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Mark-Recapture and Radiotelemetry Studies of Stikine River Adult Salmon, 2000-2005

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Mark-Recapture and Radiotelemetry Studies of Stikine River Adult Salmon, 2000-2005

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Pacific Salmon Commission
Transboundary Technical Committee

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ADF&G	Alaska Department of Fish and Game
CI	Confidence interval
CPUE	Catch per unit effort
CTC	Chinook Technical Committee
DFO	Department of Fisheries and Oceans (Canada)
EPD	Empirical probability distribution
ESSR	Excess Salmon to Spawning Requirements
FL	Fork length (fish length measurement)
LAA	Left axillary appendage
LUOP	Left upper operculum punch
MEF	Mid-eye-fork (fish length measurement)
POH	Post-orbital hypural (fish length measurement)
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
SCMM	Stikine Chinook Salmon Management Model
SE	Standard error
SMM	Stikine Management Model
SPAS	Stratified Population Analysis System
TFN	Tahltan First Nation
TTC	Transboundary Technical Committee

ABSTRACT

Abundance of adult sockeye salmon *Oncorhynchus nerka* above the U.S.-Canada border in the Stikine River was estimated by means of a two-sample, mark-recapture study from 2000 to 2005. For the first sampling event, set gillnets were fished at Rock Island Eddy (river km 25) in the lower Stikine River from mid-June through mid-September each year to capture and tag healthy sockeye salmon. For the second sampling event, sockeye salmon were captured and inspected for marks in the lower Stikine River commercial and test gillnet fisheries. Using a stratified Darroch estimator, estimated abundance was 121,746 (SE = 12,936) in 2000, 151,030 (SE = 15,932) in 2001, 78,378 (SE = 4,711) in 2002, 206,878 (SE = 9,751) in 2003, 207,621 (SE = 8,042) in 2004, and 167,551 (SE = 7,382) in 2005. Age, length, and sex composition at the tagging site were for all study years.

In addition, radiotelemetry techniques were used to estimate the stock-specific run timing and distribution of sockeye (2004 and 2005), Chinook *O. tshawytscha* (2005), and coho *O. kisutch* (2005) salmon. Fish were captured and radio-tagged using gillnets in the lower Stikine River (rkm 20-25) and tracked throughout the drainage using fixed-station receivers and aerial-tracking surveys. In both years, the largest proportion of sockeye salmon were assigned to the Tahltan Lake stock (23-29%), while the Border to Flood section of the mainstem Stikine River (12-15%), Iskut River (8-13%), and Tahltan River (9-12%) stocks were also major contributors. The majority of Chinook salmon returned to the Tahltan (41%), Little Tahltan (28%), and Iskut (14%) rivers; whereas most coho salmon returned to the mainstem Stikine River downstream of Shakes Creek (56%), Iskut River drainage (23%), Katete River (8%), and Chutine River (8%).

Sockeye salmon stocks bound for the upper portion of the drainage (e.g., Tahltan River/Lake, mainstem Stikine River above Shakes Creek) were amongst the earliest to pass the Rock Island Eddy tagging site. In both years, Craig River sockeye salmon showed the earliest run timing. Chinook salmon bound for the Chutine River and Flood to Butterfly section of the mainstem Stikine River returned earlier than fish returning to the Iskut River and mainstem Stikine River between Butterfly and Shakes creeks. Chinook bound for the Little Tahltan and Tahltan rivers, which represented the majority of the radio tagged fish, had intermediate run timing. No significant differences in run timing were detected amongst coho salmon stocks. Median swim speeds between the tagging sites and U.S.-Canada border (Boundary House fixed station) were 3.5 km/d for sockeye, 2.1 km/d for Chinook, and 4.3 km/d for coho salmon.

INTRODUCTION

The Stikine River is a transboundary river originating in northern British Columbia, Canada, and it flows through Southeast Alaska in the United States before emptying into the ocean near the community of Wrangell, Alaska (Figure 1). It is one of three transboundary rivers that produce major runs of sockeye *Oncorhynchus nerka*, Chinook *O. tshawytscha*, and coho *O. kisutch* salmon. Harvest regulations for Stikine River salmon are established through the Transboundary Technical Committee (TTC) of the Pacific Salmon Commission (PSC), and the various fisheries are managed by Alaska Department of Fish and Game (ADF&G) and the Canadian Department of Fisheries and Oceans (DFO). Stikine River salmon support important Alaskan and Canadian fisheries and as such both countries recognize the importance of obtaining reliable escapement estimates and information on spawning distribution in the achievement of mutual goals under the auspices of the Canada/U.S. Pacific Salmon Treaty (PST).

In recent years, annual in-river harvests in Canadian fisheries (excluding test fisheries) have averaged 52,175 for sockeye (1996-2005), 4,317 for Chinook (1996-2005), and 407 for coho (1994-2005) salmon (Figure 2). The recent annual harvest of Canadian bound Stikine River salmon by the US in Districts 106 and 108 have averaged 8,700 Chinook, 67,700 sockeye and >100,000 coho salmon. Stikine River salmon are harvested by U.S. commercial gillnet fisheries in Alaskan Districts 106 and 108, by Canadian commercial gillnet fisheries located in the lower and upper Stikine River, by Canadian aboriginal fisheries in the upper portion of the river, and by a recreational fishery located primarily at Telegraph Creek (PSC 2005). Since 1993, Canadian terminal area fisheries have operated in the lower Tuya River and/or at Tahltan Lake when salmon escapements were estimated to include excess salmon to spawning requirements (ESSR). A U.S. personal-use fishery was established in the lower Stikine River in 1995 and was replaced by a subsistence fishery in 2004. Additional catches of unknown quantity are taken in U.S. ocean troll and seine fisheries, and in sport fisheries near Wrangell and Petersburg, AK. Test fisheries for sockeye and coho salmon are also conducted annually for stock assessment and management purposes in the lower Stikine River immediately upstream from the U.S.-Canada border.

Stikine River sockeye salmon are typically divided into four stock groups for management purposes: 1) the *wild Tahltan stock* which originate from naturally spawning sockeye salmon in Tahltan Lake; 2) the *planted Tahltan stock* which originate from broodstock collected in Tahltan Lake that are subsequently back-planted as fry into Tahltan Lake; 3) the *Tuya stock* which originate from broodstock collected in Tahltan Lake that are subsequently back-planted as fry into Tuya Lake; and 4) the *mainstem stock* which are all other natural sockeye salmon populations in the Stikine River (PSC 2004). Wild Stikine River sockeye salmon generally emigrate from freshwater as yearling smolt, spend 2 to 3 years at sea, and then return to the river during June, July, and August; although some mainstem fish migrate to sea in the year they emerge from the gravel. Spawning escapement goals for the Tahltan (wild and planted combined) and mainstem stock groups have been established as ranges which reflect biological data regarding stock productivity and various other factors. The “fully acceptable” spawning escapement goal range for the Tahltan stocks is 18,000 to 30,000 fish, and 20,000 to 40,000 fish for the mainstem stock (PSC 2004).

Prior to each season, the TTC meets to update joint management and enhancement plans, develop run forecasts, and determine new parameters for input into the in-season sockeye and Chinook salmon run forecast models (PSC 2005). The sockeye salmon model is referred to as the Stikine Management Model (SMM). The model is upgraded annually to provide in-season forecasts of the total Stikine River sockeye salmon run as well as the following components of the run: the Tahltan stock (wild and planted combined); the planted Tuya stock; and the mainstem stocks. The model is based on catch-per-unit-effort (CPUE) data from District 106 and the Canadian commercial and test fisheries in the lower Stikine River. The model uses historical CPUE data from the Alaska District 106 and 108 fisheries, lower-river Canadian commercial fishery, and lower-river Canadian test fishery (PSC 2006). Linear regression is used in-season to forecast the run size based on cumulative weekly CPUE data from the lower Stikine commercial and test fisheries.

A weir at Tahltan Lake is used to enumerate the spawning escapement of that stock. Spawning escapements for the mainstem and Tuya stock groups are estimated indirectly by computing the ratio of Tahltan to Mainstem and Tuya components in the total in-river sockeye run. Stock identification data are collected in the lower-river commercial and test fisheries. The ratios of Tahltan:mainstem and Tahltan:Tuya are applied to the estimated in-river Tahltan run size to develop an estimate of the total in-river sockeye salmon run. Escapements are estimated by subtracting in-river catches from the in-river run-size estimate.

In 2000, a sockeye salmon mark-recapture program was initiated to develop an alternative abundance-based management regime for Stikine River sockeye salmon stocks. An additional aspect of this program were radiotelemetry studies conducted on sockeye salmon in 2004 and 2005 to provide information on the spawning distribution and migratory timing of various sockeye salmon stocks. This program was a collaborative effort between DFO and ADF&G.

Chinook salmon in the Stikine River comprise one of over 50 indicator stocks included in annual assessments by the Chinook Technical Committee (CTC) of the PSC to determine stock status, effects of management regimes, and other requirements of the PST (Der Hovanisian and Etherton 2006). The Stikine River is one of the largest producers of Chinook salmon in Northern B.C. and Southeast Alaska (Der Hovanisian and Etherton 2006). Chinook salmon in the Stikine River are a “spring run” of salmon with the majority of spawning taking place in Canada from late July to mid-September (Bernard et al. 2000). Spawning occurs in the lower mainstem and tributaries such as Tahltan, Little Tahltan, Chutine, Katete, Craig, Barrington and Tuya rivers; and Beatty, Chritstina, Verrett, Shakes, Sixmile, Andrew, and Tashoots creeks (FISS 1991; Pahlke and Etherton 1999; Bernard et al. 2000). The run timing of sockeye salmon overlaps the latter component of the Chinook salmon migration (Der Hovanisian and Etherton 2006). Most juveniles rear for just over 1 year in fresh water after emergence and smolt at age 1 (Bernard et al. 2000).

The total Stikine River target escapement range is 14,000 to 28,000 large Chinook salmon with a point target of 17,368 large fish (PSC 2004). The target escapement range for Little Tahltan River is 2,700 to 5,300 large fish with a point target of 3,300 large fish; and the target escapement range for Andrew Creek is 650 to 1,500 fish with a point estimate of 800 fish (PSC

2004; McPherson et al. 2005). The TTC uses a Chinook salmon model, referred to as the Stikine Chinook Salmon Management Model (SCMM), for in-season fisheries management. The SCMM is based on a linear regression between weekly cumulative CPUE of large Chinook salmon observed at a tagging site in the lower Stikine River and total run size based on mark-recapture studies conducted since 1996.

For escapement enumeration, aerial helicopter surveys of the Little Tahltan River have been conducted annually since 1975, and a fish-counting weir has been operated at the mouth of the Little Tahltan River since 1985 (McPherson et al. 2005). Since 1996, annual mark-recapture studies have been used to estimate spawning escapements (Pahlke and Etherton 1997, 1999, 2000; Pahlke et al. 2000; Der Hovanisian et al. 2001, 2003, 2004; Der Hovanisian et al. 2005; Der Hovanisian and Etherton 2006). Chinook salmon spawning in Andrew Creek, a lower-river tributary in the U.S., have historically been treated as a separate stock from salmon spawning upriver in Canada (Der Hovanisian and Etherton 2006). Escapements to Andrew Creek have been assessed annually since 1975 by foot, airplane, and helicopter surveys. In 1997 and 2005, radiotelemetry studies were conducted in conjunction with mark-recapture experiments to estimate the distribution and run timing of Chinook salmon spawners (Pahlke and Etherton 1999).

For Stikine River coho salmon, the 1999 PST required development of a new abundance-based management regime, supposedly by 2004. A central requirement of any abundance-based management program is the development of defensible abundance estimates; ideally stock-specific abundance and run timing. Although not through lack of trying, post-season estimates of Stikine River coho salmon escapement and run size are not robust and in-season abundance data are lacking or unreliable. Total in-river escapements from 1986 to 1999 were approximated based on the performance of a coho salmon test fishery in the lower Stikine River, augmented with annual aerial surveys of eight index sites (Table 1). However, there has not been any confirmation that the test fishery is a reliable indicator of coho salmon abundance. Nonetheless, coho salmon management typically commences in late August or early September in the Canadian commercial fishery and District 106 and 108 gillnet fisheries. The interim escapement goal range for Stikine River coho salmon is 30,000 to 50,000 fish (PSC 2004).

