falls immediately u/s of site.

FISH COLLECTION FORM

STREAM NAME	Richards Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	34.5 km upstream from mouth					WATERSHED CODE	212-580800-04700-70200			
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	34	FISH PERMIT #	SC2000-021			
DATE	9/13/2000 to 9/13/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE			

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	CON	TURB	COMMENTS
34	94G/12	010	10.445596.6381131	EF	1	4.5		C	
34	94G/12	010	10.445596.6381131	AG	1	4.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
34	EF/1	1	BT	NS		4	84	315	Rearing	
34	AG/1	1	BT	Adult		3	400	525	Spawning	

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB
	34	AG/1	1	36782	1820	36782	2020						

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	34	EF/1	1	1805	1818	273	250	7.7	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	34	AG/1	1	BT	400		M	Spawning	Fin ray	34-1	8+	
	34	AG/1	1	BT	525		M	Spawning	Fin ray	34-2	9+	
	34	AG/1	1	BT	435		M	Spawning	Fin ray	34-3	7+	
	34	EF/1	1	BT	315		M	Spawning	Fin ray	34-4	5+	
	34	EF/1	1	BT	142				Scale	34-5	-	poor scale sample
	34	EF/1	1	BT	137				Scale	34-6	2+	
	34	EF/1	1	BT	84				Scale	34-7	1+	

Richards Creek
Site 34: View upstream from centre of site.
(Roll BP11 - Exp 8; CD 3 - Im 172)

Richards Creek
Site 34: View downstream from top of site.
(Roll BP11 - Exp 9; CD 3 - Im 173)

Richards Creek
Site 34: 5 m impasse 50 m upstream from site.
(Roll BP11 - Exp 11; CD 3 - Im 176)

Richards Creek
Site 34: Upstream aerial towards 5 m impasse 50 m upstream from site.
(Roll BP11 - Exp 5; CD 3 - Im 177)

APPENDIX XXIX

TOWNSLEY CREEK
(212-580800-04700-70200-1030)

Sample Site 22

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Townsley Creek									GPS COORDINATES					
LOCATION	8 km u/s of mouth														
NID MAP #	94G/11	NID #		002	WATERSHED CODE	212-580800-04700-70200-1030									
REACH #		SITE #	22	SITE UTM	10	473534	6378696	SITE LENGTH	200	METH	HC	ACCESS	H		
DATE	9/12/2000	TIME	1345	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	21.00	17.00	14.90	12.80	8.50	9.00	13.87	meth	AL
WETTED WIDTH	RF	15.00	6.20	8.30	12.80	7.00	8.10	9.57	1.5	
RES POOL DEPTH	MS	0.08	0.12	0.22	0.38	0.14	0.09	0.17	2.0	
Wb DEPTH	0.90	0.55	0.70	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	5.0	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Moderate (5-20%)				CROWN CLOSURE							
type	SWD	LWD	B	U	DP	OV	IV		0%	1-20%	21-40%	41-70%	71-90%	>90%		
amt	S	T	D	T	S	N	N									
loc	P	P	P	P	P	P	P									

LWD FNC	Few	DIST	Even		0	1	2	3	4	5
LB SHAPE	V-shaped	RB SHAPE	Sloping							
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles	INSTREAM	Algae					
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D	VEGETATION						
STAGE	Young Forest	STAGE	Young Forest							

MORPHOLOGY

FLOOD SIGNS	0.4 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	42
D (cm)	20
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Partially Coupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing potential for juvenile "sport-fish".

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP7	13	wd	u	view u/s from bottom
BP7	14	wd	u	view u/s from centre
BP7	15	wd	d	view d/s from top
BP8	3A	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
CX1	Electro-fishing effort: 505 seconds @ 250 volts. Mountain whitefish and slimy sculpin were captured.

FISH COLLECTION FORM

STREAM NAME	Townsley Creek						LAKE	X	STREAM		WETLAND
LOCATION	8 km u/s of mouth				WATERSHED CODE	212-580800-04700-70200-1030					
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	22	FISH PERMIT #	SC2000-021				
DATE	9/12/2000	to	9/12/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE		RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
22	94G/11	002	10.473534.6378696	EF	1	5.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
22	EF/1	1	MW	NS		1	180	180	Rearing	
22	EF/1	1	CCG	Adult		1	131	131	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	22	EF/1	1	1650	1705	505	200	9.6	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	22	EF/1	1	MW	180				Scale	22-1	2+	
	22	EF/1	1	CCG	131							

Townsley Creek
Site 22: View downstream from top of site.
(Roll BP7 - Exp 15; CD 2 - Im 110)

Townsley Creek
Site 22: Upstream aerial view.
(Roll BP8 - Exp 3A; CD 2 - Im 111)

APPENDIX XXX

TOWNSLEY CREEK
(212-580800-04700-70200-1030)

Sample Site 24

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Townsley Creek									GPS COORDINATES					
LOCATION	16 km u/s of mouth														
NID MAP #	94G/6	NID #		006	WATERSHED CODE	212-580800-04700-70200-1030									
REACH #		SITE #	24	SITE UTM	10	470010	6372895	SITE LENGTH	100	METH	HC	ACCESS	H		
DATE	9/12/2000	TIME	1800	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	7.50	5.90	9.50	6.60	6.90	5.50	6.98	meth	AL
WETTED WIDTH	RF	7.50	5.90	9.50	6.60	6.90	5.50	6.98	4.0	
RES POOL DEPTH	MS	0.40	0.08	0.11	0.07	0.14	0.09	0.15	5.0	
Wb DEPTH	0.42	0.55	0.60	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

COVER — COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	S	T	D	T	S	T	T
loc	P	P	P	P	P	P	P

LWD FNC	Few	DIST	Even
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Deciduous	RIP. VEG.	Deciduous
STAGE	Shrub/Herb	STAGE	Shrub/Herb

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: Moss

WATER

EMS		COND	
TEMP (°C)	3.0	TURBIDITY	
Ph		Lightly Turbid	

MORPHOLOGY

FLOOD SIGNS	0.4 m - debris
1 BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	60 D (cm) 20
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	**B2**	B3	**D1**	**D2**	D3	**C1**	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- limited seasonal rearing potential: low temperature and water quality (iron oxide and deposits).

