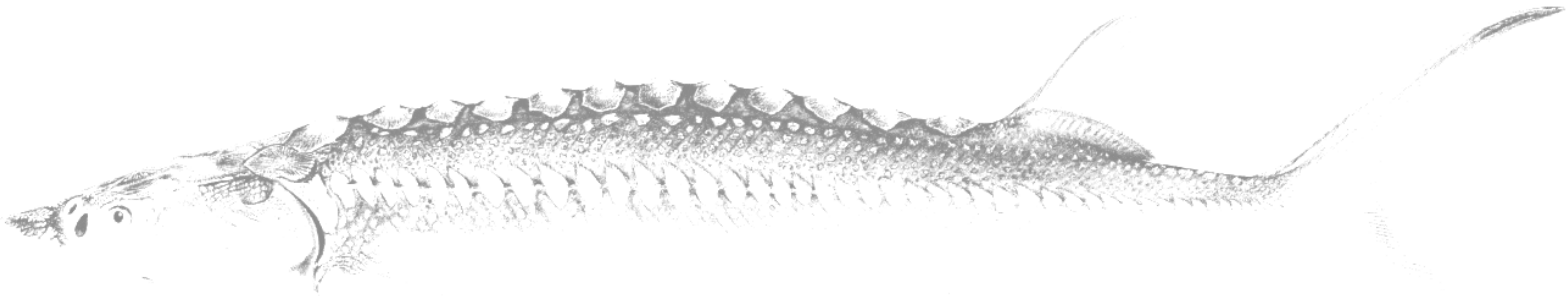

Kootenay White Sturgeon Juvenile Sampling in British Columbia, 2005-06

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Abstract

Juvenile white sturgeon (*Acipenser transmontanus*) were sampled in the Kootenay drainage between the Canada – U.S. border and the north end of Kootenay Lake. Gillnet sampling totalling 270.0 net-hours took place between July 13 and August 30, 2005, resulting in the capture of 92 juvenile sturgeon. None of the juveniles captured in 2005 were unmarked wild fish. However, one previously captured wild juvenile that was not aged on initial capture, was sampled and determined to be 12 years old (12+). Juvenile white sturgeon captured in 2005 ranged from 149 to 869 mm fork length (mean 334 mm) and weighed from 20 to 3900 g (mean 390 g). The majority of recaptures (57%) in 2005 were hatchery fish from the 2003 and 2004 brood years. However, when an analysis of the relative recapture rate by brood year was completed, these brood years were under-represented in relation to the number of fish originally released from these year classes. A comparison of relative recapture rates for the last 4 years of sampling revealed a general decreasing trend in relative recapture rate starting with releases of the 1999 brood year. Although this trend may suggest decreases in survival of these brood years, further investigation is needed. Although juveniles were captured at all sampling locations, catch rates varied by location with more captures occurring near recent hatchery release sites and the Creston Delta in Kootenay Lake.

1.0 Introduction

White sturgeon (*Acipenser transmontanus*) occur along the Pacific coast of North America from central California to the Aleutian Islands. In south-eastern British Columbia, the range of this species extends into Kootenay Lake and the Kootenay River (spelled Kootenai in the U.S.), located in the upper Columbia River basin. The Kootenay population is distinct from other Columbia River sturgeon (Anders *et al.* 2000), having been isolated by Bonnington Falls since the last glaciation (Northcote 1973). The range of this population is now further restricted by several dams, which have also altered river and lake environments. The Kootenay population is presently distributed from Kootenai Falls, Montana, downstream through Kootenay Lake to Corra Linn Dam on the lower West Arm of Kootenay Lake, British Columbia (Figure 1).

The Kootenay River white sturgeon population began to experience recruitment failure during the 1950's to mid-1960's (Partridge 1983, Paragamian et al 2005). Libby Dam, located on the Kootenai River system upstream of Kootenai Falls in Montana, began operations in 1972 and has been linked to recent, more extensive problems with recruitment (U.S. Fish and Wildlife Service 1999). The population has now been listed under the U.S. Endangered Species Act (U.S. Fish and Wildlife Service 1999). In Canada, the species has been recommended by the Committee on the Status of Endangered Wildlife for listing as endangered under Schedule 1 of the Species at Risk Act (SARA). A Recovery Plan has been implemented in the U.S., providing direction for ongoing studies, modifications to Libby Dam operations and conservation aquaculture operations (U.S. Fish and Wildlife Service 1999) and in Canada, work is also currently underway to complete a Recovery Plan.

Concern for Kootenay River white sturgeon has prompted initiation of detailed studies in both Idaho and British Columbia. Co-operative investigations by the Idaho Department of Fish and Game (IDFG), the Kootenay Tribe of Idaho (KTOI) and the B.C. Ministry of Environment (MOE) began in 1994 with funding from the Bonneville Power Administration (Columbia Basin Fish and Wildlife Authority).

Studies have included juvenile white sturgeon sampling, which has been completed annually since 1998 in the Kootenay River between the Canada – U.S. border and the Creston Delta at the south end of Kootenay Lake. Recent studies on the Kootenay River (Neufeld and Spence 2004a and 2004b, Neufeld 2005, Paragamian et *al.* 1999 and Scarnecchia 1999) have identified gill nets and ultrasonic telemetry as particularly useful techniques in describing behaviour and habitat use patterns. Also, on the Columbia River, gill nets are now frequently used in place of bottom trawls to sample juvenile sturgeon (Kern *et al.* 2001, Golder Associates Ltd. 2003, 2004). These sampling techniques now form the basis of juvenile white sturgeon assessments in B.C.

Studies completed in 2005 were aimed at assessing progress in the recovery of Kootenay River white sturgeon within B.C. Specifically, our objectives were to:

- index natural recruitment events in the Kootenay River;
- describe population trends related to age, growth, size, distribution, survival and abundance of both hatchery and wild juvenile white sturgeon; and,
- determine large scale habitat use and movement patterns of wild and hatchery produced juveniles.

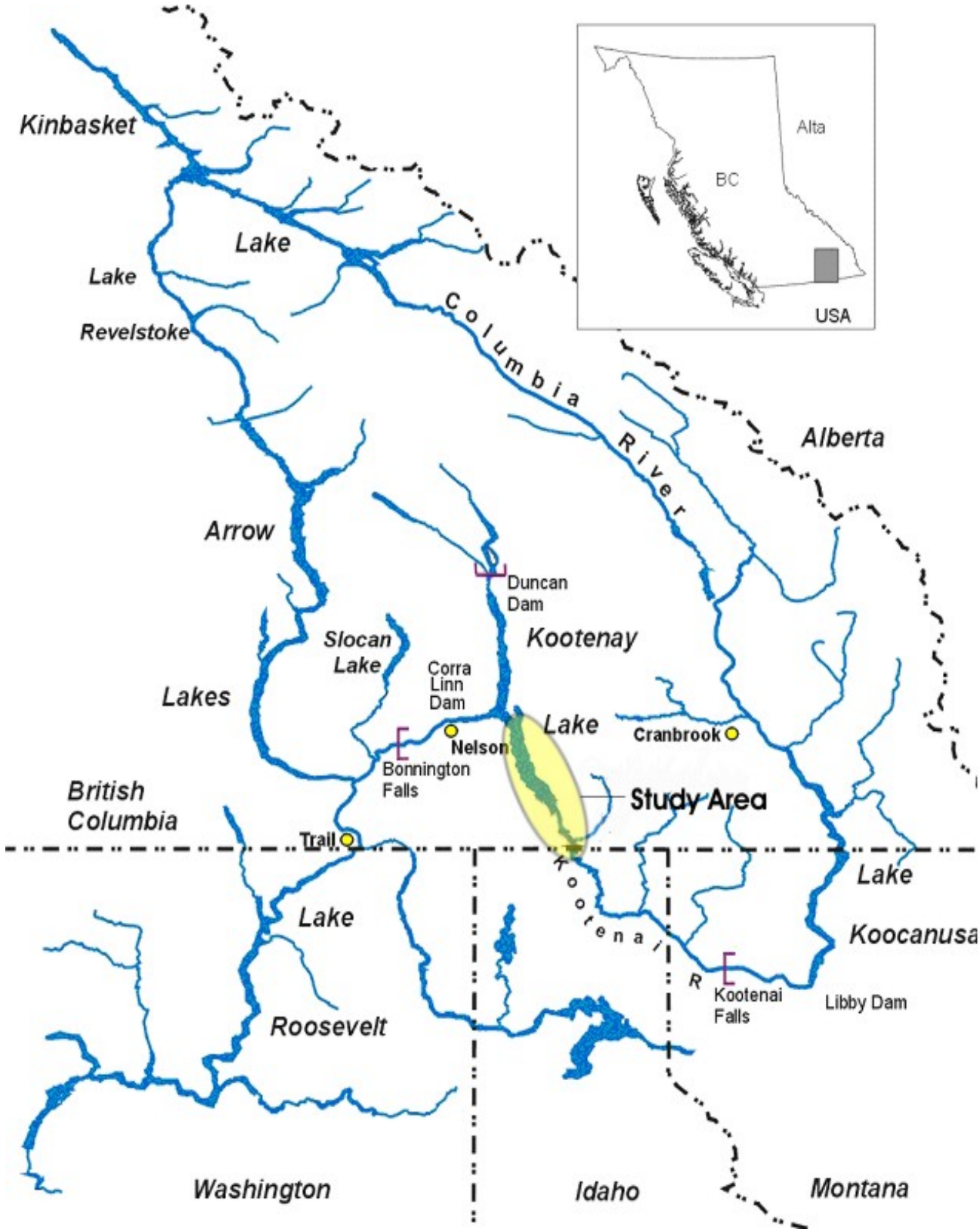

Figure 1. Location of juvenile white sturgeon studies in the Kootenay basin in B.C.

2.0 Study Area

The Canadian portion of the Kootenay white sturgeon range is located in south-eastern British Columbia, immediately north of the State of Idaho. The Kootenay River enters Kootenay Lake at its southern tip. The lake is also fed by the Lardeau and Duncan rivers at the north end, and numerous other much smaller tributaries. The outlet of Kootenay Lake flows from the lake's mid-point for approximately 70 km in a westerly direction, eventually descending over a series of dams and entering the Columbia River near Castlegar. These dams, as well as a dam on Lardeau/Duncan system, currently restrict distribution of white sturgeon in the Kootenay system within B.C. A more detailed description of Kootenay Lake can be found in Daley *et al*. (1981).

The present study was conducted in a portion of the present range of Kootenay white sturgeon, and included 50 km of Kootenay River from the Canada - U.S. border, downstream to, and including the entrance to Kootenay Lake. The area where the river enters Kootenay Lake is referred to locally as the Creston Delta. The study area continued north from the Creston Delta approximately 50 km encompassing approximately half of Kootenay Lake (Figure 1).

3.0 Methods

3.1 Gill Net Sampling

3.1.1 Sampling Locations

A total of 14 locations were selected for gill net sampling in 2005 and were similar to sampling efforts in previous years (e.g., Neufeld 2005; Figure 2, Table 1). These sites included both index and secondary sites. Index sites were selected based on previous sampling programs as the areas of highest capture efficiency and sites which were fishable during high flow events. Selection of these sites allowed the capture of relatively large numbers of juveniles to provide estimation of both survival and growth. However, we recognized that sampling only the most productive habitat may not provide representative data on habitat use, growth and survival and also may skew population estimates. Secondary sampling locations were therefore also included in sampling efforts. Approximately 24 net hours of effort were completed at index sites while approximately 12 net hours were completed in secondary locations. The order in which sites were sampled was selected randomly.

