

# **ANGLER HARVEST SURVEY**

## **MARSH LAKE 2007**

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**ANGLER HARVEST SURVEY  
MARSH LAKE 2007  
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## Key Findings

- Anglers spent 3,174 hours angling on Marsh Lake in the summer of 2007. This is 0.33 hours angling / ha over the summer, a high level of angling pressure compared to other large Yukon lakes.
- Angler success, as measured by the number of lake trout caught per hour of angling, was below average compared to other Yukon fisheries surveyed to date and has declined steadily since the first survey in 1992.
- Anglers caught 268 lake trout but released 55%. Including a 15% rate of incidental mortality (death) from catch and release, the total estimated harvest was 310 kg of lake trout. This is less than the estimated Optimal Sustainable Yield of about 1,000 kg, but there are many sources of additional harvest that are unquantified (harvest from the ice fishery, harvest from the open water fishery outside of the survey period, and First Nations subsistence harvest). In addition, because of the movements of fish between the Southern Lakes, it is difficult to make robust conclusions about the sustainability of the lake trout harvest.
- Several factors point to a depleted population in Marsh Lake: declining angler success, past overharvest, low population density, consistently high angler effort, and anecdotal reports of a decline in fishing quality.
- Northern pike catch numbers were higher than all previous surveys, but retention rates have dropped, resulting in lower harvest than previous years.

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## Introduction

We conduct angler harvest surveys, also called creel surveys, on a number of Yukon recreational fisheries each year. We use these surveys, together with other fish and fishery-related assessments, to find out if the harvest of fish from the lake is sustainable. Environment Yukon tries to conduct angler harvest surveys on key fisheries every 5 years or according to angler patterns and management concerns. The results of the surveys directly contribute to management decisions that make sure fisheries are sustainable over the long term.

Marsh Lake is located in south-central Yukon within the traditional territories of the Carcross Tagish First Nation and Kwanlin Dun First Nation. It is a large lake of 9,630 hectares (96.3 km<sup>2</sup>), and a mean depth of 12.8 m. It is located 50 km south of Whitehorse, along the Alaska Highway. The lake can be accessed at many different locations, including boat launches at the government campground, M'Clintock River Bridge, Tagish River Bridge, the Marsh Lake Marina, and all subdivisions around Marsh Lake. In addition to the regular access points, many local residents leave their boats tied up in front of their properties all season long.

Marsh Lake is part of the Southern Lakes system that also includes Bennett, Nares, Tagish, Tutshi, and Atlin lakes. These lakes are all closely connected and lake trout are known to migrate between them. Marsh Lake is the final headwater lake and drains northwest directly into the Yukon (Lewes) River. In addition to lake trout, Marsh Lake supports populations of Arctic grayling, northern pike, lake whitefish, broad whitefish, round whitefish, burbot, least cisco, longnose sucker, lake chub, and slimy sculpin. Inconnu and pygmy whitefish are present in adjoining waterbodies, but have not been recorded in Marsh Lake. Chinook salmon migrate through Marsh Lake in late summer on their way to upstream spawning locations.

Marsh Lake is a popular location for many different users; in addition to recreational and subsistence fishing, Marsh Lake is a popular location for recreational boating and snowmobiling, swimming, skiing, and wildlife viewing. Marsh Lake is also used as a water storage reservoir to supply the Whitehorse Rapids hydroelectric dam.

Angler harvest has been assessed on 3 previous occasions: 1992, 1994, and 1999. In 2007 Marsh Lake was chosen for surveying because of its past level of angling effort and its identification as a priority by management agencies and advisory bodies.

The 2007 survey was done to:

- determine how much time anglers spent fishing (effort);
- understand the fishery's characteristics and patterns of use;
- measure the success rate of anglers;

- compare the level of harvest to the productive capacity of the lake;
- record biological information on harvested fish;
- provide anglers with information about regulations; and
- establish a fisheries management presence.

## Harvest Regulations

Marsh Lake has been managed as a Conservation Water (previously known as High Quality Water) since 1993/1994. Regulations protect the larger spawning fish and encourage the harvest of smaller fish, while allowing the retention of a trophy fish if caught. Barbless hooks are required. The catch limit for lake trout is 2 fish per day and all fish between 65 cm and 100 cm must be released. Only one trout longer than 100 cm may be kept. The possession limit is 2 fish. For Arctic grayling, the catch limit is 4 fish per day and all fish between 40 cm and 48 cm must be released. Only one grayling longer than 48 cm may be kept. The possession limit for grayling is 4 fish. For northern pike, the catch limit is 4 fish per day and all fish between 75 cm and 105 cm must be released. Only one pike longer than 105 cm may be kept. The possession limit is 4 fish. General catch and possession limits apply to all other species.

The regulation history for Marsh Lake is detailed in Appendix 1.