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP8	5A	wd	u	view u/s from centre
BP8	6A	wd	u	view u/s from bottom
BP8	7A	wd	d	view d/s from top
BP8	8A	wd	d	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, elk and caribou		

COMMENTS

C	
C1	Also significant boulder component.
CX1	Electro-fishing effort: 193 seconds @ 250 volts. No fish were captured.
CX2	No barrier downstream.

FISH COLLECTION FORM

STREAM NAME	Townsley Creek						LAKE	X	STREAM		WETLAND
LOCATION	16 km u/s of mouth				WATERSHED CODE	212-580800-04700-70200-1030					
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	24	FISH PERMIT #	SC2000-021				
DATE	9/12/2000	to	9/12/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE		RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
24	94G/6	006	10.470010.6372895	EF	1	3.0		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
24	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	24	EF/1	1	1803	1812	193	100	7.0	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	

Townsley Creek
Site 24: View upstream from bottom of site.
(Roll BP8 - Exp 6A; CD 2 - Im 117)

Townsley Creek
Site 24: View upstream from centre of site.
(Roll BP8 - Exp 5A; CD 2 - Im 118)

APPENDIX XXXI

UNNAMED TRIBUTARY TO TOWNSLEY CREEK
(212-580800-04700-70200-1030-3880)

Sample Site 23

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Townsley Creek											GPS COORDINATES					
LOCATION	immediately u/s of mouth																
NID MAP #	94G/11	NID #		003	WATERSHED CODE	212-580800-04700-70200-1030-3880											
REACH #		SITE #	23	SITE UTM	10	473203	6378501	SITE LENGTH	100	METH	HC	ACCESS	H				
DATE	9/12/2000	TIME	1711	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

		meth						avg	GRADIENT %		
CHANNEL WIDTH	RF	5.20	3.80	5.50	9.30	3.50	7.00	5.72	meth	AL	
WETTED WIDTH	RF	3.10	3.80	3.70	4.70	2.70	6.50	4.08	3.5		1
RES POOL DEPTH	MS	0.07	0.21	0.08	0.09	0.68	0.09	0.20	4.0		
Wb DEPTH	0.50	0.58	0.42	STAGE	Moderate		No Vis Chan		Dry/Int		
							Dewater		Tribs		

WATER

EMS		COND	
TEMP (°C)	3.5	TURBIDITY	
Ph		Lightly Turbid	
FLOOD SIGNS	0.75 m - debris		

COVER

	COVER	Total	Trace (5%)					
type	SWD	LWD	B	U	DP	OV	IV	CROWN CLOSURE
amt	T	N	D	N	T	T	N	
loc	P	P	P	P	P	P	P	

0%	1-20%	21-40%	41-70%	71-90%	>90%		
0	1	2	3	4	5		

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Fines	TEXTURE	Gravel/Cobble
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Mature Forest	STAGE	Mature Forest

INSTREAM VEGETATION: None

MORPHOLOGY

BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	45
D (cm)	12
Morph.	Riffle-pool

DISTURBANCE INDICATORS: O1 B1 B2 B3 **D1** **D2** D3 C1 C2 / C3 C4 C5 S1 S2 S3 S4

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Decoupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- limited seasonal rearing potential.
- high gradient, questionable water quality due to high iron content.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP7	16	wd	u	view u/s from bottom
BP8	0A	wd	u	view u/s from centre
BP8	1A	wd	u	view u/s through small bedrock chute
BP8	2A	wd	d	view d/s from top
BP8	4A	wd	u	aerial view upstream from mouth (confluence with Townsley Creek)

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Water slight turbid colour, iron oxide coating on substrate.
CX1	Electro-fishing effort: 89 seconds @ 250 volts. No fish were captured.
CX2	Bedrock chute @ top of site - 0.8 m over 5 m.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Townsley Creek									LAKE [ ]	STREAM [X] WETLAND [ ]
LOCATION	immediately u/s of mouth						WATERSHED CODE	212-580800-04700-70200-1030-3880			
WATERBODY ID			ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N			
PROJECT ID	Besa-Prophet Overview		REACH #		SITE #	23	FISH PERMIT #	SC2000-021			
DATE	9/12/2000	to 9/12/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
23	94G/11	003	10.473203.6378501	EF	1	3.5		L	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
23	EF/1	1	NFC			0				

GEAR SPECS

								NET / TRAP SPECIFICATIONS					
C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	23	EF/1	1	1714	1720	89	100	4.1	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	

Unnamed tributary to Townsley Creek
Site 23: View downstream from top of site.
(Roll BP8 - Exp 2A; CD 2 - Im 115)

Unnamed tributary to Townsley Creek
Site 23: Upstream aerial view from mouth (confluence with Townsley Creek).
(Roll BP8 - Exp 4A; CD 2 - Im 116)

APPENDIX XXXII

DUFFIELD CREEK
(212-580800-04700-70200-2850)

Sample Site 21

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Duffield Creek									GPS COORDINATES					
LOCATION	700 m u/s of mouth														
NID MAP #	94G/12	NID #		003	WATERSHED CODE	212-580800-04700-70200-2850									
REACH #		SITE #	21	SITE UTM	10	464892	6382240	SITE LENGTH	200	METH	HC	ACCESS		H	
DATE	9/12/2000	TIME	1530	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	11.00	12.00	11.00	16.50	8.00	8.00	11.17	meth	AL
WETTED WIDTH	RF	11.00	10.50	10.50	6.50	8.00	8.00	9.17	2.5	
RES POOL DEPTH	MS	0.30	0.45	0.12	0.20	0.35	0.36	0.30	2.5	
Wb DEPTH	0.75	0.65	0.65	STAGE	Moderate		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	5.5	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Moderate (5-20%)			
type	SWD	LWD	B	U	DP	OV	IV	
amt	N	N	D	N	S	N	N	
loc	P	P	P	P	P	P	P	