From 2000 to 2003, a joint Canada/U.S. coho salmon mark-recapture study was conducted as a pilot experiment; however, because the numbers of tags applied and recovered were both low, the estimates of run size were not considered reliable. A coho salmon radiotelemetry study was also conducted in the Stikine River in 2005, somewhat opportunistically, and in conjunction with sockeye and Chinook salmon radiotelemetry studies.

The purpose of this report is to document the results of the sockeye salmon mark-recapture studies (2000-2005), and the sockeye (2004 and 2005), Chinook (2005), and coho (2005) salmon radiotelemetry studies conducted in the Stikine River drainage. Results from these programs will be used to develop and improve abundance-based management regimes for Stikine River salmon as specified in the current Transboundary Rivers annex of the PST. In addition, fish distribution information (spatial and temporal) will be used to assess the completeness of baselines being developed for improved stock identification and to determine where additional enumeration and sampling programs (e.g., weirs, aerial surveys) should be located (if required). These programs were conducted as a collaborative effort between DFO and ADF&G.

Specific objectives for these mark-recapture and radiotelemetry studies were to:

1. Estimate the annual number of sockeye salmon (2000 to 2005) migrating upstream of the U.S.-Canada border such that the estimates were within ±30% of the true value 95% of the time;

2. Estimate the annual age, sex, and length composition of the sockeye salmon run through the lower Stikine River such that the estimated fractions were within ±5% of the true values 95% of the time;

3. Estimate the spawning distributions of sockeye (2004 and 2005), Chinook (2005), and coho (2005) salmon within the total Stikine River escapement; and

4. Estimate the stock-specific run timing of sockeye (2004 and 2005), Chinook (2005) and coho (2005) salmon through the lower Stikine River.

STUDY AREA

The Stikine River drainage covers an area of 52,000 km^2 (Bigelow et al. 1995), much of which is inaccessible to anadromous fish because of natural barriers. From 1977 to 2005, peak annual stream flows averaged 6,000 m^3/s and ranged from 4,400 to 9,900 m^3/s (USGS 2006). Principal tributaries include the Tahltan, Chutine, Scud, Porcupine, Tanzilla, Iskut, and Tuya rivers. The lower river and most tributaries (e.g., Chutine, Scud, Porcupine, and Iskut rivers) are glacially occluded. The vast majority of the drainage, and most of the sockeye and Chinook salmon spawning areas, are located in Canada. The upper reaches of the watershed are accessible via the Telegraph Creek Road and the Stewart-Cassiar Highway.

METHODS

From 2000 to 2005, a two-event mark-recapture experiment for a closed population (Ricker 1975; Seber 1982) was conducted to estimate the annual abundance of sockeye salmon that migrated above the U.S.-Canada border in the lower Stikine River. Immigrating sockeye salmon captured by set gillnets and marked at a site located in the lower reaches of the Stikine River comprised the first sampling event (Event 1). Sockeye salmon captured and inspected for marks in the lower-river commercial and test fisheries constituted the second sampling event (Event 2) of the mark-recapture experiment. Radiotelemetry techniques were used to estimate the run timing and spawning distribution of sockeye (2004 and 2005), Chinook (2005), and coho (2005) salmon.

Mark-Recapture Studies – Sockeye Salmon

Capture and Tagging

From 2000 to 2005, set gillnets 36 m long and 5.5 m deep with 12.7-13.3 cm mesh were fished from mid-June through September annually. The gillnets were hung at hanging ratios varying from 3:1 to 4:1. Fishing took place at Rock Island Eddy (river km 25) in the lower Stikine River approximately 13 km downstream of the U.S.-Canada border (Figure 1). Gillnets were fished daily and crews tried to keep fishing effort relatively constant (6-8 hours/day) for the duration of the tagging period. If more fish were caught than could be effectively sampled, or if high water rendered the net difficult to fish, then the net was shortened. Captured fish were quickly removed from the net by untangling or cutting the mesh and then placed into a plastic fish tote filled with water. Scales were removed for ageing, lengths were measured (post-orbital hypural [POH], mid-eye to fork [MEF], and/or fork length [FL]), and gender was recorded. General health and appearance of the fish was also recorded, including injuries caused by handling or predators and the presence of sea lice (*Lepeophtheirus* sp.).

Each uninjured sockeye salmon received three marks prior to being released. The primary mark was a uniquely numbered, vinyl-tubing spaghetti tag (30 cm long). The tag was inserted through the musculature of the fish approximately 2-3 cm below the posterior end of the dorsal fin and secured with an overhand knot. The secondary mark was a 6.3 mm diameter hole in the upper portion of the left operculum (LUOP) applied with a paper punch. The tertiary mark was an amputation (fin clip) of the left axillary appendage (LAA) which is located at the left pelvic fin. Fish considered to be in poor condition were released without a mark.

A subset of sockeye salmon in 2004 and 2005 were also fitted with radio transmitters. A systematic approach was taken in an attempt to radio-tag fish in proportion to the timing and magnitude of the run. If necessary, the tagging rate was adjusted in-season according to total daily catches and the number of radio transmitters yet to be deployed.

Tag Recovery

For Event 2 sampling, sockeye salmon were caught and inspected for marks in the lower Stikine River commercial and test fisheries which took place upstream of the U.S.-Canada border (Figure 1). The total catch of marked and unmarked sockeye salmon in both fisheries was reported to DFO personnel. A cash reward was offered for both spaghetti and radio tags recovered in these fisheries to ensure that all tagged fish were returned. A subset of fish from both locations were collected and biosampled (e.g., scales and/or otoliths, length, gender).

Commercial harvesters were instructed to remove tags from fish upon capture and immediately report them to DFO. Therefore, most if not all tags were removed from tagged fish recovered in the commercial fishery prior to DFO personnel collecting their biosampling data. Alternatively, test fishermen were instructed to leave all tags on recovered fish so that an estimate of tag loss (based on the proportion of fish inspected with a secondary or tertiary mark but no tag) could be calculated and applied to the commercial fishery harvests. However, despite these instructions, tags were regularly removed from tagged fish in the test fishery prior to DFO personnel collecting their biosampling data. Tagged sockeye salmon were also reported harvested in upper-river commercial and aboriginal fisheries and in test fisheries in the Tuya and Tahltan rivers; however, these recoveries were not used in abundance calculations.

Abundance Estimation

We used Stratified Population Analysis System (SPAS) software (Arnason et al. 1996) to generate mark-recapture estimates of sockeye salmon escapement above the U.S.-Canada border. If the assumptions of the mark-recapture model were met (i.e., temporal stratification by marking and/or recapture period were not required), we used Chapman's modification of the pooled Petersen estimator (Seber 1982):

$$\hat{N} = \frac{(\hat{M}+1)(C+1)}{R+1} - 1 \text{, where} \quad (1)$$

$\hat{N}$ = estimated abundance of fish above U.S.-Canada border; $\hat{M}$ = estimated number of marked fish released during Event 1 that were available for sampling during Event 2; C = number of fish inspected for marks during Event 2; and R = number of marked fish sampled during Event 2. If the assumptions of the mark-recapture model were violated, then the maximum likelihood Darroch (1961) estimator in SPAS was used to estimate abundance. Estimates of the variance for $\hat{N}$ were obtained from SPAS.

In 2004 and 2005, the number of marked sockeye salmon available for recovery ($\hat{M}$) was calculated using the estimated proportion (p_v) of radio-tagged sockeye salmon that migrated upstream of the U.S.-Canada border:

$$\hat{M} = M\hat{p}_v = M\sum_{t=1}^{2}\frac{M_t}{M}\hat{p}_t \quad (2)$$

where M_t was the total number of salmon marked during period t ($\sum M_t = M$) and p_t was the proportion of fish marked during period t that successfully migrated upstream into the Event 2 study area and were available for sampling during Event 2. These proportions were estimated using radio-tagged fish:

$$\hat{p}_t = v_t / r_t \quad (3)$$

where r_t was the number of radio-tagged fish marked during period t and v_t were those members of r_t that successfully crossed the border. No radio-tagged sockeye salmon were released in 2000, 2001, or 2002. Therefore, for these years, we used the period-specific, weighted average of the proportions of radio-tagged fish that remained in the study area in 2004 and 2005 to adjust the number of spaghetti-tagged fish available for recovery.

The conditions for accurate use of this methodology were:

1) All fish had an equal probability of being marked in Event 1; or
2) All fish had an equal probability of being inspected for marks in Event 2; or
3) Marked fish mixed completely with unmarked fish between sampling events; and
4) There was no recruitment or emigration between sampling events; and
5) There was no tag-induced mortality; and
6) Fish did not lose their marks and all marks were recognizable and reported.

Meeting the first condition depended upon the entry pattern of fish, how long these fish remained in the sample area, and the amount of fishing effort that took place during Event 1. Residence time at the tagging site was unknown and only limited inference can be gleaned concerning entry pattern based on catch per unit effort statistics during Event 1 sampling. However, Event 1 sampling effort was fairly constant (6-8 hours/day) over the study period in all years. Meeting the second condition depended primarily upon survey coverage. Event 2 sampling took place over the entire sockeye migration and most (if not all) fish had to pass through the Event 2 sample area as they migrated upstream to the spawning grounds. Due to the short distance between sampling events and stock-specific migratory timing, it is unlikely that marked fish mixed completely with their unmarked cohorts (condition 3).

Three consistency tests described by Seber (1982) were used to test for temporal and/or spatial violations of conditions 1-3. Contingency table analyses were used to test three null hypotheses:

1) The probability of recapture was independent of when the marked fish was released;
2) The timing and location of recapture efforts (Event 2) was independent of the proportion of marks in the sample; and
3) The timing, location and probability of recovery were independent of when it was released.

Failure to reject at least one of these three hypotheses was sufficient to conclude that at least one of conditions 1-3 was satisfied.

Conditions 1-3 could also be violated if length-selective sampling occurred. Determination of whether all length categories of the sockeye salmon population were subject to similar probabilities of capture during sampling in events 1 and 2 was based upon the Kolmogorov-Smirnov (K-S) test (Conover 1980). Procedures are described in Appendix A.1 as well as corrective measures (e.g., stratification) based on diagnostic test results to minimize bias in estimates of abundance and size composition.

The fourth condition was met because the life-history of sockeye salmon isolates those fish returning to the Stikine River as a closed population.

Mortality rates from natural causes for marked and unmarked fish were assumed to be the same (condition 5). However, handling and tagging has caused a downstream movement and/or a delay in upstream migration of marked salmon in other studies (Bernard et al. 1999; Pahlke and Etherton 1999). This "sulking" behaviour may increase the probability of capture of marked fish by U.S. commercial and recreational fisheries near the mouth of the Stikine River (Pahlke and

Etherton 1999). As part of a separate program, ADF&G sampled harvest in the U.S. commercial gillnet fisheries near the mouth of the Stikine River; however, no marked sockeye salmon were recovered in these fisheries. As mentioned earlier, adjustments to the number of marked fish available for Event 2 sampling (in 2004 and 2005) were also made in accordance with findings from the distribution of radio-tagged fish.

All fish sampled in Event 1 received a minimum of three marks (i.e., radio and/or spaghetti tag, LUOP, and mutilated LAA) to ensure that they were recognizable during Event 2 sampling (condition 6). It was assumed that all marked fish were reported because of the cash reward offered for tags returned from the in-river fisheries.

Mark-recapture and fishery catch data were organized by statistical week. Statistical weeks begin at 0001 hours on Sunday and end at midnight the following Saturday, with weeks being numbered sequentially beginning with the week encompassing the first Saturday in January. Inclusive dates for 2000 to 2005 statistical weeks are shown in Appendix B.1.

Age, Sex, and Length Composition

In all years, age, sex, and length composition were estimated for sockeye salmon at the tagging site. Scales were taken from the left side of fish approximately two rows above the lateral line on the diagonal row that extends down the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (Koo 1955). Sex and length were recorded for the majority of fish sampled. Age composition by gender was estimated as a series of proportions p_{ij} defining a multinomial distribution. The marginal proportion was estimated for each combination of age and sex along with estimates for the proportions' variance (Cochran 1977):

$$\hat{p}_{ij} = n_{ij} / n \qquad (4)$$

$$var(\hat{p}_{ij}) = \frac{\hat{p}_{ij}(1 - \hat{p}_{ij})}{n_j - 1} \qquad (5)$$

where n was the sample size and n_{ij} the number in the sample of age i sex j. Mean length was estimated using standard sample summary statistics for each combination of age and sex.