## Methods

### *Survey*

In 1990 the Yukon Government adopted survey methodology developed by the Ontario Ministry of Natural Resources (Lester and Trippel 1985). A field worker conducts face-to-face interviews with anglers on selected sample days throughout the summer. The worker asks a standard set of questions about the social and biological aspects of the fishery. Data gathered include:

- How much time did anglers spend fishing?
- What fishing methods did anglers use?
- How did anglers fish (boat, shore, etc.)?
- Were anglers guided?
- Where were anglers from?
- What type of visitor were anglers (day users, campers, etc.)?



- What kinds of fish were anglers trying to catch?
- How many fish did anglers catch?
- How many fish did anglers release?

Any other information offered by anglers about their fishing experience is also recorded.

The field worker also collects biological data on the catch of cooperative anglers. Biological data gathered include: length (mm), mass (g), sex, maturity, an aging structure, as well as the collection of stomachs for content analysis in the lab. Any other information about general health and condition of the fish is recorded by the field worker (e.g., abnormalities, disease, lesions).

The field worker subjectively assesses the weather's effect on fishing over the entire sample day (no possible adverse effect, possible adverse effect, definite adverse effect).

The timing of the survey depends on management objectives, key species, and the nature of the fishery. It typically runs from ice out in the spring until either just after Labour Day or the end of September. The goal is to sample at least 20% of the total survey days. The survey is subdivided into several seasonal periods (usually 3 or 4) to better understand changes in angler activity. These periods are further divided into weekends and weekdays. Sample days are allocated to each period while considering both a higher weighting for those periods with the higher projected angler use and a minimum number of samples for each period.

Sample days are 14 hours long, 8:00AM to 10:00PM. On sample days, the field worker interviews all willing anglers. The field worker also records anglers who are observed but not interviewed.

### ***Analysis***

When the survey is finished, we enter the data into an Access database and analyze it using standard statistical methods. We determine the age of sampled fish by counting growth rings on the otolith. Diet is determined by examining the stomach contents.

### ***Lake Productivity***

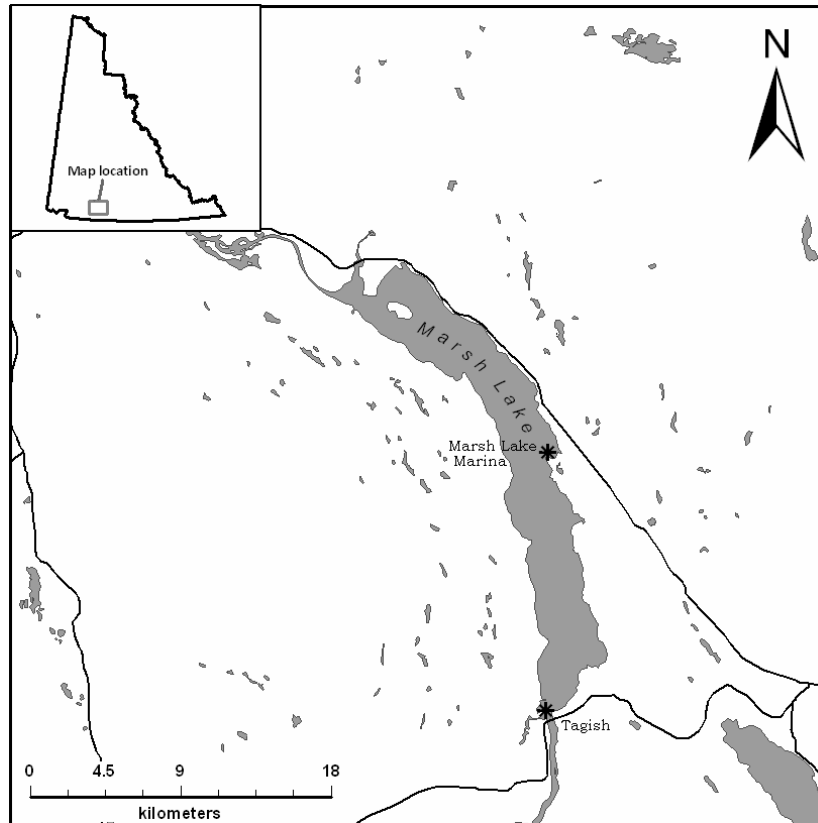
The productivity of a lake determines the amount of fish produced annually and can guide how much harvest can be sustained. Estimates of lake productivity are calculated using average lake depth, the concentration of total dissolved solids, and the average annual air temperature at the lake. Ryder's morphoedaphic index (1974) is used and incorporated into Schlesinger and Regier's equation (1982) for calculation of maximum sustained yield (MSY) for all species. Calculation of MSY for lake trout assumes a biomass of 30% lake

trout; where appropriate this may be replaced by the most recent survey data. Following O'Connor (1982) and others, 15% of MSY provides an “optimum” sustained yield (OSY), which maintains high quality fisheries on light to moderately fished lakes.

### **2007 Marsh Lake Survey**

The survey began May 20 and concluded on September 5, 2007.