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	Sloping
TEXTURE	Cobbles	TEXTURE	Cobbles
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

CROWN CLOSURE	0%	1-20%	21-40%	41-70%	71-90%	>90%		
	0	1	2	3	4	5		

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	0.45 m -debris
BED MATERIAL	
Dominant	Boulder (> 256 mm)
Subdom.	Cobble (64-256 mm)
D95 (cm)	43
D (cm)	23
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Decoupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate quality seasonal rearing for juvenile bull trout.
- no small granular substrates for spawning.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP7	8	wd	u	view u/s from bottom
BP7	9	wd	u	view u/s from centre
BP7	10	wd	d	view d/s from top
BP7	12	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
CX1	Electro-fishing effort: 408 seconds @ 250 volts. Bull trout were captured.

FISH COLLECTION FORM

STREAM NAME	Duffield Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	700 m u/s of mouth				WATERSHED CODE	212-580800-04700-70200-2850				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	21	FISH PERMIT #	SC2000-021			
DATE	9/12/2000 to 9/12/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
21	94G/12	003	10.464892.6382240	EF	1	5.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
21	EF/1	1	BT	Juv		5	152	180	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	21	EF/1	1	1535	1555	408	200	9.2	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	21	EF/1	1	BT	166				Scale	21-1	3+	
	21	EF/1	1	BT	165				Scale	21-2	2+	
	21	EF/1	1	BT	169				Scale	21-3	2+	
	21	EF/1	1	BT	152				Scale	21-4	2+	
	21	EF/1	1	BT	180				Scale	21-5	2+	

Duffield Creek
Site 21: View downstream from top of site.
(Roll BP7 - Exp 10; CD 2 - Im 106)

Duffield Creek
Site 21: Upstream aerial view.
(Roll BP7 - Exp 12; CD 2 - Im 107)

APPENDIX XXXIII

DUFFIELD CREEK
(212-580800-04700-70200-2850)

Sample Site 39

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Duffield Creek											GPS COORDINATES					
LOCATION	6 km upstream from mouth																
NID MAP #	94G/12	NID #		013	WATERSHED CODE	212-580800-04700-70200-2850											
REACH #		SITE #	39	SITE UTM	10	464202	6377564	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	9/15/2000	TIME	910	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	18.40	19.60	17.20	16.00	9.00	22.00	17.03	meth	AL
WETTED WIDTH	RF	9.60	8.80	11.30	10.20	5.20	13.20	9.72	2.0	
RES POOL DEPTH	MS	0.10	0.20	0.20	0.10	0.17	0.22	0.17	2.5	
Wb DEPTH	0.40	0.46	0.42	STAGE	Light		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	1.3	TURBIDITY	
Ph		Clear	
FLOOD SIGNS	0.3 m - debris		

COVER

COVER Total: Trace (5%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	N	T	D	N	S	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Gravel/Cobble	TEXTURE	Fines
RIP. VEG.	Mixed C & D	RIP. VEG.	Coniferous
STAGE	Young Forest	STAGE	Mature Forest

INSTREAM VEGETATION: Algae

MORPHOLOGY

BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	29
D (cm)	11
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate quality rearing habitat for bull trout: abundant boulder cover, few pools, some side channels present.
- limited spawning potential within site depsite presence of YOY and yearling BT.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP12	18-19	wd	u	aerial view to headwaters from upstream of site (10.464000.6372500)
BP12	20	wd	u	view u/s from bottom
BP12	21	wd	u	view u/s from centre
BP12	22	wd	d	view d/s from top
BP13	3	wd	u	upstream aerial view
BP13	9-10	wd	u	downstream aerial view from upstream of site (10.464300.6373250)

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Also significant boulder component.
CX1	Electro-fishing effort: 704 seconds @ 200-250 volts. Bull trout were captured.
CX3	YOY, yearling and 2+ BT present - spawning occuring in vicinity.

FISH COLLECTION FORM

STREAM NAME	Duffield Creek						[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	6 km upstream from mouth				WATERSHED CODE	212-580800-04700-70200-2850			
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	39	FISH PERMIT #	SC2000-021		
DATE	9/15/2000 to 9/15/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE	[ ]	RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
39	94G/12	013	10.454202.6377564	EF	1	1.3		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
39	EF/1	1	BT	NS		14	47	176	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	39	EF/1	1	0912	0930	704	200	9.7	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	39	EF/1	1	BT	162				Scale	39-1	2+	
	39	EF/1	1	BT	160				Scale	39-2	2+	
	39	EF/1	1	BT	176				Scale	39-3	2+	
	39	EF/1	1	BT	151				Scale	39-4	2+	
	39	EF/1	1	BT	110				Scale	39-5	1+	
	39	EF/1	1	BT	99				Scale	39-6	1+	
	39	EF/1	1	BT	104				Scale	39-7	1+	
	39	EF/1	1	BT	49				Scale	39-8	0+	
	39	EF/1	1	BT	48							
	39	EF/1	1	BT	49							
	39	EF/1	1	BT	47							
	39	EF/1	1	BT	98							
	39	EF/1	1	BT	101							
	39	EF/1	1	BT	96							

Duffield Creek
Site 39: View upstream from bottom of site.
(Roll BP12 - Exp 20; CD 3 – Im 202)

Duffield Creek
Site 39: Upstream aerial view.
(Roll BP13 - Exp 3; CD 3 – Im 205)

APPENDIX XXXIV

UNNAMED TRIBUTARY TO DUFFIELD CREEK
(212-580800-04700-70200-2850-3680)