3.1.2 Sampling Gear

Juvenile sampling was conducted from a 7.0 m boat. Set locations were determined by GPS (Garmin GPS-12). Set and pull times were also recorded for each set. Maximum and minimum depths were recorded for all net sets using a depth sounder (Lowrance LMS-350a). Set areas were occasionally limited by bottom conditions; nets were not set in areas with high concentrations of woody debris because of potential problems with lost or damaged gear.

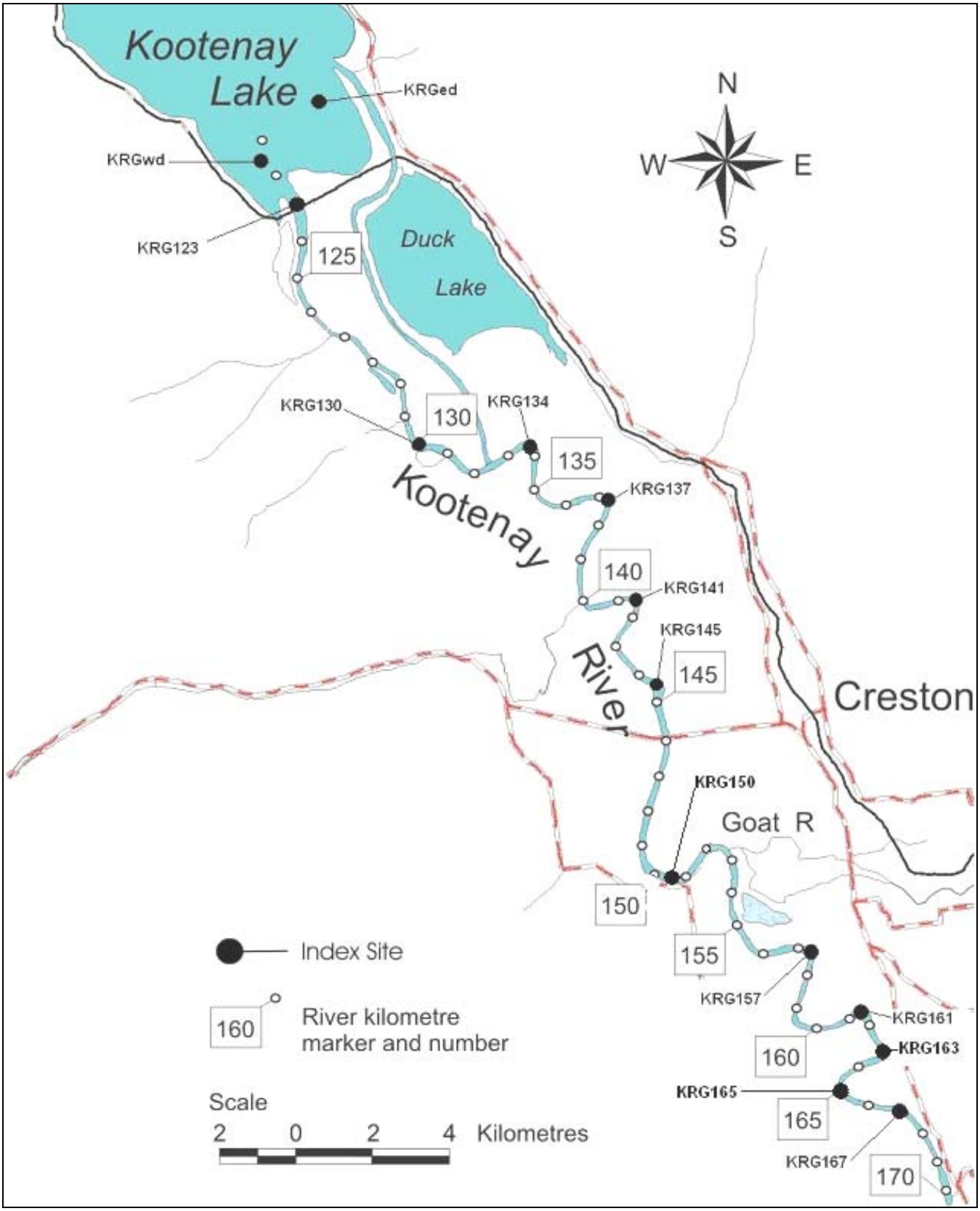

Figure 2. Juvenile white sturgeon river kilometre (RKM) and gill net sampling index site locations on the Kootenay River and Creston Delta.

Table 1. Juvenile white sturgeon gill net sites (site code and location).

Index Site Code	Location (RKM)	Site Type
KRGed	120	Index
KRGwd	121	Index
KRG123	123	Secondary
KRG130	130	Index
KRG134	133.7	Index
KRG137	137.4	Index
KRG141	141.5	Secondary
KRG145	144.8	Index
KRG150	150	Secondary
KRG157	157.3	Secondary
KRG161	161.4	Index
KRG163	163	Secondary
KRG165	165	Index
KRG167	167	Secondary

To avoid problems associated with size selectivity by gill-net mesh size (McCombie and Berst 1969, Hamley 1975 and references therein, Hilborn and Walters 1992, Burner *et al*. 2000), stretch measure nets of 5.1, 10.2 and 15.2 cm were employed to account for all juvenile age classes (Neufeld and Spence 2004a, b). Nets were produced by H. Christianson Co. and constructed of multi-strand nylon, measuring 46.0 m long and 1.8 m deep with a twine size of #69 for 5.1 cm nets and #104 for 10.2 and 15.2 cm nets. Considering that the key objective was to index natural recruitment, crews fished two 5.1 cm nets (targeting the youngest age classes) and only one each of the 10.2 and 15.2 cm nets each day. These four nets were fished continuously as a group over the day, with mesh sizes selected randomly for each set. The target length of sets was 90 minutes, although it was recognized that water conditions, weather and catches could result in a range of set durations. Sets typically ranged between 60 and 120 minutes.

3.1.3 Biological Sampling

All captured white sturgeon were brought into the boat for sampling. Smaller juveniles were placed in a plastic container filled with water while larger juveniles and all adults were placed in a waterproof stretcher, with enough water to allow for respiration. Fresh water was frequently added to the stretcher during the processing period. Sturgeon were processed following standardized methods described fully in Neufeld and Spence (2004b). After processing, sturgeon were returned to the water and released once normal respiration, orientation and swimming behaviour were established.

4.0 Results

4.1 Effort and Catch

In 2005, gill nets were set 176 times between July 13 and August 30. A total of 270 net-hours of effort resulted in a catch of 92 juvenile sturgeon (Appendices A and B) and a catch per unit effort (CPUE) of 0.357 fish per net-hour. A total of four adult sturgeon were also captured during juvenile netting efforts (Appendix C).

4.2 By-Catch

A total of 50 fish were collected incidentally during this study, for a by-catch capture rate of 0.185 fish per net-hour (Appendix D). Species captured included longnose sucker (*Catostomus catostomus*), largescale sucker (*C. macrocheilus*), peamouth (*Mylocheilus caurinus*), northern pikeminnow (*Ptychocheilus oregonensis*), mountain whitefish (*Prosopium williamsoni*) and bull trout *(Salvelinus confluentus*). Peamouth accounted for the highest number of captures (34%), although whitefish and longnose suckers were also captured frequently (26 and 20%, respectively).

4.3 Sturgeon Capture Locations

Sampling was performed at all 14 sampling sites with sturgeon captured at all but one site (Table 2; Figure 3). Catch rates were variable by sampling location although higher catches were observed near recent hatchery release sites, the Creston Delta and one large eddy in the main river. High catch rates were observed near hatchery release sites at RKM 141, 145 and 150. Catch rates were also high near the Creston Delta (RKM 120, 121 and 123) and a large eddy at RKM 161.4. Catch rates were relatively low at RKM 130, 157.3 and 165. The variability in catch rates reflects diversity in habitat suitability as well as a proximity to a recent hatchery release site.

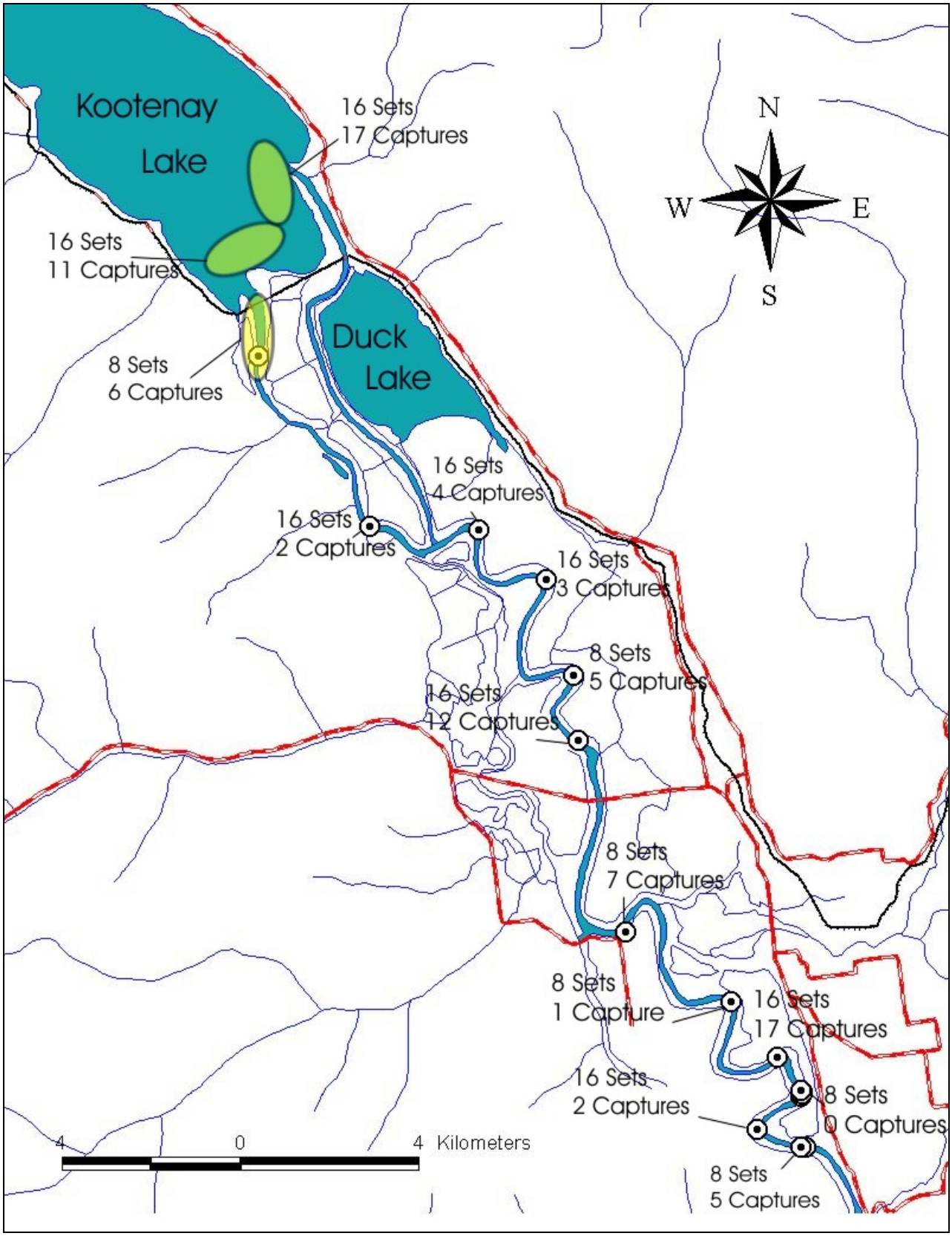

Figure 3. Frequency and location of gillnet sets and sturgeon captures during juvenile white sturgeon sampling on the Kootenay River, 2005.