We used an access survey, meaning a field worker was stationed at the Marsh Lake Marina on the eastern shore of the lake (Figure 1) for the entire sample day and interviewed angling parties at the end of their fishing trip. From this central lake location the surveyor could monitor traffic on the lake and users who accessed from other places such as “Inn on the Lake.” A second surveyor was stationed at the Tagish Bridge and monitored traffic entering the southern portion of the lake.



**Figure 1.** Marsh Lake, showing locations of 2007 Angler Harvest Surveys (\*).

The survey period was partitioned into 6 time periods, weekends and weekdays in May/June, July and August/September. Over the 105 day survey period, (marina survey period was 101 days and Tagish Bridge sample period was 109 days), 36 days were sampled for an overall sampling effort of 33%.

We analyzed the data in 2 ways. In the first, we combined data across all 6 time periods, and in the second we compared results between time periods. We analyzed all data at the party level.

## Results of the 2007 Survey

### *Effort*

Anglers spent 3,174 hours fishing on Marsh Lake. This is 0.33 hours angling / ha over the summer, a high level of angling pressure compared to other large Yukon lakes. There were a total of 1,170 anglers in 606 parties. On average, there were 30.2 hours of angler effort per day over the entire survey, and each angler fished for 2.7 hours.

### *Fishing Methods*

Trolling was the most popular method of fishing, followed by spin casting (Table 1). Still fishing, drift fishing, fly casting and combinations of methods were all observed, but in smaller numbers.

**Table 1.** Fishing methods, Marsh Lake 2007.

<b>Method of Fishing</b>	<b>Percent of Parties</b>
Still	<1%
Jig	
Drift	<1%
Troll	81%
Spin Cast	9%
Fly Cast	<1%
Other or Combination	8%

### **Methods of Access**

Most anglers accessed the lake by motorboats (Table 2). A few anglers accessed the lake from shore and canoes.

**Table 2.** Angler access methods, Marsh Lake 2007.

<b>Access Method</b>	<b>Percent of Parties</b>
Canoe	3%
Rowboat	
Motorboat	87%
Shore	9%
Other	1%

### **Guided Anglers**

Only one guided party was observed, accounting for less than one percent of angling parties.

### **Angler Origin**

Whitehorse anglers were the most frequent fishers, followed by local anglers (Table 3). There was a minor presence of Canadian and American anglers.

**Table 3.** Angler origin, Marsh Lake 2007.

<b>Origin</b>	<b>Percent of Parties</b>
Local	39%
Whitehorse	50%
Yukon	1%
Canada	4%
U.S.	5%
Other	1%

### **Visitor Type**

Most anglers were day users (Table 4).

**Table 4.** Angler visitor type, Marsh Lake 2007.

<b>User Type</b>	<b>Percent of Parties</b>
Day users	91%
Camper – Territorial campground	8%
Camper – Crown Land	1%
Camper – Private campground	

### ***Weather***

Weather showed a slight adverse effect on fishing activity (Table 5). Almost all of the effect was from wind.

**Table 5.** Sample day weather, Marsh Lake 2007.

<b>Did Weather Affect Angling?</b>	<b>Percent of Parties</b>
No possible adverse effect	73%
Possible adverse effect	23%
Definite adverse effect	4%

### ***Catch and Harvest***

Lake trout were by far the most heavily caught and harvested species, with a 51% retention rate (Table 6). Some northern pike were caught, mostly by anglers departing from the marina, and the majority were released. Arctic grayling were caught in small numbers, but only by anglers departing from the marina.

**Table 6.** Angler catch and harvest, Marsh Lake 2007.

	<b># Caught</b>	<b># Kept</b>	<b>Retention Rate</b>
<b>Marina Access Point</b>			
Lake trout	186	95	51%
Northern pike	121	19	16%
Arctic grayling	34	4	12%
<b>Tagish Bridge Access Point</b>			
Lake trout	80	31	39%
Northern pike	5	3	60%
Arctic grayling			
<b>Combined Results</b>			
Lake trout	268	126	47%
Northern pike	126	22	18%
Arctic grayling	34	4	12%

Estimated angler success rates, calculated over the entire survey as numbers of fish caught per hour of angling effort (CPUE), is presented for all anglers (regardless of target species) and separated by each location (Table 7).

