



September, 2001

To:

Lac La Biche area fisheries biologists (C. Davis and B. Makowecki), NEB NRS and ACA fisheries and the ACA home office library.

Subject:

Data from the Sport Fisheries Monitoring Program creel survey of Seibert Lake (2000) and the assessment of the northern pike sport fishery.

Introduction

Seibert Lake was designated a trophy lake for pike in 1970. Anglers were required to purchase a special pike license in addition to their provincial license. The daily catch and possession limit for pike was 2 fish of any size. In 1995 a daily catch and possession limit of 2 pike over 90 cm natural total length (TL nat) minimum size limit was implemented. In 1998 the trophy status was removed and no special license was required. However, the daily catch and possession limit and length restriction did not change. In 1999, Alberta Natural Resources Service implemented a pike management strategy at all pike lakes (Berry 1999) except Seibert Lake. In 2000, the regulation was modified and a 1 pike over 100 cm maximum total length (TL max) pike daily catch and possession limit was implemented.

Methods

One creel survey crew (two biotechnicians) collected information from both Seibert Lake and Moose Lake between June 1 and 20 August 2000. While at Seibert Lake, the crew was stationed at the Seibert Lake Forest Recreation Area campground. A schedule of 5 survey days at Seibert Lake (Wednesdays through Sundays) was preceded by 5 survey days at Moose Lake (Fridays through Tuesdays). Each shift was followed by 4 days off. This cycle was repeated 6 times during the study (Appendix 1).

The methods of the creel survey, the collection of creel data, biological data, angling test fishery data, data management and verification procedures, the calculation of sport fishery parameters specific to the creel survey site and the fishery were conducted following Patterson 1999.

Several important parameters relating to compliance and reporting bias were calculated using test fishery and sport fishery data following Sullivan 2000.

Results

During the 2000 survey, the survey crew interviewed 947 anglers (Table 1). The total number of anglers was estimated at 2,910 (Table 2). The estimated effort was 11,709 hours resulting in an estimated angling pressure of 3.1 angler-hours / hectare. Since 1994, angler effort increased 35% from 2.3 hrs / ha and is still considered low (Figure 1). The estimated harvest of legal-sized pike was 17 fish. The estimated illegal harvest of sublegal sized pike was 13 fish. The sport harvest of pike has decreased 84% since the implementation of the large minimum size limit in 1995. The estimate of reported released sublegal and legal size pike was 6,912 and 24 fish, respectively. It is estimated that anglers actually released 1,746 sublegal size pike. The yield of harvested legal-sized pike was estimated at 112 kg (0.03 kg / ha). Assuming a modest 10% release mortality, the estimated yield of released, but dead pike was 1165 kg (1,746 pike*0.1 mortality*1.794 kg mean weight) or 0.083 kg / ha. The sport yield of harvested pike during the period of this survey was therefore 0.113 kg / ha, of which 73% was released, but likely dead pike.

Table 1. Observed and reported catch rates of anglers; Seibert Lake, 2000.

CREEL DATA	1992	1993	1994	2000
# days surveyed	~60	~60	~36	29
# anglers interviewed	2,104	2,030	1,036	947
# angling hours reported	6,955	6,366	3,310.5	3,771.75
NORTHERN PIKE DATA				
Pike kept / ang-hr	**0.074	**0.066	**0.056	*0.003
Pike rel. legal-sized / ang-hr	N/A	N/A	N/A	*0.002
Pike rel. sublegal/ ang-hr	N/A	N/A	N/A	*0.68
Total pike released / ang-hr	**0.13	**0.13	**0.15	0.68
WALLEYE HARVEST CUE				
> 501 mm FL / angler-hr	0.006	0.005	0.008	0.004
396 - 501 mm FL/ angler-hr (illegal)	0.038	0.028	0.014	0.008
< 396 mm FL/ angler-hr	0.022	0.022	0.030	0.029
Total kept / angler-hr	0.066	0.055	0.052	0.041
WALLEYE RELEASE CUE				
> 501 mm FL / angler-hr	0.001	0.001	0.002	0.002
396 - 501 mm FL/ angler-hr	0.15	0.22	0.14	0.14
< 396 mm FL/ angler-hr	0.018	0.044	0.054	0.19
YELLOW PERCH DATA				
Perch kept / ang-hr	0.081	0.030	0.041	0.008
Perch rel. / ang-hr	0.076	0.009	0.018	0.011

*Early 2000, AB Govt introduced a 100 cm TL maximum size limit / 1 fish daily bag possession limit. No special license required.