Sample Site 40

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Duffield Creek											GPS COORDINATES					
LOCATION	immediately upstream of confluence with Duffield Creek																
NID MAP #	94G/12	NID #		014	WATERSHED CODE	212-580800-04700-70200-2850-3680											
REACH #		SITE #	40	SITE UTM	10	464087	6377447	SITE LENGTH	100	METH	HC	ACCESS	H				
DATE	9/15/2000	TIME	940	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

		meth						avg	GRADIENT %	
CHANNEL WIDTH	RF	10.00	8.10	7.10	13.50	8.80	6.80	9.05	meth	AL
WETTED WIDTH	RF	7.20	5.20	4.80	11.60	7.20	6.00	7.00	6.0	
RES POOL DEPTH	MS	0.25	0.15	0.10	0.10	0.15	0.12	0.15	5.5	
Wb DEPTH	0.25	0.30	0.26	STAGE	Light		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	1.5	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Trace (5%)				CROWN CLOSURE							
type	SWD	LWD	B	U	DP	OV	IV		0%	1-20%	21-40%	41-70%	71-90%	>90%		
amt	N	N	D	N	T	N	T									
loc	P	P	P	P	P	P	P									

LWD FNC	None	DIST		0	1	2	3	4	5
LB SHAPE	V-shaped	RB SHAPE	V-shaped						
TEXTURE	Gravel/Cobble	TEXTURE	Gravel/Cobble	INSTREAM	Algae				
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D	VEGETATION	Moss				
STAGE	Mature Forest	STAGE	Mature Forest						

MORPHOLOGY

FLOOD SIGNS	none evident
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	35 D (cm) 11
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side and Mid-stream
COUPLING	Partially Coupled
CONFINED	Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for juvenile bull trout: fish likely moved out or dormant in substrate - none caught.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP12	23	wd	u	u/s from bottom
BP12	24	wd	u	u/s from centre
BP12	25	wd	d	d/s from top
BP13	1	wd	u	upstream aerial view from trib confluence
BP13	2	wd	u	upstream aerial view from trib confluence

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
CX1	Electro-fishing effort: 200 seconds @ 250 volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Duffield Creek			[ ] LAKE	[X] STREAM	[ ] WETLAND	
LOCATION	immediately upstream of confluence with Duffield			WATERSHED CODE	212-580800-04700-70200-2850-3680		
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	40	FISH PERMIT #	SC2000-021
DATE	9/15/2000 to 9/15/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	CON	TURB	COMMENTS
40	94G/12	014	10.464087.6377447	EF	1	1.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
40	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	40	EF/1	1	0945	1000	200	100	7.0	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS

Unnamed tributary to Duffield Creek
Site 40: View upstream from bottom of site.
(Roll BP12 - Exp 23; CD 3 – Im 208)

Unnamed tributary to Duffield Creek
Site 40: View upstream from bottom of site.
(Roll BP13 - Exp 1; CD 3 – Im 211)

APPENDIX XXXV

UNNAMED TRIBUTARY TO DUFFIELD CREEK
(212-580800-04700-70200-2850-6980)

Sample Site 41

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Duffield Creek											GPS COORDINATES					
LOCATION	100 m upstream of confluence with Duffield Creek																
NID MAP #	94G/5	NID #		014	WATERSHED CODE	212-580800-04700-70200-2850-6980											
REACH #		SITE #	41	SITE UTM	10	464217	6372896	SITE LENGTH	100	METH	HC	ACCESS	H				
DATE	9/15/2000	TIME	1030	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	3.30	4.80	6.30	6.20	6.10	5.40	5.35	meth	AL
WETTED WIDTH	RF	3.00	2.20	6.20	3.80	4.80	3.70	3.95	3.0	
RES POOL DEPTH	MS	0.15	0.06	0.14	0.11	0.12	0.09	0.11	4.0	
Wb DEPTH	0.42	0.52	0.47	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	2.0	TURBIDITY	
Ph		Clear	

FLOOD SIGNS: 0.3 m - debris

COVER

COVER Total: Moderate (5-20%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	S	T	D	T	S	S	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	Few	DIST	Even
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Fines/Cobbles	TEXTURE	Fines/Cobbles
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

INSTREAM VEGETATION: Algae

MORPHOLOGY

BED MATERIAL

Dominant	Cobble (64-256 mm)		
Subdom.	Boulder (> 256 mm)		
D95 (cm)	55	D (cm)	20
Morph.	Riffle-pool		

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Partially Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for juvenile bull trout.
- no fish caught; either moved d/s or dormant in substrate.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP13	4	wd	u	view u/s from bottom
BP13	5	wd	u	view u/s from centre
BP13	6	wd	d	view d/s from top
BP13	7-8	wd	d	downstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Boulders and pockets of gravels also.
CX1	Electro-fishing effort: 385 seconds @ 250 volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Duffield Creek				[ ] LAKE	[X] STREAM	[ ] WETLAND
LOCATION	100 m upstream from confluence with Duffield			WATERSHED CODE	212-580800-04700-70200-2850-6980		
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	41	FISH PERMIT #	SC2000-021
DATE	9/15/2000 to 9/15/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION: TEMP	CON	TURB	COMMENTS
41	94G/5	014	10.464217.6372896	EF	1	2.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
41	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	41	EF/1	1	1035	1053	384	100	4.0	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE: STR	SAMPLE #	AGE	COMMENTS

Unnamed tributary to Duffield Creek
Site 41: View downstream from top of site.
(Roll BP13 - Exp 6; CD 3 – Im 215)

Unnamed tributary to Duffield Creek
Site 41: Upstream aerial view.
(Roll BP13 - Exp 7; CD 3 – Im 216)

APPENDIX XXXVI

UNNAMED TRIBUTARY TO RICHARDS CREEK
(212-580800-04700-70200-4820)

Sample Site 33

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Richards Creek	GPS COORDINATES	
LOCATION	450 m upstream from mouth		

NID MAP #	94G/12	NID #	009	WATERSHED CODE	212-580800-04700-70200-4820						
REACH #		SITE #	33	SITE UTM	10	456792	6382863	SITE LENGTH	160	METH HC	ACCESS H
DATE	9/13/2000	TIME	1600	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM Y X N	