Radiotelemetry Studies – Sockeye, Chinook, and Coho Salmon

Capture and Tagging

In 2005, Chinook salmon were captured and radio-tagged using drift gillnets in the mainstem Stikine River at a site known as Kakwan Point (rkm 20; Figure 1). Nets measured 36 m long and 5.5 m deep with a 19 cm mesh size. Two crews fished for approximately 6 h of soak time per day during the sample period.

In 2004 and 2005, sockeye salmon were captured for a standard mark-recapture experiment (methods described above), and a subset of these were fitted with radio transmitters. A systematic approach was taken in an attempt to radio-tag fish in proportion to the timing and magnitude of the run. If necessary, the tagging rate was adjusted in-season according to total daily catches and the number of radio transmitters yet to be deployed.

Capture and tagging methods for coho salmon in 2005 were similar to those described earlier for sockeye salmon.

Radio transmitters were inserted through the esophagus and into the upper stomach of the fish using a 31 cm long piece of vinyl tubing.

Tags and Tracking Equipment

Radio transmitters used during this study were manufactured by Lotek Wireless Inc.[4] Radio tags were programmed to emit a signal every 2.5 s (burst rate) for a period of approximately 200 d from the time of activation. The tags transmitted on 10 frequencies (320, 340, 360, 400, 420, 480, 500, 660, 720, and 740 kHz) within 149 MHz range. Radio-tagged salmon were monitored using fixed stations and mobile tracking. Both monitoring systems used SRX400 radio receivers manufactured by Lotek Wireless Inc., and 3-element or 4-element Yagi antennas. Data from fixed stations, mobile tracking, and voluntary tag returns were used to determine the final fate of each radio-tagged fish.

Fixed Stations

A number (11 in 2004; 13 in 2005) of fixed stations were established along the Stikine River and within major tributaries to monitor tagged fish movements towards and into spawning areas (Figure 1). Specific locations were chosen to monitor the arrival of fish into the study area (Boundary House; or the U.S.-Canada border) and document departures from the mainstem of the Stikine River into spawning tributaries.

In both years, fixed stations along the Stikine River mainstem were located at Boundary House (rkm 37.5), and at the junctions with the Flood River (rkm 105), Butterfly Creek (rkm 148), and Shakes Creek (rkm 190). Fixed stations were also deployed in the Iskut, Chutine, Tuya, and Tahltan rivers to identify fish that moved out of the Stikine River mainstem. In the Iskut River, fixed stations were located at the "Water Survey" (rkm 8) and "Snip" (rkm 45) sites. In the Tahltan River, one station was located 8 km from the mouth and the other station was located at the entrance to Tahltan Lake (59 km from the junction with the Stikine River). In 2005, three additional fixed stations were deployed: one within the Craig River, a tributary to the Iskut River; one at the junction of the Tahltan and Little Tahltan rivers; and one at Kakwan Point in the lower Stikine River (rkm 16). In 2004, two fixed stations were deployed at Boundary House.

Each fixed station consisted of one to three antennas, antenna switching hardware (where necessary), a receiver, a 12 V battery, an enclosure to protect the equipment, and a solar panel to charge to battery. Antennas were placed more than 10 m above the water level, either in a tree or on an aluminium mast. Antennas were aimed to detect fish that were present downstream of the station, up a tributary (if present), and upstream of the station.

[4] Product names used in this report are included for scientific completeness, but do not constitute a product endorsement.

Typically, receiver performance is assessed using battery-check data recorded hourly by the SRX receivers. However, in this study, battery-check data were excised from the download files and thus unavailable for analyses. Moreover, since the receivers were programmed to not record noise events, there was no way to distinguish periods of receiver inactivity from periods when no fish were in the area. Nevertheless, *minimum* receiver activity values were calculated from the fish-detection data. Receiver activity was assessed either daily or weekly. In either case, the number of hours for which detection data were recorded was divided by the number of hours in the day (or week).

Another measure of receiver performance is the detection efficiency. Detection efficiencies for each fixed station were estimated by dividing the total number of unique radio-tagged fish detected at the station by the total number of unique radio-tagged fish known to have passed. The total number known to have passed included all fish detected at that station plus any fish detected at sites located farther upstream.

Mobile Tracking (Aerial Surveys)

Mobile tracking was conducted to confirm the final locations and fate of radio-tagged salmon, particularly in and near spawning areas. Mobile tracking included some areas that were not monitored by fixed stations, such as the Christine, Scud, Katete, West Fork, Kikake, and Porcupine rivers (Figure 1). In 2004, aerial-tracking surveys were conducted on 28 July, 19 August, 13 September, and 12 October. Surveys were conducted on 22 June, 18 July, 29 August, 28 September, and 30 October in 2005. All radio-tagged fish detected during mobile surveys were assigned to specific stream reaches based on the GPS location of the mobile tracker at the time the fish was detected.

Data Management

Data from fixed stations were downloaded about monthly. Typically, telemetry data would be imported into LGL's custom database software called *Telemetry Manager* for processing and analysis. However, in this study, the SRX download-data were not provided in a raw format. Instead, it had been manipulated in excel, and then re-saved as text files. Several extra days of processing were required to create and run programs that would re-import the text files into excel, re-format in excel, and re-export them as text files in a format matching that of the original download files (except that the hourly battery-check data could not be recovered). Once reformatted, the data could be imported into *Telemetry Manager*. *Telemetry Manager* facilitates data organization, record validation, and analysis through the systematic application of user-defined criteria. Raw data were archived so that the temporal/spatial resolution or noise filtering criteria could be changed by the user at any time without altering the original database.

An important aspect of radio-telemetry is the removal of false records in receiver files, for example, those that arise from electronic noise. In this study, the following criteria were set for records to be considered valid: 1) power levels had to be greater than 30 (on a 1 to 232 scale); 2) detections had to be paired within a single site and recorded within 20 minutes of each other (i.e., single records or records separated by more than 20 minutes were rejected); and 3) detections had to be recorded at sites that were geographically located between the locations of previous and subsequent valid detections. Once false records were removed, *Telemetry Manager* created a compressed database of sequential detections for each fish. Each record included the tag number, zone number (antenna number, fixed station number, or a general location), the first and last time and date for sequential detections in a specific zone, and the maximum power for all detections in that interval. The compressed database was used to determine when each fish entered the study area, residence times at each fixed-station or spawning area, rates of movement between detection sites, and sites of last detection.

Spawning Distribution

For all three species and in both years, we assumed that radio tags were applied in proportion to the timing and abundance of the run. Unfortunately, no independent estimates of daily escapement past the tagging sites were available to test the validity of this assumption. Radio-tagged fish were assigned to one of 13 "stocks" based on the location of their final detection. Fish that were never detected could not be assigned to a stock.

Distribution estimates may be biased if individual stocks are harvested at different rates in the lower-river fisheries over time. To correct for this potential bias, we applied a weighting factor to the observed number of radio-tagged fish assigned to a specific stock in order to estimate the actual number of radio-tagged fish would have been assigned to that stock had a portion of the tags not been removed in the lower-river fisheries. The weighting factor (b_w) was calculated from the weekly proportion of radio-tagged fish removed in the lower-river fisheries:

$$\hat{T}_s = \sum_{w=1}^{n} T_{sw} b_w \qquad (6)$$

$$b_w = T_w / (T_w - H_w) \qquad (7)$$

where $\hat{T}_s$ = the estimated number of radio-tagged fish assigned to a specific stock (s); T_{sw} = the number of fish radio-tagged in statistical week w that were assigned to stock s; T_w = the number of fish radio-tagged in week w that were tracked into Canada; and H_w = the number of fish radio-tagged in week w that were harvested in the lower-river fisheries.

Run Timing and Swim Speeds

Once fish were assigned to a stock, they could be grouped together to calculate stock-specific run-timing distributions. Run timing was calculated based on tagging date. Fish were assumed to have been caught and tagged in a sequence that was representative of the timing of their arrival in the tagging area.

Travel times for individual fish were calculated based on the time required to pass between the various fixed stations. Travel time between two stations was calculated as the time between the first detection at the downstream station and that at the upstream station. Migration rates were calculated by dividing the distance (in km) between fixed stations by the travel time (in days).

Travel times (and hence migration rates) tended to be non-normal. For non-parametric comparisons among means, the Kruskal-Wallis test, a rank-order equivalent of the ANOVA, was used. For within-individual comparisons of travel times (e.g., a comparison of migration rates from point A to B vs. that from point B to C), paired t-tests were used. Although the distribution of migration rates tended to be non-normal, differences within individuals are generally more normal. For analyses of fish length and run timing, (standard parametric) general linear models were used.

Least-squares linear regression was used to examine the relationship between mainstem Stikine migration rates and reach length. Although the residual distribution of migration rates was non-normal, the linear regression results were presented because of their simplicity, because the relationships were not used to show differences among groups (or to make quantitative predictions), and because large samples sizes provided robustness against violations of the assumption of normality. In all cases, we assumed an alpha value of 0.05.

RESULTS

Mark-Recapture Studies – Sockeye Salmon

Year 1: 2000

Capture and Tagging

From 19 June to 16 October 2000, 1,218 sockeye salmon were captured in 832 h of set gillnet effort in the lower Stikine River (Figure 4, Appendix C.1). Of these, 1,207 fish were sampled, tagged (0-68 fish/day), and released (Figure 5). Fishing effort averaged 6.9 hours/day and ranged from 0 to 8.6 hours/day. Catch per unit effort (CPUE) ranged from 0 to 9.1 fish/hour and peaked on 4 July when 68 sockeye salmon were captured (Figure 5). The date of 50% cumulative catch was 14 July, and 90% of fish were caught by 4 August.

From 2000 to 2005, daily discharge of the Stikine River (from 1 June to 31 October) averaged 2,870 m^3/s and ranged from 875 m^3/s to 4,163 m^3/s (Figure 3) (USGS 2006). Over the same period in 2000, discharge averaged 3,074 m^3/s and increased substantially on three occasions: 25 July (5,409 m^3/s), 22 August (5,437 m^3/s), and 18 September (5,777 m^3/s).

Tag Recovery

In the lower-river commercial fishery, 20,472 sockeye salmon were caught from weeks 27 to 37, of which 157 fish (0.01%) were tagged (Appendix D.1). During the lower-river test fishery which operated from week 20 to 43, 2,378 sockeye salmon were caught of which 19 fish (0.8%) were tagged (Appendix D.1). Travel times for fish tagged at Rock Island Eddy and recovered in the lower river averaged 10.4 d in the commercial fishery and 6.9 d in the test fishery (Figure 6).

Abundance Estimation

Testing for size-selective sampling was conducted as part of the abundance estimate. For these comparisons, fish sampled in the lower-river commercial and test fisheries were pooled. To evaluate the null hypothesis of equal probability sampling during Event 2, the cumulative length-frequency distribution of fish marked during Event 1 (M) was compared to that of all marked fish recaptured during Event 2 (R). We failed to reject the null hypothesis (d_{max} = 0.083, P = 0.241; Figure 7). To evaluate the null hypothesis of equal probability sampling during Event 1, the length-frequency distribution of all fish inspected during Event 2 (C) was compared to that of all marked fish recaptured during Event 2 (R). We rejected the null hypothesis (d_{max} = 0.180, P = 0.000; Figure 7). Based on these tests, there was no size selectivity detected during Event 2 but there was during Event 1 and no stratification by fish size was necessary to estimate abundance (Case III experiment; see Appendix A.1).

The number of spaghetti-tagged fish released at Rock Island Eddy from 2000 to 2003 was adjusted using the average proportion of radio-tagged fish that migrated past the U.S.-Canada border in the 2004 and 2005 radiotelemetry studies. In both 2004 and 2005, a larger proportion of fish released from weeks 25 to 29 (95.9% in 2004, 95.4% in 2005) were detected at or above the border compared to fish released after week 29 (84.9% in 2004, 84.6% in 2005; Figure 8). For each of these two periods, we took the average of the proportions observed in 2004 and 2005 and applied similar values to fish tagged from 2000 to 2003. In 2000, we censored 37 fish (4.4%) tagged from weeks 25 to 29 and 53 fish (15.2%) tagged after week 29 from the marked sample. Thus, a total of 1,117 spaghetti-tagged fish were considered available for recovery in the lower-river fisheries.

