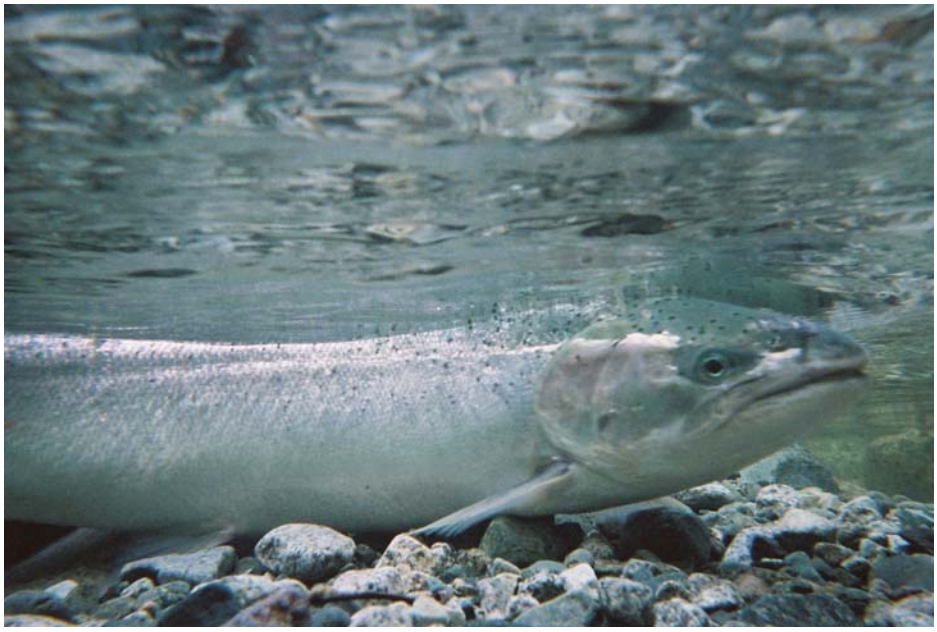
# Snorkel Observations of Winter Steelhead Trout Escapement to the Englishman River, Vancouver Island, 2005



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GREATER GEORGIA BASIN
STEELHEAD Recovery Plan
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**December 2005**

## ACKNOWLEDGEMENTS

James Craig[1], Mike McCulloch[1], Harlan Wright[1], Craig Wightman[2], Randy Dolighan[3], Skip Rimmer[4], Al Eden[5] and the author conducted snorkel surveys of the Englishman and South Englishman rivers. Funding for this project was provided by the Pacific Salmon Endowment Fund Society, through the Englishman River Watershed Recovery Plan, and the Ministry of Environment, through the Greater Georgia Basin Steelhead Recovery Plan. Appreciation is extended to James Craig for editing this report. Craig Wightman provided technical support and was the scientific authority. This report follows a format similar to those produced by B. Smith (Smith 2003[1] and Smith 2003[2]). His effort in program design, implementation, and reporting was much appreciated.

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## 1.0 INTRODUCTION

The Englishman River is an important salmon and steelhead producing stream on the central east coast of Vancouver Island (Figure 1). The watershed supports anadromous populations of steelhead and cutthroat trout, coho, chinook, chum, sockeye and pink salmon, along with resident cutthroat and rainbow trout (Lough and Morley 2002). Since the mid 1990s, decreased ocean survivals, along with forest harvesting, agricultural land use and urban encroachment impacts have resulted in declines in steelhead abundance in the Englishman River (Wightman et al. 1998, Bocking and Gaboury 2001).

The Englishman River was selected in 2001 by the Pacific Salmon Endowment Fund Society (PSEFS) as the first watershed to receive attention in the Georgia Basin steelhead and salmon recovery planning process (PSEF Technical Committee 2001). Additionally, the Greater Georgia Basin Steelhead Recovery Plan (GGBSRP) selected the Englishman River as a key east coast Vancouver Island (ECVI) steelhead indicator stream. The 2005 winter steelhead season marked the fourth consecutive year that fisheries staff from the BC Conservation Foundation (BCCF) and Ministry of Environment (MoE) conducted an intensive snorkel survey program to document current steelhead abundance trends in the Englishman River watershed.


**Figure 1.** Location of the Englishman River watershed.

Between February 10 and May 18, 2005, five snorkel surveys were conducted to determine the relative abundance of steelhead in the Englishman River. Survey timing and swim sections were intended to match surveys in 2002-2004 and included 19.5 km of anadromous stream length in the Englishman and South Englishman rivers.

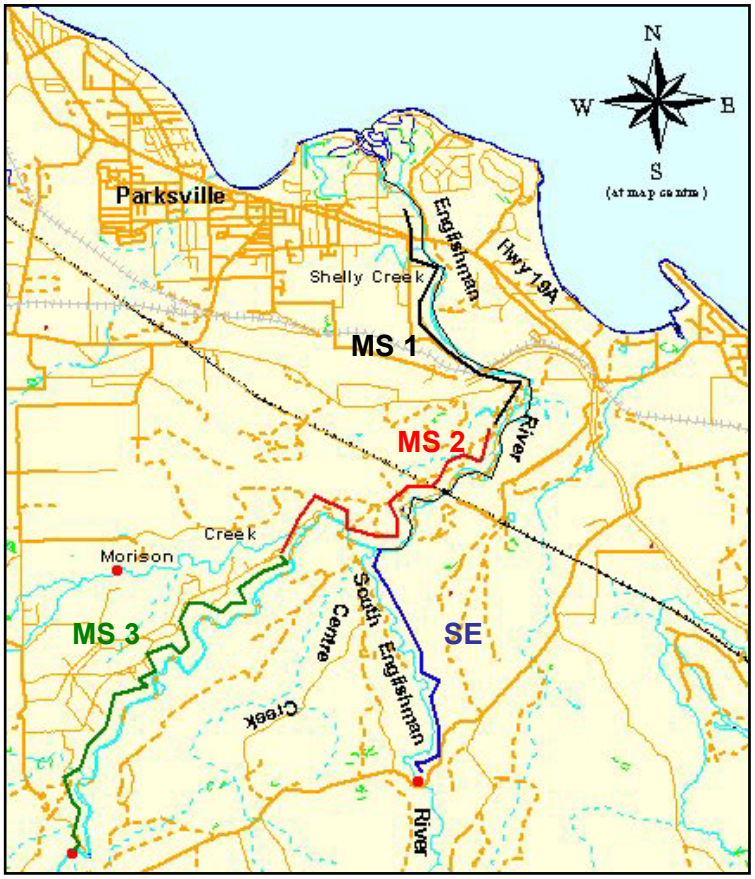
As in previous years, the objectives of the 2005 study were to:

- enumerate steelhead and determine the relative abundance of steelhead in the Englishman River in 2005;
- better define steelhead run-timing and snorkel observer efficiencies;
- continue to identify critical spawning and holding habitat; and,
- further develop the Englishman River as an ECVI steelhead index stream.

For detailed study area information please refer to *Snorkel Observations of Winter Steelhead Trout Escapement to the Englishman River, Vancouver Island, 2002 and 2003* (Smith 2003[1], Smith 2003[2]).