Table 2. Summary of catch and catch rate of white sturgeon, by sample location, in Kootenay River and Lake, 2005.

Index Site Code	Location (RKM)	Number of Sets	Number of Net Captures	Effort (net-hours)	CPUE (fish/hr)
KRGed	120	16	17	25.0	0.679
KRGwd	121	16	11	26.6	0.413
KRG123	123	8	6	12.6	0.475
KRG130	130	16	2	24.1	0.083
KRG134	133.7	16	4	24.9	0.161
KRG137	137.4	16	3	23.9	0.125
KRG141	141.5	8	5	12.2	0.411
KRG145	144.8	16	12	24.8	0.483
KRG150	150	8	7	11.2	0.624
KRG157	157.3	8	1	12.2	0.082
KRG161	161.4	16	17	24.0	0.710
KRG163	163	8	0	12.4	0.000
KRG165	165	16	2	24.2	0.083
KRG167	167	8	5	11.8	0.423
Total or Mean		**176**	**92**	**270.0**	**0.339**

4.4 Life History

The length of juvenile white sturgeon captured in 2005 ranged from 149 to 869 mm FL with a mean of 334 mm (SE=14.7; Figure 4; Appendix B). Weights of these fish ranged from 20 to 3900 g with a mean of 390 g (SE=71.7; Appendix B). Ages of all captured juveniles (based on brood year and date of release information in IDFG database) ranged from 1 to 12 years with a mean of 3.4 years (Figure 5). Included was one previously marked wild fish re-captured in 2005 which had not previously been aged. This fish was age 12+, measured 790 mm FL, and weighed 3550 g (Figure 6). Of the 92 juveniles captured in 2005, 4 (4.3 %) showed fin deformities. Fin deformities included one folded and three reduced fins.

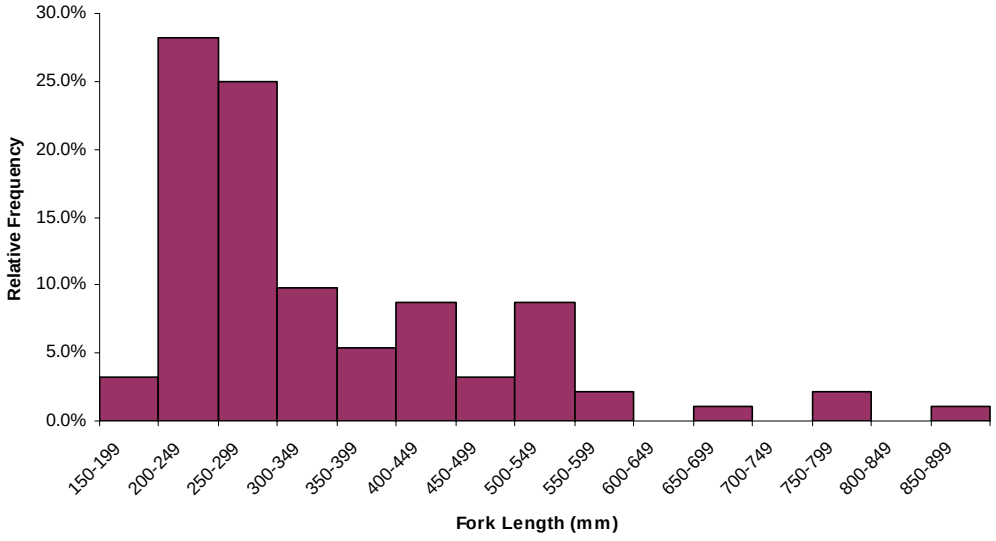

Figure 4. Length frequency histogram for juvenile white sturgeon captured in 2005.

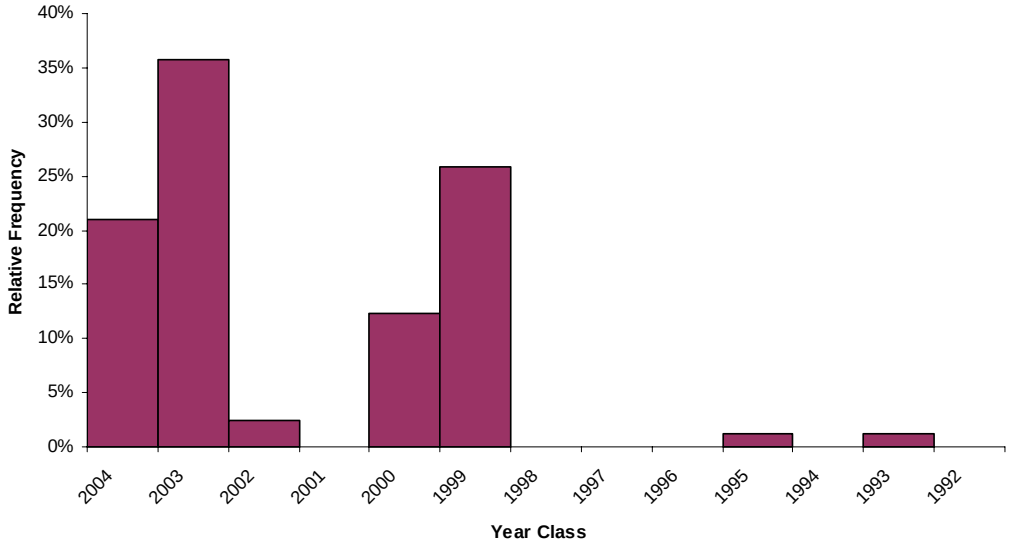

Figure 5. Age frequency histogram for juvenile white sturgeon captured in 2005, based on broodyear from the IDFG database.

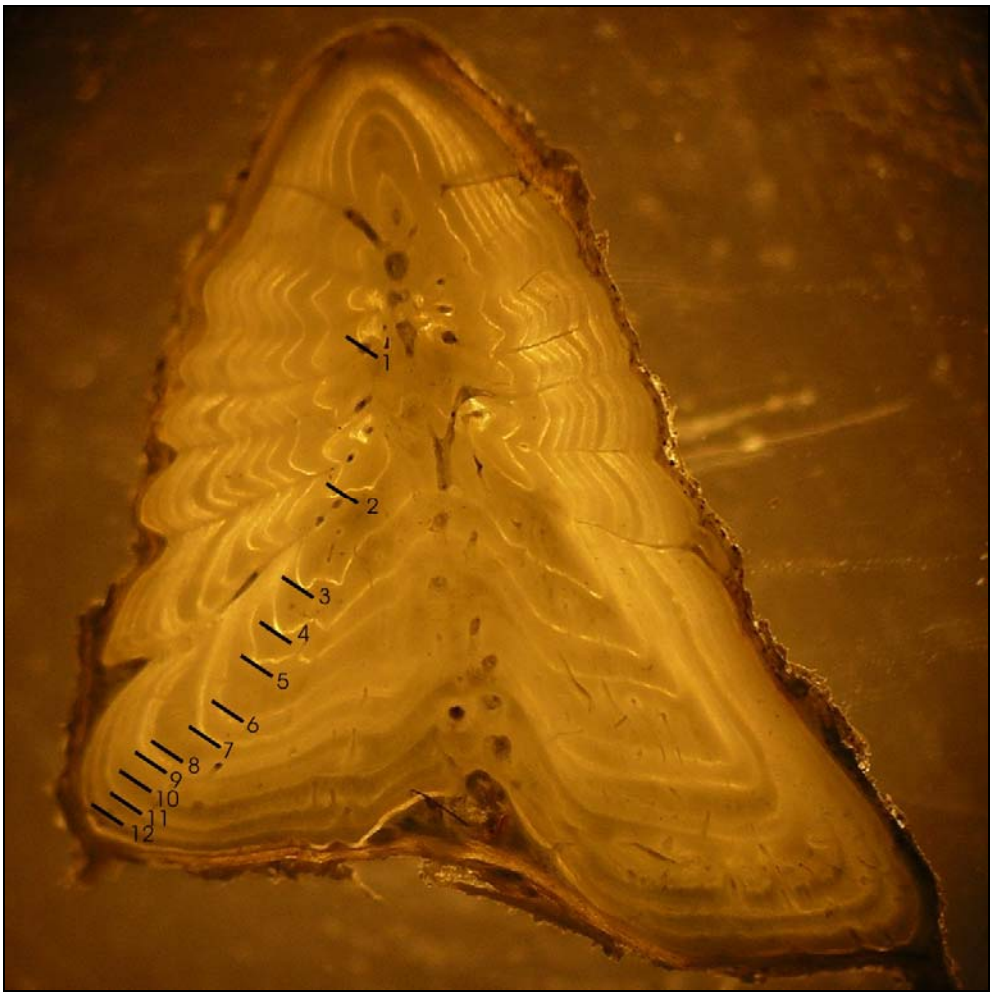

Figure 6. Fin ray sample from a wild fish recaptured in 2005 and sampled for age (ray aged at 12+ years).

Examination of the age frequency of Canadian juvenile white sturgeon captures in 2005 showed few captures of juveniles from the 2001 and 2002 brood years and under-representation of several other recent years (2000, 2003 and 2004), despite large hatchery releases numbers during that period (Figure 5, Table 3). To evaluate this trend further, the age class recaptures from all juvenile sampling efforts (Idaho and BC) on the Kootenay River were plotted for sampling data collected between 2002 and 2005. These years were selected because sampling protocols were standardized in 2002, following methods detailed in Neufeld and Spence (2004a) and IDFG (2003) and therefore bias as a result of changes in sampling method were eliminated.

When capture data from sampling conducted between 2002 and 2005 were examined, marked trends were evident. Small hatchery release groups on the Kootenay River from the 1990's (Table 3) were, in general, very well represented in annual catch for all sampling years (Figure 7). These release groups included small releases from the 1990, 1991, 1992, and 1995 brood years. In addition, a small release of 1998 brood year fish were also represented reasonably well in annual catches. The 1999 brood year, released in 2001, was the first brood year group released in large numbers (>4000 fish) and were represented very well in relative age frequency (the percent of annual catch by age class) and relative recapture frequency (expressed as the ratio of the number of captures of fish from a given brood year, relative to the number originally released; Figure 7, Table 3) in all years of sampling. However, despite increasing numbers of fish released, there was a general decline in the number of captures and the relative recapture frequency by brood year from 2000 through to 2004. Within this general decline, the 2001 and 2002 brood years were even more poorly represented compared to all other release years. Although substantial numbers of fish were released from these brood years (Table 3) very few were recaptured, and the relative recapture frequencies were very low (0 to 0.3%). In comparison, some of the early 1990's brood year annual relative recapture rates were as high as 14%.

The lack of substantial recruitment of the 2001 and 2002 year classes to our gear, as well as limited captures of subsequent brood years suggests declining survival within these release groups. However, exacerbating factors such as differing release timing and location have not been factored into the analysis and may be affecting these results. Therefore, more detailed survival estimates by year class are currently underway to investigate this further (Beamsderfer, pers com, Pyper 2006.). It may be necessary to collect additional years of data to fully evaluate this trend.

Table 3. Number of juvenile white sturgeon released by brood year (KTOI 2005).