**prior to 90 cm TL limit / 2 fish daily bag possession limit implemented in 1995.

Table 2. Whole lake estimates; Seibert Lake, 2000.

	1992 WHOLE LAKE ESTIMATE	1993 WHOLE LAKE ESTIMATE	1994 WHOLE LAKE ESTIMATE	2000 WHOLE LAKE ESTIMATE (95% CI)
# Anglers	3,011	2,677	2,719	2,910 (+17.3%)
# Hours	9,758	8,339	8,673	11,709 (+19.4%)
Hours / hectare	2.6	2.2	2.3	3.1 (+19.4%)
# pike harvested	518	419	185	30 (+45.6%)

Figure 1. Effort graph (insert)

Test Angling

Angling test fisheries were conducted on 20 days, from 20 May to 18 August. A total of 166.0 hours were spent test angling. A total of 208 pike and 269 walleye were caught and measured. Only 2 pike were legal size (>100 cm TL max) and the remaining 206 were sublegal size. This provides a ratio of 103 sublegal pike : 1 legal size pike. By multiplying the observed legal-size pike harvest rate by this ratio, a sublegal-size catch rate can be estimated. The estimated total catch rate does not include the angler's reported catch of legal or sublegal size pike since these numbers are usually exaggerated. Since the number of legal size pike caught in the test fishery is very small, the sublegal : legal size ratio may not accurately represent the angled population.

Compliance

Angler's reports of released sublegal and legal size pike are likely exaggerated. The compliance parameters in Table 3 are taken from Jordan Walker's (Alberta Environment, Fish and Wildlife Service, Enforcement Field Services) M. Sc. work in progress. Walker's work is based on Sullivan's *Exaggeration of walleye catches by anglers in Alberta and perceived hyperstability in reported catch rates* (2000). At this juncture, any questions regarding these parameters should be directed to Walker and Sullivan.

Table 3. Non-compliance with size limits; Moose Lake, 2000.

PARAMETER	Using angler's reported legal-size released (LCI – UCI, 95%)	Using 10% of angler's reported legal-size pike released (LCI – UCI, 95%)	If all legal-size pike were kept (zero legal-size pike released) (LCI – UCI, 95%)
Illegal harvest (%)	0.44% (0.52% - 2.94%)	1.00% (0.52% - 2.94%)	1.17% (0.52% - 2.94%)
Exaggeration (1X)	2.5X	5.8X	6.7X

Historical

Valastin and Sullivan (1996) report the fishery for northern pike was "superlative" and had a province-wide reputation for trophy pike. Respondents commonly described catches of "huge trophy-sized pike with reports of fish weighing 30 pounds and average sizes were described as being between 10 and 20 pounds". Two respondents mentioned that it "started to get harder to catch the limit of pike as time went on". Chipeniuk (1975) notes that there were "incredible numbers of 18 – 30 pound jacks at that time (1940s), with odd ones going to 40 pounds and as the small whitefish were harvested out...the pike (or muskellunge as they were referred to) became fewer and smaller".

Status of the Pike Fishery

The metrics associated with reference points that are used to assess Alberta’s pike fisheries are shown in Table 4. The following parameters are ineffective in the assessing Seibert Lake pike fishery:

- #1/ Catch rate (CUE) for legal size pike (>63 cm TL max) is not comparable and,
- #8/ Percent successful anglers catching one or more pike >63 cm TL max.

Table 4. Assessment of the status of the pike fishery; Seibert Lake, 2000.

