# Executive Summary Kwitzil (Gravel Pit) Lake 2000

A stocking assessment was conducted at Kwitzil Lake on July 31, 2000. This was the first formal stocking assessment completed since the inception of stocking in 1970. The management goal for Kwitzil Lake is to maintain an average quality, high-use fishery in all seasons. Kwitzil Lake is a small 6.5 ha lake situated 32 km west of Prince George along highway 16-east.

In 1983, Kwitzil Lake was poisoned with the pesticide rotenone to remove lake chubb and red-side shiners that had been illegally moved into the lake in an effort to improve the quality of the sports fishery. The lake was subsequently re-stocked in 1984 with rainbow trout the lake was then stocked annually from 1985 through 1988. Stocking was suspended from 1989-1992 after which the lake was stocked with eastern brook trout in odd years. The stocking of brook trout has continued annually since 1995.

To assess the status of the fishery, two standard mesh gillnets were set into Kwitzil Lake in 2000. The total sampling effort was 6 hours resulting in a gillnet catch per unit effort (CPUE) of 4.33 brook trout per gill-net-hour. Based on this assessment, the Kwitzil Lake eastern brook trout population appear to be providing an average angling experience as 42.3% of the fish sampled were between 250 - 400 mm in length. The age 2+ cohort was missing from the lake during the survey which is cause for some concern, however periodic stocking failures can occur.

Kwitzil Lake is known to support a significant winter fishery based anecdotal evidence as well as a series of aerial ice-hole counts conducted in in winter 2004. Aerial boat counts conducted in summer between 2005-2007 did not however, identify substantial levels of angling effort as less than 77, angler-hours were identified in each of 2005 and 2007 (zero in 2006). This observation is common to many of the lakes stocked with eastern brook trout in Omineca Region, as most brook trout fisheries primarily occur in winter due to the decreased catchability of brook trout in summer. To increase summer use, it is recommended that rainbow trout be stocked into Kwitzil Lake starting in 2008 in addition to the eastern brook trout already stocked. A follow-up stock assessment is recommended for 2013 to assess this change in stocking. A ground-based boat count survey is also recommended to assess the level of summer and winter effort, until the next series of aerial boat counts that are scheduled to take place in starting in 2011.

Figure 1. Aerial photo of Kwitzil (Gravelpit) Lake with a sample of the gillnet catch (inset) showing brook trout and lake chubb.

# OMINECA REGION
# LAKE STOCK ASSESSMENT REPORT

***LAKE NAME:*** Kwitzil Lake ***BC WBID:*** 00377LCHL

***ALIAS:*** Gravelpit Lake

***LAKE LOCATION:*** *Nearest center:* Prince George (32 km W) *Drainage:* Fraser

*UTM:* 10.483507.5968200

***LAKE ATTRIBUTES:***

| | | | | |
|---|---|---|---|---|
| *Surface Area:* | 6.5 Ha | *Elevation:* | 776 | m |
| *Littoral Area:* | 6.5 Ha | *T.D.S.:* | 97 | ppm |
| *Max Depth:* | 3.7 m | *Mean depth:* | 1.7 | m |

***MANAGEMENT OBJECTIVE (mean length in gillnet (cm)):***

| | | |
|---|---|---|
| Objective 1 | Family Fishery (High CPUE <30 cm) | ☐ |
| Objective 2 | Average Quality (30-40 cm) | ☒ |
| Objective 3 | Above Average (40-50 cm) | ☐ |
| Objective 4 | Trophy ( 20% > 50 cm for RB, 20% > 40 cm for EB) | ☐ |

***MANAGEMENT/SURVEY HISTORY :***

Previous gill net assessment(s): no ☐ yes ☒ MOE- PG Lakes Files; CSTC

Year(s) Surveyed: 1983; 2000

***STOCKING DATA:***

| | | | | |
|---|---|---|---|---|
| *Current Stocking Rate* | E. Brook | 385 | Fingerling/Ha | Annually |
| *Strain* | E. Brook | AYLMER | | |
| *Percent of rate:* | E. Brook | 71.9 | % | |