Brood Year	Total # Released
2004	36,114
2003	12,562
2002	14,785
2001	8,856
2000	7,311
1999	4,260
1998	309
1997	-
1996	-
1995	2,085
1994	-
1993	-
1992	123
1991	104
1990	14
All Years	**86,523**

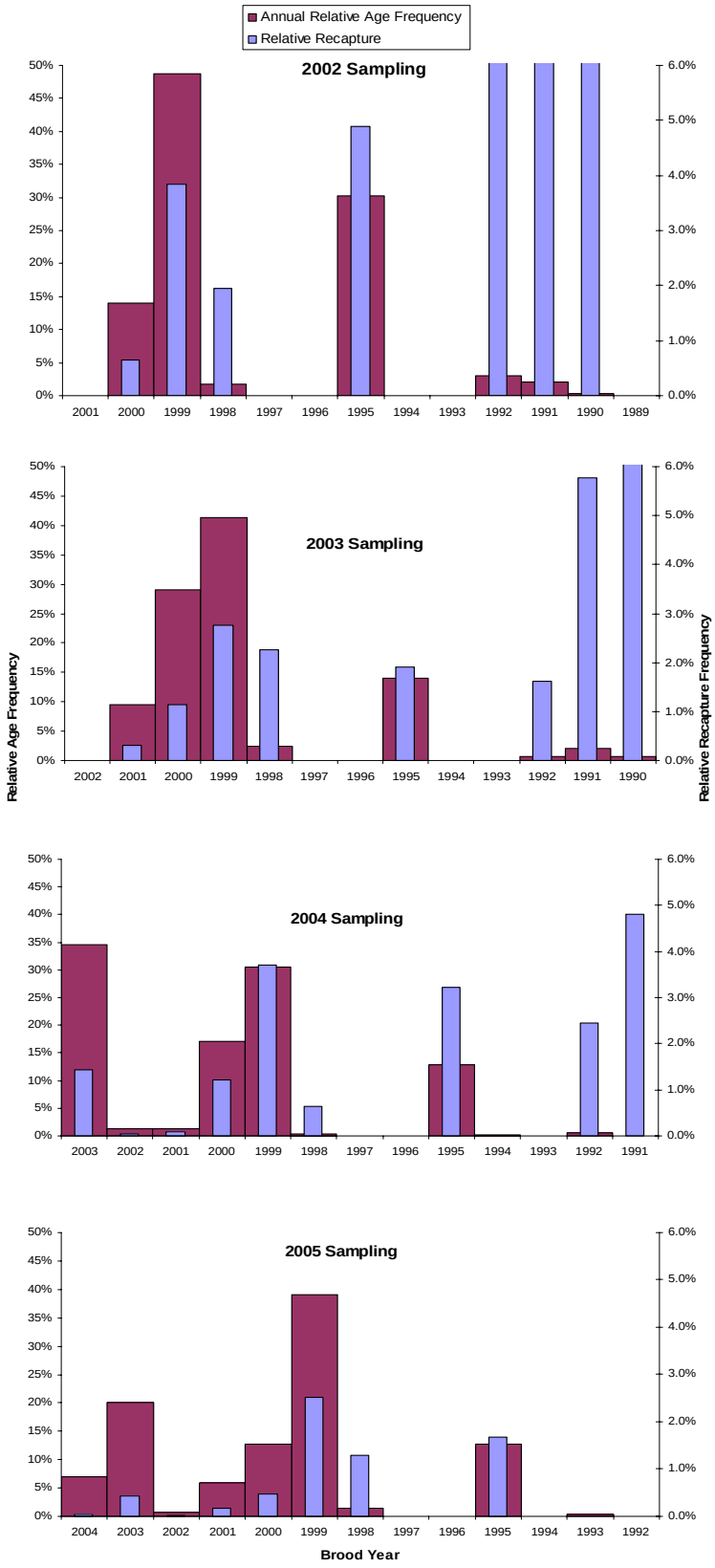

Figure 7. Annual relative age frequency (brood year based on IDFG database) and relative recapture frequency by sampling year from 2002-2005. Data includes both Idaho and BC gill net sampling data.

4.5 Recapture Information

Catch information from previous years sampling was summarized by matching PIT tag numbers to those recorded in the IDFG Kootenai white sturgeon database (Appendix E). Unfortunately, for 10 records, there was no match found in this database. The data from these fish was either unavailable at the time of analysis (still held by hatchery personnel), or did not match any record of tagged fish. Recapture analyses were completed without the data from these 10 juveniles.

All juvenile sturgeon captured in 2005 were hatchery release recaptures or wild fish marked in previous years. The majority (57%) of recaptures in 2005 were hatchery fish from the 2003 and 2004 brood years. Four adult sturgeon were also captured in gill nets, of which one was a recapture.

Unlike previous years, assessment of the the number of juvenile sturgeon captured with lost or non-functional PIT tags was not possible in 2005 because many of the 2004 brood released in 2005 were not PIT tagged on release. However, all hatchery reared juveniles could be identified by scute removal patterns and all captured fish were implanted with a new PIT tag if one was not present.

Recaptured juveniles were at large for 408 to 3010 days between captures (mean 1022 days). A total of 25% of recaptured juveniles with a location history were captured upstream from their previous capture or hatchery release location, while 75% were captured downstream. The mean distance travelled between release or previous capture and recapture was 25 km downstream, with a range of 34 km upstream to 127 km downstream (Figure 8).

Annual growth rates were determined from changes in length and weight, and the number of days at large of recaptured juveniles with a location history. The annual TL growth of recaptured juveniles ranged from -180 to 110 mm/yr (mean 45 mm/yr). Included in this analysis were release records for two juveniles recorded in the database which showed substantial decreases in TL, and therefore were thought to represent data entry error at release or recapture. The annual weight gain of juveniles ranged from -62 to 437 g/yr (mean 80 g/yr). A total of seven juvenile sturgeon (11%) lost weight between release and recapture. Condition factor, recognized as an indicator of forage, feeding and health problems for wild fish and hatchery fish adapting to the natural environment (Ricker 1975; Ireland *et al*. 2001) was calculated for each recapture. The relative weight index (W_r) has become the primary method of comparing the condition of white sturgeon populations through most of their range (further described in Beamesderfer, 1993; Ireland *et al*. draft 2001; Neufeld and Spence 2004a). The Wr index for juvenile sturgeon captured in 2005 ranged from 34 to 105 % (mean 78.4 %). Again included in this analysis were release records for 2 juveniles recorded in the database which showed substantial decreases in TL, and therefore were thought to represent data entry error at release or recapture. The mean change in relative weight for recaptures was -20.5 %, with a range of -65 to 63 %. In total, 88% of recaptured sturgeon showed a decrease in relative weight between previous capture or release and recapture in 2005.

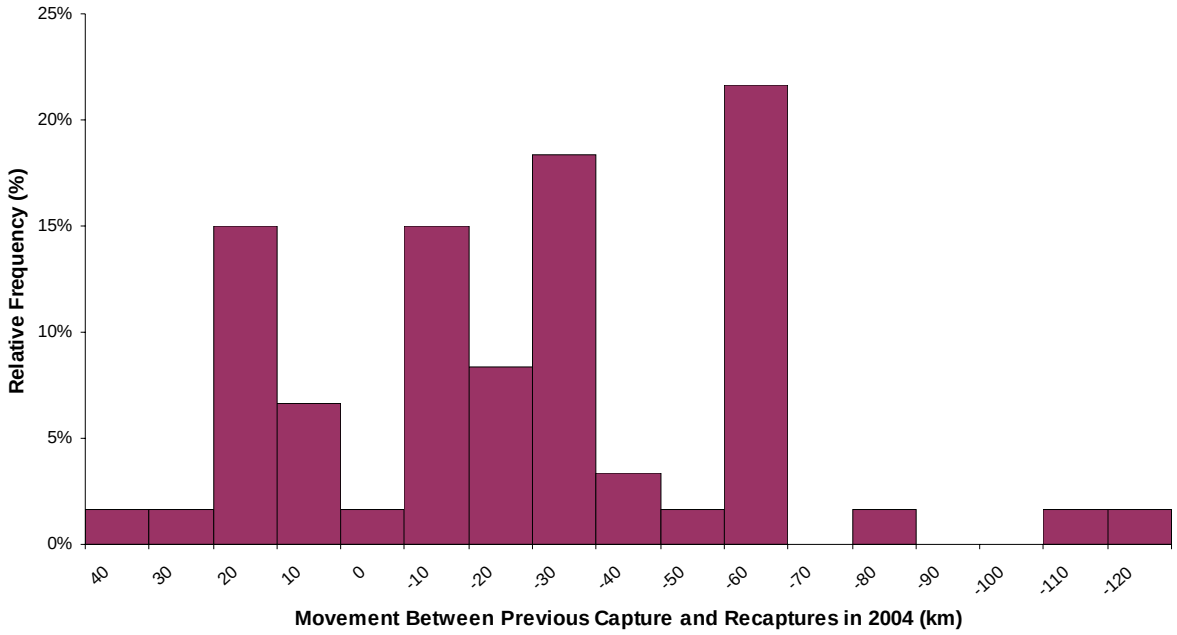

Figure 8. The relative frequency of distance between previous capture or release location and 2005 capture location (- denotes a downstream movement).

One juvenile sturgeon, captured in the river and sonic tagged in 2004, was recaptured during gill netting efforts in 2005. As with previous sonic tag recaptures (Neufeld 2005), the fish showed little sign of trauma resulting from the previous year's surgery and sonic tag implant (Figure 9). Although the tag was large enough to be visible through the ventral body wall, very little evidence of the surgical scar was apparent.

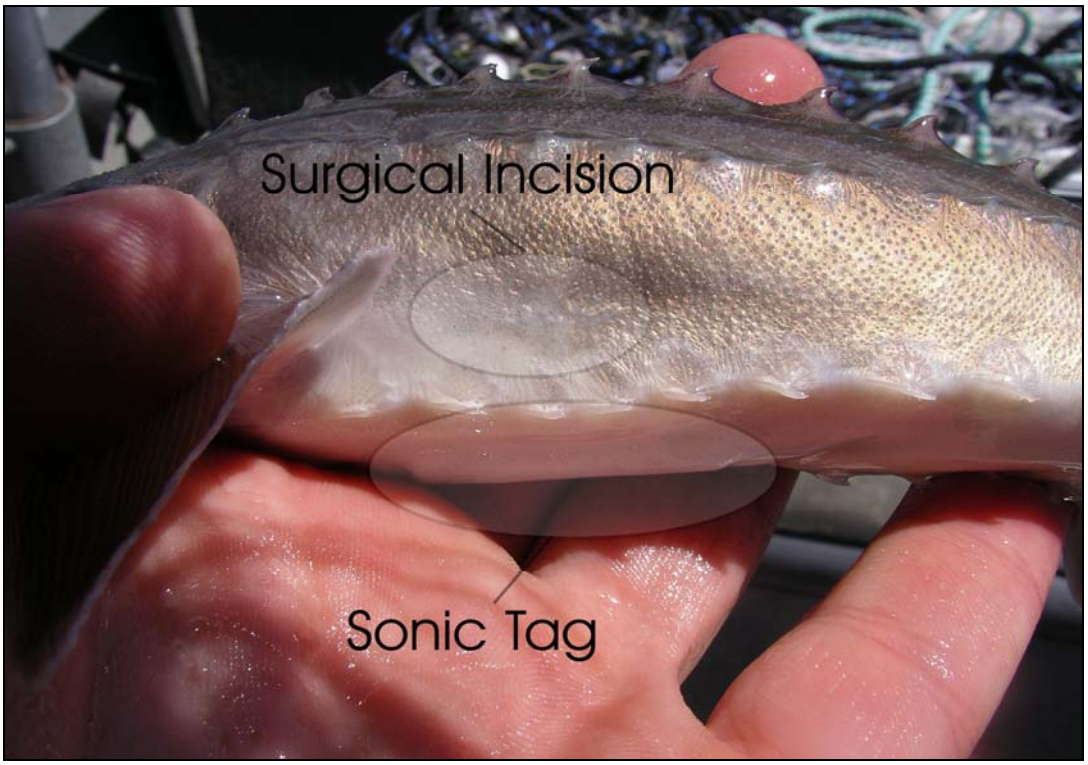

Figure 9. Juvenile sturgeon sonic tagged in 2004 and recaptured in 2005 showing sonic tag and surgical incision scar.