Diagnostic tests were conducted to detect temporal violations of conditions 1-3 using the adjusted number of available marked fish available for recovery in Event 2. The null hypothesis that the probability that a marked fish was inspected for marks during Event 2 was independent of the time during the run that it was marked in Event 1 was rejected (χ^2 = 12.5, df = 2, P = 0.002; Appendix E.1). In total, 176 fish or 15.8% of available tagged fish were recovered in the lower-river fisheries. Similarly, the null hypothesis that the probability that an Event 2 fish was marked was independent of the time interval during Event 2 when the fish was sampled was also rejected (χ_4^2 = 154.8, P = 0.000; Appendix E.1). The mark rate of fish inspected in Event 2 from weeks 31 to 40 (1.9%) was over four times higher than the mark rate of fish inspected from weeks 24 to 30 (0.4%). Based on these tests, a partially stratified model was required to estimate abundance. Mark rates, as defined by the proportion of fish inspected in Event 2 that were tagged, were the same in the commercial and test fisheries (0.8%; χ_1^2 = 0.0, P = 0.865).

Using the Darroch estimator in SPAS, an estimated 121,746 (SE = 12,936) sockeye salmon migrated above the U.S.-Canada border in the lower Stikine River in 2000 (Table 3). The 95% confidence interval (CI) was 96,391 to 147,100 fish based on a bootstrap analysis. This abundance estimate was based on 1,117 tagged fish available for recovery, 22,850 fish sampled in the lower-river fisheries, and 169 recaptures. Seven recovered fish with unknown dates of tagging or recovery were excluded from abundance calculations.

Age, Sex, and Length Composition

Sockeye salmon tagged in the lower Stikine River in 2000 were comprised of 11 age classes ranging from age-0.2 to age-4.2 that represented 5 brood years (1993-1997) returning as 3, 4, 5, 6, and 7-year old fish (Appendix F.1). Age-1.2 (20.6%), age-1.3 (40.7%), and age-2.2 (19.3%) made up the majority of fish sampled. Age-0.2 (2.3%), age-0.3 (3.6%), age-2.1 (0.1%), age-0.4 (0.2%), age-1.4 (0.5%), age-2.3 (3.8%), age-3.2 (8.0%), and age-4.2 (0.9%) comprised the remainder. In Appendix F.1, age class data are broken out by sex, and average length (POH) is presented by sex-and-age class.

Year 2: 2001

Capture and Tagging

From 19 June to 12 September 2001, 2,072 sockeye salmon were captured in 847 h of set gillnet effort in the lower Stikine River (Figure 4, Appendix C.2). Of these, 1,987 fish were sampled, tagged (0-97 fish/day), and released (Figure 5). Fishing effort averaged 7.2 hours/day and ranged from 0 to 9.0 hours/day. Catch per unit effort ranged from 0 to 11.9 fish/hour and peaked on 28 July when 107 sockeye salmon were captured (Figure 5). The date of 50% cumulative catch was 18 July, and 90% of fish were caught by 5 August. From June through October, discharge of the Stikine River averaged 3,074 m^3/s and peaked on 22 July at 5,692 m^3/s (Figure 3).

Tag Recovery

In the lower-river commercial fishery, 19,872 sockeye salmon were caught from weeks 26 to 36, of which 291 fish (1.5%) were reported tagged (Appendix D.2). During the lower-river test fishery which operated from week 20 to 43, 3,281 sockeye salmon were caught of which 45 fish (1.4%) were tagged (Appendix D.2). Travel times for tagged fish from release at Rock Island Eddy to recovery in the lower river averaged 6.9 d in the commercial fishery and 6.2 d in the test fishery (Figure 6).

Abundance Estimation

The length-frequency distribution of fish marked (M) in Event 1 was not statistically different from the distribution of fish recaptured (R) in Event 2 (d_{max} = 0.049, P = 0.492; Figure 7). In contrast, the length-frequency distributions of fish captured (C) and recaptured (R) in Event 2 were significantly different (d_{max} = 0.240, P = 0.000; Figure 7). Thus, no size selectivity was detected during the second sampling event but there was during the first sampling event (Case III experiment); and no stratification by fish size was required to estimate abundance.

Fifty fish tagged from weeks 24 to 29 and 126 fish tagged from weeks 30 to 37 were censored from the marked sample to account for the proportion of tagged fish that not migrate as far as the U.S.-Canada border. Diagnostic tests indicated that the probability of a marked fish being inspected for marks during Event 2 was not independent of the time during the run that it was marked in Event 1 (χ^2_4 = 53.1, P = 0.000; Appendix E.2). In total, 336 fish or 18.6% of available tagged fish were recovered in the lower-river fisheries. Mark rates were also found to differ statistically over the study period (χ^2_5 = 185.4, P = 0.000; Appendix E.2). Similar to 2000, the mark rate of fish caught in Event 2 from weeks 31-40 (3.0%) was substantially higher than the mark rate of fish inspected in weeks 24-30 (0.9%). Mark rates in the lower-river commercial and test fisheries were similar (χ^2_1 = 0.2, P = 0.680). Based on the results of these tests, a partially stratified model was required to estimate abundance.

Unfortunately, SPAS failed to generate a Darroch estimate when the most reasonable choice for a transition matrix was selected. In order to generate a Darroch estimate, tagging data were grouped into two strata (weeks 24-26 and 27-31) where periods with statistically different recapture probabilities were pooled. Using this approach, an estimated 151,030 (SE = 15,932) sockeye salmon past the U.S.-Canada border in the lower Stikine River in 2001 (Table 3). The 95% CI was 119,803 to 182,256 fish based on the bootstrap analysis. This estimate was based on 1,811 tagged fish available for recovery, 23,153 fish sampled in the lower-river fisheries, and 336 recaptures.

Age, Sex, and Length Composition

Sockeye salmon tagged in the lower Stikine River in 2001 were comprised of 11 age classes ranging from age-0.2 to age-4.2 that represented 5 brood years (1994-1998) returning as 3, 4, 5, 6, and 7-year old fish (Appendix F.2). Age-1.2 (6.6%), age-1.3 (75.7%), and age-2.3 (6.2%) made up the majority of fish sampled. Age-0.2 (0.3%), age-1.1 (0.2%), age-0.3 (5.8%), age-2.2 (3.4%), age-1.4 (0.3%), age-3.2 (0.4%), age-3.3 (1.0%), and age-4.2 (0.2%) comprised the remainder. In Appendix F.2, age class data are broken out by sex, and average length (POH) is presented by sex-and-age class.

Year 3: 2002

Capture and Tagging

A total of 1,565 sockeye salmon were captured in 812 h of set gillnet effort in the lower Stikine River from 20 June to August 30 (Figure 4, Appendix C.3). Of these, 1,546 fish (0-98 tags/day) were sampled, tagged, and released (Figure 5). Fishing effort ranged from 0 to 8.2 hours/day and averaged 6.9 hours/day over the study period. Catch per unit effort ranged from 0 to 13.4 fish/hour and peaked on 8 July when 104 sockeye salmon were captured (Figure 5). The 50% and 90% cumulative catches occurred on 9 July and 28 July, respectively. From June through October, the Stikine River discharge averaged 2,872 m^3/s and peaked at 6,400 m^3/s on 28 August (Figure 3).

Tag Recovery

From weeks 26 to 34, 10,420 sockeye salmon were caught in the lower-river commercial fishery of which 264 (2.5%) were tagged (Appendix D.3). There were 4,412 sockeye salmon caught in the lower-river test fishery from weeks 19 to 42, of which 33 (0.7%) were tagged (Appendix D.3). Tagged fish averaged 7.7 d (commercial) and 6.7 d (test) from release at Rock Island Eddy to recovery in the lower-river fisheries (Figure 6).

Abundance Estimation

Tests for size selectivity were conducted using only those fish sampled in the lower-river test fishery. Similar to the previous two years, the length-frequency distribution of fish marked (M) in Event 1 was not statistically different from the length-frequency distribution of marked fish recaptured (R) in Event 2 (d_{max}= 0.144, *P* = 0.543; Figure 7). In contrast, length-frequency distributions of fish captured (C) and recaptured (R) during Event 2 were significantly different (d_{max}= 0.294, *P* = 0.009; Figure 7). Based on these tests we had a Case III experiment and no stratification by fish size was necessary. Length-frequency distributions of fish measured for fork length (FL) in the commercial and test fisheries were similar (d_{max}= 0.040, *P* = 0.232).

To account for the proportion of tagged fish that were not available for recovery in the lower-river fisheries, 54 fish tagged from weeks 25 to 29 and 47 fish tagged from weeks 30 to 35 were censored from the marked sample. The probability of a marked fish being inspected during Event 2 was not independent of the time during the run that it was marked in Event 1 (χ_2^2 = 17.6, *P* = 0.000; Appendix E.3). Overall, 297 fish or 20.6% of available tags were recovered in the lower-river fisheries. The proportion of marked fish sampled in Event 2 also varied significantly over the study period (χ_3^2 = 90.2, *P* = 0.000; Appendix E.3). Of the 14,832 fish sampled in Event 2, 2.0% were marked. The mark rate of fish sampled in the test fishery (0.8%) was significantly lower than the mark rate in the commercial fishery (2.6%; χ_1^2 = 50.4, *P* = 0.000).

Using the Darroch estimator, an estimated 78,378 (SE = 4,711) sockeye salmon migrated above the U.S.-Canada border in the lower Stikine River in 2002 (Table 3). The 95% CI was 69,143 to 87,612 fish. This abundance estimate was based on 1,445 tagged fish available for recovery, 14,832 fish sampled in the lower-river fisheries, and 294 recaptures. Three recaptured fish with unknown tagging or recovery dates were excluded from abundance calculations.

Age, Sex, and Length Composition

Sockeye salmon tagged in the lower Stikine River in 2002 were comprised of 10 age classes ranging from age-0.2 to age-3.3 that represented 5 brood years (1995-1999) returning as 3, 4, 5, 6, and 7-year old fish (Appendix F.3). Age-1.2 (50.2%), age-1.3 (26.5%), and age-3.2 (9.2%) made up the majority of fish sampled. Age-0.2 (4.7%), age-1.1 (0.3%), age-0.3 (2.1%), age-0.4 (0.1%), age-2.2 (5.4%), age-2.3 (1.3%), and age-3.3 (0.1%) comprised the remainder. In Appendix F.3, age class data are broken out by sex, and average length (POH) is presented by sex-and-age class.

Year 4: 2003

Capture and Tagging

A total of 2,699 sockeye salmon were captured in 829 h of set gillnet effort from 14 June to 13 October in the lower Stikine River (Figure 4, Appendix C.4). Of these, 2,576 fish were sampled, tagged (0-137 tags/day), and released (Figure 5). Fishing effort averaged 6.8 hours/day and ranged from 0 to 7.9 hours/day. Catch per unit effort ranged from 0 to 18.8 fish/hour and peaked when 140 sockeye salmon were captured on 8 July (Figure 5). The date of 50% cumulative catch was 11 July and 90% of fish were caught by 2 August. Stikine River discharge averaged 2,829 m^3/s from June through October and peaked on 27 October at 4,984 m^3/s (Figure 3).

Tag Recovery

In 2003, 51,735 sockeye salmon were captured in the lower-river commercial fishery from weeks 26 to 35, of which 590 fish (1.1%) were reported tagged (Appendix D.4). The lower-river test fishery operated from week 19 to week 42 and during this time 3,356 sockeye salmon were caught of which 26 (0.8%) were tagged (Appendix D.4). Travel times for tagged fish released at Rock Island Eddy and recovered in the lower river averaged 7.7 d for the commercial fishery and 8.6 d for the test fishery (Figure 6).

Abundance Estimation

We found no statistical difference between the length-frequency distributions of fish marked (M) in Event 1 and fish recaptured (R) in Event 2 (d_{max} = 0.061, P = 0.050; Figure 7). In contrast, length distributions of fish captured (C) and recaptured (R) in Event 2 were significantly different (d_{max} = 0.179, P = 0.000; Figure 7). Thus, size selectivity was not detected during Event 2 but it was during Event 1 (Case III experiment), and no stratification by fish size was required to estimate abundance.