**Table 7.** Estimated catch per unit of effort (fish/hour), Marsh Lake 2007.

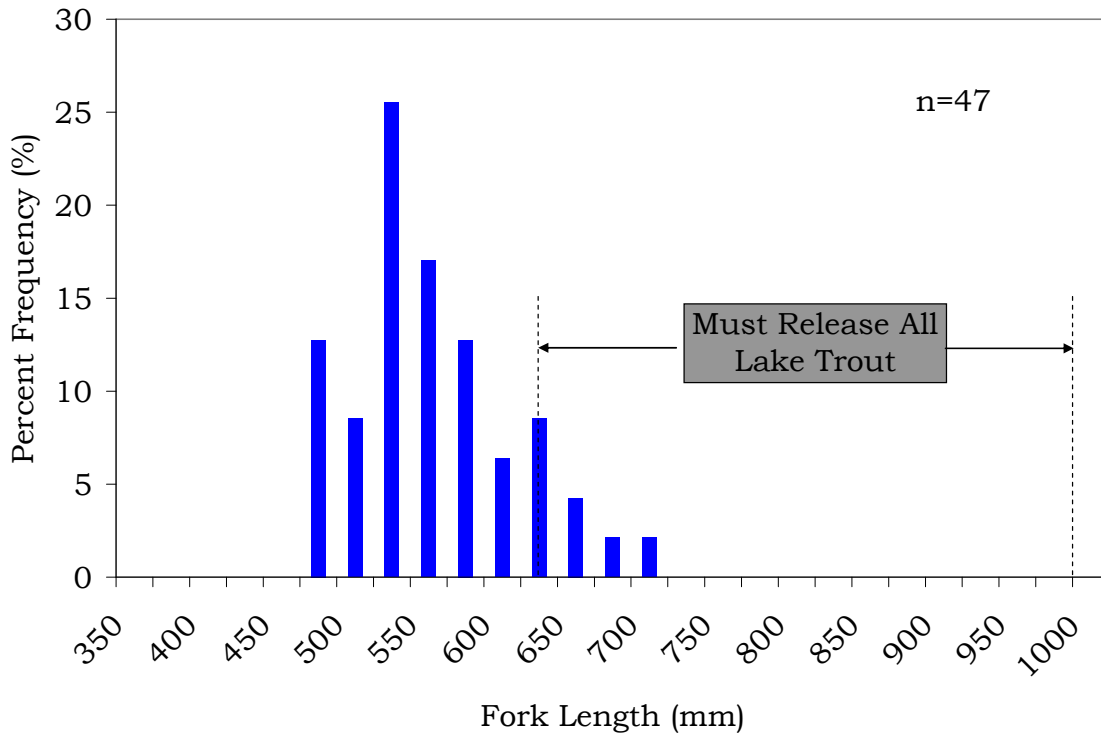
<b>Species</b>	<b>Marina CPUE</b>	<b>Tagish Bridge CPUE</b>
Lake trout	0.113	0.052
Arctic grayling	0.021	
Northern pike	0.073	0.004

### **Biological Data**

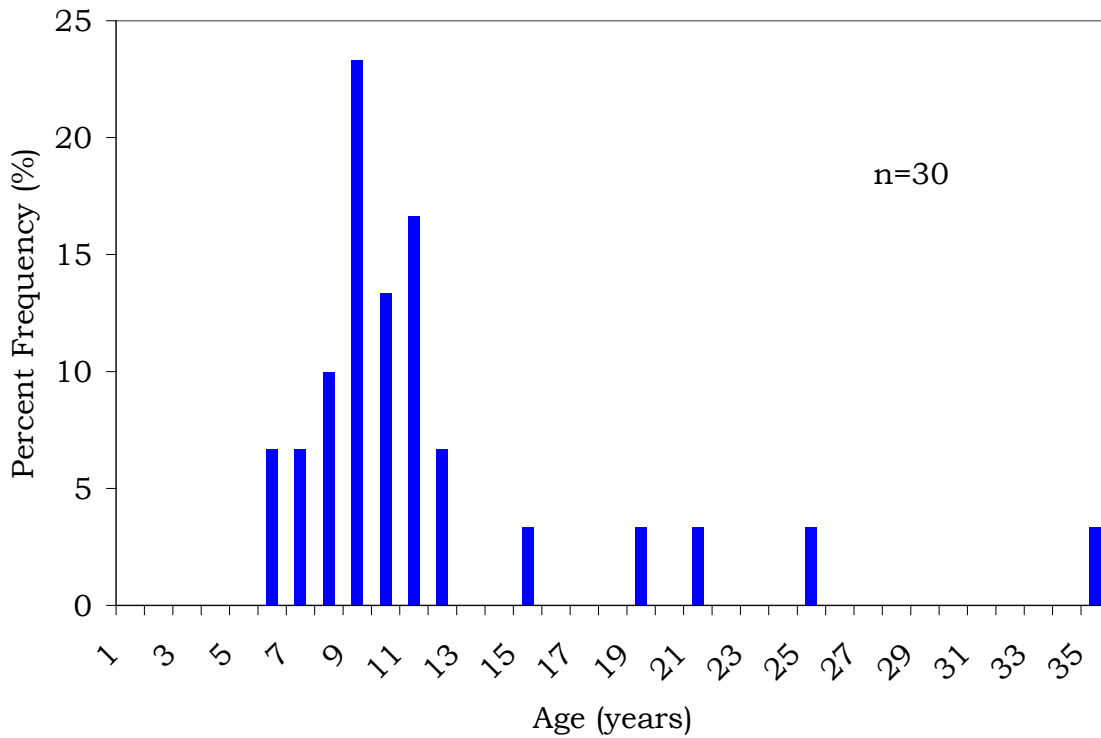
We sampled 47 lake trout for fork length (mean 542 mm) and weight (mean 2,107 g). These fish had a mean condition factor of 1.32, which is very good for lake trout in Yukon, and indicates “fat” fish (condition factor is the relationship between length and weight). The sex ratio was 1.15 males per female. A similar number of lake trout were harvested across a wide range of size classes from 475 to 700 mm (Figure 2). A few slot limit fish were harvested.