5.0 Discussion

5.1 Distribution of Catch

Gillnet catch rates were variable with no distinct trends through the sampling period. This was also observed in 1999, and 2002-2004 (Neufeld and Spence 2004a and 2004b), whereas catch rates generally increased in late summer during sampling in both 2000 and 2001 (Vandenbos and Spence 2001, Neufeld and Spence 2002). Although catch rates varied by location, sites nearest hatchery release points and near the Creston Delta had the highest catch rates. This trend was also noted during sampling in 2004 (Neufeld 2005).

5.2 Life History

The lengths of juvenile white sturgeon captured in 2005 were similar to those captured during sampling in 2001 and 2004 (Neufeld and Spence 2002, Neufeld 2005) but were larger in 1999, 2000, 2002 and 2003 sampling (Vandenbos and Spence 2001; Neufeld and Spence 2004a, b). Smaller sizes encountered in 2005 may be an artefact of a greater presence of younger fish in the population from recent 2003 and 2004 brood year hatchery release in the study area. Similarly in 2001, a 1999 brood year release also resulted in a smaller average size. The majority of recaptures in 2005 were hatchery fish from the 2003 and 2004 brood year (57%), while fish from the 1999 and 2000 brood years were also captured frequently (21 and 10%, respectively).

The mean rate of growth in length for all juvenile sturgeon captured in 2005 was similar to annual growth rates recorded in between 1998 and 2003 (Neufeld and Spence 2002, 2004a, b) and lower than those recorded in 2004 (Neufeld 2005). The difference in growth rates in 2004 likely reflected higher numbers of young juveniles in the sample, as higher annual length growth generally occurs among these juvenile fish (Ireland *et al*. 2002). Although observed growth rates in 2005 were similar to previous years, they were still much lower than those observed on the upper Columbia River in B.C. (Golder Associates Ltd. 2003, 2004). The mean daily growth rate of upper Columbia hatchery juveniles released in May and captured November of the same year was between 0.06 and 0.10 cm/day in both 2002 and 2003, up to ten times greater than Kootenay juveniles.

The mean weight growth for all juvenile sturgeon captured in 2005 was similar to rates observed in previous years sampling (Neufeld and Spence 2002, 2004a, 2004b, Neufeld 2005). Although this rate is similar to previous years growth, it was much lower than the 206 g/yr average growth increment of Kootenay River fish captured after up to 8 years at-large since 1990 (Ireland *et al*. 2002). The difference in weight growth rate compared to this baseline may again be the result of high numbers of young fish in our sample, as little or no weight gain often occurs among fish within the first 2 years of release (Ireland *et al.* 2002). The weight growth rates observed on the Kootenay in all years of sampling are again much lower than those observed on the upper Columbia River in B.C. As in the case of growth in length, weight gain among these hatchery released juveniles was several fold greater that the best annual growth observed on the Kootenay River (Golder Associates Ltd. 2003, 2004).

The mean relative weight at recapture for all juveniles in 2005 was similar to captures in previous years (Neufeld and Spence 2002, 2004a, 2004b, Neufeld 2005). The relative weights at recapture in 2005 were generally less than relative weights at the time of release or previous capture. In 2005, 88% of juveniles recaptured showed a decrease in relative weight. Ireland *et al.* (2002) also reported that 77% of hatchery fish lost weight between release and recapture, as was the trend in previous sampling years (Neufeld and Spence 2002, 2004a, b, Neufeld 2005). Although it is common for many juveniles to show a decrease in relative weight between release and recapture on the Kootenay River, this is not the trend observed on the upper Columbia River. In juvenile sampling efforts on that system (Golder Associates Ltd. 2003, 2004), all juvenile sturgeon recaptured showed significant growth in both length and weight, and a decrease in relative weight was not observed in any juvenile recaptures. The differences in growth rates between these two rivers suggests a significant difference in juvenile food availability. *Mysis relicta* entrained from Kootenay Lake and Arrow Lakes Reservoir are abundant in the upper Columbia and appear to represent virtually the entire diet of juvenile white sturgeon that area (Golder Associates Ltd. 2003, 2004). Similar prey are unavailable to white sturgeon in the Kootenay River.

5.4 Movements Based on Recaptures

Juveniles were captured both upstream (25%) and downstream (75%) of their previous capture or hatchery release location. A number of these fish moved long distances, some travelling as far as 127 km downstream. Although almost 50% of juveniles showed upstream movement in 2004 (Neufeld 2005) the majority of recaptures in previous years showed downstream movement (Vandenbos and Spence 2001, Neufeld and Spence 2004a, b). In these years, it was noted that the majority of sampling programs and hatchery releases had taken place in Idaho, upstream of the study area. This increased the probability that recaptures would have been originally captured upstream, and thus observed movement patterns may have been an artefact of the previous sampling programs and stocking locations. The trend of downstream movements has also been observed in juvenile sampling on the upper Columbia River (Golder Associates Ltd. 2003).

Gill net sampling in 2004 around recent Canadian hatchery release sites, as well as subsequent sonic tagging, has confirmed that the prevalence of downstream movements observed in previous programs on the Kootenay were most likely a stocking and sampling location artefact, and that juveniles move both up and downstream regularly (Neufeld 2005).

6.0 Recommendations

- Gill nets with 5.1, 10.2 and 15.2 cm stretched measure should continue to be used in future sampling projects to avoid identified biases associated with mesh size selectivity.

- Although a stratified sampling program targeting an even spatial distribution of sampling effort implemented every 4 years (such as that used in 2001) to track possible changes in habitat use as the number of juveniles in the population grows has been suggested in previous recommendations, continuation of the index approach used this year is suggested in future sampling. Although changes in habitat use are important to identify, this is better approached using telemetry methods, and standardized annual gill netting methods will assist in avoiding biases in mark-recapture estimates in the future.

Acknowledgements

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Appendices

Appendix A. Summary of gill net set data.

ID #	Date	Site[1] ID	Mesh Size (inches)	Set Time (Minutes)	Depth		Location[2]	
					Min	Max	Eastings	Northings
1	13-Jul-05	145	2	90	14.8	17.2		
2	13-Jul-05	145	6	96	13.2	18.2		
3	13-Jul-05	145	4	101	15.0	20.2		
4	13-Jul-05	145	2	100	17.0	21.6		
5	13-Jul-05	145	2	90	16.0	19.2		
6	13-Jul-05	145	6	86	16.8	19.5		
7	13-Jul-05	145	4	95	18.0	24.5		
8	13-Jul-05	145	2	94	20.0	26.2		
9	14-Jul-05	161	2	88	12.6	15.5		
10	14-Jul-05	161	4	94	16.0	27.9		
11	14-Jul-05	161	2	82	9.0	23.5		
12	14-Jul-05	161	6	102	10.0	24.0		
13	14-Jul-05	161	2	90	17.5	25.7		
14	14-Jul-05	161	4	90	13.0	19.7		
15	14-Jul-05	161	6	84	9.5	16.5		
16	14-Jul-05	161	2	90	10.0	16.9		
17	20-Jul-05	wd	2	88	11.5	28.1		
18	20-Jul-05	wd	6	92	8.2	11.2		
19	20-Jul-05	wd	2	112	13.1	16.5		
20	20-Jul-05	wd	4	117	15.0	20.1		
21	20-Jul-05	wd	2	100	15.0	25.5		
22	20-Jul-05	wd	6	112	12.0	14.8		
23	20-Jul-05	wd	2	111	14.0	16.5		
24	20-Jul-05	wd	4	125	18.5	30.0		
25	21-Jul-05	ed	2	92	19.2	21.9	524117	5460061
26	21-Jul-05	ed	4	71	18.2	26.2	523881	5459131
27	21-Jul-05	ed	2	97	20.6	24.1	523898	5458783
28	21-Jul-05	ed	6	97	19.0	22.2	523937	5458407
29	21-Jul-05	ed	4	93	25.7	26.3	523881	5459131
30	21-Jul-05	ed	2	84	15.2	18.6	524117	5460061
31	21-Jul-05	ed	2	84	16.0	20.0	523898	5458783
32	21-Jul-05	ed	6	98	13.8	16.5	523937	5458407
33	22-Jul-05	134	6	90	14.2	15.6		
34	22-Jul-05	134	2	90	14.2	14.8		
35	22-Jul-05	134	2	92	14.6	17.6		
36	22-Jul-05	134	4	96	13.3	16.6		
37	22-Jul-05	134	6	90	15.2	17.6		
38	22-Jul-05	134	2	96	22.2	25.3		
39	22-Jul-05	134	2	108	15.6	24.2		
40	22-Jul-05	134	4	100	22.0	26.2		
41	25-Jul-05	165	2	90	8.2	16.2		
42	25-Jul-05	165	4	96	9.2	21.0		
43	25-Jul-05	165	6	106	16.5	22.5		
44	25-Jul-05	165	2	113	15.7	21.5		
45	25-Jul-05	165	2	92	16.8	20.1		
46	25-Jul-05	165	4	87	19.0	21.5		

ID	Date	Site[1]	Mesh Size	Set Time	Depth		Location[2]	
#		ID	(inches)	(Minutes)	Min	Max	Eastings	Northings
47	25-Jul-05	165	6	81	16.2	17.9		
48	25-Jul-05	165	2	80	10.0	11.0		
49	26-Jul-05	ed	4	91	10.0	11.6	523985	5459054
50	26-Jul-05	ed	2	103	10.0	16.5	524035	5458867
51	26-Jul-05	ed	2	112	10.0	14.3	524034	5458745
52	26-Jul-05	ed	6	130	10.0	14.5	524053	5458611
53	26-Jul-05	ed	4	100	8.0	10.5	523985	5459054
54	26-Jul-05	ed	2	95	13.1	16.1	524035	5458867
55	26-Jul-05	ed	2	85	8.0	14.0	524034	5458745
56	26-Jul-05	ed	6	70	13.0	17.1	524053	5458611
57	27-Jul-05	150	2	77	10.0	19.9		
58	27-Jul-05	150	4	82	10.0	19.9		
59	27-Jul-05	150	6	91	10.0	21.3		
60	27-Jul-05	150	2	93	10.0	21.0		
61	27-Jul-05	150	2	87	20.0	25.1		
62	27-Jul-05	150	4	80	10.0	10.7		
63	27-Jul-05	150	6	83	14.3	14.6		
64	27-Jul-05	150	2	80	9.0	15.2		
65	28-Jul-05	wd	6	92	10.2	14.2	522515	5457228
66	28-Jul-05	wd	2	104	12.0	13.5	522563	5457149
67	28-Jul-05	wd	4	100	10.4	15.9	522560	5457282
68	28-Jul-05	wd	2	102	16.0	17.9	522514	5457347
69	28-Jul-05	wd	6	90	13.6	14.7	522515	5457228
70	28-Jul-05	wd	2	85	9.0	11.4	522563	5457149
71	28-Jul-05	wd	2	83	17.0	28.0	522290	5457231
72	28-Jul-05	wd	4	85	12.0	30.0	522310	5457056
73	29-Jul-05	137	2	88	11.5	12.0		
74	29-Jul-05	137	4	93	11.0	20.0		
75	29-Jul-05	137	6	97	11.5	19.0		
76	29-Jul-05	137	2	99	13.0	19.0		
77	29-Jul-05	137	2	90	11.0	15.0		
78	29-Jul-05	137	4	87	12.2	17.5		
79	29-Jul-05	137	6	86	10.0	15.5		
80	29-Jul-05	137	2	85	12.0	14.0		
81	04-Aug-05	163	2	90	11.0	19.2		
82	04-Aug-05	163	6	89	8.5	20.5		
83	04-Aug-05	163	2	95	10.0	19.1		
84	04-Aug-05	163	4	97	10.9	18.8		
85	04-Aug-05	163	2	93	19.0	22.3		
86	04-Aug-05	163	6	95	20.0	21.0		
87	04-Aug-05	163	2	93	16.6	17.0		
88	04-Aug-05	163	4	92	11.0	18.0		
89	05-Aug-05	130	4	87	14.0	27.0		
90	05-Aug-05	130	2	88	14.0	21.0		
91	05-Aug-05	130	6	93	15.0	21.0		
92	05-Aug-05	130	2	95	10.0	20.0		