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	12.10	16.50	7.20	15.00	8.50	8.50	11.30	meth	AL
WETTED WIDTH	RF	6.40	10.50	6.20	8.80	7.50	8.50	7.98	1.5	
RES POOL DEPTH	MS	0.25	0.10	0.10	0.21	0.21	0.22	0.18	2.0	
Wb DEPTH	0.40	0.45	0.51	STAGE	Moderate		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	5.0	TURBIDITY	
Ph			Clear

COVER

COVER	Total	Moderate (5-20%)					
type	SWD	LWD	B	U	DP	OV	IV
amt	S	S	T	T	D	N	N
loc	P	P	P	P	P	P	P

LWD FNC	Few	DIST	Even
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobbles
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Pole-sapling	STAGE	Young Forest

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0 (marked)	1	2	3	4	5

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS	0.45 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	24
D (cm)	11
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	**B2** (marked)	B3	**D1** (marked)	**D2** (marked)	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	Occasional
BARS	Side and Mid-stream
COUPLING	Decoupled
CONFINED	Unconfined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO		COMMENTS	UTM
						R	F		
						R	F		
						R	F		

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate juvenile bull trout rearing potential.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP10	21	wd	u	view u/s from bottom
BP10	22	wd	u	view u/s from centre
BP10	23	wd	d	view d/s from top
BP10	24	wd	u	aerial view downstream to confluence with Richards Creek

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Fine gravels also abundant.
CX1	Electro-fishing effort: 246 seconds @ 250 volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Richards Creek							LAKE [ ]	STREAM [X] WETLAND [ ]
LOCATION	450 m upstream from mouth					WATERSHED CODE	212-580800-04700-70200-4820		
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	33	FISH PERMIT #	SC2000-021		
DATE	9/13/2000 to 9/13/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
33	94G/12	009	10.456792.6382863	EF	1	5.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
33	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	33	EF/1	1	1605	1620	246	160	8.0	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS

Unnamed tributary to Richards Creek
Site 33: View downstream from top of site.
(Roll BP10 - Exp 23; CD 3 – Im 169)

Unnamed tributary to Richards Creek
Site 33: Upstream aerial view.
(Roll BP10 - Exp 24; CD 3 – Im 170)

APPENDIX XXXVII

KRAVAC CREEK
(212-580800-04700-72600)

Sample Site 19

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Kravac Creek							GPS COORDINATES			
LOCATION	5.5 km u/s of mouth										
NID MAP #	94G/12	NID #	002	WATERSHED CODE	212-580800-04700-72600						
REACH #		SITE #	19	SITE UTM	10	465764	6395335	SITE LENGTH	200	METH HC	ACCESS H
DATE	9/12/2000	TIME	1230	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM Y X N	

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	8.50	7.50	7.20	6.50	8.50	7.50	7.62	meth	AL
WETTED WIDTH	RF	8.50	3.50	5.60	6.50	8.50	7.00	6.60	2.5	
RES POOL DEPTH	MS	0.11	0.40	0.23	0.30	0.25	0.10	0.23	3.5	
Wb DEPTH	0.52	0.47	0.55	STAGE	Light		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	4.0	TURBIDITY	
Ph			Clear

COVER

COVER	Total	Trace (5%)				
type	SWD	LWD	B	U	DP	OV	IV
amt	T	T	D	N	S	N	N
loc	P	P	P	P	P	P	P

LWD FNC	Few	DIST	Clumped
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobbles
RIP. VEG. STAGE	Mixed C & D Mature Forest	RIP. VEG. STAGE	Coniferous Mature Forest

CROWN CLOSURE

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: Moss

MORPHOLOGY

FLOOD SIGNS	1.2 m - debris
BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Boulder (> 256 mm)
D95 (cm)	52 — D (cm) 18
Morph.	Riffle-pool
DISTURBANCE INDICATORS	O1 **B1** B2 B3 D1 D2 D3 C1 C2 **C3** C4 C5 S1 S2 S3 S4
PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Partially Coupled
CONFINED	Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094G.012	002	F	7	GE	R	6	F	18	Impassable falls at top of site	10	465750	6395290
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low to moderate seasonal rearing for bull trout - high boulder cover.
- no small granulars for spawning.
- no surface flow in lower 1000 m of creek; seasonal access restricted.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP6	15	wd	u	view u/s from bottom
BP6	16	wd	u	view u/s from centre
BP6	17	wd	d	view d/s from top
BP6	18	wd	u	impassable 7 m falls immediatley upstream of site
BP6	20	wd	u	upstream aerial view
BP6	21	wd	u	upstream aerial view toward headwaters - site 19 is on left fork, right fork is de-watered
BP6	23	wd	u	aerial view u/s from Prophet River confluence

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
C1	Bedrock out croppings present in site.
CX1	Falls 7 m high u/s of site.
CX2	Flow becomes subsurface in gravel before entering Prophet River.
CX3	Electro-fishing effort: 313 seconds @ 250m volts. No fish were captured.

FISH COLLECTION FORM

STREAM NAME	Kravac Creek							LAKE [ ]	STREAM [X]	WETLAND [ ]
LOCATION	5.5 km u/s of mouth				WATERSHED CODE	212-580800-04700-72600				
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y	[ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	19	FISH PERMIT #	SC2000-021			
DATE	9/12/2000 to 9/12/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ]	RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
19	94G/12	002	10.465764.6395335	EF	1	4.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
19	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	19	EF/1	1	1236	1300	313	200	6.6	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	

Kravac Creek
Site 19: View upstream from bottom of site.
(Roll BP6 - Exp 15; CD 2 – Im 90)

Kravac Creek
Site 19: Impassable falls immediately upstream of site.
(Roll BP6 - Exp 18; CD 2 – Im 93)

Kravac Creek
Site 19: Aerial view upstream from Prophet River confluence.
(Roll BP6 - Exp 23; CD 2 – Im 96)

Kravac Creek
Site 19: Upstream aerial view from Prophet River confluence.
(Roll BP6 - Exp 21; CD 2 – Im 95)