***Recommended Stocking Rate:***
**(Stringer, 1980)**

| | Total | Fish/Ha |
|---|---|---|
| ***Fry*** | 34791 | 5352 |
| ***Fallfry*** | 6958 | 1070 |
| ***Yearlings*** | 3479 | 535 |

***SURVEY DETAILS:***

| Date (yy.mm.dd) | Survey Agency | Crew |
|---|---|---|
| 2000-07-31 | Carrier Sekani Tribal Council | Margo French, Lawrence Ward |

***Netting Specifications:*** *Net type:* Standard Experimental *Net length: 90m (3x30m)*

*Setting:* Unk. *Panel Mesh: RISC- Standard Gill Net*

*Duration:* Day Set

***CATCH COMPARISON:***

| ***Survey Date*** | **31-Jul-00** | | **24-Oct-83** | |
|---|---|---|---|---|
| **Net Hours** | 6 | | n/a | |
| ***# of Sets:*** | 2 | | n/a | |
| | **Catch** | CPUE | **Catch** | CPUE |
| **Rainbow** | 0 | - | 28 | - |
| **Eastern brook trout** | 26 | 4.33 | 0 | - |
| **Kokanee** | 0 | - | 0 | - |
| **Lake Trout** | 0 | - | 0 | - |
| **Bull Trout** | 0 | - | 0 | - |
| **Burbot** | 0 | - | 0 | - |
| **Red-side Shiner** | 0 | - | 0 | - |
| **Lake Chubb** | 88 | 14.67 | 0 | - |
| **Peamouth Chubb** | 0 | - | 0 | - |
| **Long Nose Sucker** | 0 | - | 0 | - |
| **Large Scale Sucker** | 0 | - | 0 | - |
| **Northern Pikeminnow** | 0 | - | 0 | - |
| **Mountain Whitefish** | 0 | - | 0 | - |
| **Lake Whitefish** | 0 | - | 0 | - |
| **Pygmy Whitefish** | 0 | - | 0 | - |

***SURVEY CONCLUSIONS:***

| Objective | Objectives Achieved Yes | No | Reason |
|---|---|---|---|
| 1. Family | ☐ | ☐ | |
| 2. Average | ☒ | ☐ | The catch rate and growth of eastern brook trout was reasonable. However this only meet the objectives for a winter fishery. |
| 3. Above Average | ☐ | ☐ | |
| 4. Trophy | ☐ | ☐ | |

***Next Assessment :*** **2013**

***NOTES/ RECOMMENDATIONS:***

***Assessment:*** Good growth, missing 2+ cohort.

***Management:*** Low summer use- stock with rainbows starting in 2008.

***Comments:*** May have winter killed in winter 2007-2008. Occasional winter kill identified in the lakes files.

***Uncertainties:*** Net sets were not overnight and may be biased. Missing 2+ cohort.

***Recent Brood Request Comments:***

**2008** Annual. Assessed in 2000. 2+ cohort missing from sample, otherwise reasonable growth. 01 and 05-07 aerial survey suggests very low summer use, but it is a popular winter fishery. Annual. Reduce EB and use RB to increase summer use to help divert effort from nearby sensitive lake trout fisheries and to enhance this popular fishery. (Lake estimated (TRIM) to be 5-7 Ha depending on water levels).

**2007** Annual. Assessed in 2000. 2+ cohort missing from sample, otherwise reasonable growth. 01 and 05/06 aerial survey suggests very low summer use, but it is a popular winter fishery.

***History of Angling Regulations***

No special angling restrictions. No power boats.