ID	Date	Site[1]	Mesh Size	Set Time	Depth		Location[2]	
#		ID	(inches)	(Minutes)	Min	Max	Eastings	Northings
93	05-Aug-05	130	4	85	15.0	28.2		
94	05-Aug-05	130	2	83	18.0	22.0		
95	05-Aug-05	130	6	85	17.3	25.0		
96	05-Aug-05	130	2	85	9.0	20.0		
97	11-Aug-05	157	6	90	14.7	20.5		
98	11-Aug-05	157	2	92	8.0	23.3		
99	11-Aug-05	157	2	98	7.0	20.5		
100	11-Aug-05	157	4	103	12.0	17.0		
101	11-Aug-05	157	6	90	22.0	28.5		
102	11-Aug-05	157	2	92	18.1	22.0		
103	11-Aug-05	157	2	90	10.2	15.0		
104	11-Aug-05	157	4	75	12.0	19.5		
105	12-Aug-05	141	4	90	11.9	19.1		
106	12-Aug-05	141	2	90	17.0	20.0		
107	12-Aug-05	141	2	91	16.0	22.0		
108	12-Aug-05	141	6	90	13.0	18.0		
109	12-Aug-05	141	4	90	15.0	17.1		
110	12-Aug-05	141	2	89	26.0	27.1		
111	12-Aug-05	141	2	95	17.0	20.0		
112	12-Aug-05	141	6	95	15.0	22.4		
113	18-Aug-05	167	6	87	7.0	16.5		
114	18-Aug-05	167	2	90	12.0	20.0		
115	18-Aug-05	167	4	96	13.3	18.1		
116	18-Aug-05	167	2	98	12.6	17.4		
117	18-Aug-05	167	6	87	14.1	18.3		
118	18-Aug-05	167	2	84	7.0	17.5		
119	18-Aug-05	167	4	81	14.1	17.5		
120	18-Aug-05	167	2	86	7.5	14.7		
121	22-Aug-05	161	6	88	16.5	24.3		
122	22-Aug-05	161	2	90	20.0	26.1		
123	22-Aug-05	161	4	104	15.0	22.0		
124	22-Aug-05	161	2	107	15.0	22.6		
125	22-Aug-05	161	6	80	24.0	27.7		
126	22-Aug-05	161	2	78	22.0	27.0		
127	22-Aug-05	161	4	83	17.0	20.0		
128	22-Aug-05	161	2	87	16.9	23.9		
129	23-Aug-05	137	4	90	11.0	16.5		
130	23-Aug-05	137	2	90	16.5	21.5		
131	23-Aug-05	137	2	95	15.0	20.5		
132	23-Aug-05	137	4	100	15.0	18.4		
133	23-Aug-05	137	4	90	11.2	17.2		
134	23-Aug-05	137	2	88	14.8	20.0		
135	23-Aug-05	137	2	80	17.6	22.4		
136	23-Aug-05	137	4	78	15.0	15.3		
137	24-Aug-05	134	4	90	13.3	17.3		
138	24-Aug-05	134	2	92	16.6	25.4		

ID	Date	Site[1]	Mesh Size	Set Time	Depth		Location[2]	
#		ID	(inches)	(Minutes)	Min	Max	Eastings	Northings
139	24-Aug-05	134	4	96	17.6	19.3		
140	24-Aug-05	134	2	101	12.0	16.5		
141	24-Aug-05	134	4	90	11.6	14.0		
142	24-Aug-05	134	2	89	16.7	19.0		
143	24-Aug-05	134	4	86	16.4	20.0		
144	24-Aug-05	134	2	89	14.6	19.2		
145	25-Aug-05	165	4	90	15.3	20.2		
146	25-Aug-05	165	2	93	15.0	23.2		
147	25-Aug-05	165	2	94	20.5	23.2		
148	25-Aug-05	165	4	96	13.3	18.1		
149	25-Aug-05	165	4	85	20.0	21.5		
150	25-Aug-05	165	2	82	15.0	17.3		
151	25-Aug-05	165	2	83	8.0	17.1		
152	25-Aug-05	165	4	84	11.0	13.5		
153	26-Aug-05	130	2	90	10.1	19.1		
154	26-Aug-05	130	4	93	10.0	22.0		
155	26-Aug-05	130	4	95	19.0	26.0		
156	26-Aug-05	130	2	97	16.0	28.0		
157	26-Aug-05	130	2	91	12.3	20.3		
158	26-Aug-05	130	4	92	13.1	23.0		
159	26-Aug-05	130	4	93	18.0	27.3		
160	26-Aug-05	130	2	94	19.3	28.3		
161	29-Aug-05	145	2	90	13.0	17.1		
162	29-Aug-05	145	4	92	15.0	16.8		
163	29-Aug-05	145	4	95	20.0	21.8		
164	29-Aug-05	145	2	100	19.6	24.7		
165	29-Aug-05	145	2	92	19.1	13.5		
166	29-Aug-05	145	4	90	17.5	19.1		
167	29-Aug-05	145	4	90	22.2	25.0		
168	29-Aug-05	145	2	89	17.2	23.0		
169	30-Aug-05	123	4	95	14.0	20.0		
170	30-Aug-05	123	2	86	10.0	20.0		
171	30-Aug-05	123	4	94	11.3	19.3		
172	30-Aug-05	123	2	96	15.3	17.1		
173	30-Aug-05	123	4	98	15.0	21.0		
174	30-Aug-05	123	2	98	15.0	16.9		
175	30-Aug-05	123	4	97	14.9	19.0		
176	30-Aug-05	123	2	94	14.5	16.9		

[1] For Site ID, see Figure 2, Table 1.
[2] All locations in UTM Zone 11.

Appendix B. Juvenile sturgeon capture information.

Date	Location[1]	Set[2]	Length (mm)		Weight	Missing Scutes		Pit Tag #	
	(RKM)	ID #	Fork	Total	(g)	L#	R#		Comments
13-Jul-05	145	3	253	295	90	1/5	-	141475767A	
13-Jul-05	145	3	375	435	315	11	10	4240466646	
13-Jul-05	145	6	324	380	200	10	10	141276296A	NO PIT
13-Jul-05	145	8	251	291	100	1/5	-	141427750A	NO PIT
13-Jul-05	145	8	241	281	90	1/6	-	141277094A	
14-Jul-05	161	10	387	450	365	10	9	4240315B21	
14-Jul-05	161	11	230	270	65	1/5	-	141471664A	curled r pec fin 60% normal
20-Jul-05	wd	17	240	280	-	1/4	-	141712251A	reduced/clubed caudal fin
20-Jul-05	wd	17	210	248	-	1/5	-	141276731A	slight curl r pc fin
20-Jul-05	wd	17	305	330	-	1/5	-	141716534A	
20-Jul-05	wd	17	224	262	-	1/6	-	141239573A	
20-Jul-05	wd	18	650	755	1950	9	9	423D512D43	
20-Jul-05	wd	21	543	632	1080	10	11	423D310744	
20-Jul-05	wd	22	532	618	1030	9	9	423E3C625B	
20-Jul-05	wd	22	511	568	750	10	10	127645393A	
20-Jul-05	wd	22	456	529	250	10	10	130955645A	
21-Jul-05	ed	30	300	350	160	1/4	-	141255335A	
21-Jul-05	ed	31	426	496	500	9	9	42404F1C73	
21-Jul-05	ed	31	531	613	1000	11	10	42404D0A44	l pec 50% normal size
21-Jul-05	ed	31	541	635	1050	10	11	423D310744	
22-Jul-05	134	40	425	492	480	10	10	423D262F12	
25-Jul-05	165	42	294	338	165	9	11	130958693A	recapture of a vemco tagged fish
25-Jul-05	165	46	345	404	240	10	10	423D330B7F	
26-Jul-05	ed	49	408	471	525	10	9	130922622A	
26-Jul-05	ed	49	530	610	900	10	9	42401F172F	
26-Jul-05	ed	49	555	641	1050	10	10	4240230919	
26-Jul-05	ed	49	412	473	500	9	10	423D315454	missing 1 dorsal scute
26-Jul-05	ed	50	390	452	450	10	10	141709174A	
26-Jul-05	ed	51	260	301	100	10	11	137539612A	
26-Jul-05	ed	51	790	885	3550	2	-	7F7D375446	
26-Jul-05	ed	52	520	606	975	9	9	4240226E7A	
26-Jul-05	ed	52	757	861	2650	9	5	50620E241E	
26-Jul-05	ed	52	869	990	3900	9	5	504E68466B	
26-Jul-05	ed	53	548	635	1050	10	10	423D59506F	
26-Jul-05	ed	56	491	562	750	10	10	423D3C336C	

Date	Location[1] (RKM)	Set[2] ID #	Length (mm) Fork	Total	Weight (g)	Missing Scutes L#	R#	Pit Tag #	Comments
26-Jul-05	ed	56	450	530	600	9	10	504E070478	
27-Jul-05	150	57	178	210	35	1/6	-	141715731A	
27-Jul-05	150	57	242	280	65	1/4	-	141258350A	
27-Jul-05	150	59	375	436	350	11	9	42401F0B0D	
27-Jul-05	150	60	221	265	60	1/4	-	141449266A	
27-Jul-05	150	60	251	290	75	1/5	-	141409485A	
27-Jul-05	150	60	415	482	450	10	11	423D270545	
27-Jul-05	150	61	400	470	425	9	10	4240205D77	
28-Jul-05	wd	65	573	663	1150	10	9	423D284E77	
28-Jul-05	wd	70	242	282	80	1/5	-	141217174A	
29-Jul-05	137	76	225	255	60	1/5	-	141233353A	
5-Aug-05	130	94	294	342	130	1/5	-	141455335A	
5-Aug-05	130	95	350	395	275	10	10	130922256A	
11-Aug-05	157	98	255	305	75	1/6	-	141457614A	
12-Aug-05	141	106	215	250	45	1/6	-	141279261A	NO PIT
12-Aug-05	141	106	264	310	100	1/5	-	141476547A	
12-Aug-05	141	107	321	369	170	1/5	-	141252583A	
12-Aug-05	141	109	308	348	135	10	10	127661291A	
12-Aug-05	141	111	238	282	65	1/5	-	141254515A	
18-Aug-05	167	114	150	176	25	-	1/4	-	too small to tag
18-Aug-05	167	114	341	400	200	11	11	127675692A	
18-Aug-05	167	116	158	183	20	-	6/11	-	too small to tag
18-Aug-05	167	118	278	225	110	2/6	-	141716744A	
18-Aug-05	167	120	149	171	20	-	1/5	-	too small to tag
22-Aug-05	161	122	280	328	125	1/5	-	141421640A	
22-Aug-05	161	122	270	315	85	2/6	-	141422271A	
22-Aug-05	161	122	322	374	160	10	10	127711272A	
22-Aug-05	161	122	254	295	80	1/5	-	141435171A	
22-Aug-05	161	122	244	282	75	1/6	-	141256752A	NO PIT
22-Aug-05	161	123	276	323	110	1/5	-	141455694A	
22-Aug-05	161	124	244	283	75	1/6	-		released before tagged
22-Aug-05	161	126	265	305	90	1/5	-	127671490A	
22-Aug-05	161	126	240	279	65	1/6	-	141266717A	NO PIT
22-Aug-05	161	126	270	311	95	10	13	141277110A	NO PIT
22-Aug-05	161	126	243	283	65	1/5	-	141716250A	