METRIC	STABLE	VULNERABLE (No Risk)	VULNERABLE (Low Risk)	COLLAPSED
1. CUE kept (63 cm TL max) ?	> 0.1	> 0.02	> 0.01	< 0.01
2. CUE estimated total (observed legal size CUE + estimated release CUE) INCLUDES TEST FISHERY FORK LENGTH DATA	1 – 2	0.5 - 1	0.2 - 0.5	< 0.2 0.175
3. # MEASURABLE AGE-CLASSES (> 0.02 / h) INCLUDES TEST FISHERY FORK LENGTH DATA	7 – 12	3 – 7 3	1 – 2	Almost none
4. GROWTH RATE INCLUDES TEST FISHERY FORK LENGTH AND AGE DATA	Slow	Increasing	Increasing	Fast Fast, provincial minimum size at age 5.
5. MEAN WT (kg) (>63 cm TL, provincial minimum size) INCLUDES TEST FISHERY FORK LENGTH DATA	1 – 2	< 1	0.5 – 1.5	0.5 – 3.5 3.224 kg
6. PSD (% pike >53 cm TL max) INCLUDES TEST FISHERY FORK LENGTH DATA	> 40 87%	< 40	Variable (> 0.1 pike / h)	Variable (< 0.1 pike / h)
7. RSD (% pike 35 – 52 cm TL max, stock – quality sized) INCLUDES TEST FISHERY FORK LENGTH DATA	< 50	> 50	Variable (> 0.1 / h) 12%	Variable (< 0.1 / h)
8. SUCCESS ? (% anglers catching 1 or more legal-size pike, 63 cm TL)	> 70	< 70	< 40	< 20
9. GINI (total CUE) (catch inequality)	0.3	0.5 – 0.7 0.59	0.7 – 0.9	> 0.9