Seventy-seven fish tagged from weeks 24 to 29 and 127 fish tagged from weeks 30 to 38 were censored from the marked sample to account for the estimated proportion of tagged fish not available for recovery in the lower-river fisheries. Using the adjusted data, we found that the probability of a marked fish being inspected for marks during Event 2 was not independent of the time during the run that it was marked in Event 1 (χ^2_4 = 61.6, P = 0.000; Appendix E.4). In total, 616 or 26.0% of available fish were recovered in the lower-river fisheries. Mark rates were also found to differ significantly over the 2003 study period (χ^2_3 = 68.1, P = 0.000; Appendix E.4). In contrast, mark rates in the commercial (1.1%) and test (0.8%) fisheries were similar (χ^2_1 = 3.8, P = 0.051). Based on these results, temporal stratification was required to estimate abundance.

Using the Darroch estimator, an estimated 206,878 (SE = 9,751) sockeye salmon migrated above the U.S.-Canada border in 2003 (Table 3). The 95% CI was 187,766 to 225,990 fish. This abundance estimate was based on 2,372 tagged fish available for recovery, 55,091 fish sampled in the lower-river fisheries, and 600 recaptures. Sixteen recaptured fish with unknown tagging dates were excluded from the calculations of abundance.

Age, Sex, and Length Composition

Sockeye salmon tagged in the lower Stikine River in 2003 were comprised of 10 age classes ranging from age-0.2 to age-4.2 that represented 5 brood years (2000, 1999, 1998, 1997 and 1996) returning as 3, 4, 5, 6, and 7-year old fish (Appendix F.4). Age-1.3 made up the overwhelming majority (58.1%) of fish sampled. The remainder of the fish were mostly either age 1.2 (19.1%), age 2.2 (11.0%), age 2.3 (4.0%) or age 0.2 (3.5%). Relatively few fish returned from the remaining age classes: age 0.3 (2.7%), age 3.2 (1.0%), age 3.3 (0.4%), age 1.1 (0.1%) and age 4.2 (0.1%). In Appendix F.4, age class data are broken out by sex, and average length (POH) is presented by sex-and-age class.

Year 5: 2004

Capture and Tagging

From 16 June to 3 September 2004, 2,292 sockeye salmon were captured in 517 h of set gillnet effort in the lower Stikine River (Figure 4, Appendix C.5). Of these, 2,207 fish were sampled, tagged (0-127 tags/day), and released (Figure 5). This included 500 radio-tagged fish. Fishing effort ranged from 4.5 to 7.4 hours/day and averaged 6.4 hours/day. Catch per unit effort ranged from 0 to 20.0 fish/hour and peaked when 130 sockeye salmon were captured on 6 July (Figure 5). The date of 50% cumulative catch was 17 July, and 90% of fish were captured by 9 August. From June through October, discharge of the Stikine River averaged 2,880 m^3/s and it peaked on 25 June at 5,635 m^3/s (Figure 3).

Tag Recovery

In the lower-river commercial fishery, 77,530 sockeye salmon were caught from weeks 26 to 36, of which 686 fish (0.9%) were reported tagged (Appendix D.5). From weeks 26 to 40, 1,338 sockeye salmon were caught in the lower-river test fishery of which 26 (1.9%) were tagged (Appendix D.5). Travel times for tagged fish from release at Rock Island Eddy to recovery in the lower river were 7.4 d in the commercial fishery and 6.3 d in the test fishery (Figure 6).

Abundance Estimation

The cumulative length-frequency distribution of fish marked (M) in Event 1 was not statistically different from that of marked fish recaptured (R) in Event 2 (d_{max}= 0.045, P = 0.221; Figure 7). In contrast, the cumulative length-frequency distributions of fish captured and recaptured in Event 2 were significantly different (d_{max}= 0.140, P = 0.000; Figure 7). A significant difference was also found between the cumulative length-frequency distributions of marked fish in Event 1 and fish captured in Event 2 (d_{max} = 0.152, P = 0.000). These results indicate there was no size selectivity detected during Event 2 but there was during Event 1 (Case III experiment), and no stratification by fish size was required to estimate abundance.

Of the 500 radio-tagged sockeye salmon released in 2004, 459 (91.8%) were detected above the U.S.-Canada border. Further investigation revealed that fish radio-tagged from weeks 25 to 29 had a significantly higher probability (95.9%) of being detected above the border than fish tagged after week 29 (84.9%; χ^2_1 = 18.5, P = 0.000; Figure 8). These period-specific proportions were used to adjust the number of tagged fish available for recovery in 2004. In total, 208 (41 radio tags, 144 spaghetti tags) or 9.1% of all tagged fish were censored, leaving 1,999 marked fish available for recovery in the second sampling event.

The probability of a fish marked in Event 1 being captured during Event 2 was not independent of the week it was marked in Event 1 (χ_5^2 = 175.3, *P* = 0.000; Appendix E.5). In total, 712 or 35.6% of available tagged fish were recovered in the lower-river fisheries. Overall, the mark rate averaged 0.01% (712 out of 78,868 fish inspected). Mark rates varied significantly over the study period (χ_6^2 = 180.7, *P* = 0.000; Appendix E.5); and mark rates were also significantly different for fish caught in the commercial (0.01%) and test (0.02%) fisheries (χ_1^2 = 16.5, *P*-value = 0.000). Based on these results, a partially stratified estimator was required to estimate abundance.

Using the Darroch estimator, an estimated 207,621 (SE = 8,042) sockeye salmon migrated above the U.S.-Canada border in 2004 (Table 3). The 95% CI was 191,858 to 223,384 fish. This estimate was based on 1,999 marked fish available for recovery, 78,868 fish sampled in the lower-river fisheries, and 700 recaptures. Twelve fish recovered in the lower-river fisheries with unknown dates of tagging were excluded from abundance calculations.

Age, Sex, and Length Composition

Sockeye salmon tagged in the lower Stikine River in 2004 were comprised of 10 age classes ranging from age-0.2 to age-3.3 that represented 5 brood years (2001, 2000, 1999, 1998, and 1997) returning as 3, 4, 5, 6, and 7-year old fish (Appendix F.5). Age-1.2 (39.7%), age-1.3 (34.3%), and age-2.2 (11.4%) made up the majority of fish sampled. The remainder was comprised of age-0.2 (1.1%), age-0.3 (9.6%), age-1.4 (0.4%), age-2.3 (2.8%), age-1.4 (0.5%), age-2.3 (2.8%), age-3.2 (0.2%), age-2.4 (0.1%), and age-3.3 (0.1%) fish. In Appendix F.5, age class data are broken out by sex, and average length (POH) is presented by sex-and-age class.

Year 6: 2005

Capture and Tagging

A total of 2,094 sockeye salmon were captured in 705 h of set gillnet effort in the lower Stikine River from 16 June to 14 October 2005 (Figure 4, Appendix C.6). Of these, 2,012 fish were sampled, tagged (0-87 tags/day), and released (Figure 5). This included 493 radio-tagged fish. Fishing effort ranged from 2.8 to 6.8 hours/day and averaged 5.8 hours/day. Catch per unit effort ranged from 0 to 13.8 fish/hour and peaked on 13 July when 89 sockeye salmon were captured (Figure 5). The 50% and 90% cumulative catches occurred on 13 July and 9 August, respectively. Stikine River discharge averaged 2,660 m^3/s from June through October and peaked at 3,908 m^3/s on 20 August (Figure 3).

Tag Recovery

From weeks 25 to 33, 79,947 sockeye salmon were caught in the lower-river commercial fishery of which 877 fish (1.1%) were reported tagged (Appendix D.6). The lower-river test fishery was functional from weeks 26 to 42, and during this time 1,651 sockeye salmon were caught of which 21 (1.3%) were tagged (Appendix D.6). Due to the continuous commercial fishing activity in during in stat weeks 28-30, no test fishing was conducted which explains why none of the first 1,428 fish tagged were recaptured in the test fishery. Travel times for tagged fish from release at Rock Island Eddy to recovery in the lower river were 7.3 d in the commercial fishery and 7.0 d in the test fishery (Figure 6).

Abundance Estimation

Tests for size selectivity in 2005 were conducted using fork lengths (FL) of fish measured during both events. The length-frequency distributions of fish marked (M) in Event 1 and recaptured (R) in Event 2 were not significantly different (d_{max} = 0.027, P = 0.747; Figure 7). In contrast, length distributions of fish captured (C) and recaptured (R) in Event 2 were statistically different (d_{max} = 0.245, P = 0.000; Figure 7). Again, these results indicated a Case III experiment and no need to stratify by fish size.

Of the 493 radio-tagged sockeye salmon released, 452 (91.7%) were detected above the U.S.-Canada border. As in 2004, fish that were radio-tagged from weeks 25 to 29 had a significantly higher probability (95.4%) of being detected above the border than fish tagged after week 29 (84.6%; χ^2_1 = 16.8, P = 0.000; Figure 8). Using these period-specific proportions, 185 (41 radio tags, 144 spaghetti tags) or 9.2% of all tagged fish were censored from the marked sample, leaving 1,827 marked fish available for recovery in Event 2.

Diagnostic tests using the adjusted number of available marks showed that the probability of a marked fish being captured during Event 2 was not independent of the time during the run that it was marked in Event 1 (χ^2_4 = 217.4, P = 0.000; Appendix E.6). In total, 898 or 49.2% of available tagged fish were recovered in the lower-river fisheries. The overall mark rate was 1.1%; however; mark rates varied significantly over the study period (χ^2_7 = 137.7, P = 0.000; Appendix E.6). Mark rates in the lower-river commercial (1.1%) and test (1.3%) fisheries were similar (χ^2_1 = 0.5, P = 0.500). These results indicated that a partially stratified estimator was required to estimate abundance.

Using the Darroch estimator, an estimated 167,551 (SE = 7,382) sockeye salmon migrated upstream of the U.S.-Canada border in 2005 (Table 3). The 95% CI was 153,083 to 182,019 fish. This estimate was based on 1,827 marked fish available for recovery, 81,598 fish inspected for marks in the lower-river fisheries, and 890 recaptures. Eight fish with unknown tagging dates were excluded from abundance calculations.

Age, Sex, and Length Composition

Sockeye salmon tagged in the lower Stikine River in 2005 were comprised of 10 age classes ranging from age-1.1 to age-3.3 that represented 5 brood years (2002, 2001, 2000, 1999 and 1998) returning as 3, 4, 5, 6, and 7-year old fish (Appendix F.6). Age-1.3 made up the overwhelming majority (76.0%) of fish sampled. The remainder of the fish were mostly either age 2.3 (8.1%), age 0.3 (5.5%) or age 1.2 (5.0%). Relatively few fish returned from the remaining age classes: age 2.2 (2.5%), age 3.2 (2.0%), age 1.1 (0.3%), age 1.4 (0.2%), age 4.1 (0.2%), and age 3.3 (0.2%). In Appendix F.1, age class data are broken out by sex, and average length (POH) is presented by sex-and-age class.

Radiotelemetry Studies – Sockeye, Chinook, and Coho Salmon

Tag Application

In total, 500 and 493 sockeye salmon were caught, radio-tagged, and released at Rock Island Eddy in 2004 (Appendix C.5) and 2005 (Appendix C.6), respectively. Tagging began on 16 June in both years, and ended 10 d earlier in 2005 than in 2004 (end-dates for tagging were 2 September 2004 and 23 August 2005). Excluding these last days[5], analyses of the weekly distribution of tags applied showed no significant differences between years (χ_9^2 = 14.0; P > 0.05; Figure 9). The average length of sockeye salmon tagged in 2004 (606 mm FL) was significantly smaller than that in 2005 (617 mm FL; t_{991} = -3.72, P = 0.0002; Figure 10). In 2005, 369 Chinook salmon and 268 coho salmon (Appendix G.1) were also radio-tagged. Chinook salmon were radio-tagged at Kakwan Point (downstream of the Rock Island Eddy tag site) from 8 May to 11 July, and coho salmon were radio-tagged at Rock Island Eddy from 9 August to 13 October. The average length of radio-tagged coho salmon was 662 mm FL and they ranged from 485 mm FL to 810 mm FL (Figure 10). Length data for radio-tagged Chinook salmon were unavailable.

Plots of the cumulative relative proportions of CPUE, radio tags deployed, and catch in the lower-river Canadian fisheries show that in general, fish were radio-tagged in proportion to abundance (Figure 12).

Receiver Effectiveness

Minimum receiver activity data showed considerable temporal and spatial variability (Table 4). Activity levels varied among weeks, and among fixed stations. Four receivers in 2004 and one in 2005 showed consistently high (> 85%) activity levels. These were Boundary House West in both years (Figure 11); and Flood, Butterfly, and Shakes in 2004.