APPENDIX XXXVIII

HEWER CREEK
(212-580800-04700-82300)

Sample Site 36

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Hewer Creek									GPS COORDINATES					
LOCATION	200 m upstream from mouth														
NID MAP #	94B/12	NID #		007	WATERSHED CODE	212-580800-04700-82300									
REACH #		SITE #	36	SITE UTM	10	446702	6391208	SITE LENGTH	200	METH	HC	ACCESS	H		
DATE	9/14/2000	TIME	950	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	18.50	14.50	47.00	43.00	52.00	41.00	36.00	meth	AL
WETTED WIDTH	RF	6.50	6.50	5.20	6.90	7.60	7.90	6.77	1.0	
RES POOL DEPTH	MS	0.11	0.09	0.15	0.45	0.43	0.25	0.25	1.0	
Wb DEPTH	0.30	0.25	0.35	STAGE	Light		No Vis Chan		Dry/Int	1
							Dewater		Tribs	

COVER

	COVER	Total			Trace (5%)			
type	SWD	LWD	B	U	DP	OV	IV	CROWN CLOSURE
amt	S	S	N	N	D	N	N	
loc	P	P	P	P	P	P	P	

LWD FNC	Few	DIST	Even	
LB SHAPE	Sloping	RB SHAPE	Sloping	
TEXTURE	Fines	TEXTURE	Fines	
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous	
STAGE	Mature Forest	STAGE	Mature Forest	

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

INSTREAM VEGETATION: None

WATER

EMS		COND	
TEMP (°C)	4.2	TURBIDITY	
Ph		Clear	

MORPHOLOGY

FLOOD SIGNS	0.3 m - debris
BED MATERIAL	
Dominant	Gravel (2-64 mm)
Subdom.	Cobble (64-256 mm)
D95 (cm)	9
D (cm)	3
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	**B1**	B2	B3	**D1**	**D2**	**D3**	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side and Mid-stream
COUPLING	Decoupled
CONFINED	Occasionally Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	94B/12	5	F	10		R	11	F	22	Impassable falls 5 km upstream	10	447296	6386866
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- low seasonal rearing potential.
- limited cover, unstable, appears to be "flashy".

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP11	16	wd	u	view u/s from bottom
BP11	17	wd	u	view u/s from centre
BP11	18	wd	d	view d/s from top
BP11	21	wd	u	aerial view upstream
BP11	22	wd	u	10 m falls 5 km upstream of site

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Elk tracks		

COMMENTS

C	
C1	Also a high fines component.
CX1	Electro-fishing effort: 276 seconds @ 250 volts. Bull trout and slimy sculpin were captured.
CX2	Channel is wide and unstable, current wetted channel in centre of site courses through wooded area.
CX3	Immpassable 10 m falls 5 km upstream of site.

FISH COLLECTION FORM

STREAM NAME	Hewer Creek							LAKE [ ]	STREAM [X] WETLAND [ ]
LOCATION	200 m upstream from mouth					WATERSHED CODE	212-580800-04700-82300		
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	[X] Y [ ] N		
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	36	FISH PERMIT #	SC2000-021		
DATE	9/14/2000 to 9/14/2000	AGENCY	Diversified Environmental Services			CREW	BC/TE [ ] RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION TEMP	STREAM CONDITION CON	STREAM CONDITION TURB	COMMENTS
36	94g/12	007	10.446702.6391208	EF	1	4.2		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
36	EF/1	1	BT	NS		1	315	315	Rearing	
36	EF/1	1	CCG	NS		1	72	72	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	36	EF/1	1	0953	1013	276	200	6.8	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE STR	AGE SAMPLE #	AGE AGE	COMMENTS
	36	EF/1	1	BT	315				Fin ray	36-1	5+	Poor ageing structure
	36	EF/1	1	CCG	72							

Hewer Creek
Site 36: View downstream from top of site.
(Roll BP11 - Exp 18; CD 3 - Im 189)

Hewer Creek
Site 36: Upstream aerial view.
(Roll BP11 - Exp 21; CD 3 - Im 190)

APPENDIX XXXIX

HEWER CREEK
(212-580800-04700-82300)

Sample Site 31

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Hewer Creek									GPS COORDINATES					
LOCATION	7 km upstream from mouth														
NID MAP #	94G/12	NID #		004	WATERSHED CODE	212-580800-04700-82300									
REACH #		SITE #	31	SITE UTM	10	445766	6386371	SITE LENGTH	160	METH	HC	ACCESS	H		
DATE	9/13/2000	TIME	1515	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N		

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	8.90	16.00	15.00	10.30	19.00	11.00	13.37	meth	AL
WETTED WIDTH	RF	8.00	11.50	8.40	8.40	12.00	7.20	9.25	2.5	
RES POOL DEPTH	MS	0.20	0.15	0.21	0.13	0.16	0.12	0.16	2.5	
Wb DEPTH	0.80	0.75	0.73	STAGE	Light		No Vis Chan		Dry/Int	
							Dewater		Tribs	

WATER

EMS		COND	
TEMP (°C)	5.0	TURBIDITY	
Ph		Clear	

COVER

	COVER	Total			Trace (5%)			
type	SWD	LWD	B	U	DP	OV	IV	CROWN CLOSURE
amt	N	N	D	N	S	N	N	
loc	P	P	P	P	P	P	P	

0%	1-20%	21-40%	41-70%	71-90%	>90%
0	1	2	3	4	5

LWD FNC	None	DIST	
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobble/Bdrock
RIP. VEG.	Shrubs	RIP. VEG.	Shrubs
STAGE	Shrub/Herb	STAGE	Shrub/Herb

INSTREAM VEGETATION: None

MORPHOLOGY

FLOOD SIGNS	none evident
BED MATERIAL	
Dominant	Boulder (> 256 mm)
Subdom.	Cobble (64-256 mm)
D95 (cm)	60
D (cm)	23
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side and Mid-stream
COUPLING	Coupled
CONFINED	Frequently Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS		UTM	
						R		F					
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing potential for bull trout.
- access precluded by impassable falls 1.7 km downstream.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP10	12	wd	U	view u/s from bottom
BP10	13	wd	U	view u/s from centre
BP10	14	wd	U	cross-channel into unnamed trib at centre of site
BP10	15	wd	D	view d/s from top
BP10	17	wd	U	downstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS

COMMENTS

C	
CX1	Electro-fishing effort: 439 seconds @ 250 volts. No fish were captured.
CX2	Impassable falls 1700 m d/s of site; assumed non fish-bearing.