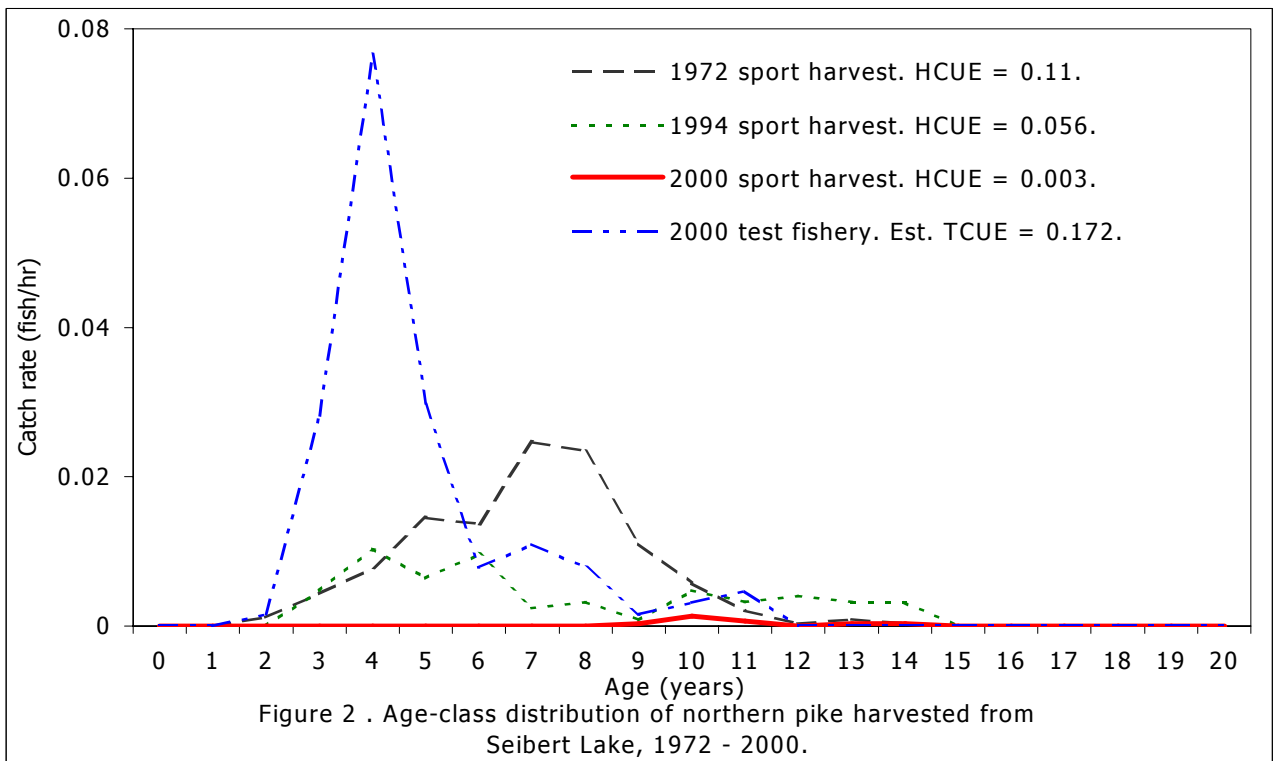
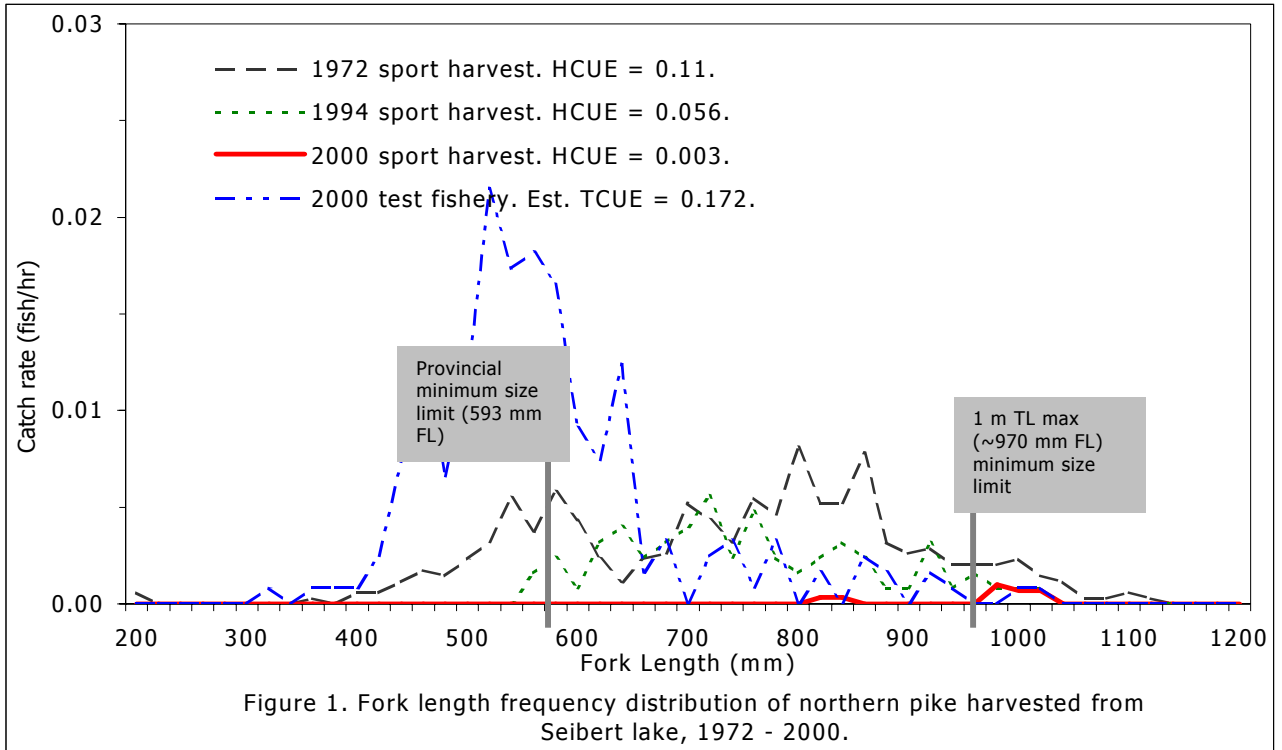
1. Biological Metrics