We aged 30 of the sampled lake trout. These fish ranged from 6 to 35 years old, and had an average age of 11.6 years (Figure 3). The most common

age was 9 years old. Note that young fish (less than 5 years) are not vulnerable to angling gear and regulation does not allow harvest of larger fish (with the exception of one very large trophy). These portions of the population are therefore under represented in the sample. A number of sampled lake trout were between 65 and 100 cm total length (fish that must be released by recreational anglers). These fish may have been taken lawfully by subsistence harvesters, or may represent unlawful harvest by recreational anglers.



**Figure 2.** Lengths of lake trout caught by anglers, Marsh Lake 2007.



**Figure 3.** Ages of lake trout caught by anglers, Marsh Lake 2007.

We examined the stomachs of 47 lake trout. Of these, 5 were empty and the remaining 42 averaged 76.9% full. Unidentified fish were the most common diet item (Table 8).

**Table 8.** Sampled lake trout stomach contents, Marsh Lake 2007.

Stomach Content	Percent Volume
Unidentified Fish	59%
Non-Biting Midges	34%
Caddisflies	3%
Round Whitefish	2%
Least Cisco	1%
Slimy Sculpin	<1%
Snails	<1%
Unknown	<1%
Pond Snails	<1%
Unidentified Vegetation	<1%
Scuds, Sideswimmers	<1%
Clams, Mussels	<1%



Only one Arctic grayling stomach was analyzed; it contained beetles, slimy sculpin, and caddisflies.

We also analyzed stomach contents from 2 northern pike, which contained equal amounts of unidentified fish, dragonflies, and damselflies.

## Comparison With Previous Surveys

We previously surveyed the angler harvest on Marsh Lake in 1992, 1994, and 1999. These surveys had similar methods and design and are directly comparable with the 2007 survey.

### *Effort*

Estimated summer open water angler effort over the past 15 years has fluctuated (Table 9). We estimated 3,174 angler hours of effort over the 2007 survey. From 1992 to 2007, angler effort decreased by 34%, but between 1999 and 2007, it rose by 20%.

**Table 9.** Total estimated angler hours, Marsh Lake 2007, 1999, 1994, and 1992.

	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Hours	3,174	2,653	4,216	4,828

### *Fishing Methods*

Fishing methods have remained fairly constant since 1994. Trolling has slowly decreased in popularity while spin casting has increased (Table 10). These data are not available from 1992.

**Table 10.** Fishing methods (percent of parties), Marsh Lake 2007, 1999, 1994, and 1992.

<b>Fishing Method</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Still	<1%			
Jig			2%	
Drift	<1%	2%		
Troll	81%	92%	96%	N/A
Spin Cast	9%	6%	2%	
Fly Cast	<1%			
Other or Combination	8%			

### **Methods of Access**

Methods of access were only recorded in the most recent survey (Table 11).

**Table 11.** Methods of access (percent of parties), Marsh Lake 2007, 1999, 1994, and 1992.

<b>Method of Access</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Canoe	3%			
Rowboat				
Motorboat	87%		No Data Available	
Shore	9%			
Other	1%			

### **Guided Anglers**

Formally guided parties have accounted for 0 - 2% of the angler effort in all surveys (Table 12). These data are not available from 1992.

**Table 12.** Guided anglers (percent of parties) , Marsh Lake 2007, 1999, 1994, and 1992.

<b>Guided</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Yes		1%	2%	N/A
No	100%	99%	98%	

### **Angler Origin**

Over the 15 years of survey data, the proportion of local anglers has increased (Table 13). Whitehorse anglers have remained the majority throughout most surveys. The proportion of Canadian and Yukon anglers has dropped since the earlier surveys.

**Table 13.** Origin of anglers (percent of parties) , Marsh Lake 2007, 1999, 1994, and 1992.

<b>Origin</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Local	39%	26%	19%	29%
Whitehorse	50%	57%	42%	50%
Yukon	1%	4%	5%	8%
Canada	4%	7%	17%	8%
United States	5%	4%	15%	5%
Other	1%	4%	1%	0%

### **Visitor Type**

Visitor type has been dominated by day users in all years (Table 14). There was a much higher percentage of government campground users in 1994 than in subsequent years. These data were not collected in 1992.