FISH COLLECTION FORM

STREAM NAME	Hewer Creek						LAKE	X	STREAM		WETLAND
LOCATION	7 km upstream from mouth				WATERSHED CODE	212-580800-04700-82300					
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	31	FISH PERMIT #	SC2000-021				
DATE	9/13/2000	to	9/13/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE		RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
31	94G/12	004	10.445766.6386371	EF	1	5.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
31	EF/1	1	NFC			0				

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	31	EF/1	1	1520	1540	439	160	9.2	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	

Hewer Creek
Site 31: View upstream from bottom of site.
(Roll BP10 - Exp 12; CD 3 - Im 158)

Hewer Creek
Site 31: Downstream aerial view.
(Roll BP10 - Exp 17; CD 3 - Im 162)

APPENDIX XL

UNNAMED TRIBUTARY TO PROPHET RIVER
(212-580800-04700-87900)

Sample Site 30

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Prophet River											GPS COORDINATES					
LOCATION	650 m u/s of mouth																
NID MAP #	94F/9	NID #		009	WATERSHED CODE	212-580800-04700-87900											
REACH #		SITE #	30	SITE UTM	10	438594	6391182	SITE LENGTH	200	METH	HC	ACCESS	H				
DATE	9/13/2000	TIME	1415	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N				

CHANNEL (m)

	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	18.00	16.50	10.50	15.00	14.50	11.50	14.33	meth	AL
WETTED WIDTH	RF	7.20	10.10	6.90	7.40	11.50	10.50	8.93	2.0	
RES POOL DEPTH	MS	0.18	0.08	0.11	0.13	0.07	0.15	0.12	1.5	
Wb DEPTH	1.00	0.87	0.90	STAGE	Moderate	No Vis Chan			Dry/Int	
						Dewater			Tribs	

WATER

EMS		COND	
TEMP (°C)	5.0	TURBIDITY	
Ph		Clear	
FLOOD SIGNS	0.2 m - debris		

COVER

COVER	Total	None (0%)

	SWD	LWD	B	U	DP	OV	IV
type							
amt	N	T	D	N	S	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE	0%	1-20%	21-40%	41-70%	71-90%	>90%
	0	1	2	3	4	5

LWD FNC	Few	DIST	Even
LB SHAPE	Sloping	RB SHAPE	V-shaped
TEXTURE	Cobbles	TEXTURE	Cobbles
RIP. VEG.	Mixed C & D	RIP. VEG.	Mixed C & D
STAGE	Young Forest	STAGE	Young Forest

INSTREAM VEGETATION

MORPHOLOGY

1 BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm)	36
D (cm)	15
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Decoupled
CONFINED	Unconfined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094F.009	010	CH			R		F		Impassable chute 4 km u/s of site	10	436120	6394702
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for bull trout and mountain whitefish juveniles.
- 90% boulder cover.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP10	8	wd	u	view u/s from bottom
BP10	9	wd	u	view u/s from centre
BP10	10	wd	u	view u/s from top
BP10	11	wd	u	upstream aerial view

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Moose, elk		

COMMENTS

C	
C1	Also significant boulder component.
CX1	Electro-fishing effort: 443 seconds @ 250 volts. Mountain whitefish, bull trout and slimy sculpin were captured.
CX2	Impassable chute 4 km u/s of site.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Prophet River								LAKE	X	STREAM		WETLAND
LOCATION	650 m u/s of mouth					WATERSHED CODE	212-580800-04700-87900						
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N			
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	30	FISH PERMIT #	SC2000-021						
DATE	9/13/2000	to	9/13/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE		RE-SAMPLE				

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
30	94F/9	009	10.438594.6391182	EF	1	5.0		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
30	EF/1	1	MW	NS		2	122	139	Rearing	
30	EF/1	1	BT	NS		2	121	198	Rearing	
30	EF/1	1	CCG	NS		1	68	68	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	30	EF/1	1	1418	1500	443	200	8.9	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	30	EF/1	1	BT	198				Scale	30-1	3+	
	30	EF/1	1	BT	121				Scale	30-2	1+	
	30	EF/1	1	MW	139				Scale	30-3	1+	
	30	EF/1	1	MW	122				Scale	30-4	1+	
	30	EF/1	1	CCG	68							

Unnamed tributary to Prophet River
Site 30: View upstream from bottom of site.
(Roll BP10 - Exp 8; CD 3 - Im 154)

Unnamed tributary to Prophet River
Site 30: Upstream aerial view.
(Roll BP10 - Exp 11; CD 3 - Im 157)

APPENDIX XLI

UNNAMED TRIBUTARY TO PROPHET RIVER
(212-580800-04700-91800)

Sample Site 29

Site Data Card, Fish Collection Form and Site Photographs

SITE CARD

STREAM NAME	Unnamed tributary to Prophet River											GPS COORDINATES							
LOCATION	150 m u/s of mouth																		
NID MAP #	94F/9	NID #		007	WATERSHED CODE	212-580800-04700-91800													
REACH #		SITE #	29	SITE UTM	10	430975	6387144	SITE LENGTH	150	METH	HC	ACCESS	H						
DATE	9/13/2000	TIME	1245	AGENCY	Diversified Environmental Services			CREW	BC/TE	FISH FORM	Y	X	N						