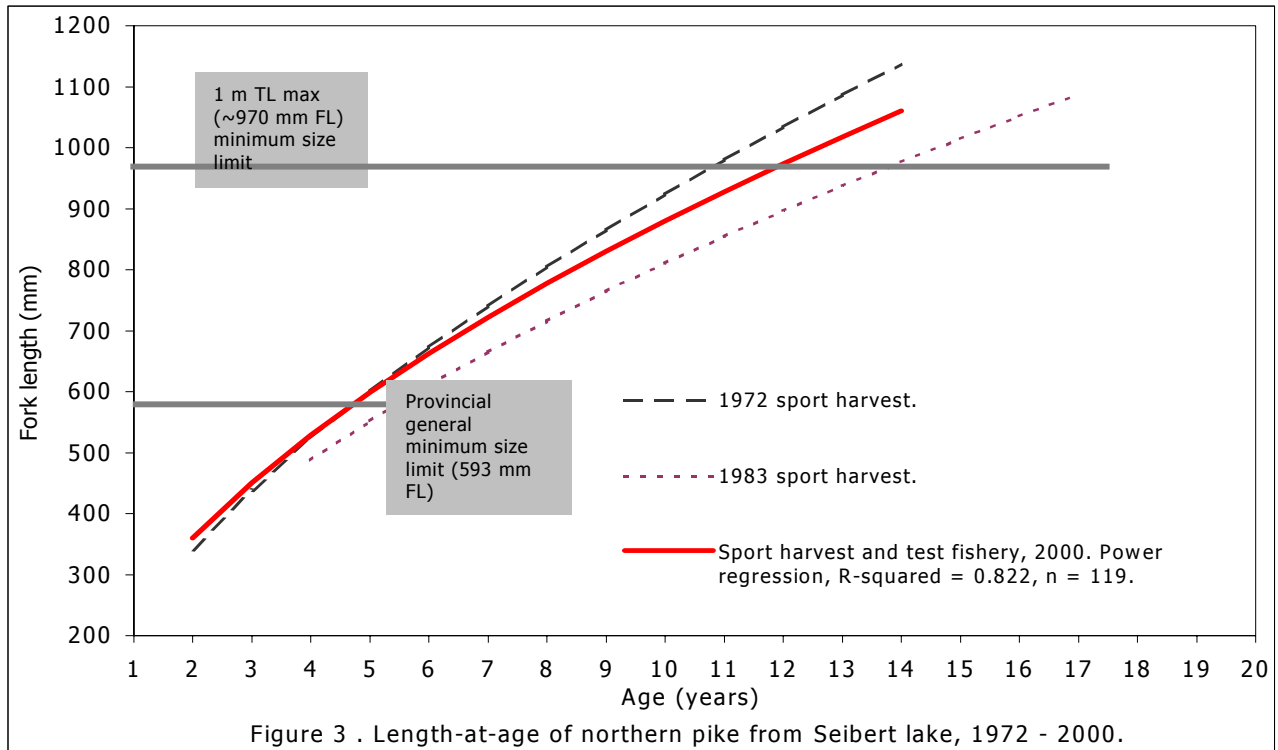
From the 2000 survey, the observed legal-size harvest rate on pike was **0.0017** kept / hour. Nine pike were observed harvested of which 5 were legal-size. The reported release rate for legal size pike was 0.002 fish/hr. The reported release rate for sublegal size pike was 0.68 fish/hr. Prior to 1995 and the minimum size limit on pike, the reported release rates (fish/hr) were 0.13 (1992), 0.13 (1993) and 0.15 (1994). According to Sullivan (2000) reported release rates are likely exaggerated; exaggeration in catches was not constant, but increased exponentially with decreasing catch rate. Therefore, since the reported release rate was high it is likely exaggerated to a lesser degree. Based on the test fishery, the estimated sublegal release rate was 0.172 pike released / hr. Therefore, the estimated total catch rate for pike at Seibert Lake in 2000 was 0.175 fish / hr (0.003 + 0.172). Walker's graduate work suggests anglers are exaggerating their catch of pike by at least 2.5X. The calculation of the exaggeration of reported release rates is imprecise due to the small sample size of the legal-size pike caught in the angling test fishery.