## 2.0 METHODS

Snorkel surveys to enumerate steelhead trout were planned for the anadromous portions of the Englishman and South Englishman rivers from early February to mid-May, 2005. Timing was similar to 2004 where efficiencies identified during the 2002/2003 studies were employed to best use limited project resources. Survey sections were identical to those in the previous studies (Figure 2, Table 1) and included:




- *Mainstem 1 (MS 1)*: 'Grassy Bank' downstream to the Big Tent Run located 400 m downstream of the Highway 19A bridge crossing (4.2 km);
- *Mainstem 2 (MS 2):* end of Englishman River Road downstream to 'Grassy Bank', 1.0 km upstream of Allsbrook Canyon (4.6 km);
- *Mainstem 3 (MS 3):* Falls located in Englishman River Falls Provincial Park downstream to the end of Englishman River Road (6.2 km); and,
- *South Englishman (SE):* from cascades at Branch 155 Bridge crossing to Englishman River confluence (4.5 km).

**Figure 2.** Snorkel survey sections in the Englishman River watershed, 2005.

**Table 1.** Englishman River snorkel survey put-in and take-out coordinates (UTM).

| Big Tent Run | Grassy Bank | End of Englishman River Rd. | Englishman River Falls | Branch 155 ML Bridge | Englishman River Confluence |
|---|---|---|---|---|---|
| 406550m E | 407603m E | 404693m E | 401829m E | 406319m E | 405792m E |
| 5463774m N | 5460986m N | 5459175m N | 5455736m N | 5456147m N | 5459287m N |

Surveys involved two technicians swimming in parallel lanes, each observing half the wetted channel but focusing on the thalweg and likely holding areas. Besides adult counts, data collected included distribution, sex, size, and origin (hatchery or wild). Colour, condition and spawning status of observed steelhead were also recorded to provide insight regarding residence time. Resident trout observations were also noted.

Englishman River discharge data were obtained from the Water Survey of Canada (WSC) gauging station (08HB0027-BC), located downstream of the Highway 19A Bridge. Un-corrected river discharge information can be viewed online at http://scitech.pyr.ec.gc.ca/waterweb/fullgraph.asp. In addition, stream temperatures, water clarity (visibility), weather and habitat conditions were recorded on each survey.

## 3.0 RESULTS

### 3.1 Observed Steelhead Abundance and Distribution

A total of five snorkel surveys occurred between February 10 and May 18, 2005 (Appendix A). Generally, each survey was completed over two days when water conditions allowed. Steelhead were counted on all five surveys with the highest count (61) recorded on April 14/15. Table 2 summarizes observed steelhead abundance and distribution during the study period.

**Table 2.** Adult steelhead snorkel survey counts and distribution in the Englishman River, February 10 - May 18, 2005.

| Date | Steelhead/Section | | | | # of Steelhead | Total Distance | Steelhead |
|---|---|---|---|---|---|---|---|
| | MS 1 | MS 2 | MS 3 | SE | Observed | (km) | Observed / km |
| 10-11 Feb | 1 | 6 | 2 | ns | 9 | 15.0 | 0.60 |
| 7-8 Mar | 4 | 18 | 10 | ns | 32 | 15.0 | 2.13 |
| 14-15 Apr | 11 | 29 | 19 | 2 | 61 | 19.5 | 3.13 |
| 27-29 Apr | 10 | 16 | 19 | 2 | 47 | 19.5 | 2.41 |
| 18 May | 5 | 7 | ns | ns | 12 | 8.8 | 1.36 |

ns = not surveyed

The peak count of 61 steelhead on April 14/15, 2005, correlates closely with the peak count in 2002 (n=73, April 24-26), 2003 (n=50, April 22/23), and 2004 (n=47, April 13/14) confirming mid to late April is when steelhead abundance peaks in the Englishman River (Figure 3).

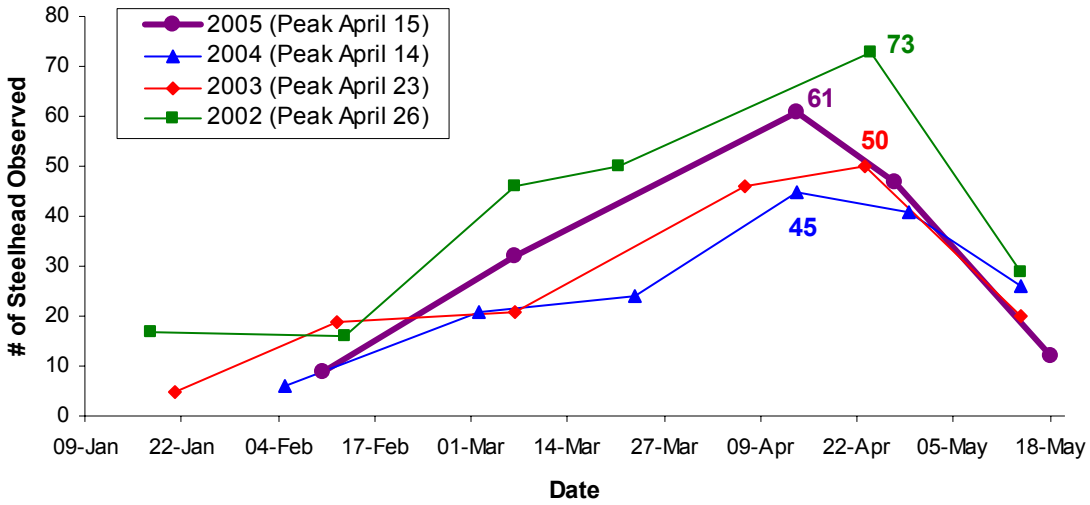



**Figure 3.** Englishman River winter steelhead snorkel survey counts, 2002 - 2005.

South Englishman River surveys were conducted on April 15 and April 27, based on past results that found steelhead present during peak run timing only. Fish bound for the South Englishman River likely mature in the mainstem, and then enter only for a short period to spawn (Smith 2003[2]).

During snorkel surveys, mainstem discharge ranged from 9.75 to 18.0 $m^3/s$ and visibility varied from 2 to 8 m (Appendix B). Un-corrected mean daily discharge readings during the study period ranged from 2.93 to 249 $m^3/s$ (Figure 4).

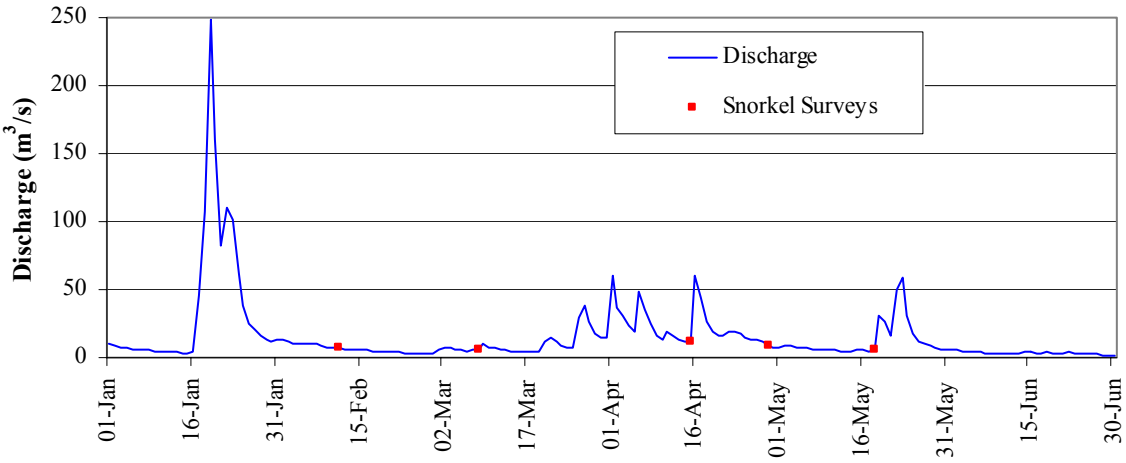



**Figure 4.** Un-corrected mean daily discharge readings for the Englishman River, January 1-June 30, 2005.

## 3.2 Historical Snorkel Survey Data

Snorkel surveys to enumerate winter steelhead on the Englishman River have been conducted by BCCF and/or provincial fisheries staff in Nanaimo since 1982. Peak observed winter steelhead densities (fish/km) in *mainstem sections 1 and 2* from 1982 to 2005 have declined by an order of magnitude since the late 1980s and have generally remained low since 1994 (Figure 5). Smith (2003[1], 2003[2]) presents additional information and historical data on the Englishman River steelhead stock.