***Reported by:*** Cory Williamson
***Date:*** Jul-08

**Table 1. Physical attributes for Kwitzil Lake eastern brook trout (2000) and rainbow trout (1983) by age.**

| | | | Length (mm) | | | | Weight (g) | | | | Condition (k) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Year | Age | Sample Size | Mean | Min | Max | StdDev | Mean | Min | Max | StdDev | Mean | Min | Max | StdDev |
| 2000 | 1 | 15 | 133 | 108 | 152 | 14.0 | 28 | 14.9 | 40.8 | 8.5 | 1.19 | 0.90 | 1.45 | 0.1 |
| 1983 | 2 | 12 | 232 | 160 | 270 | 29.7 | 154 | 60 | 220 | 51.6 | 1.20 | 0.86 | 1.48 | 0.2 |
| 2000 | 3 | 11 | 316 | 293 | 341 | 15.7 | 383 | 315 | 480 | 51.1 | 1.21 | 1.06 | 1.51 | 0.1 |
| 1983 | 3 | 14 | 278 | 220 | 330 | 35.8 | 258 | 140 | 440 | 105.0 | 1.15 | 0.98 | 1.45 | 0.1 |
| 1983 | 4 | 1 | 240 | - | - | - | 180 | - | - | - | 1.30 | - | - | - |

**Table 2. Summary of physical attributes for Kwitzil Lake rainbow and eastern brook trout for all sample years.**

| | | Length (mm) | | | | Weight (g) | | | | Condition (k) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Year | Sample Size | Mean | Min | Max | StdDev | Mean | Min | Max | StdDev | Mean | Min | Max | StdDev |
| **Rainbow Trout** | | | | | | | | | | | | | |
| 1983 | 28 | 256 | 160 | 330 | 38.7 | 209 | 60 | 440 | 94.9 | 1.17 | 0.86 | 1.48 | 0.16 |
| **Brook Trout** | | | | | | | | | | | | | |
| 2000 | 26 | 210 | 108 | 341 | 93.5 | 178 | 15 | 480 | 181.6 | 1.20 | 0.90 | 1.51 | 0.12 |

**Table 3. Proportion of Catch (by survey year) for eastern brook trout (2000) and rainbow trout (1983).**

| ***Survey Year*** | 2000<br>Brook Trout | 1983<br>Rainbow Trout |
|---|---|---|
| Less than 250 mm | 57.7 % | 53.6 % |
| Between 250-300 mm | 11.5 % | 32.1 % |
| Between 300-400 mm | 30.8 % | 14.3 % |
| Greater than 400 mm | 0.0 % | 0.0 % |
| Greater than 500 mm | 0.0 % | 0.0 % |

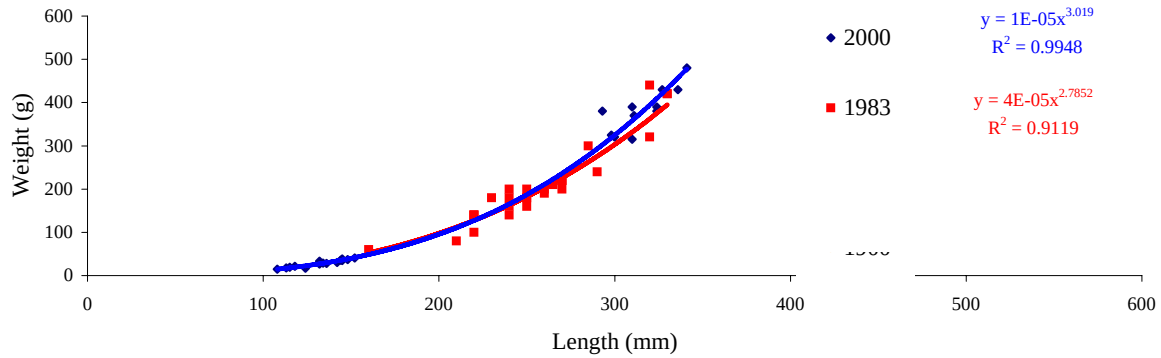


Figure 2. Length-weight power relationship for Kwitzil Lake eastern brook trout (2000) and rainbow trout (1983).