Date	Location[1] (RKM)	Set[2] ID #	Length (mm) Fork	Total	Weight (g)	Missing Scutes L#	R#	Pit Tag #	Comments
22-Aug-05	161	126	245	285	65	1/7	-	141274635A	NO PIT
22-Aug-05	161	127	234	276	80	1/5	-	141269525A	
22-Aug-05	161	127	255	299	75	1/5	-	141476472A	
22-Aug-05	161	128	236	273	65	1/6	-	141263537A	NO PIT
23-Aug-05	137	130	215	250	40	2/5	-	141435256A	
23-Aug-05	137	131	230	269	50	1/5	-	141456150A	
24-Aug-05	134	138	278	324	100	1/5	-	141257732A	
24-Aug-05	134	140	220	262	50	1/6	-	141716566A	
24-Aug-05	134	143	405	470	380	10	10	423D583F4A	
29-Aug-05	145	163	330	383	235	11	10	127449617A	
29-Aug-05	145	164	255	298	75	1/6	-	141709231A	NO PIT
29-Aug-05	145	168	232	263	50	1/6	-	141439697A	NO PIT
29-Aug-05	145	168	228	265	55	1/6	-	141411444A	NO PIT
29-Aug-05	145	168	235	275	60	1/6	-	141463095A	NO PIT
29-Aug-05	145	168	249	288	75	1/6	-	141409515A	NO PIT
29-Aug-05	145	168	271	315	105	1/5	-	141466440A	
30-Aug-05	123	170	261	303	85	1/5	-	141465755A	
30-Aug-05	123	172	263	307	85	1/5	-	141459324A	NO PIT
30-Aug-05	123	172	262	313	90	1/6	-	141276626A	
30-Aug-05	123	172	400	465	340	10	10	42417C1C1F	
30-Aug-05	123	172	225	261	55	1/6	-	141275523A	
30-Aug-05	123	172	260	301	75	3/6	-	127459174A	

[1] For locations see Figure 2.
[2] For set information see appendix A.

Appendix C. Summary of adult sturgeon net capture data.

Date	[1] Location	Set	Length (mm)		Weight	Sex/	Scutes		Pit Tag #	Comments
	(RKM)	ID	Fork	Total	(lb)	Matur	L#	R#		
20-Jul-05	121	21	1420	1620	45 LB	n/a	2		141465460A	
20-Jul-05	120	24	1270	1405	32LB	n/a	2		141276473A	r nasal opening divider missing
21-Jul-05	120	31	1810	2050	95LB	n/a	2		7F7E6A4509	KT00253 floy removed
11-Aug-05	157	100	1570	1770	65LB	n/a	2		141256185A	

[1] For set information see appendix A.

Appendix D. Summary of incidental gill net catch.

Date	[1] Set ID #	[2] Species	[3] Length (mm)
13-Jul-05	1	BT	333
13-Jul-05	4	LNS	227
21-Jul-05	25	LNS	420
21-Jul-05	25	LNS	405
21-Jul-05	25	LNS	355
21-Jul-05	31	LNS	405
21-Jul-05	31	LNS	378
21-Jul-05	31	LNS	365
22-Jul-05	35	LNS	270
22-Jul-05	35	LNS	328
05-Aug-05	96	LNS	280
30-Aug-05	171	LSS	392
13-Jul-05	1	NPM	231
26-Jul-05	50	NPM	290
26-Jul-05	50	NPM	298
26-Jul-05	55	NPM	390
26-Jul-05	55	NPM	256
28-Jul-05	70	NPM	241
28-Jul-05	70	NPM	244
30-Aug-05	173	NPM	455
14-Jul-05	9	PMC	230
14-Jul-05	16	PMC	225
20-Jul-05	19	PMC	241
20-Jul-05	19	PMC	205
20-Jul-05	21	PMC	235
20-Jul-05	21	PMC	235
20-Jul-05	21	PMC	244
20-Jul-05	21	PMC	239
21-Jul-05	27	PMC	241
21-Jul-05	31	PMC	226
21-Jul-05	31	PMC	228
21-Jul-05	31	PMC	215
25-Jul-05	44	PMC	230
26-Jul-05	51	PMC	241
27-Jul-05	61	PMC	275
28-Jul-05	70	PMC	241
28-Jul-05	70	PMC	238
20-Jul-05	17	WF	235
20-Jul-05	17	WF	272
26-Jul-05	50	WF	245
26-Jul-05	50	WF	305
26-Jul-05	51	WF	298
26-Jul-05	51	WF	265
26-Jul-05	51	WF	235
26-Jul-05	53	WF	265
26-Jul-05	55	WF	265
26-Jul-05	55	WF	248
28-Jul-05	70	WF	240
28-Jul-05	70	WF	243
28-Jul-05	70	WF	245

[1] For set information see appendix A.
[2] Species where; WF = mountain whitefish, PMC = peamouth, NPM = northern pikeminnow, LNS = longnose sucker, LSS = largescale sucker, YP = yellow perch, BT= bull trout, KOK= Kokanee and SF = pumpkinseed.
[3] Length represents fork length.

Appendix E. Summary of sturgeon recapture and life history information.

Fish [1]	Pitag1	Date	Rkm	TL(cm)	WT(kg)	Year class	Stock yr.	Released	Days at Large	Relative Weight		Growth	
										Wr(%)	Change (%)	Tl (cm)	Mass (kg)
44771.00	141475767A	07/04/2004	151.00	23.50	0.05	2003	2004	20/05/2004		94.9			
	141475767A	13-Jul-05	145	29.5	0.09	2003	2004		419	81.9	-13.0	5.2	0.035
7644.00	4240466646	28/09/2000	170.00	24.00	0.06	1999	2000	28/09/2000		106.4			
7644.00	4240466646	24/11/2000	169.60	24.50	0.05	1999	2000	28/09/2000	57	82.9	-23.4	3.2	-0.064
	4240466646	13-Jul-05	145	43.5	0.315	1999	2000		1749	81.7	-1.2	4.0	0.055
9026.00	4240315B21	09/04/2001	170.00	34.00	0.19	1999	2001	19/04/2001		109.3			
	4240315B21	14-Jul-05	161	45	0.365	1999	2001		1547	84.8	-24.4	2.6	0.041
47021.00	141471664A	26/03/2004	151.00	22.00	0.05	2003	2004	20/05/2004		117.4			
	141471664A	14-Jul-05	161	27	0.065	2003	2004		420	78.8	-38.7	4.3	0.013
42170.00	141712251A	26/04/2004	144.00	21.00	0.04	2003	2004	21/05/2004		109.2			
	141712251A	20-Jul-05	120	28		2003	2004		425	0.0	-109.2	6.0	-0.034
45076.00	141276731A	07/04/2004	151.00	21.00	0.04	2003	2004	20/05/2004		109.2			
	141276731A	20-Jul-05	120	24.8		2003	2004		426	0.0	-109.2	3.3	-0.034
47731.00	141716534A	17/03/2004	144.00	23.00	0.08	2003	2004	21/05/2004		162.7			
	141716534A	20-Jul-05	120	33		2003	2004		425	0.0	-162.7	8.6	-0.069
45226.00	141239573A	12/04/2004	151.00	20.00	0.03	2003	2004	20/05/2004		95.9			
45226.00	141239573A	04/08/2004	141.00	23.60	0.06	2003	2004	20/05/2004	76	112.3	16.4	17.3	0.144
	141239573A	20-Jul-05	120	26.2		2003	2004		426	0.0	-112.3	2.2	-0.051
9335.00	423D512D43	03/04/2001	170.00	28.50	0.09	1999	2001	19/04/2001		91.6			
	423D512D43	20-Jul-05	120	75.5	1.95	1999	2001		1553	85.1	-6.4	11.0	0.437
7603.00	423D310744	28/09/2000	170.00	26.00	0.08	1999	2000	28/09/2000		109.5			
	423D310744	20-Jul-05	120	63.2	1.08	1999	2000		1756	83.8	-25.7	7.7	0.208
8254.00	423E3C625B	04/04/2001	200.00	31.50	0.13	1999	2001	19/04/2001		95.7			
	423E3C625B	20-Jul-05	120	61.8	1.03	1999	2001		1553	85.9	-9.8	7.1	0.212
11079.00	127645393A	13/09/2001	170.00	26.70	0.08	2000	2001	03/10/2001		100.5			
	127645393A	20-Jul-05	120	56.8	0.75	2000	2001		1386	82.1	-18.4	7.9	0.176
25719.00	130955645A	25/10/2002	177.00	49.50	0.42	2000	2002	25/10/2002		71.7			
	130955645A	20-Jul-05	120	52.9	0.25	2000	2002		999	34.5	-37.3	1.2	-0.062
42724.00	141255335A	27/04/2004	151.00	26.00	0.07	2003	2004	20/05/2004		95.8			
	141255335A	21-Jul-05	118	35	0.16	2003	2004		427	83.8	-12.0	7.7	0.077
9555.00	42404F1C73	03/04/2001	170.00	29.00	0.09	1999	2001	19/04/2001		86.6			
	42404F1C73	21-Jul-05	118	49.6	0.5	1999	2001		1554	84.9	-1.7	4.8	0.096