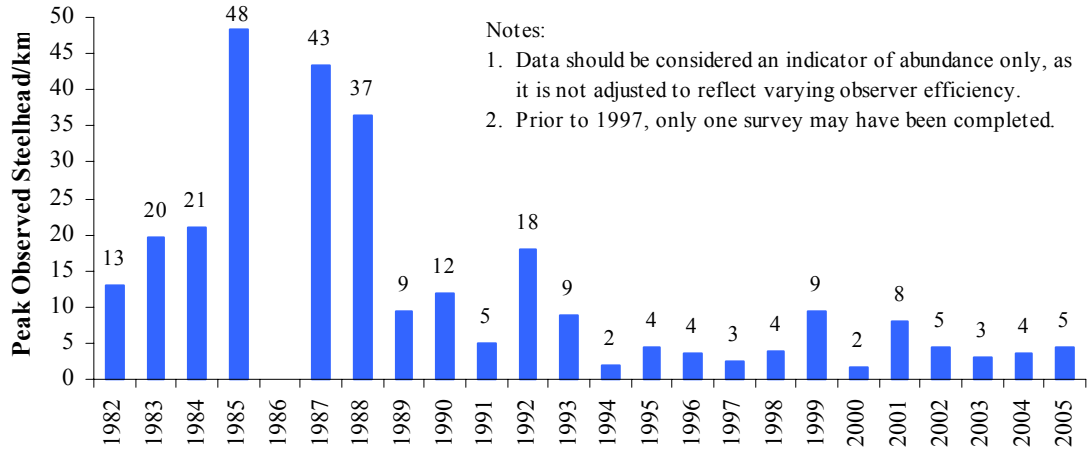



**Figure 5.** Peak adult steelhead densities (fish/km) observed during snorkel surveys in mainstem sections 1 and 2 of the Englishman River, 1982 – 2005.

## 3.3 Abundance Trends

Snorkel survey count data were plotted and area under the curve (AUC) calculated to compare 2005 to previous years. The final snorkel survey series performed in May of 2005 did not include MS 3 as water levels had risen from heavy rains overnight. Results from the three previous years of surveys show that mid May counts in MS 3 are on average equal to 51% of the aggregate count. Based on this ratio and for AUC purposes only, the May count was expanded to 24. The first and last days of the run were assumed to be January 1 and May 31, respectively, making the cumulative run-time 150 days. Numbers of fish observed on each survey were plotted against time (expressed as days from the start of the run) to generate a total of 4,050 fish-days for the 2005 winter steelhead run (Figure 6). *Assuming observer efficiency is similar year to year*[6], these results indicate an increase in steelhead abundance in 2005 relative to 2004 and 2003.

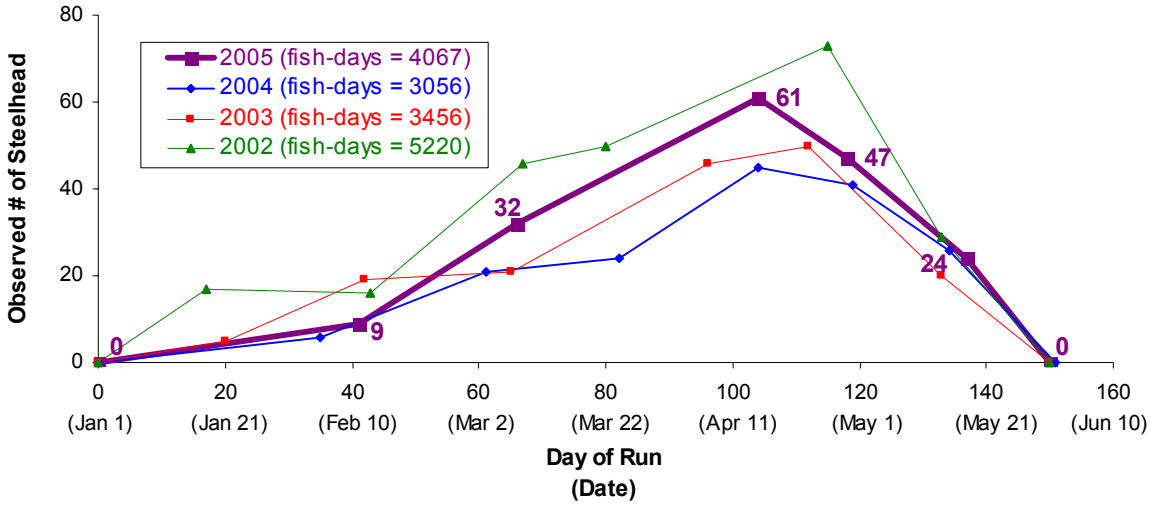



**Figure 6.** AUC results for snorkel survey series in the Englishman River, February 10 - May 18, 2005.

The precision of an AUC estimate depends strongly on observer efficiency and residence time, neither of which were determined in this or any other study of Englishman River steelhead. With only estimates of these variables, the value of an AUC-derived escapement is questionable. Observer efficiency could be determined if steelhead were tagged (radio and Floy™) and re-observed during subsequent snorkel surveys (mark-recapture component). In addition, radio tags would allow the residence time of a sample of the population to be determined. Program costs would be significantly higher with a tagging component and the process of netting or angling fish from such a small stock to apply tags may not be desirable due to the potential for stress and hooking mortality.

[6] With few exceptions, surveys have been performed by the same technicians since 2002, and survey methodology has remained unchanged.

## 3.4 Comparison of Juvenile and Adult Densities

For the Englishman River, Wright (2004) investigated the relationship between peak adult steelhead/km observed during spring snorkel surveys, and mean depth-velocity adjusted fry/unit[7] (FPU) obtained from closed-site electrofishing at the end of summer. Using data from 1990 and 1998-2003, results indicated a strong relationship ($r^2$=0.85) between the number of spawners and subsequent fry densities. Figure 7 displays these results updated with 2004 and 2005 juvenile and adult data. This relationship may be suitable for predicting fry or adult densities if only one variable is known. Additional data (fry, parr and smolts) on juvenile densities resulting from high adult escapements does not exist for the Englishman River, but would provide insight into carrying capacity and adult escapement requirements. Future data collection should aim at filling these data gaps with the hopes of developing a full stock recruitment curve for Englishman River steelhead.