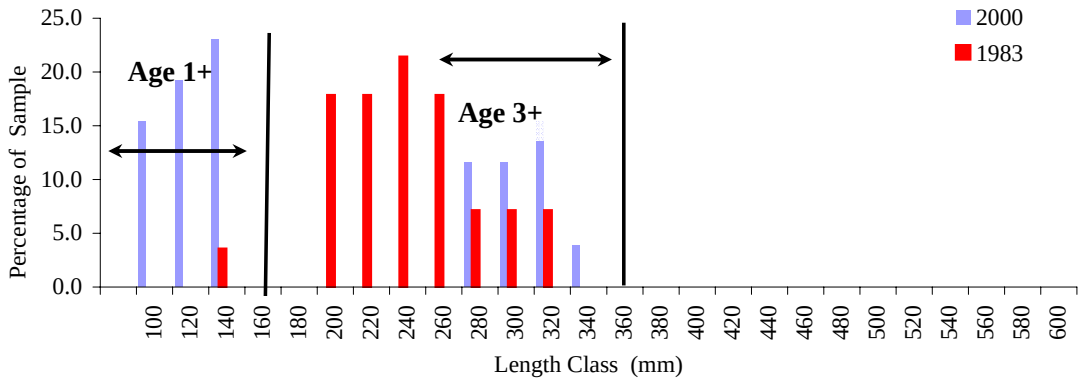


Figure 3. Length frequency distribution for Kwitzil Lake eastern brook trout (2000) rainbow trout (1983). Age brackets apply to the most recent survey data only (eastern brook trout-2000). Note: No age-2 fish were capture in 2000.