**Table 14.** Visitor type (percent of parties), Marsh Lake 2007, 1999, 1994, and 1992.

<b>Visitor Type</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Day users	90%	90%	71%	
Camper – Territorial campground	8%	9%	29%	N/A
Camper – Crown Land	2%			
Camper – Private campground				

### **Catch and Harvest**

Lake trout catch estimates for 2007 were slightly higher than the previous survey in 1999, but were much lower than the average of all 4 surveys (Table 15). Lake trout harvest rates were lower than the previous survey, as anglers released an increasing percentage of their catch.

Northern pike catches were much higher than the 1999 survey. Percent retention of northern pike dropped significantly in 2007.

Estimated CPUE (number of fish per angler hour) over the entire survey can reflect the changes in the fishery because it incorporates effort and catch. Dramatic decreases in CPUE for a particular species could indicate problems in terms of the health or status of the fish species in question. However, relying on CPUE of anglers alone is not recommended – see the section entitled “Invisible Collapse” in the *Status of Yukon Fisheries 2010* (Environment Yukon 2010) – anglers are very good at finding fish even when the population is in decline.

The CPUE for lake trout has been steadily declining (Table 16) and results were below the Yukon average for lakes surveyed to date (0.14 fish per hour). The CPUE for other species should be treated with caution. These species receive only a small amount of fishing effort, and so these estimates are quite rough.

**Table 15.** Estimated number of fish caught, fish kept, and the retention rate, Marsh Lake 2007, 1999, 1994, and 1992.

<b>Species</b>	<b>Retention</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Lake trout	Caught	268	244	634	2074
	Kept	126	141	426	1035
	Released	142	103	208	1039
	% Kept	47	57	67	50
Northern pike	Caught	126	65	71	
	Kept	22	33	30	
	Released	104	32	41	
	% Kept	17	51	42	
Arctic grayling	Caught	34			
	Kept	4			
	Released	30			
	% Kept	12			
Lake whitefish	Caught		8		
	Kept		0		
	Released		8		
	% Kept		0		

**Table 16.** Estimated Catch per Unit of Effort (Fish/Hour), Marsh Lake 2007, 1999, 1994, and 1992.

<b>Species</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Lake trout	0.08	0.09	0.15	0.24
Northern pike	0.04	0.003	0.02	
Lake whitefish		0.02		
Arctic grayling	0.01			

### ***Biological data***

Sample sizes of harvested lake trout from angler harvest surveys conducted before 2007 are too small to permit confident comparisons with 2007 lake trout biological data.

## Fishery Sustainability

We estimate that Marsh Lake could sustain a total annual lake trout harvest of 1,000 kg (total dissolved solids: 57 mg/L, mean annual air temperature: -1.0 °C, mean depth: 12.8 m; see Methods – *Lake Productivity*).

Anglers harvested 126 lake trout over the summer (Table 17). The estimated lake trout harvest (harvest estimate x mean weight) from the 2007 summer’s angling was 266 kg (Table 18). Total fish mortality (death) includes an estimate of the unintentional mortality of any released fish. Catch and release, when done properly, has minimal impact on released fish. Lake trout survival rates range from 93% for lightly handled fish to 76% for deep-hooked fish (YFWMB 1998). We used an average of 85% survival. For the 142 lake trout released, we estimated an additional mortality of 21 fish for a total of 147 fish. Based on average size of harvested fish, the weight of total lake trout mortality in the recreational fishery was 310 kg.

**Table 17.** Estimated summer lake trout harvest by anglers, Marsh Lake 2007, 1999, 1994, and 1992.

<b>Lake Trout Harvest</b>	<b>2007</b>	<b>1999</b>	<b>1994</b>	<b>1992</b>
Lake trout harvested	126	141	426	1035
Lake trout released	142	100	208	1039
Catch and release mortality (15%)	21	15	31	156
Total harvest and mortality	147	156	457	1190
Mean lake trout weight (kg)	2.11	2.10	2.05	1.76
Total harvest and mortality (kg)	310	328	937	2096

There is a fairly active ice fishery on Marsh Lake but it has only been formally monitored once, in 1995 (YG unpublished data). Estimates showed that there were over 1,755 angler hours exerted on ice fishing in 1995. Unfortunately species data are not available and there has not been another survey since. Anecdotal information suggests that effort and harvest are moderate and the fishery is focused on northern pike and lake trout. Data is unavailable for First Nations subsistence harvest. Our harvest estimate of 310 kg is therefore a minimum estimate.

Further, harvest estimates for Marsh Lake do not include harvest from the Six Mile River, and particularly the Tagish Bridge fishery. The estimated harvest from the Tagish Bridge in 2007 was 567 kilograms (Millar et al. 2012). Because we do not have a good understanding of lake trout migrations in the Southern Lakes, the proportion of this harvest which should be counted against the OSY of Marsh Lake is unknown.