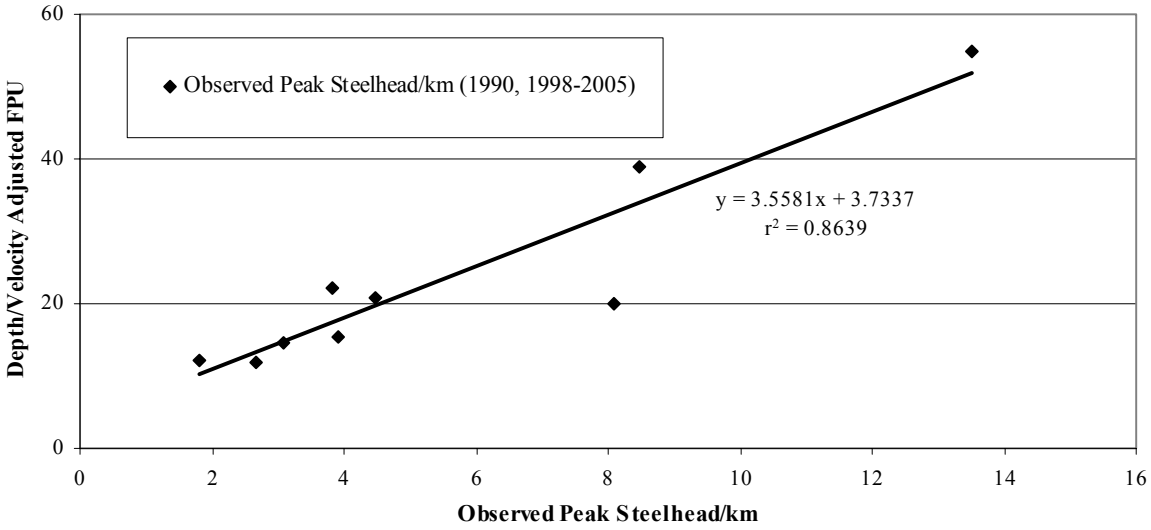



**Figure 7.** Observed peak adult steelhead counts (1990, 1998 - 2005) versus mean depth-velocity adjusted fry/unit in the Englishman River.

## 3.5 Resident Fish/Juvenile Observations

The number, species, size, origin, and distribution of resident trout was also documented during snorkel surveys. Overall, low to moderate densities of cutthroat and resident rainbow trout were observed during mainstem and South Englishman surveys (Appendix C). Several trout were counted but not clearly observed to determine species or origin.

As was the case in previous years, very few steelhead fry or parr were noted during snorkel surveys, particularly from February to April. Low densities of steelhead parr and pre-smolts were noted during the April and May surveys. Coho pre-smolts were observed in low to moderate abundances in all mainstem sections on May 18. Several chinook fry were observed on the last survey in mainstem section 1.

[7] Unit = 100 $m^2$ of suitable steelhead fry habitat.

## 4.0 SUMMARY AND CONCLUSIONS

The 2005 program marks the fourth consecutive year of intensive steelhead enumeration by BCCF and MoE staff in the Englishman and South Englishman rivers. Estimates of adult abundance using snorkel techniques, smolt emigration using rotary screw traps, and fry standing stocks using closed-site electrofishing further develop the Englishman River as a key steelhead index stream on the east coast of Vancouver Island.

Results from five snorkel surveys between February 10 and May 18 were evaluated using the AUC method to assess the level of abundance of winter steelhead in 2005. Results indicate that abundance levels were slightly higher in 2005 than in 2004 and 2003 as peak abundance counts and fish-days increased. The lack of observer efficiency and residence time parameters precludes the calculation of a reasonable escapement estimate for Englishman River steelhead in 2005. The additional program components needed to determine these parameters are costly, and hooking mortalities and tagging-related stress must be considered in light of the population's small size. Resource managers need also consider the potential accuracy of an escapement estimate derived from a more rigorous (and costly) program, and the likelihood of such results changing the way the stock is managed

Given the importance of Englishman River steelhead, collection of abundance trend data should continue in 2006. Further development of the Englishman River as a key index stream for winter steelhead populations in the Georgia Basin is a high priority outlined in the *Greater Georgia Basin Steelhead Recovery Action Plan* (Lill 2002).

## 5.0 REFERENCES

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# Appendix A.

2005 Englishman River snorkel survey reports.

**FILE NOTE**

Date: March 1, 2005
File: 34560-20/SNORK
xf: 34560-27/ENGL

SNORKEL SURVEY REPORT
Englishman River

DATE: February 10 and 11, 2005.
WEATHER: February 10 – slightly overcast, mild, air temperature 4.0 °C
February 11 – sunny, mild, air temperature 5.0 °C
WATER TEMP. (°C): 2.0 on February 10 @ 1030 hrs, 3.0 on February 11 @ 1230 hrs.
DISCHARGE ($m^3/s$): 13.0 on February 10, 12.0 on February 11 (per WSC website)
VISIBILITY (m): February 10 – 7 m; February 11 – 2.5-4 m
PERSONNEL: Mainstem section 1: J. Craig, R. Dolighan
Mainstem section 2: S. Rimmer, H. Wright
Mainstem section 3: J. Craig, S. Silvestri
AREA: Mainstem 1: Grassy Bank to Big Tent Run (4.2 km)
Mainstem 2: End of Englishman River Rd. to Grassy Bank (4.6 km)
Mainstem 3: Falls Pool to end of Englishman River Rd. (6.2 km)

Total distance surveyed = 15.0 km

**1. Fish Observed:**

Adult Steelhead:

A total of 9 wild steelhead (4 males, 4 females, and 1 undetermined sex) were counted for an observed density of 0.6 fish/km.
Distribution was as follows:

- **Section 1:** one female was observed downstream of Top Bridge Park
- **Section 2:** one pair (male and female) at Morison Creek confluence, four individual fish fairly evenly distributed downstream
- **Section 3:** two males were observed evenly distributed throughout the survey section

Estimated weights ranged from 3-5 kg and fish were bright to moderate in colour. See table below for condition rating:

| Condition | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| # | 4 | 4 | | | 1 |
| % | 44.4 | 44.4 | | | 11.2 |

1 (bright), 2 (moderately coloured), 3 (mid spawn), 4 (post spawn), 5 (undetermined

Rainbow/Cutthroat Trout:

- **Section 1:**
  No trout were observed in this section
- **Section 2:**
  2 rainbow trout (both wild; 1 @ 35-45 cm, 1 > 45 cm)
- **Section 3:**
  3 wild rainbow trout (2 @ 25-35 cm, 1 @ 35-45 cm)

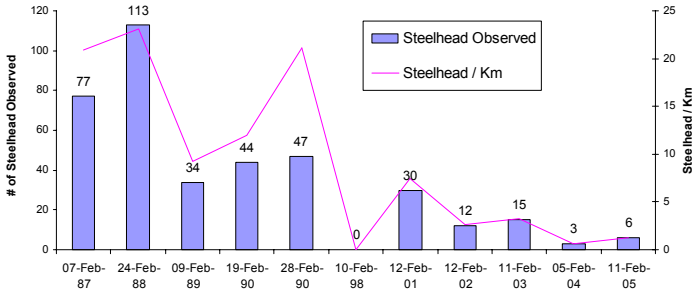
Juveniles:

None observed.

**2. Notes:**

- No anglers or evidence of recent angling were observed (stream is closed below lower Englishman River falls December 1-May 31).
- New gravel accumulations and minor channel shifting was noted throughout section 2. The Slough Pool has become much shallower and the thalweg at the head of the pool is continuing to shift away from the right bank.
- All but one of the LWD structures constructed since 2003 were intact after very high stream flows in mid-January (peak discharge measured January 19 was 361 $m^3/s$; WSC staff, pers. comm.). The damaged structure, located at the head of the Long Run, was built opportunistically with less ballast and fewer anchors than the other structures.
- Several single pieces of transient LWD were noted in the river channel in section 1. Additionally, flood related changes in pool morphology were noted at Parrys RV Corner and the Highway 19A Bridge pool.
- Visibility below Morison Creek and the "Claybank" was reduced, resulting in an estimated observer efficiency near 50%.
- February snorkel surveys on the Englishman River have been conducted regularly by WLAP and BCCF staff. Results of mainstem section 2 surveys from 1987–2005 are presented.