The harvest of large, older pike has obviously declined since the previous surveys (Figures 1 and 2). Cushing (1981) refers to a growth overfished population as both the catch and the stock density of large fish have been reduced while remaining adult population has maintained or increased the recruitment of fish. Both the reported and the estimated release rates suggest a moderate level of recruitment. If the reported rate is exaggerated, it still indicates a modest level of recruitment. The index-of-growth of young pike from the 1972 and 2000 surveys are similar and relatively fast (Figure 3). Pike are first reaching the provincial general regulation of 630 mm TL max (593 mm FL) minimum size regulation by age 5. The mean weight of a pike >630 mm TL was 1.785 kg. The proportional stock density (PSD) was 87% (% pike > 520 mm TL max) (Gablehouse 1984). Twelve percent of pike were in the stock-quality size class (350 - 520 mm TL max).

2. Social Metrics

There was a moderate degree of inequality in the catch of pike (Baccante 1995). A gini coefficient of 0 indicates all anglers caught equal numbers of fish and a coefficient of 1 indicates that a single angler caught the entire catch. The gini coefficient is likely inflated due to exaggeration found in reported catch rates.





Discussion

Historically, Seibert Lake was a superlative pike fishery with catches of many large pike. During the 1940s, the pike fishery declined with the increasing gill-net harvest of whitefish. The pike sport harvest has been greatly decreased since the implementation of the large minimum size limit. However, the majority of the sport yield is released, dead pike. The reported release rate, even somewhat exaggerated, suggests modest level of recruitment and densities of sublegal size pike. Cushing refers to this type of fishery as growth overfished; the reduced adult population has maintained or increased recruitment. The growth rate of young pike is fast and reaching the provincial size limit by age 5. The majority of the pike are larger than 52 cm (TL max). There was some inequality in the catch of pike.

It is necessary to continue to monitor this fishery with special attention given to changes in angling pressure and to the response of these vulnerable, young pike to the effects of hooking mortality. As pike numbers and catch rate increases angling pressure will also increase. As these young pike recruit into the fishery, their excessive *harvest* may overwhelm the conservative regulation of pike.

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Appendix 1. Daily summary of angler survey data. [Seibert Lake, 2000]

Month	Day	# Anglers	# Hours	Walleye Kept	Walleye Released >53 cm TL	Walleye Released 42 - 53 cm TL	Walleye Released <42 cm TL	Pike Kept	Pike Released <100 cm TL	Pike Released >100 cm TL	Perch Kept	Perch Released
Totals	29	947	3771.75	155	8	509	700	10	2569	9	1	3
6	7	28	98.5	3	0	9	6	0	112	0	0	0
6	8	56	149.5	9	0	19	23	2	157	0	0	0
6	9	21	37.75	5	0	11	5	1	26	0	0	0
6	10	64	141.75	2	0	23	4	1	111	0	0	0
6	11	8	16.25	0	0	0	0	0	7	0	0	0
6	21	3	6	0	0	0	0	0	2	0	0	0
6	22	23	120.25	5	0	17	4	0	45	1	0	0
6	23	39	158.75	5	0	3	0	0	94	0	0	0
6	24	76	330.75	14	1	20	20	0	223	1	0	0
6	25	6	15	0	0	0	3	0	22	0	0	0
7	5	28	126	0	0	11	35	1	83	2	0	0
7	6	17	73	1	0	12	17	0	40	0	0	0
7	7	14	39.5	3	0	4	16	0	27	0	0	0
7	8	44	195	2	0	20	33	0	139	0	0	0
7	9	24	112.5	2	0	16	14	0	127	0	0	0
7	19	13	60	0	1	7	20	0	48	2	0	0
7	20	21	63	2	2	8	18	0	71	0	0	0
7	21	31	92	5	0	22	20	0	32	0	0	0
7	22	37	164.5	7	0	18	55	0	63	0	0	0
7	23	11	51.5	0	0	11	21	0	15	0	0	0
8	2	50	256	16	2	59	31	1	147	0	0	0
8	3	28	197.5	10	0	34	23	1	170	3	0	0
8	4	31	180	7	0	21	39	0	132	0	0	0
8	5	88	347.25	29	1	66	141	1	181	0	1	2
8	6	99	453.5	23	1	72	123	2	328	0	0	1
8	7	37	128	5	0	16	17	0	125	0	0	0
8	16	2	3	0	0	0	0	0	1	0	0	0
8	17	12	48	0	0	4	2	0	7	0	0	0
8	18	36	107	0	0	6	10	0	34	0	0	0