The detection efficiency of fixed-station receivers could be determined when detection zones existed farther upriver. In 2004, detection efficiencies for sockeye salmon ranged from 53% to 98% (Table 5). Sockeye salmon detection efficiencies were higher in 2005 (Table 5), ranging from 85% to 100%. There was a temporal pattern in the detection efficiencies of sockeye salmon at the Boundary House receiver (Figure 13). In 2004, there was a period early in the study with lower detection efficiencies, but the values increased thereafter (χ_3^2 = 13.9; P < 0.01). In 2005, detection efficiencies were lower in the middle two quarters, and higher in the first and last periods (χ_3^2 = 8.7; P < 0.05). There were no large differences among species in detection efficiencies (Table 6).

[5] χ^2 tests are very sensitive to empty cells and can be difficult to interpret when cell values are < 1.

Tracking Results

Radio-tagged salmon were detected as they passed fixed-station receivers, during mobile-tracking surveys, and when they were recaptured in fisheries. In 2004, 485 of the 500 radio-tagged sockeye salmon (97.0%) were either caught in fisheries or tracked on at least one occasion (Table 8). In 2005, detection rates were similar (481 of 493, or 97.6%). For Chinook salmon tagged in 2005, 369 of the 367 fish tagged (99.5%) were detected at least once. For coho salmon, 238 of the 268 tagged fish (88.8%) were detected (Table 9).

Based on the farthest upstream detection of each fish, it was determined that 91.8% of the sockeye salmon tagged in 2004 (and 91.9% of those in 2005) crossed the border into Canada, and could thus have been vulnerable to capture in the lower-river fisheries. In both years, about 8% of the radio-tagged sockeye salmon either spawned in U.S. mainstem locations, ventured into U.S. tributary spawning locations, died before entering Canada, regurgitated their radio tags, or entered Canadian waters without being detected. Closer examination of these data showed a temporal pattern in the proportion of tagged fish that did not reach Canada (Figure 14). In both years, Canadian entry rates were higher (> 90%) during the first portion of the tagging period, and then declined (to < 90%) thereafter (2004: $\chi^2_3 = 16.4$; $P < 0.001$; 2005: $\chi^2_3 = 11.9$; $P < 0.01$).

For all species, the proportion of fish radio-tagged each week that were tracked into Canada and recovered in the lower-river fisheries varied over time (Table 7). In 2004, between 0% and 53% of sockeye salmon radio-tagged each week were reported harvested. In 2005, 0-71% of sockeye, 0-68% of Chinook, and 0-9% of coho salmon that were tracked into Canada were recovered in the lower-river fisheries. These weekly proportions were used to calculate weighting factors for adjusting the observed number of radio-tagged fish assigned to each stock (Table 7).

Stock Distribution

Based on the location of their final detection, radio-tagged fish were assigned to one of 11 "stocks." In both years, the largest proportion of sockeye salmon were assigned to the Tahltan Lake stock (28.7% in 2004, 35.0% in 2005; Table 10), followed by the Border to Flood stock (14.7% in 2004, 12.0% in 2005). Despite very similar sockeye salmon distributions between years, significant differences were detected ($\chi^2_{11} = 40.3$; $P < 0.001$). The significant difference in sockeye salmon distributions can be explained largely by the difference between years in the proportion of spawners assigned to the Tahltan Lake stock, followed by differences between years in the Iskut (7.6-12.7%), Chutine (2.3-7.2%), Tahltan (8.6-12.0%), and Craig (2.0-5.4%) rivers.

The majority of the Chinook salmon radio-tagged in 2005 were assigned to the Tahltan (41.4%), Little Tahltan (18.1%), and Iskut (13.8%) river stocks (Table 10; Figure 15). In contrast, coho salmon were not distributed in the upper areas of the Stikine River drainage. No coho salmon were last detected above the Shakes station (Table 9). Most coho salmon were assigned to lower-river stocks, including Border to Flood (29.5%), Below Border (20.6%), and the Iskut River (15.6%; Table 10).

It is important to note that the validity of these stock distributions depend on the fish being tagged in proportion to the run. It was not possible to directly assess whether or not proportionate tagging occurred, since no data were available to determine the temporal trend in sockeye abundance in the river. Marks rates in both 2004 and 2005 varied significantly over time (Appendix E.5 and E.6), and in both years were lower during the earliest parts of the run. As a result, the proportion of early run-timing groups (e.g., Craig, Tahltan River, Tahltan Lake, Above Shakes) may have been underestimated, and the later run-timing groups may have been overestimated.

Run Timing

Run-timing distributions for major sockeye salmon stocks (i.e., n > 5) showed that stocks associated with the upper portion of the watershed (Above Shakes, Tahltan River, and Tahltan Lake) were also among the earliest entrants (Figure 16). Mainstem stocks (Flood to Butterfly, Butterfly to Shakes), mid-watershed tributaries (Chutine and Katete rivers), and Iskut River fish had later entry dates. Stocks utilizing the lower portions of the watershed (Below Border, Border to Flood) had the latest entry dates. Run-timing patterns for specific stocks were similar among years (Figure 17). In both years, the Craig River stock was the earliest to pass the Rock Island Eddy tagging site.

There were significant differences in run-timing dates among sockeye salmon stocks in both 2004 ($F_{10,272} = 11.8$; $P < 0.001$) and 2005 ($F_{10,201} = 5.7$; $P < 0.001$). In 2004, fish using the lower portions of the watershed (Below Border, Border to Flood, Iskut River) had significantly later run timing than Craig River and upper-river (Above Shakes, Tahltan River, and Tahltan Lake) stocks (Tukey-Kramer pairwise comparisons; Figure 17). In 2005, Iskut River and Border to Flood stocks arrived significantly later than Craig River and upper-river stocks. Run timing of the Below Border stock was more variable in 2005 than it was in 2004, and was significantly different only from the Craig River stock (Figure 17).

For Chinook salmon, the Chutine River and Flood to Butterfly stocks had significantly earlier run timing than Iskut River and Butterfly to Shakes stocks ($F_{8,200} = 3.9$; $P = 0.0002$; Figure 18). Run timing of the Little Tahltan River stock was also significantly earlier than the Butterfly to Shakes stock. No other significant differences in run timing existed among Chinook salmon stocks. Of note, the upper-river (Above Shakes, Tahltan River, and Little Tahltan River) and lower-river (Below Border, Border to Flood) stocks had similar run timings. For coho salmon, there were no significant differences in run timing between stocks ($F_{9,227} = 1.5$; $P = 0.13$; Figure 18).

Swim Speeds

In both years, sockeye salmon swim speeds increased significantly as fish moved upriver through the progression of fixed stations on the mainstem Stikine River: Boundary House, Flood, Butterfly, Shakes, then Tahltan River (2004: $r^2 = 0.47$; $F_{1,816} = 725$; $P < 0.001$. 2005: $r^2 = 0.57$; $F_{1,956} = 1275$; $P < 0.001$; Table 11, Figure 19). Swim speeds in reaches ending at tributary receivers (Chutine, Tahltan, and Iskut) were significantly slower than those for adjacent mainstem locations in both years (Table 12). Swim speeds within the Iskut (0.4 km/d in 2004, 1.1 km/d in 2005) were the slowest observed. For reaches with the most data (n > 100), differences in sockeye salmon swim speeds between years were relatively minor; although the difference in the Flood to Butterfly reach was statistically significant (Kruskal Wallis H = -2.45; *P* = 0.01; Table 13). Swim speeds were consistently slower in 2004 than in 2005.

Chinook salmon swim speeds increased significantly as the fish moved upriver through the progression of mainstem Stikine zones (r^2 = 0.26; $F_{1,919}$ = 320.2; *P* < 0.001; Table 14, Figure 19). The increase in swim speeds was not as marked as that for sockeye salmon, and Chinook salmon swim speeds were more variable (lower r^2). Swim speeds for coho salmon did not increase along the Stikine River mainstem ($F_{1,246}$ = 1.00; *P* = 0.32), but note that this species did not typically travel into the upper reaches of the watershed (Table 14).

Reach-specific swim speeds varied among stock groups (Table 15). In 2004, there were significant differences among sockeye stocks in two reaches: that from the Canada-U.S. Border to the Flood confluence (χ^2_3 = 27.6; *P* < 0.0001); and that from the Flood confluence to the Butterfly confluence (χ^2_3 = 9.0; *P* = 0.03; Figure 20). In 2005, there were significant differences among sockeye stocks in all four reaches downstream of the Shakes confluence (χ^2 from 4.4 to 22.2; *P* from 0.049 to 0.001; Figure 21). In 2005, there were significant differences among Chinook stocks in two reaches: that from the Canada-U.S. Border to the Flood confluence (χ^2_2 = 12.4; *P* = 0.002); and that from the Shakes confluence to the Tahltan confluence (χ^2_1 = 7.8; *P* = 0.005; Figure 22). In all reaches upstream of the Canada-U.S. Border, where significant differences could be detected, the upper river stocks traveled faster than the lower river ones (Table 15). Swim speeds downstream of the Canada-U.S. Border did not appear to be a function of the distance to the spawning areas (Figure 21).

DISCUSSION

Mark-Recapture Studies – Sockeye Salmon

The number of sockeye salmon captured and tagged using gillnets at Rock Island Eddy and inspected for marks in the lower-river fisheries was sufficient to generate unbiased and reasonably precise abundance estimates from 2000 to 2005 (Table 3). Precision of the estimates tended to increase as the program evolved over a 6-year period (coefficient of variation ranged from 10.6% in 2000 to 3.9% in 2004).

Abundance estimates derived from the mark-recapture experiments were consistently higher than corresponding estimates generated by the TTC using post-season, run-reconstruction analyses (Table 3). However, the percent difference between the two estimates has declined over time: In 2000 and 2001, mark-recapture estimates were 50% and 30% higher than run-reconstruction estimates, respectively; from 2002 to 2004, mark-recapture estimates were 6% to 12% higher than corresponding run-reconstruction estimates; and the two types of estimates were nearly identical in 2005. In contrast, there was no consistent pattern in the comparison between mark-recapture estimates and the in-river run size generated by the SMM (Table 3): differences ranged from -28.1% to +9.8 %. Statistical bounds are not currently available for the annual TTC and SMM estimates so we cannot assess whether the observed differences are statistically significant. Given the similarity between the three estimates for 2002-2005 and the bounds on the mark-recapture estimates, it is unlikely that the differences between the estimates for these years would be statistically significant. However, for 2000 data, it is likely that the observed difference between the mark-recapture and run reconstruction estimates is large enough to be statistically significant. Since 2000 was the first year of the mark-recapture study, it would be reasonable to expect that the mark rate derived from voluntary tag returns could have been biased low. The substantial decline in mark rate over the 2000 fishing season suggests that this type of reporting bias may have occurred or there were other problems associated with the marking effort. Therefore, the mark-recapture estimates are probably the least reliable of the available estimates for 2000.

There were substantial benefits to using sockeye salmon caught in the lower-river fisheries for second-event sampling. A large number of fish could be "inspected" for marks (with relatively little effort and additional cost to the studies) which in effect reduced the number of fish that had to be marked in Event 1 in order to achieve a given level of precision. In addition, most sockeye salmon marked at Rock Island Eddy were available for recovery in the lower-river fisheries because the majority of fish had to migrate through the fishing areas in order to reach spawning grounds in the upper portion of the drainage. As a result, the marked fraction of fish sampled in the upper-river commercial, aboriginal, and ESSR fisheries; and fish sampled at the Tahltan weir and on the spawning grounds, were not used (or required) to estimate abundance.

Capture probabilities during both sampling events varied significantly over time in all six years of the mark-recapture experiments (see Appendices E.1–E.6). Apart from 2000, the proportion of tagged fish caught in the lower-river fisheries tended to increase during the first few weeks of the season, and then decrease towards the end of the tagging period. In contrast, the marked:unmarked ratio of fish caught in the lower-river fisheries tended to increase during second-event sampling. The combination of these factors made it necessary to use a temporally stratified Darroch model to estimate abundance.