Fish [1]	Pitag1	Date	Rkm	TL(cm)	WT(kg)	Year class	Stock yr.	Released	Days at Large	Relative Weight		Growth	
										Wr(%)	Change (%)	Tl (cm)	Mass (kg)
7799.00	42404D0A44	28/09/2000	170.00	25.00	0.07	1999	2000	28/09/2000		108.8			
7799.00	42404D0A44	11/08/2004	120.00	57.50	0.71	1999	2000	28/09/2000	1413	74.7	-34.0	8.4	0.165
	42404D0A44	21-Jul-05	118	61.3	1	1999	2000		1757	85.6	10.9	0.8	0.060
7603.00	423D310744	28/09/2000	170.00	26.00	0.08	1999	2000	28/09/2000		109.5			
	423D310744	21-Jul-05	118	63.5	1.05	1999	2000		1757	80.2	-29.3	7.8	0.202
13673.00	423D262F12	02/11/2001	204.00	21.60	0.03	2000	2001	02/11/2001		74.8			
	423D262F12	22-Jul-05	134	49.2	0.48	2000	2001		1358	83.6	8.9	7.4	0.121
26085.00	130958693A	17/01/2003	170.00	29.90	0.12	2000	2003	17/01/2003		104.6			
26085.00	130958693A	05/08/2004	163.00	33.50	0.14	2000	2003	17/01/2003	566	84.5	-20.1	2.3	0.013
	130958693A	25-Jul-05	165	33.8	0.165	2000	2003		920	96.7	12.3	0.1	0.010
9258.00	423D330B7F	03/04/2001	170.00	25.50	0.06	1999	2001	19/04/2001		87.4			
	423D330B7F	25-Jul-05	165	40.4	0.24	1999	2001		1558	79.1	-8.4	3.5	0.042
26433.00	130922622A	17/01/2003	170.00	33.40	0.20	2000	2003	17/01/2003		121.8			
	130922622A	26-Jul-05	118	47.1	0.525	2000	2003		921	105.3	-16.5	5.4	0.129
7396.00	42401F172F	28/09/2000	170.00	26.00	0.08	1999	2000	28/09/2000		109.5			
7396.00	42401F172F	26/07/2002	192.00	35.00	0.17	1999	2000	28/09/2000	666	89.0	-20.5	4.9	0.049
	42401F172F	26-Jul-05	118	61	0.9	1999	2000		1762	78.3	-10.8	5.4	0.151
8508.00	4240230919	09/04/2001	170.00	35.00	0.19	1999	2001	19/04/2001		99.5			
	4240230919	26-Jul-05	118	64.1	1.05	1999	2001		1559	77.8	-21.7	6.8	0.201
7605.00	423D315454	28/09/2000	170.00	22.00	0.06	1999	2000	28/09/2000		140.9			
	423D315454	26-Jul-05	118	47.3	0.5	1999	2000		1762	98.9	-42.0	5.2	0.091
35915.00	137539612A	03/12/2003	170.00	20.70	0.04	2002	2003	03/12/2003		114.4			
	137539612A	26-Jul-05	118	30.1	0.1	2002	2003		601	85.3	-29.1	5.7	0.036
5384.00	7F7D375446	26/07/1999	140.00	64.50	1.10			26/07/1999		79.9			
	7F7D375446	26-Jul-05	118	88.5	3.55	wild	wild		2192	92.7	12.9	4.0	0.408
8159.00	4240226E7A	09/04/2001	200.00	28.50	0.10	1999	2001	19/04/2001		101.7			
	4240226E7A	26-Jul-05	118	60.6	0.975	1999	2001		1559	86.6	-15.1	7.5	0.205
4336.00	504E68466B	03/04/1997	245.00	26.30	0.06	1995	1997	29/04/1997		79.1			
4336.00	504E68466B	08/07/1998	215.50	43.20	0.25	1995	1997	29/04/1997	435	66.3	-12.8	14.2	0.159
4336.00	504E68466B	01/08/2000	215.70	62.40	0.84	1995	1997	29/04/1997	1190	67.9	1.6	5.9	0.181
	504E68466B	26-Jul-05	118	99	3.9	1995	1997		3010	70.9	3.0	4.4	0.371
8942.00	423D59506F	09/04/2001	170.00	34.00	0.17	1999	2001	19/04/2001		97.8			
	423D59506F	26-Jul-05	118	63.5	1.05	1999	2001		1559	80.2	-17.6	6.9	0.206
8752.00	423D3C336C	09/04/2001	170.00	30.50	0.13	1999	2001	19/04/2001		106.2			
	423D3C336C	26-Jul-05	118	56.2	0.75	1999	2001		1559	85.0	-21.2	6.0	0.145

Fish [1]	Pitag1	Date	Rkm	TL(cm)	WT(kg)	Year class	Stock yr.	Released	Days at Large	Relative Weight		Growth	
										Wr(%)	Change (%)	Tl (cm)	Mass (kg)
5730.00	504E070478	25/10/2000	245.00	26.80	0.08	1999	2000	25/10/2000		99.3			
	504E070478	26-Jul-05	118	53	0.6	1999	2000		1735	82.2	-17.1	5.5	0.109
49624.00	141258350A	29/04/2004	144.00	22.00	0.05	2003	2004	21/05/2004		117.4			
	141258350A	27-Jul-05	150	28	0.065	2003	2004		432	70.0	-47.4	5.1	0.013
9464.00	42401F0B0D	03/04/2001	170.00	25.00	0.06	1999	2001	19/04/2001		93.2			
	42401F0B0D	27-Jul-05	150	43.6	0.35	1999	2001		1560	90.1	-3.1	4.4	0.068
41745.00	141449266A	26/04/2004	144.00	21.00	0.04	2003	2004	21/05/2004		109.2			
	141449266A	27-Jul-05	150	26.5	0.06	2003	2004		432	77.2	-32.0	4.6	0.017
46202.00	141409485A	25/03/2004	151.00	24.00	0.07	2003	2004	20/05/2004		124.1			
	141409485A	27-Jul-05	150	29	0.075	2003	2004		433	72.1	-52.0	4.2	0.004
9467.00	4240205D77	03/04/2001	170.00	25.50	0.06	1999	2001	19/04/2001		87.4			
	4240205D77	27-Jul-05	150	47	0.425	1999	2001		1560	85.8	-1.6	5.0	0.085
9225.00	423D284E77	03/04/2001	170.00	31.00	0.12	1999	2001	19/04/2001		93.0			
	423D284E77	28-Jul-05	120	66.3	1.15	1999	2001		1561	76.4	-16.6	8.3	0.241
48811.00	141217174A	10/05/2004	144.00	22.00	0.05	2003	2004	21/05/2004		117.4			
	141217174A	28-Jul-05	120	28.2	0.08	2003	2004		433	84.2	-33.2	5.2	0.025
45232.00	141455335A	12/04/2004	151.00	28.00	0.09	2003	2004	20/05/2004		97.0			
	141455335A	5-Aug-05	130	34.2	0.13	2003	2004		442	73.4	-23.6	5.1	0.033
26114.00	130922256A	17/01/2003	170.00	37.20	0.26	2000	2003	17/01/2003		111.8			
	130922256A	5-Aug-05	130	39.5	0.275	2000	2003		931	97.4	-14.4	0.9	0.006
49930.00	141476547A	24/06/2004	144.00	34.00	0.16	2003	2004	30/06/2004		92.0			
	141476547A	12-Aug-05	141	31	0.1	2003	2004		408	77.5	-14.5	-2.7	-0.054
49957.00	141252583A	24/06/2004	144.00	25.50	0.07	2003	2004	30/06/2004		102.0			
	141252583A	12-Aug-05	141	36.9	0.17	2003	2004		408	75.0	-27.0	10.2	0.089
11376.00	127661291A	13/09/2001	170.00	25.00	0.06	2000	2001	03/10/2001		93.2			
	127661291A	12-Aug-05	141	34.8	0.135	2000	2001		1409	72.0	-21.2	2.5	0.019
42882.00	141254515A	28/04/2004	151.00	24.00	0.05	2003	2004	20/05/2004		88.6			
	141254515A	12-Aug-05	141	28.2	0.065	2003	2004		449	68.4	-20.2	3.4	0.012
11194.00	127675692A	13/09/2001	170.00	25.20	0.07	2000	2001	03/10/2001		106.0			
	127675692A	18-Aug-05	167	40	0.2	2000	2001		1415	68.0	-38.0	3.8	0.034
49101.00	141716744A	10/05/2004	144.00	56.00	0.09	2003	2004	21/05/2004		10.3			
	141716744A	18-Aug-05	167	32.5	0.11	2003	2004		454	73.2	62.9	-18.9	0.016
47255.00	141421640A	26/03/2004	151.00	25.00	0.07	2003	2004	20/05/2004		108.8			
	141421640A	22-Aug-05	161	32.8	0.125	2003	2004		459	80.7	-28.0	6.2	0.044

Fish [1]	Pitag1	Date	Rkm	TL(cm)	WT(kg)	Year class	Stock yr.	Released	Days at Large	Relative Weight		Growth	
										Wr(%)	Change (%)	Tl (cm)	Mass (kg)
50016.00	141422271A	24/06/2004	144.00	27.00	0.09	2003	2004	30/06/2004		109.0			
	141422271A	22-Aug-05	161	31.5	0.085	2003	2004		418	62.6	-46.5	3.9	-0.004
11304.00	127711272A	13/09/2001	170.00	26.00	0.07	2000	2001	03/10/2001		95.8			
	127711272A	22-Aug-05	161	37.4	0.16	2000	2001		1419	67.6	-28.2	2.9	0.023
46701.00	141435171A	25/03/2004	151.00	21.00	0.04	2003	2004	20/05/2004		109.2			
	141435171A	22-Aug-05	161	29.5	0.08	2003	2004		459	72.8	-36.4	6.8	0.032
46013.00	141455694A	12/04/2004	151.00	26.00	0.08	2003	2004	20/05/2004		109.5			
	141455694A	22-Aug-05	161	32.3	0.11	2003	2004		459	74.7	-34.8	5.0	0.024
46144.00	127671490A	25/03/2004	151.00	25.50	0.08	2003	2004	20/05/2004		116.6			
	127671490A	22-Aug-05	161	30.5	0.09	2003	2004		459	73.5	-43.1	4.0	0.008
48099.00	141716250A	17/03/2004	144.00	22.00	0.05	2003	2004	21/05/2004		117.4			
	141716250A	22-Aug-05	161	28.3	0.065	2003	2004		458	67.6	-49.8	5.0	0.012
44630.00	141269525A	07/04/2004	151.00	23.00	0.05	2003	2004	20/05/2004		101.7			
	141269525A	22-Aug-05	161	27.6	0.08	2003	2004		459	90.3	-11.4	3.7	0.024
42428.00	141476472A	26/04/2004	144.00	24.00	0.05	2003	2004	21/05/2004		88.6			
	141476472A	22-Aug-05	161	29.9	0.075	2003	2004		458	65.3	-23.3	4.7	0.020
45397.00	141456150A	12/04/2004	151.00	21.50	0.05	2003	2004	20/05/2004		126.5			
	141456150A	23-Aug-05	137	26.9	0.05	2003	2004		460	61.3	-65.2	4.3	0.000
47499.00	141257732A	17/03/2004	144.00	23.00	0.06	2003	2004	21/05/2004		122.1			
	141257732A	24-Aug-05	134	32.4	0.1	2003	2004		460	67.2	-54.8	7.5	0.032
7734.00	423D583F4A	28/09/2000	170.00	23.00	0.05	1999	2000	28/09/2000		101.7			
7734.00	423D583F4A	26/08/2004	134.00	43.70	0.30	1999	2000	28/09/2000	1428	76.7	-25.0	5.3	0.064
	423D583F4A	24-Aug-05	134	47	0.38	1999	2000		1791	76.8	0.1	0.7	0.016
25910.00	127449617A	17/01/2003	170.00	33.60	0.18	2000	2003	17/01/2003		107.6			
	127449617A	29-Aug-05	145	38.3	0.235	2000	2003		955	92.0	-15.6	1.8	0.021
49197.00	141466440A	10/05/2004	144.00	23.00	0.06	2003	2004	21/05/2004		122.1			
	141466440A	29-Aug-05	145	31.5	0.105	2003	2004		465	77.3	-44.8	6.7	0.035
41263.00	141465755A	26/04/2004	144.00	22.50	0.05	2003	2004	21/05/2004		109.2			
	141465755A	30-Aug-05	123	30.3	0.085	2003	2004		466	70.9	-38.3	6.1	0.027
9985.00	42417C1C1F	24/05/2001	240.00	18.60	0.02	1999	2001	24/05/2001		80.8			
	42417C1C1F	30-Aug-05	123	46.5	0.34	1999	2001		1559	71.1	-9.7	6.5	0.075
47711.00	141275523A	17/03/2004	144.00	19.00	0.03	2003	2004	21/05/2004		113.2			
	141275523A	30-Aug-05	123	26.1	0.055	2003	2004		466	74.4	-38.8	5.6	0.020
30287.00	127459174A	26/03/2003	88.00	26.90	0.06	2002	2003	14/05/2003		73.6			
	127459174A	30-Aug-05	123	30.1	0.075	2002	2003		839	64.0	-9.6	1.4	0.007