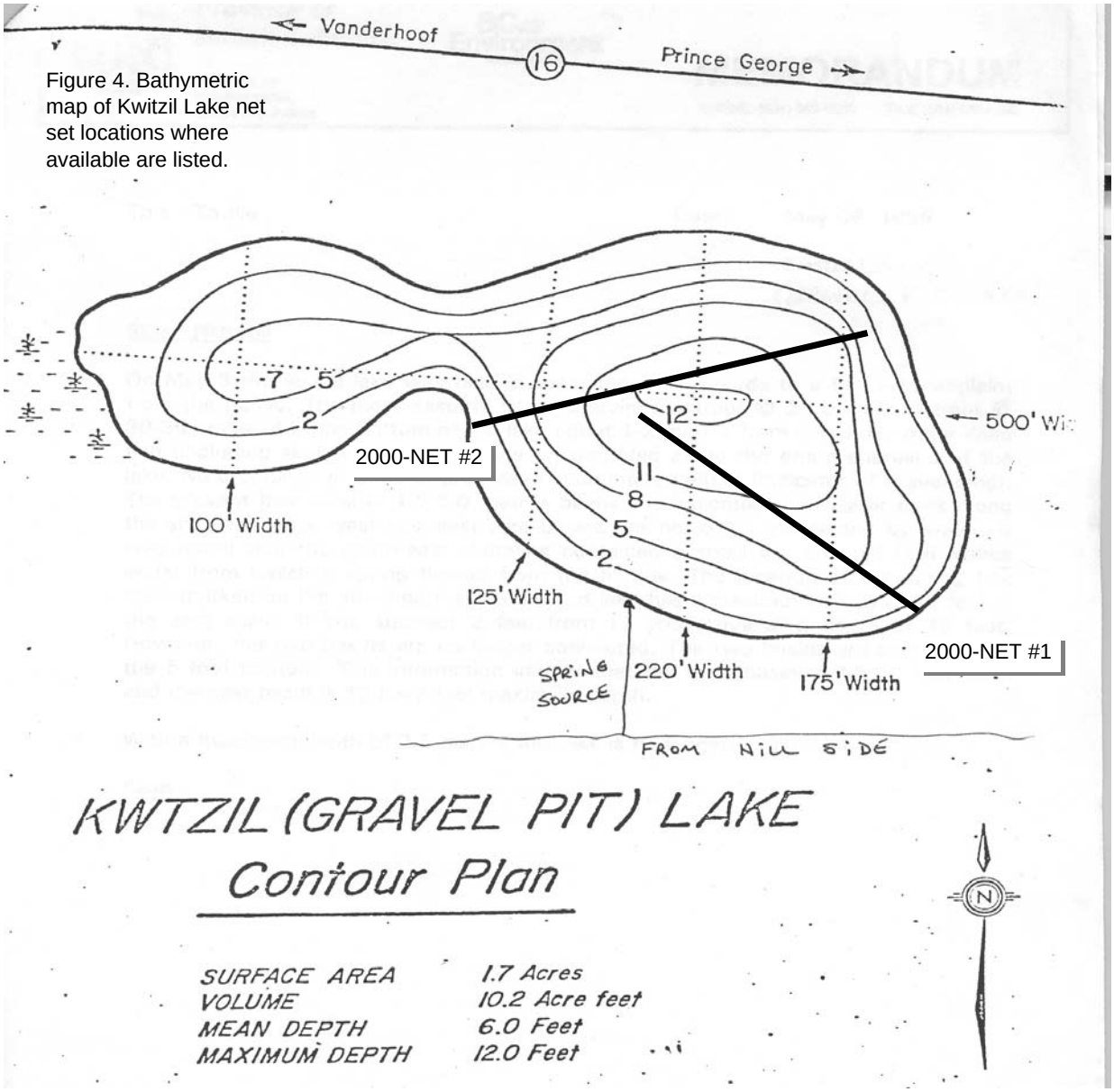


Figure 4. Bathymetric map of Kwitzil Lake net set locations where available are listed.

**Table 4. Complete stocking history for Kwitzil Lake 1970-2007.**

| Release Date | Species Name | Fish Count | Strain | Genotype | Mark | Average Size (gm) | Life Cycle Stage |
|---|---|---|---|---|---|---|---|
| 2008-06-20 | Brook Trout | 2500 | AYLMER | AF3N | | 7.6 | Fingerling |
| 2007-06-08 | Brook Trout | 2500 | AYLMER | AF3N | | 7.8 | Fingerling |
| 2006-06-09 | Brook Trout | 2500 | AYLMER | AF3N | | 6 | Fingerling |
| 2005-06-07 | Brook Trout | 2500 | AYLMER | AF3N | | 7.2 | Fingerling |
| 2004-06-01 | Brook Trout | 2500 | AYLMER | AF3N | | 7.2 | Fingerling |
| 2003-06-11 | Brook Trout | 2500 | AYLMER | AF3N | | 6.4 | Fingerling |
| 2002-06-14 | Brook Trout | 2500 | AYLMER | AF3N | | 10 | Fingerling |
| 2001-06-05 | Brook Trout | 2500 | AYLMER | AF3N | | 8 | Fingerling |
| 2000-05-30 | Brook Trout | 2500 | AYLMER | AF3N | | 4.8 | Fingerling |
| 1999-06-01 | Brook Trout | 2500 | AYLMER | AF3N | | 6 | Fingerling |
| 1998-05-28 | Brook Trout | 2500 | AYLMER | 3N | | 4.4 | Fingerling |
| 1997-06-16 | Brook Trout | 2000 | AYLMER | 2N | | 3 | Fingerling |
| 1995-06-10 | Brook Trout | 2500 | AYLMER | 2N | | 4 | Fingerling |
| 1994-06-12 | Brook Trout | 2500 | AYLMER | 2N | | 4 | Fingerling |
| 1992-05-27 | Brook Trout | 5000 | AYLMER | 2N | | 2.4 | Fingerling |
| 1988-05-01 | Rainbow | 2500 | TUNKWA | 2N | | 10 | Unknown |
| 1987-05-01 | Rainbow | 2500 | TUNKWA | 2N | | 15.6 | Unknown |
| 1986-08-01 | Rainbow | 2500 | TUNKWA | 2N | | 0.8 | Unknown |
| 1986-05-01 | Rainbow | 2500 | PREMIER | 2N | | 4.4 | Unknown |
| 1985-06-01 | Rainbow | 2500 | PREMIER | 2N | | 3.6 | Unknown |
| 1984-09-01 | Rainbow | 5000 | PENNASK | 2N | | 33.2 | Unknown |
| 1979-01-01 | Rainbow | 10000 | PREMIER | 2N | | 3.4 | Unknown |
| 1978-01-01 | Rainbow | 5000 | PREMIER | 2N | | 4 | Unknown |
| 1976-01-01 | Rainbow | 6660 | PENNASK | 2N | | 1.3 | Unknown |
| 1975-01-01 | Rainbow | 10000 | BEAVER | 2N | | 0 | Fry |
| 1974-01-01 | Rainbow | 5000 | TUNKWA | 2N | | 0 | Fry |
| 1972-01-01 | Rainbow | 5000 | BEAVER | 2N | | 0 | Fry |
| 1970-01-01 | Rainbow | 5000 | TUNKWA | 2N | | 0 | Fry |