Assessing the sustainability of the harvest of lake trout from Marsh Lake is currently difficult; there are many unknowns and sources of error. First, the harvest we estimated is a minimum; it does not include open water harvest outside of the survey period, First Nations subsistence harvest, or harvest from ice fishing. Second, lake trout migrate in and out of Marsh Lake and are harvested elsewhere, such as Six Mile River. We do not know what proportion of these fish belong to the Marsh Lake stock. Third, past overharvests may have reduced the population to a level where it does not produce as many fish as a healthy population would; the 1,000 kg OSY may be an overestimate. As a result, we cannot make robust conclusions about the sustainability of the fishery.

Several factors point to a population that is depleted relative to its past levels:

- the lake trout harvest exceeded sustainable levels in 1992 and was very close to OSY in 1994;
- since the first survey in 1992, the success of anglers (CPUE) has steadily and significantly declined from 0.28 in 1992 to 0.08 in 2007;
- Marsh Lake receives a high level of angling pressure, even for such a large lake;
- netting surveys have found very low densities of lake trout in Marsh Lake (YG unpublished data); and
- anecdotal information suggests that fishing success and the number of large fish in the lake used to be much greater.

We recommend close monitoring of the angler harvest on Marsh Lake in general and specifically to assess the trend of declining angler success. We recommend that future surveys also assess in a qualitative, if not quantitative way, any additional harvests. Finally, we recommend conducting studies to determine the migration of lake trout between the Southern Lakes. This information is required to make robust conclusions about the sustainability of the Marsh Lake fishery.

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## APPENDIX 1. Marsh Lake angling regulation changes 1989 to 2007.

Year	Species	Catch limit	Possession limit	Size restrictions
1989/90*			General Regulations	
	Lake trout	3	6	Only one fish over 80 cm
	Arctic grayling	5	10	none
	Northern pike	5	10	none
	Whitefish	5	10	none
1991/92			General Regulations	
	Lake trout	3	6	Only one fish over 65 cm
	Arctic grayling	5	10	Only one fish over 40 cm
	Northern pike	5	10	Only one fish over 75 cm
	Whitefish	5	10	none
1993/94			Conservation Waters (was High Quality Waters)	
	Lake trout	2	2	None between 65 and 100 cm; only one over 100 cm
	Arctic grayling	4	4	None between 40 and 48 cm; only one over 48 cm
	Northern pike	4	4	None between 75 and 105 cm; only one over 105 cm
	Whitefish	5	10	none

\* Yukon Government obtained responsibility for freshwater fisheries management from the federal government in 1989.



## APPENDIX 2. Comparisons between periods

### Effort

Mean daily effort varied between the two locations on Marsh Lake. Effort charts have been broken up to show the differences.

Mean daily angler effort at the Marsh Lake Marina was very high on weekends in both May/June and July with a substantial drop in August/September (Figure 2.1). Weekday effort at the marina was much lower but followed a pattern similar to weekend effort. This is a typical pattern in Yukon lake trout fisheries.

Mean daily angler effort at the Tagish Bridge access point to Marsh Lake was highest on May/June weekends then dropped substantially during the remainder of the season (Figure 2.2). Weekday effort was minimal all season long.