Some of the variation in capture probabilities may be attributed to using recovery data that were voluntarily reported to DFO personnel by harvesters in the lower-river commercial and test fisheries. For example, DFO did not offer a cash-reward for tags recovered in the lower-river test fishery until 2005. Subsequent to this policy change, there was anecdotal evidence to suggest that tags recovered in the test fishery were being reported as harvested in the commercial fishery. In addition, we found several instances where tagged fish were reported harvested during statistical weeks when no fishery took place, or even in the year following their deployment. Mark rates in the commercial and test fisheries were statistically different in 2002 and 2004 (attributed to cash reward system). Based on these findings, it is recommended that a portion of fish caught in both lower-river fisheries be physically inspected for marks by DFO personnel upon their immediate capture. The mark rates in these samples could then be used to assess whether the mark rates from voluntary returns are accurately reported.

Handling and tagging fish during first-event sampling may delay upstream migration or cause higher mortality rates than unmarked fish, both of which could introduce bias in the abundance estimates. In 2004 and 2005, about 96% of sockeye salmon radio-tagged from statistical weeks 25 to 29 were successfully tracked above the U.S.-Canada border, whereas only 85% of fish radio-tagged after week 29 were detected above the border (Figure 8). Based on these period-specific proportions, we adjusted the number of marked fish (radio- and spaghetti-tagged) available for recovery in the lower-river fisheries and made our estimates germane to the U.S.-Canada border. However, if these proportions were biased high (and thus overestimating the true proportion of fish that migrated above the border), then the estimated number of marked fish available for recovery, and resultant abundance estimates, would be biased low (and vice versa).

One explanation for the temporal difference in the proportion of sockeye salmon that were detected above the border is that a larger proportion of fish tagged after week 29 may be bound for spawning areas located downstream of the lower-river fisheries relative to those fish tagged earlier. As a result, these later-run fish would be less susceptible to recovery in the lower-river fisheries. This explanation is supported by the stock-specific run-timing curves (Figure 16 and Figure 17), which show that in general, stocks bound for spawning areas in the lower portion of the drainage tend to pass the tagging site at Rock Island Eddy later than stocks bound for the upper drainage. The other implication of this phenomena is that the mark-recapture abundance estimates we calculated are germane to the border; therefore, any sockeye salmon spawning downstream of the border are not accounted for in the estimates.

Radiotelemetry Studies – Sockeye, Chinook, and Coho Salmon

Mark-recapture experiments indicated that an estimated 207,621 sockeye salmon in 2004 and 167,551 sockeye salmon in 2005 migrated above the U.S.-Canada border (Table 3). Radiotelemetry data showed that in these years, the largest proportion of all radio-tagged sockeye salmon returned to Tahltan Lake (28.7% in 2004 and 35.0% in 2005; Table 10). If we remove the Below Border stock to make the distribution estimates germane to the border (and thus comparable to the mark-recapture estimates), an estimated 31.1% and 38.6% of sockeye salmon that migrated above the border in 2004 and 2005 survived to Tahltan Lake. By applying these proportions to the abundance estimates, it was estimated that 64,570 fish in 2004 and 64,675 fish in 2005 should have arrived at Tahltan Lake. Our 2004 estimate was within 2% of the number of sockeye that was counted through the Tahltan Lake weir from 11 July to 15 September (63,372). Our 2005 estimate was 50% higher than the 43,666 sockeye salmon that were counted through the weir from 12 July to 15 September 2005. The most likely cause for the discrepancy is over representation of Tahltan fish in the radio-tag sample compared with other stocks. Figure 12 shows for both 2004 and 2005 that there was proportionally more tags applied in the early parts of the run, when a higher proportion of Tahltan fish were passing through the area. The disproportional tagging of Tahltan fish in 2005 would have to have been substantial to explain the difference between the estimates. Weekly stock composition data for both the radio-tagged fish and for the fishery harvests would be required in order to assess the degree to which stocks were tagged proportionally. In the future, genetic samples should be collected from each of the radio-tagged fish and combined with similar information from the fishery to assess bias in tagging rates across stocks.

Mainstem Stikine River stocks which include fish that spawn in tributaries and lakes other than Tahltan Lake, as well as in the mainstem and side sloughs of the Stikine River, comprised 71.3%

of the run in 2004 and 65.0% of the run in 2005. Although substantial inter-annual differences in relative distribution were observed for the Tahltan Lake, Iskut River (7.6-12.7%), and Chutine River (2.3-7.2%) stocks; the relative distribution of most sockeye salmon stocks was similar between years (Table 6). It is important to note that the proportions of fish assigned to mainstem and lower tributary spawning areas may have been overestimated in the radiotelemetric analyses. Based on run reconstruction analysis, 37% of the escapement in 2004 and 57% of the escapement in 2005 occurred outside of Tahltan Lake. There are two main reasons why the radiotelemetry data may have overestimated mainstem spawning proportions. First, the temporal variation in mark rates within both study years would result in an underestimation of upper-river stocks, and hence an overestimation of the lower-river stocks. Second, any Tahltan-bound fish that expended too much energy and died en route would have been erroneously assigned to lower river spawning stocks.

In both years, the run timing of Stikine River sockeye salmon revealed that upriver stocks, such as the Tahltan River and Tahltan Lake stocks, were amongst the first to pass the Rock Island tagging site, and downriver stocks (e.g., mainstem Stikine downstream of Flood) were amongst the last. This trend in run-timing pattern where upriver stocks return earlier than those bound for the lower areas of a drainage has been observed for sockeye salmon on other river systems (English et al. 2004; Smith et al. 2006). Assuming this run-timing pattern holds true in the lower-river fisheries, then it is likely that individual stocks are subject to varying levels of exploitation. For example, in both years, the majority of the Above Shakes and Craig River stocks had passed the tagging site prior to the peak harvest periods (weeks 28-30 in 2004 and weeks 27-30 in 2005).

The spawning distribution of Chinook salmon in 2005 was similar to that observed by Pahlke and Etherton (1999) during a similar radiotelemetry study conducted in 1997 (Figure 15). In both studies, the Tahltan River stock comprised the largest proportion of the run, followed by the Upper Stikine, Little Tahltan River, and Iskut River stocks. Preliminary results from a mark-recapture study conducted in 2005 indicated an above-average spawning escapement of 29,800 (95% CI: 26,400-33,500) large Chinook salmon (PSC 2006). From 19 June to 8 August 2005, a total of 7,387 large Chinook salmon were counted through the Little Tahltan River weir, which represented 24% of the total Stikine escapement (PSC 2006). During the 2005 radiotelemetry study, 18.1% of Chinook salmon of all size categories returned to the Little Tahltan River.

Similar to sockeye salmon, run-timing patterns for Chinook salmon in the Stikine River and elsewhere have shown that fish returning to spawning areas in the upper drainage tend to return earlier than fish spawning in the lower drainage (Koski et al. 1996; Pahlke and Bernard 1996; Pahlke and Etherton 1999; Savereide 2005). In 2005, however, we found no significant differences in run timing between upper-river and lower-river Chinook salmon stocks (Figure 18); although sample sizes for some stocks were small. Although not significantly different, Iskut River fish appeared to migrate past the Kakwan Point tagging site later in the year than fish heading to the Tahltan spawning areas. This pattern was also observed on the Stikine River in 1996 and 1997 (Pahlke and Etherton 1997, 1999). As indicated by Pahlke and Etherton (1999), this may result in higher harvest rates on the typically smaller, Iskut River fish in gillnet fisheries that target sockeye salmon.

In 2005, the median swim speed for radio-tagged Chinook salmon from release at Kakwan Point to first detection at the Boundary House fixed station was 2.1 km/d (0.9-36.9 km/d). This swim speed was comparable to the median swim speed of 2 km/d (0.6-20.0 km/d) reported by Pahlke and Etherton (1999). In 2005, Chinook salmon swim speeds increased significantly as the fish progressed further upstream (Figure 19).

In 2005, the majority (56.4%) of coho salmon were distributed in the mainstem Stikine River downstream of the Shakes Creek fixed-station (Table 10). The remaining 43.6% of coho salmon were assigned to tributary stocks in the Iskut (15.6%), Katete (8.0%), Chutine (7.6%), Craig (7.3%), and Scud (5.1%) rivers. The relative distribution of radio-tagged coho salmon in 2005 amongst the index streams typically surveyed by DFO (Table 1) was quite similar. Thirty radio-tagged coho salmon (11.1% of 268 tagged) were never detected after release, which was substantially higher than the rates observed for sockeye (2.4% in 2004, 3.0% in 2005) and Chinook (0.5%) salmon. Only one complete aerial survey was conducted in the drainage after the last coho salmon was radio-tagged on 13 October, so these fish were less likely to be detected on aerial surveys. A larger proportion of radio-tagged coho salmon may also have been tracked into spawning tributaries had additional mobile tracking been conducted in the lower portion of the drainage in November 2005. No significant differences in run timing were detected among stocks. The median swim speed for coho salmon from release at Rock Island Eddy to first detection at the Boundary House fixed station was 4.3 km/d (0.4-34.7 km/d), which was faster than swim speeds for sockeye (3.5 km/d) and Chinook (2.1 km/d) salmon through the same river section.

In both years, radio-tagged fish that were detected at least once after release but never detected in a specific spawning tributary were classified as mainstem spawners. This included 27% of sockeye salmon in 2004; and 19% of sockeye, 13% of Chinook, and 56% of coho salmon in 2005. Many fish have been observed spawning in the Stikine mainstem (pers. obs.). In reality, the specific fate of these fish was unknown and may have included: 1) failed radio transmitters; 2) fish that dropped back after release and returned to the ocean; 3) fish that regurgitated their tags or died; 4) fish that ran out of energy and died en route to a spawning tributary; 5) fish that moved into tributaries but were not detected; or 6) fish that were harvested but not reported. Motion-sensing radio transmitters that emit a different code when a radio tag is immobile for a specified period may help to distinguish mainstem spawning activity from these other six fates. Additional mobile-tracking surveys in the lower river would also be useful for this purpose.

CONCLUSIONS AND RECOMMENDATIONS

In-river returns of sockeye salmon to the Stikine River were successfully estimated during the 6-year mark-recapture program (2000-2005) and the precision of the estimates was well within acceptable limits. Set gillnets were an effective method of capturing a sufficient number of sockeye salmon over the entire migration and during fluctuating river conditions. Although the lower-river commercial and test fisheries provided large numbers of fish for Event 2 sampling, it was recommended that a portion of these fish be physically inspected for marks upon capture (i.e., prior to tags being removed) to verify mark rates derived from voluntary recovery data.

Further, it is recommended that recovery efforts (Event 2) be increased via the deployment of additional test net fishing during any prolonged periods when the commercial fishery is inactive.

Although there was success in generating in-river abundance estimates by mark-recapture studies, there were obvious inconsistencies between these numbers and those generated by run reconstruction (based on weir counts and stock identification of Tahltan Lake sockeye) or SMM (based on the linear relationship between effort and run size). It is recommended that fisheries managers in Canada and US review the all of the run size estimates, before adopting one estimate over another. The true estimate may be generated by using a combination of the three methods. Note that overall cost must be factored into the decision of which assessment method (or combination of methods) is to be adopted.

Weekly run size estimates generated from mark-recapture studies were beyond the scope of this report; however, these estimates served to assist Canadian managers in their weekly management responses. The weekly estimates were often used in combination with estimates generated from the SMM, especially in assessing run strength of the mainstem component of the sockeye run . In light of the in-season utility of the mark-capture programme, it is recommended that the SMM be reviewed and any necessary adjustments made for it to deliver more accurate mainstem sockeye run size estimates.

Radiotelemetry techniques were used successfully to generate stock-specific run-timing and distribution estimates for sockeye (2004 and 2005), Chinook (2005), and coho (2005) salmon. It is recommended that further radio telemetry studies be conducted on Chinook, sockeye, and coho to assess whether run distribution and timing varies with run size. One could reasonably expect to meet this goal by conducting radio telemetry studies for a full cycle of each species. Recommendations for subsequent radiotelemetry studies include: 1) using motion-sensing transmitters to help determine the fate of radio-tagged fish last detected in the lower mainstem Stikine River; 2) obtaining DNA samples to determine stock origins for each radio-tagged fish; 3) conducting additional mobile surveys in the lower river; and 4) keeping a backup copy of all raw fixed-station and mobile receiver files. For both the mark-recapture and radiotelemetry studies, investigators should consider options to reduce the likelihood of data-entry errors in the field, such as employing in-season quality-control measures to verify data and using hand-held computers to enter field data.