**Table 5. Year 2000 stock Assessment Data for Kwitzil Lake eastern brook trout in (see lake files for additional survey data).**

| Species Caught | Calender Age | Length (mm) | Weight (grams) | Condition (k) | Age Structure | Sex | Maturity | Comments |
|---|---|---|---|---|---|---|---|---|
| EB | 1+ | 108 | 14.9 | 1.18 | otolith | Unknown | immature | |
| EB | 1+ | 113 | 17.8 | 1.23 | otolith | Unknown | immature | |
| EB | 1+ | 115 | 19.2 | 1.26 | otolith | Unknown | immature | |
| EB | 1+ | 132 | 33.4 | 1.45 | otolith | Unknown | immature | |
| EB | 1+ | 134 | 29.2 | 1.21 | otolith | Unknown | immature | |
| EB | 1+ | 136 | 28.0 | 1.11 | otolith | Unknown | immature | |
| EB | 1+ | 145 | 34.9 | 1.14 | otolith | Unknown | immature | |
| EB | 3+ | 293 | 380.0 | 1.51 | otolith | Unknown | spent | otolith broken |
| EB | 3+ | 298 | 325.0 | 1.23 | otolith | Unknown | spent | |
| EB | 3+ | 310 | 315.0 | 1.06 | otolith | Unknown | spent | changed weight to 315, was 31.5 |
| EB | 3+ | 310 | 390.0 | 1.31 | otolith | Unknown | spent | |
| EB | 3+ | 311 | 370.0 | 1.23 | otolith | Unknown | spent | |
| EB | 3+ | 341 | 480.0 | 1.21 | otolith | Unknown | spent | otolith sheared |
| EB | n/a | 118 | 21.1 | 1.28 | otolith | Male | immature | otolith missing |
| EB | n/a | 145 | 38.2 | 1.25 | otolith | Male | immature | otolith missing |
| EB | 1+ | 124 | 17.2 | 0.90 | otolith | Male | immature | |
| EB | 1+ | 132 | 26.8 | 1.17 | otolith | Male | immature | |
| EB | 1+ | 142 | 30.5 | 1.07 | otolith | Male | immature | |
| EB | 1+ | 144 | 35.8 | 1.20 | otolith | Male | immature | |
| EB | 1+ | 148 | 37.3 | 1.15 | otolith | Male | immature | |
| EB | 1+ | 152 | 40.8 | 1.16 | otolith | Male | immature | |
| EB | 3+ | 324 | 380.0 | 1.12 | otolith | Male | spent | |
| EB | 3+ | 324 | 390.0 | 1.15 | otolith | Male | spent | |
| EB | 3+ | 327 | 430.0 | 1.23 | otolith | Unknown | spent | |
| EB | 3+ | 336 | 430.0 | 1.13 | otolith | Unknown | spent | otolith sheared |
| EB | n/a | 300 | 320.0 | 1.19 | otolith | n/a | n/a | otolith sheared, unreadable |