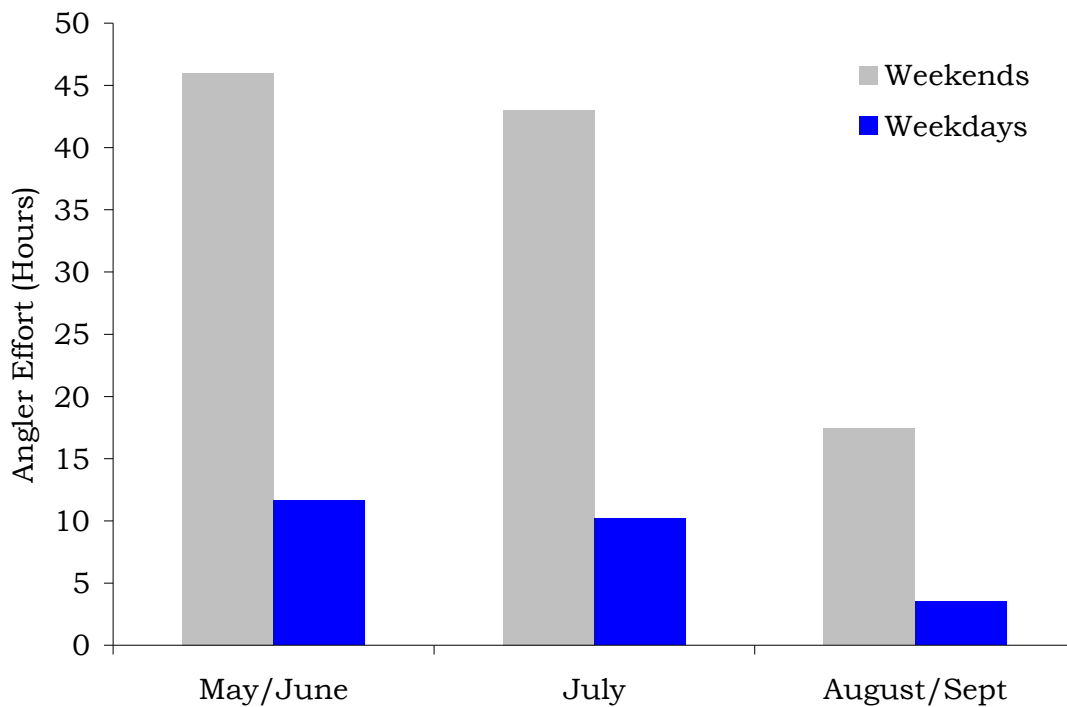
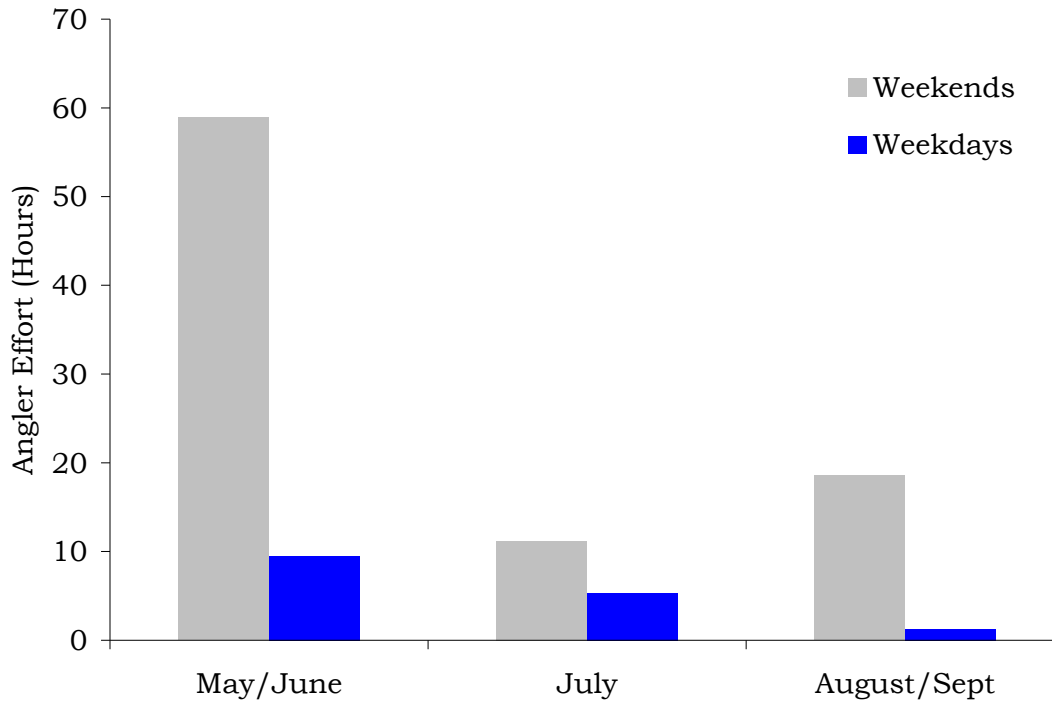


Figure 2.1. Estimated angler effort per day, Marina access point.



**Figure 2.2.** Estimated angler effort per day, Tagish Bridge access point.

### **Catch**

Lake trout CPUE was low at Marsh Lake in 2007. Between the 2 locations, lake trout CPUE was higher for anglers that departed from the marina except on weekends in August/September when it was higher for anglers in the south. (see Table 10) Northern pike and Arctic grayling CPUE were fairly high in a few periods, but not consistently over the survey period. Northern pike and Arctic grayling CPUE were very poor by anglers that departed from the Tagish Bridge.

Catch per unit effort patterns for lake trout was somewhat consistent with typical Yukon summer patterns. In most Yukon lakes, success is high in the spring following ice out and then drops as water temperature warms. Fall increases are usually related to onset of spawning and cooling water temperatures. Lake trout CPUE on Marsh Lake was highest on May and June weekends for anglers departing from both the marina and Tagish Bridge, but a midsummer decline followed by a late summer increase in CPUE was not clearly demonstrated (Table 2.1).

**Table 2.1.** Estimated catch per unit of effort (fish/hour) by period.

	<b>Lake Trout</b>	<b>Arctic Grayling</b>	<b>Northern Pike</b>
<b>Marina Access Point</b>			
May/June weekends	0.128		0.194
May/June weekdays	0.074		
July weekends	0.159	0.068	0.128
July weekdays	0.071		
August/September weekends	0.069		0.012
August/September weekdays	0.064		
<b>Tagish Bridge Access Point</b>			
May/June weekends	0.092		0.006
May/June weekdays	0.003	0.033	
July weekends	0.045		
July weekdays	0.000		
August/September weekends	0.110		
August/September weekdays	0.000		