**Steelhead observed in Section 2**
**February snorkel surveys, 1987-2005**

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**FILE NOTE**

Date: March 11, 2005
File: 34560-20/SNORK
xf: 34560-27/ENGL

SNORKEL SURVEY REPORT
Englishman River

DATE: March 7 and 8, 2005.
WEATHER: March 7 – mostly sunny, mild, air temperature 12.0 °C
March 8 – overcast, mild, air temperature 12.0 °C
WATER TEMP. (°C): 6.5 on March 7 @ 1200 hrs at end of Englishman River Rd
DISCHARGE ($m^3/s$): 10.05 on March 7, 10.4 on March 8 (per WSC website)
VISIBILITY (m): March 7: 7 m, decreasing to 3 m below Morison Cr. and the "claybank" in section 2, March 8: 7 m in section 3, 2 m, increasing to 3.5 m in section 1 below Allsbrook Canyon
PERSONNEL: Mainstem section 1: J. Craig, C. Wightman
Mainstem section 2: J. Craig, S.Silvestri
Mainstem section 3: S. Silvestri, H. Wright
AREA: Mainstem 1: Grassy Bank to Big Tent Run (4.2 km)
Mainstem 2: End of Englishman River Rd. to Grassy Bank (4.6 km)
Mainstem 3: Falls Pool to end of Englishman River Rd. (6.2 km)

Total distance surveyed = 15.0 km

**1. Fish Observed:**

Adult Steelhead:

A total of 32 steelhead (9 males, 19 females, and 4 undetermined sex) were counted for an observed density of 2.13 fish/km.
An even distribution was noted through each section:

- **Section 1:** three females and one undetermined sex.
- **Section 2:** 18 steelhead (11 females and seven males).
- **Section 3:** 10 steelhead (five females, two males and three undetermined sex).

Estimated weights ranged from 2 - 8.5 kg and fish were bright to moderately dark in colour. One female kelt was observed. See table below for condition rating.

| Condition | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| # | 8 | 13 | 7 | 1 | 3 |
| % | 25 | 40.6 | 21.9 | 3.1 | 9.4 |

1 (bright), 2 (moderately coloured), 3 (mid spawn), 4 (post spawn), 5 (undetermined)

Rainbow/Cutthroat Trout:

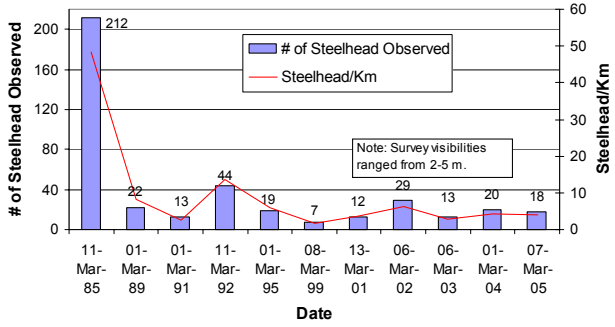
- **Section 1:**
  6 cutthroat trout (4 @ 25-35 cm, 2 @ 35-45 cm, 50% AFC)
- **Section 2:**
  8 wild rainbow trout (4 @ 25-35 cm, 4 @ 35-45 cm)
  12 cutthroat trout (2 wild @ 25-35 cm, 2 wild @ 35-45 cm, 4 hatchery @ 25-35 cm, 1 hatchery @ 35-45 cm, 3 undetermined origin @ 25-35 cm)
  3 unidentified trout of undetermined origin (2 @ 25-35 cm, 1 @ 35-45 cm)
- **Section 3:**
  6 wild rainbow trout (3 @ 25-35 cm, 3 @ 35-45 cm)

Juveniles:

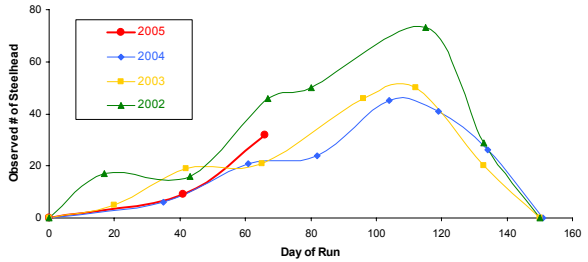
Several rainbow parr were observed in the upper survey section.

**2. Notes:**

- No anglers were observed during this survey. This stream is closed below lower Englishman River falls December 1-May 31. A float set-up was observed ~ 200 m upstream of the Hwy 19A Bridge.
- New material from the claybank continues to be added to the river. A large piece of the bank has fallen in approximately 2/3 of the way through the claybank run. Visibility was reduced to 3 metres below this point. Fines from the claybank were evident throughout the rest of the middle survey section, and in the upper half of the lower section.
- The most upstream LWD structure (site 8+960, constructed in 2004) appears to have settled, as one "filler" log has broken and allowed the rest of the structure to drop. High stream flows occurred in mid-January (peak discharge measured January 19 was 361 $m^3/s$; WSC staff, pers. comm.). Loose cables will need to be tightened on this site.
- Early March snorkel surveys on the Englishman River have been conducted regularly by WLAP and BCCF staff. Results of mainstem section 2 surveys from 1987–2005 are presented below:




- Snorkel survey count data from the previous three years is shown below, with early 2005 results added for comparison. For area under the curve (AUC) purposes, the first and last days of the run are assumed to be January 1 (Day 1) and May 31 (Day 151), respectively.

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**FILE NOTE**

Date: April 18, 2005
File: 34560-20/SNORK
xf: 34560-27/ENGL

SNORKEL SURVEY REPORT
Englishman River

DATE: April 14 and 15, 2005.
WEATHER: April 14 – overcast, rain, hail, lightening; air temperature 11.5 °C
April 15 – overcast, mild, air temperature 7.5 °C
WATER TEMP. (°C): 4.0 on April 14 @ 1000 hrs at end of Englishman River Road
DISCHARGE ($m^3/s$): 16.45 on April 14, 14.63 on April 15 (per WSC website)
VISIBILITY (m): April 14: 6 m, decreasing to 4 m below Morison Cr. and the "claybank" in section 2, April 15: 6 m in section 3, 5 m in the South Englishman River
PERSONNEL: Mainstem section 1: J. Craig, S. Silvestri, H. Wright
Mainstem section 2: J. Craig, S. Silvestri, H. Wright
Mainstem section 3: M. McCulloch, S. Silvestri
South Englishman River: J. Craig, H. Wright
AREA: Mainstem 1: Grassy Bank to Big Tent Run (4.2 km)
Mainstem 2: End of Englishman River Rd. to Grassy Bank (4.6 km)
Mainstem 3: Falls Pool to end of Englishman River Rd. (6.2 km)
South Englishman River: #155 ML bridge crossing to mouth (4.5 km)

Total distance surveyed = 19.5 km

**1. Fish Observed:**

Adult Steelhead:

A total of 61 steelhead (24 males, 17 females, and 20 undetermined sex) were counted for an observed density of 3.13 fish/km. Of fish observed for origin, 32 were wild and 6 were hatchery (Little Qualicum River LGB strays).
An even distribution was noted through each section:

- **Section 1:** 11 steelhead (4 females, 2 males, 5 undetermined sex)
- **Section 2:** 29 steelhead (15 females, 9 males, 5 undetermined sex)
- **Section 3:** 19 steelhead (5 females, 5 males, 9 undetermined sex)
- **South Englishman:** 2 steelhead (1 male, 1 undetermined sex)

Estimated weights ranged from 2 - 7.5 kg and fish were bright to post spawn in condition. See table below for condition rating.

| Condition | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| # | 8 | 21 | 19 | 5 | 8 |
| % | 13.1 | 34.4 | 31.2 | 8.2 | 13.1 |

1 (bright), 2 (moderately coloured), 3 (mid spawn), 4 (post spawn), 5 (undetermined)

Rainbow/Cutthroat Trout:

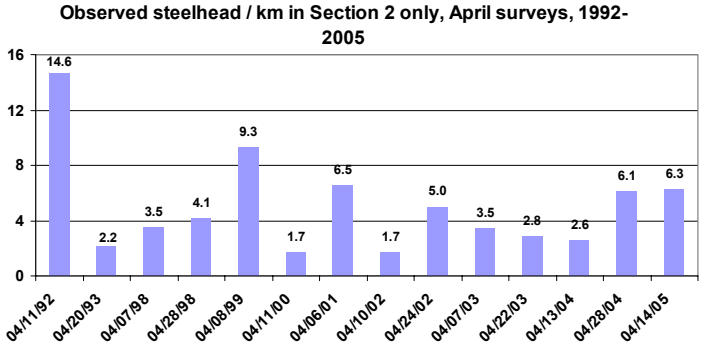
- **Section 1:**
  2 cutthroat trout (1 wild @ 25-35 cm, 1 hatchery @ 25-35 cm)
- **Section 2:**
  4 wild rainbow trout (2 @ 25-35 cm, 1 @ 35-45 cm, 1 @ 45+ cm)
  2 cutthroat trout (1 wild @ 35-45 cm, 1 hatchery @ 35-45 cm)
  3 unidentified trout of undetermined origin (2 @ 25-35 cm, 1 @ 35-45 cm)
- **Section 3:**
  8 wild rainbow trout (2 @ 25-35 cm, 3 @ 35-45 cm, 3 @ 45+ cm)

Juveniles:

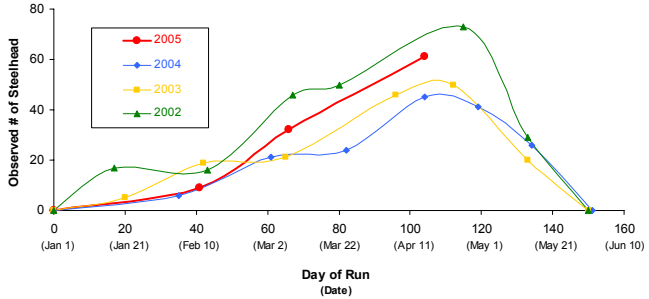
Several rainbow parr and one steelhead smolt were observed during the survey.

**2. Notes:**

- No anglers or evidence of recent angling were observed during this survey. This stream is closed below lower Englishman River falls December 1-May 31.
- Visibility in the section of river above Morison Creek was near normal (6 m). The visibility in the section below Morison Creek was reduced (4 m), however conditions were still favorable for snorkel surveying. Due to elevated water conditions and to achieve similar observer efficiencies to previous surveys, a third surveyor was employed in sections 1 and 2.
- The "claybank" area of section 2 showed signs of recent instability and sloughing since the last survey.
- April snorkel surveys on the Englishman River have been conducted regularly by WLAP and BCCF staff. Results of mainstem section 2 surveys from 1992–2005 are presented below:




- Snorkel survey count data from the previous three years is shown below, with early 2005 results added for comparison. For area under the curve (AUC) purposes, the first and last days of the run are assumed to be January 1 (Day 1) and May 31 (Day 151), respectively.




Scott Silvestri
Fisheries Technician
BC Conservation Foundation

cc: All Fisheries staff
Steelhead Crew
Conservation Officer Service, Nanaimo
B. Bocking, LGL Ltd., Sidney
M. Gaboury, LGL Ltd., Nanaimo
M. Sheng, Biologist, DFO, Nanaimo (Departure Bay Road)
K. Simpson, Biologist, DFO, Nanaimo (PBS)
P. Law, Ecosystems Biologist, WLAP, Nanaimo

**FILE NOTE**
Date: May 2, 2005
File: 34560-20/SNORK
xf: 34560-27/ENGL

SNORKEL SURVEY REPORT
Englishman River

DATE: April 27-29, 2005.
WEATHER: April 27 – mainly sunny, warm, air temperature 22.0 °C
April 28 – mainly sunny, warm, air temperature 20.0 °C
April 29 – mainly sunny, warm, air temperature 18.0 °C
WATER TEMP. (°C): 9.5 on April 27 @ 1300 hrs at end of Englishman River Road (MS3), 12.0 on April 27 @ 1430 hrs in the South Englishman at the Confluence, 8.0 on April 29 @ 1000 hrs at Allsbrook Canyon (MS1).
DISCHARGE ($m^3/s$): 18.00 on April 27, 16.30 on April 28, 14.15 on April 29 (per WSC website)
VISIBILITY (m): April 27 - 6 m in MS 3 and 5 m in SE, April 28 - 6 m decreasing to 4 m below Morison Cr. and the "claybank" in MS 2, April 29 - 4 m in MS 1.
PERSONNEL: Mainstem section 1: M. McCulloch, S. Silvestri, H. Wright
Mainstem section 2: J. Craig, S. Silvestri, H. Wright
Mainstem section 3: J. Craig, M. McCulloch
South Englishman River: S. Silvestri, H. Wright
AREA: Mainstem 1 (MS1): Grassy Bank to Big Tent Run (4.2 km)
Mainstem 2 (MS2): End of Englishman River Rd. to Grassy Bank (4.6 km)
Mainstem 3 (MS3): Falls Pool to end of Englishman River Rd. (6.2 km)
South Englishman River (SE): #155 ML bridge crossing to mouth (4.5 km)

Total distance surveyed = 19.5 km

**1. Fish Observed:**

Adult Steelhead:

A total of 47 steelhead (25 males, 18 females, and 4 undetermined sex) were counted for an observed density of 2.41 fish/km. Of fish observed for origin, 40 were wild and two were hatchery (Little Qualicum River LGB strays?). An even distribution was noted through each section:

- **Section 1:** 10 steelhead (3 females, 7 males)
- **Section 2:** 16 steelhead ( 8 females, 6 males, 2 undetermined sex)
- **Section 3:** 19 steelhead (6 females, 11 males, 2 undetermined sex)
- **South Englishman:** 2 steelhead (1 male, 1 female)

Estimated weights ranged from 2 - 7.5 kg and fish were slightly coloured to post spawn in condition. See table below for condition rating.

| Condition | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| # | 1 | 8 | 14 | 20 | 4 |
| % | 2.1 | 17 | 29.8 | 42.6 | 8.5 |

1 (bright), 2 (moderately coloured), 3 (mid spawn), 4 (post spawn), 5 (undetermined)

Rainbow/Cutthroat Trout:

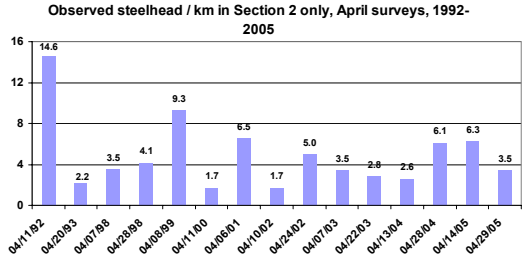
- **Section 1:**
  1 wild cutthroat trout @ 35-45 cm
- **Section 2:**
  8 wild rainbow trout (4 @ 25-35 cm, 3 @ 35-45 cm, 1 @ 45+ cm)
  7 cutthroat trout (3 wild, 1 hatchery, 3 undetermined origin; 3 @ 25-35 cm, 4 @ 45+ cm)
  1 unidentified trout of undetermined origin @ 35-45 cm
- **Section 3:**
  9 wild rainbow trout (2 @ 25-35 cm, 6 @ 35-45 cm, 1 @ 45+ cm)
- **South Englishman:**
  3 wild rainbow trout (2 @ 25-35 cm, 1 @ 35-45 cm)
  1 wild cutthroat trout @ 25-35 cm

Juveniles:

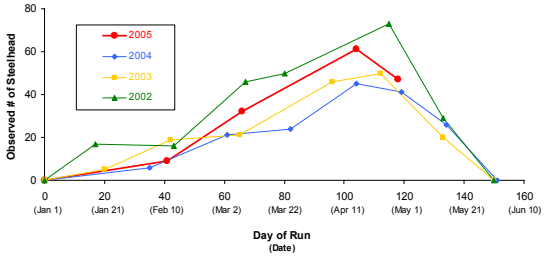
A low abundance of yearling rainbow parr and steelhead smolts/pre-smolts were observed during this survey. 25 smolts/pre-smolts and 34 parr were observed in the South Englishman River.

**2. Notes:**

- No anglers or evidence of recent angling were observed during this survey. This stream is closed below lower Englishman River falls December 1-May 31.
- At total of 9 redds and 2 test redds were observed during this survey.
- Visibility in the section of river above Morison Creek was near normal (6 m). The visibility in the section below Morison Creek and the "Claybank" was reduced (4 m), however conditions were still favorable for snorkel surveying. Due to elevated water conditions and to achieve similar observer efficiencies to previous surveys, a third surveyor was employed in sections 1 and 2.
- Results from this survey indicate that peak abundance of steelhead in the Englishman River has past as 61 fish were counted on April 14-15. The date of this year's peak count is similar to results observed from 2002-2004 when peaks occurred in the second to third week of April.
- April snorkel surveys on the Englishman River have been conducted regularly by WLAP and BCCF staff. Results of mainstem section 2 surveys from 1992–2005 are presented below:




- Snorkel survey count data from the previous three years is shown below, with 2005 results added for comparison. For area under the curve (AUC) purposes, the first and last days of the run are assumed to be January 1 (Day 1) and May 31 (Day 151), respectively.




Scott Silvestri
Fisheries Technician
BC Conservation Foundation

cc: All Fisheries staff
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M. Gaboury, LGL Ltd., Nanaimo
M. Sheng, Biologist, DFO, Nanaimo (Departure Bay Road)
K. Simpson, Biologist, DFO, Nanaimo (PBS)
P. Law, Ecosystems Biologist, WLAP, Nanaimo

**FILE NOTE**
Date: June 16, 2005
File: 34560-20/SNORK
xf: 34560-27/ENGL

SNORKEL SURVEY REPORT
Englishman River

DATE: May 18, 2005.
WEATHER: May 18 – mainly cloudy, light rain, air temperature 16.0 ºC
WATER TEMP. (ºC): 11.0 @ 1300 hrs at Grassy Bank
DISCHARGE ($m^3/s$): 9.75 on May 18 (per WSC website)
VISIBILITY (m): 8 m decreasing to 5 m below Morison Cr. and the "claybank" in MS 2.
PERSONNEL: Mainstem section 1: J. Craig, S. Silvestri
Mainstem section 2: M. McCulloch, Al Eden (Volunteer)
AREA: Mainstem 1 (MS1): Grassy Bank to Big Tent Run (4.2 km)
Mainstem 2 (MS2): End of Englishman River Rd. to Grassy Bank (4.6 km)

Total distance surveyed = 8.8 km

**1. Fish Observed:**

Adult Steelhead:

A total of 12 steelhead (7 males, 5 females) were counted for an observed density of 1.36 fish/km. All fish observed were confirmed wild in origin. Four of the five steelhead observed in MS1 were observed at or above Allsbrook canyon. An even distribution was noted in MS2. Section distribution was as follows:

- **Section 1:** 5 steelhead (3 females, 2 males)
- **Section 2:** 7 steelhead (2 females, 5 males)

Estimated weights ranged from 2 - 6 kg and fish were mid to post spawn in condition. See table below for condition rating.

| Condition | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| # | 0 | 1 | 7 | 4 | 0 |
| % | 0 | 8.3 | 58.3 | 33.4 | 0 |

1 (bright), 2 (moderately coloured), 3 (mid spawn), 4 (post spawn), 5 (undetermined)

Additionally, 1 bright summer chinook (~4 kg) was observed in MS2

Rainbow/Cutthroat Trout:

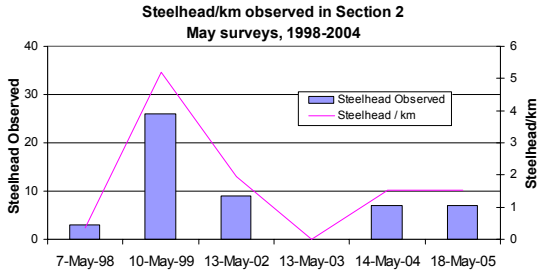
- **Section 1:**
  15 cutthroat trout (9 wild @ 25-35 cm, 3 wild @ 35-45 cm, 1 wild @ 45+ cm, 1 hatchery @ 25-35 cm, 1 hatchery @ 35-45 cm)
  1 unidentified trout of unknown origin @ 25-35 cm
- **Section 2:**
  9 wild rainbow trout (2 @ 25-35 cm, 5 @ 35-45 cm, 2 @ 45+ cm)
  3 cutthroat trout (1 hatchery @ 25-35 cm, 1 hatchery @ 45+ cm, 1 unknown origin @ 25-35 cm)

Juveniles:

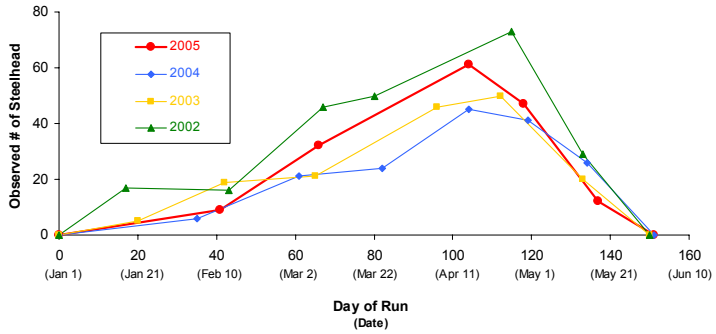
A low abundance of steelhead smolts/pre-smolts (< 30) and cutthroat smolts were observed during this survey. Low densities of yearling and age 2+ rainbow parr were observed. A moderate abundance of coho smolts and a low abundance of coho fry were also observed. Approximately 20-30 chinook smolts were observed. Two large schools of juvenile fish (coho, steelhead, chinook and cutthroat smolts, as well as younger fish) were observed immediately upstream and downstream of the lower rotary screw trap (upstream of Parry's RV). The first school of approximately 200 fish was observed in the back eddy of a boulder groyne immediately upstream of the rotary screw trap along Parry's RV, while the second school (~50 fish) was observed just downstream of the rotary screw trap.