WATER

CHANNEL (m)	meth							avg	GRADIENT %	
CHANNEL WIDTH	RF	19.00	15.00	12.00	8.50	8.60	14.50	12.93	meth	AL
WETTED WIDTH	RF	7.50	8.90	9.50	6.50	7.00	11.00	8.40	1.0	
RES POOL DEPTH	MS	0.23	0.15	0.25	0.17	0.10	0.20	0.18	1.5	
Wb DEPTH	0.42	0.37	0.41	STAGE	Light		No Vis Chan		Dry/Int	1
					Moderate (5-20%)		Dewater		Tribs	

EMS	COND
TEMP (°C) 4.5	TURBIDITY
Ph	Clear
FLOOD SIGNS	0.5 m - debris

COVER

COVER	Total						
type	SWD	LWD	B	U	DP	OV	IV
amt	N	N	D	N	S	N	N
loc	P	P	P	P	P	P	P

CROWN CLOSURE	0%	1-20%	21-40%	41-70%	71-90%	>90%
	0	1	2	3	4	5

LWD FNC	None	DIST	
LB SHAPE	V-shaped	RB SHAPE	V-shaped
TEXTURE	Cobble/Bdrck	TEXTURE	Bedrock
RIP. VEG.	Coniferous	RIP. VEG.	Coniferous
STAGE	Mature Forest	STAGE	Mature Forest

INSTREAM VEGETATION: None

MORPHOLOGY

BED MATERIAL	
Dominant	Cobble (64-256 mm)
Subdom.	Gravel (2-64 mm)
D95 (cm) 65	D (cm) 18
Morph.	Riffle-pool

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3	C1	C2
C3	C4	C5	S1	S2	S3	S4		

PATTERN	Sinuous
ISLANDS	None
BARS	Side
COUPLING	Coupled
CONFINED	Confined

FEATURES

C	NID MAP #	NID #	TYPE	HT/LG (m)	mthd	PHOTO				COMMENTS	UTM		
	094G.009	008	F	50	GE	R	9	F	25	Impassable falls 750 m u/s of mouth	10	431055	6386701
						R		F					
						R		F					

DISTURBANCE INDICATOR LEGEND

O1	Beaver Dam	B3	Avulsion	D3	Recent LWD jam	C3	Elevated Bar	S1	Homogenous Bed	S4	Extensive Bars
B1	Abandoned Channel	D1	Small Woody Debris	C1	Extensive Riffles	C4	Multiple Channel	S2	Sediment Fingers	S5	Extensive Scours
B2	Eroding Bank	D2	Large Woody Debris	C2	Limited Pools	C5	Disturbed Lines	S3	Sediment Wedges		

HABITAT QUALITY

- moderate seasonal rearing for bull trout and mountain whitefish.

FSZ

PHOTO DOCUMENTATION

ROLL	FRAME	FOCAL LN	DIRECTION	COMMENTS
BP10	1	wd	u	view u/s from bottom
BP10	2	wd	u	view u/s from centre
BP10	3	wd	d	view d/s from centre
BP10	4	wd	d	view d/s from top
BP9	25	wd	u	50 m falls u/s of site 29

WILDLIFE

GROUP	WILDLIFE OBSERVATIONS	GROUP	WILDLIFE OBSERVATIONS
MAM	Elk and moose tracks		

COMMENTS

C	
C1	Large coluvial component also.
CX1	Electro-fishing effort: 337 seconds @ 250 volts. Bull trout, mountain whitefish and slimy sculpin were captured.
CX2	Impassable 50 m falls 750 m u/s of mouth.

FISH COLLECTION FORM

STREAM NAME	Unnamed tributary to Prophet River						LAKE	X	STREAM		WETLAND
LOCATION	150 m u/s of mouth				WATERSHED CODE	212-580800-04700-91800					
WATERBODY ID		ILP MAP		ILP #		SITE/LAKE CARD ATTACHED	X	Y		N	
PROJECT ID	Besa-Prophet Overview	REACH #		SITE #	29	FISH PERMIT #	SC2000-021				
DATE	9/13/2000	to	9/13/2000	AGENCY	Diversified Environmental Services	CREW	BC/TE		RE-SAMPLE		

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	METHOD/NO.		STREAM CONDITION			COMMENTS
						TEMP	CON	TURB	
29	94F/9	007	10.430975.6387144	EF	1	4.5		C	

FISH SUMMARY

SITE #	MTD/NO	H/P	SPECIES	STAGE	AGE	TOTAL NO	MIN LN (mm)	MAX LN (mm)	FISH ACT	COMMENTS
29	EF/1	1	BT	NS		3	237	300	Rearing	
29	EF/1	1	MW	NS		2	150	155	Rearing	
29	EF/1	1	CCG	NS		1	86	86	Rearing	

GEAR SPECS

NET / TRAP SPECIFICATIONS

C	SITE #	MD/NO	H/P	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

C	SITE #	MD/NO	H/P	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLT	FREQ	PLSE	MAKE	MDL
	29	EF/1	1	1248	1310	337	150	8.4	O	250	60	Fixed	Coffelt	Mk X

COMMENTS

C	

INDIVIDUAL FISH DATA

C	SITE #	MD/NO	H/P	SPECIES	LENGTH (mm)	WEIGHT (gms)	SEX	MATUR	AGE			COMMENTS
									STR	SAMPLE #	AGE	
	29	EF/1	1	BT	237				Fin ray	29-1	4+	
	29	EF/1	1	BT	255				Fin ray	29-2	5+	
	29	EF/1	1	BT	300				Fin ray	29-3	5+	Poor ageing sample
	29	EF/1	1	MW	155				Scale	29-4	2+	
	29	EF/1	1	MW	150				Scale	29-5	2+	
	29	EF/1	1	CCG	86							

Unnamed tributary to Prophet River
Site 29: View downstream from top of site.
(Roll BP10 - Exp 4; CD 3 - Im 149)

Unnamed tributary to Prophet River
Site 29: 50 m falls upstream of site.
(Roll BP9 - Exp 25; CD 3 - Im 150)

APPENDIX XLII

PROJECT OVERVIEW MAP

1:80,000