**2. Notes:**

- No anglers or evidence of recent angling were observed during this survey. This stream is closed below lower Englishman River falls December 1-May 31.
- No redds were observed during this survey.
- A newly noted microwave oven was observed in the upper portion of Allsbrook canyon.
- Due to increased water levels as a result of significant rain on May 18 and 19, the upper survey section (MS3) was not surveyed as part of this series.
- May snorkel surveys on the Englishman River have been conducted regularly by WLAP and BCCF staff. Results of mainstem section 2 surveys from 1998–2005 are presented below:




- Snorkel survey count data from the previous three years is shown below, with 2005 results added for comparison. For area under the curve (AUC) purposes, the first and last days of the run are assumed to be January 1 (Day 0) and May 31 (Day 151), respectively. The May 18 (Day 137) result of 12 steelhead does not include the upper survey section.




Scott Silvestri
Fisheries Technician
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K. Simpson, Biologist, DFO, Nanaimo (PBS)
P. Law, Ecosystems Biologist, WLAP, Nanaimo

## Appendix B.

Summary of environmental conditions during snorkel surveys in the Englishman River, 2005.

| Date | Section | Weather | Water Temp ($^{o}$C) | Mainstem Discharge ($m^3/s$) | Visibility (m) |
|---|---|---|---|---|---|
| 10-Feb-05 | MS 1 | Slightly o/c, mild | 2 | 13 | 7 |
| | MS 2 | | | | 7 |
| 11-Feb-05 | MS 3 | Sunny, mild | 3 | 12.0 | 2.5-4 |
| 07-Mar-05 | MS 2 | Sunny, mild | 6.5 | 10.05 | 3-7* |
| 08-Mar-05 | MS 1 | o/c, mild | n/a | 10.4 | 2-3.5 |
| | MS 3 | | | | 7 |
| 14-Apr-05 | MS 1 | o/c, rain, hail | 4 | 16.45 | 6 |
| | MS 2 | | | | 4-6* |
| 15-Apr-05 | SE | o/c mild | n/a | 14.63 | 5 |
| | MS 3 | | n/a | | 6 |
| 27-Apr-05 | MS 3 | Mainly Sunny, Warm | 9.5 | 18 | 6 |
| | SE | Mainly Sunny, Warm | | | 5 |
| 28-Apr-05 | MS 2 | | 12 | 16.3 | 4-6* |
| 29-Apr-05 | MS 1 | Mainly Sunny, Warm | 8 | 14.15 | 4 |
| 18-May-05 | MS 1 | Cloudy, Light Rain | 11 | 9.75 | 8 |
| | MS 2 | | | | 5-8* |

* Visibility reduced below Morison Creek

## Appendix C.

Incidental trout observations during steelhead snorkel surveys in the Englishman River, 2005.

| Date | Section | Species, Origin and Size | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rainbow Trout | | | | | | Cutthroat Trout | | | | | | | | | Unidentified Trout | |
| | | Wild | | | Hatchery | | | Wild | | | Hatchery | | | Unknown | | | | |
| | | S | M | L | S | M | L | S | M | L | S | M | L | S | M | L | S | M | L |
| 10-Feb-05 | MS1 | | | | | | | | | | | | | | | | | |
| | MS2 | | 1 | 1 | | | | | | | | | | | | | | |
| 11-Feb-05 | MS3 | 2 | 1 | | | | | | | | | | | | | | | |
| 07-Mar-05 | MS2 | 4 | 4 | | | | | 2 | 2 | | 4 | 1 | | 3 | | | | |
| 08-Mar-05 | MS1 | | | | | | | 2 | 1 | | 2 | 1 | | | | | | |
| 08-Mar-05 | MS3 | 3 | 3 | | | | | | | | | | | | | | | |
| 13-Apr-05 | MS1 | | | | | | | 1 | | | 1 | | | | | | | |
| | MS2 | 4 | 1 | 1 | | | | | 1 | | | 1 | | | | | 2 | 1 |
| 15-Apr-05 | MS3 | 2 | 3 | 3 | | | | | | | | | | | | | | |
| | SE | | | | | | | | | | | | | | | | | |
| 27-Apr-05 | MS3 | | | | | | | | | | | | | | | | | |
| | SE | 2 | 1 | | | | | 1 | | | | | | | | | | |
| 28-Apr-05 | MS2 | 4 | 3 | 1 | | | | 1 | | 1 | 1 | | | | | 3 | | 1 |
| 29-Apr-05 | MS1 | | | | | | | | 1 | | | | | | | | | |
| 18-May-05 | MS1 | | | | | | | 9 | 3 | 1 | 1 | 1 | | | | | 1 | |
| | MS2 | 2 | 5 | 2 | | | | | | | 1 | | 1 | 1 | | | | |

S = Small (25-35 cm), M = Medium (35-45 cm), L = Large (45+ cm)

# Appendix D.

2005 project budget summary.

## British Columbia Conservation Foundation
## Project Summary Statement of Expenditures

Today's Date : 7-Dec-05
Regional Contact: Pat Stephenson

| | | | |
|---|---|---|---|
| CLIENT NAME : | Alan Kenney | PROJECT NAME | Steelhead Snorkel Program 2005 (ER 007 2005) |
| CLIENT AGENCY: | Pacific Salmon Foundation | BCCF PROJECT # | 132650 |
| ADDRESS : | 300 - 1682 West 7th Avenue | CLIENT CONTRACT # | ER 007 2005 |
| CITY, PROVINCE : | Vancouver, B.C. | TOTAL CONTRACT | 4995.00 |
| POSTAL CODE : | V6J 4S6 | FEES | 454.09 |
| TEL. NUMBER : | | CARRY-OVER OR SUBSIDY | |
| FAX NUMBER : | | | |

| GL ACC'T. | EXPENDITURE | AMOUNT |
|---|---|---|
| 3050 | Fees Earned | $454.09 |
| 4050 | Equipment Rental | |
| 4051 | Other Charges | |
| 4055 | Coordinator/Mgmt Charges | |
| 4056..5030 | Contract wages | $2,358.60 |
| 5110 | Sub Contracts | $1,223.68 |
| 5115 | Premises Rent | |
| 5210 | Equipment > 100 | |
| 5220 | Equipment < 100 | |
| 5230 | Equipment Repairs | |
| 5235 | Rentals | |
| 5240 | Communications | |
| 5245 | Computer Costs | |
| 5300 | Materials/Supplies/Courier | $8.63 |
| 5400 | Project Publications | |
| 5500 | Vehicle Operating Costs | |
| 5520 | Transportation | |
| 5530 | Vehicle Rental | $650.00 |
| 5540 | Mileage (only) | |
| 5545 | Travel Costs/Fuel | $300.00 |
| 5550 | Accommodation/Food | |
| 5555 | Allowances | |
| 5560 | Per Diem (only) | |
| 5600 | Miscellaneous | |
| 5700 | Training / Safety | |
| 5750 | Employee Advances | |
| 5800 | GST | |

**Total Project Costs** **$4,995.00**

*filename:Invoices.xls, tab:FSE*
*location: http://www.bccf.com/admin section*
*date: March 30, 1999*
*Authority: M. Burelli*

*Project Budget Update Form 2.0*
*Controlled Critical Document*
*page 2 of 3*
*see instructions page 3*