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TABLES

Table 1. Aerial survey counts of coho salmon at eight index sites within the Stikine River drainage, 1984 to 2005.

Year	D	Katete West	Katete	Craig	Verrett	Bronson Slough	Scud Slough	Porcupine	Christina	Total
1984	10/3	147	313	0	15	42				517
1985	10/2	590	1,217	735	39	0	924	365		3,870
1988	10/2	32	227		175		97	53	0	584
1989	10/2	336	896	992	848	120	707	90	55	4,044
1990	10/3	94	548	810	494		664	430		3,040
1991	10/2	302	878	985	218		221	352		2,956
1992	10/2	295	1,346	949	320		462	316		3,688
1993	10/30						206	324		
1994	11/1	28	652	1,026	466		448	1,105		3,725
1995	10/3	211	208	1,419	574		621	719		3,752
1996	10/3	163	232	205	549		630	1,466		3,245
1997	11/0	2	0	19	116		272	648		1,057
1998	10/3	14	63	141	282		143	450		1,093
1999	11/0	163	773	891	490		661	894		3,872
2000	11/2-3				5		95	206		306
2001	11/2	207	1,401	3,121	708		1,571	397		7,405
2002	11/	806	2,642	4,488	1,695		1,389	1,626		12,646
2003	no surveys conducted due to inclement survey conditions									
2004[a]		78	762	19	959		173	1,009		3,000
2005		300	1,195	444	353		218	689		3,199
Average										
84-05		222	785	1,015	461	54	528	619	28	3,444
96-05		217	884	1,166	573		572	821		3,980

Table 1 continued.

Survey Date	Katete West	Katete	Craig	Verrett	Bronson Slough	Scud Slough	Porcupine	Christina	Total
1984 10/30	147	313	0	15	42				517
1985 10/25	590	1,217	735	39	0	924	365		3,870
1988 10/28	32	227		175		97	53	0	584
1989 10/29	336	896	992	848	120	707	90	55	4,044
1990 10/30	94	548	810	494		664	430		3,040
1991 10/29	302	878	985	218		221	352		2,956
1992 10/29	295	1,346	949	320		462	316		3,688
1993 10/30						206	324		
1994 11/1-2	28	652	1,026	466		448	1,105		3,725
1995 10/30	211	208	1,419	574		621	719		3,752
1996 10/30	163	232	205	549		630	1,466		3,245
1997 11/01	2	0	19	116		272	648		1057
1998 10/30	14	63	141	282		143	450		1093
1999 11/05	163	773	891	490		661	894		3872
2000 11/2-3				5		95	206		306
2001 11/2-3	207	1401	3121	708		1571	397		7405
2002 11/05	806	2642	4488	1695		1389	1626		12646
2003	No surveys conducted due to inclement survey conditions								
2004[a]	78	762	19	959		173	1009		3000

[a] 2004 data are preliminary; viewing conditions at the Craig River site were poor in 2004.

Table 2. Fates of sockeye salmon in the mark-recapture experiment and fates of radio-tagged salmon.

Sockeye Salmon
1. Marked and never seen again
2. Marked and recovered in the lower river fisheries
3. Unmarked and not seen in the lower river fisheries
4. Unmarked and inspected in the lower river fisheries
Radio-tagged Sockeye Salmon
1. Marked ($t = 1$) and not tracked into Canada
2. Marked ($t = 1$) and recovered in the lower river fisheries
3. Marked ($t = 1$) and not seen in the lower river fisheries
4. Marked ($t = 2$) and not tracked into Canada
5. Marked ($t = 2$) and recovered in the lower river fisheries
6. Marked ($t = 2$) and not seen in the lower river fisheries

Table 3. Comparison of in-river abundance estimates for Stikine River sockeye salmon generated from annual mark-recapture experiments (Darroch and Petersen estimators), post-season run reconstruction, and Stikine River Management Model (SMM) final estimates.

	Year					
Estimation Method	2000	2001	2002	2003	2004	2005
A. Mark-recapture (Darroch)	**121,746**	**151,030**	**78,378**	**206,878**	**207,621**	**167,551**
SE	12,936	15,932	4,711	9,751	8,042	7,382
Lower 95% CI	96,391	119,803	69,143	187,766	191,858	153,083
Upper 95% CI	147,100	182,256	87,612	225,990	223,384	182,019
B. Run Reconstruction	**53,145**	**103,755**	**68,635**	**194,425**	**189,415**	**167,570**
C. Difference (A-B)	68,601	47,275	9,743	12,453	18,206	-19
% difference	56.3	31.3	12.4	6.0	8.8	0.0
D. Mark-Recapture (Petersen)	144,335	124,495	71,974	211,844	221,230	165,920
SE	9,887	6,065	3,671	7,291	6,612	3,921
E. SMM final estimates	127,000	147,700	100,400	237,800	187,300	173,300
Difference (A-E)	-5,254	3,330	-22,022	-30,922	20,321	-5,749
% difference	-4.3	2.2	-28.1	-14.9	9.8	-3.4

For the Petersen estimates, recoveries in the lower-river fisheries where the date of tagging and/or date of recovery were unknown were included in abundance calculations. Standard errors for the Petersen estimates were generated using SPAS.

Table 4. Minimum weekly receiver activity (percent of hours during which detection data were recorded) for the fixed stations deployed in 2004 and 2005. Boundary House is abbreviated as "BH." Receiver activity data are considered minima because noise records and hourly battery-check data had been removed from the download files that were provided for these analyses.

Stat Week	BH West	BH East	Iskut WS	Craig River	Iskut Snip	Flood	Butter-fly	Chutine	Shakes	Tahltan River	Tuya	Tahltan Lake	Little Tahltan
2004													
25	96%	0%	57%		100%	100%	100%	100%	100%	3%	0%	0%	
26	96%	0%	100%		100%	100%	100%	100%	100%	0%	0%	0%	
27	96%	0%	100%		100%	100%	100%	100%	100%	0%	0%	0%	
28	96%	20%	100%		100%	100%	100%	100%	100%	0%	28%	0%	
29	100%	96%	100%		100%	100%	100%	100%	100%	0%	96%	2%	
30	100%	96%	100%		100%	100%	100%	100%	100%	0%	96%	100%	
31	100%	96%	100%		100%	100%	100%	98%	99%	49%	96%	98%	
32	100%	96%	100%		100%	100%	100%	96%	100%	96%	96%	96%	
33	100%	96%	100%		100%	100%	100%	96%	100%	96%	96%	96%	
34	100%	95%	100%		57%	100%	100%	64%	100%	96%	96%	96%	
35	100%	96%	100%		95%	100%	100%	0%	100%	96%	96%	96%	
36	100%	96%	100%		37%	100%	100%	0%	100%	96%	96%	96%	
2005													
25	99%		50%	0%	0%	58%	46%	0%	6%	0%	0%	0%	0%
26	99%		62%	2%	24%	91%	44%	30%	54%	83%	22%	0%	66%
27	100%		64%	95%	52%	91%	75%	54%	88%	100%	50%	0%	91%
28	100%		78%	96%	56%	89%	79%	53%	75%	100%	63%	0%	77%
29	100%		67%	96%	58%	90%	82%	56%	100%	100%	62%	0%	96%
30	97%		79%	49%	27%	80%	89%	14%	97%	96%	57%	31%	96%
31	93%		96%	7%	7%	54%	96%	12%	96%	96%	5%	50%	96%
32	89%		96%	0%	52%	36%	96%	31%	96%	96%	24%	57%	96%
33	93%		96%	0%	8%	56%	96%	10%	96%	96%	8%	51%	96%
34	96%		96%	0%	4%	96%	96%	7%	96%	96%	0%	96%	90%
35	96%		96%	0%	2%	96%	96%	30%	96%	96%	14%	96%	87%
36	96%		60%	6%	6%	45%	45%	0%	46%	67%	0%	96%	95%

Table 5. The number of radio-tagged sockeye salmon detected at each fixed-station receiver, and the number known to have passed (i.e., detected at the station or farther upstream). Detection efficiencies of the stations were calculated as the ratio of detected to passed fish. Detection efficiencies could not be calculated for receivers in terminal areas (e.g., tributaries) since no receivers were deployed farther upriver. Tahltan Lake detection efficiencies were based on fish detected during mobile tracks upstream of the station.

Location of	2004			2005		
Fixed Station	Detected	Passed	Det. Eff.	Detected	Passed	Det. Eff.
Boundary House	329	459	72%	384	452	85%
Iskut Water Survey	58	59	98%	26	26	100%
Flood	164	183	90%	185	186	99%
Butterfly	148	154	96%	154	156	99%
Shakes	127	135	94%	135	136	99%
Tahltan River	50	94	53%	100	101	99%
Little Tahltan	not deployed in 2004			95	95	100%
Tahltan Lake	61	73	84%	77	77	100%

Table 6. The number of radio-tagged fish detected at each fixed-station receiver, and the number known to have passed (i.e., detected at the station or farther upstream), by species in 2005. Detection efficiencies of the stations were calculated as the ratio of detected to passed fish. Detection efficiencies could not be calculated for receivers in terminal areas (e.g., tributaries) since no receivers were deployed farther upriver. Tahltan Lake detection efficiencies were based on fish detected during mobile tracks upstream of the station.

	Sockeye			Chinook			Coho		
Fixed Station Location	Detected	Passed	Det. Eff.	Detected	Passed	Det. Eff.	Detected	Passed	Det. Eff.
Boundary House	384	452	85%	293	351	83%	185	195	95%
Iskut Water Survey	26	26	100%	27	27	100%	56	56	100%
Flood	185	186	99%	188	193	97%	43	45	96%
Butterfly	154	156	99%	163	169	96%	19	20	95%
Shakes	135	136	99%	149	158	94%	1	1	100%
Tahltan River	100	101	99%	128	137	93%	0	0	
Little Tahltan	95	95	100%	85	87	98%	0	0	
Tahltan Lake	77	77	100%	0	0		0	0	

Table 7. Weekly proportion of sockeye, Chinook, and coho salmon that were radio-tagged, tracked into Canada, and recovered in lower-river fisheries, 2004 and 2005. Weighting factors (b_w) based on the weekly proportion of radio-tagged fish removed in the lower-river fisheries were used to adjust the observed number of radio-tagged fish assigned to each stock.

	Statistical week																								
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total
2004 - Sockeye																									
Tagged							15	34	100	87	78	63	47	30	18	16	7	5							500
To Canada							14	32	97	85	71	49	42	24	12	11	7	4							448
Recovered							4	9	43	45	26	20	16	4	0	1	2	0							170
b_w							1.4	1.4	1.8	2.1	1.6	1.7	1.6	1.2	1.0	1.1	1.4	1.0							
2005 - Sockeye																									
Tagged							10	56	96	84	78	60	48	30	18	10	3								493
To Canada							7	52	92	80	73	53	40	22	13	7	3								442
Recovered							0	25	53	44	52	26	14	7	1	0	0								222
b_w							1.0	1.9	2.4	2.2	3.5	2.0	1.5	1.5	1.1	1.0	1.0								
2005 - Chinook																									
Tagged	1	23	32	93	83	36	31	42	23	5															369
To Canada	0	22	31	84	80	35	31	40	21	5															349
Recovered	0	15	15	37	35	11	8	10	7	3															141
b_w	0.0	3.1	1.9	1.8	1.8	1.5	1.3	1.3	1.5	2.5															
2005 - Coho																									
Tagged															11	14	35	34	52	36	36	30	12	8	268
To Canada															8	11	24	27	36	29	21	20	9	4	189
Recovered															0	1	0	0	0	0	0	0	0	0	1
b_w															1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	

Table 8. Area of last detection/recovery for radio-tagged sockeye salmon released at Rock Island Eddy in 2004 and 2005. "Last Zone" refers to the final detection location, and "Max Zone" refers to the farthest upstream reach at which the fish was detected. Shaded zones are located downstream of the Canadian fisheries.

	2004		2005	
River, Location, or Reach	Last Zone	Max Zone	Last Zone	Max Zone
Release Sites				
Release - Rock Island	15	15	12	12
Stikine Mainstem Locations				
Downstream of Rock Island	3	1	8	1
Rock Island to Border	34	25	31	27
Border to Iskut	19	21	11	19
Iskut to Porcupine	17	16	11	13
Porcupine to Flood	12	10	8	6
Flood to Scud	10	20	3	23
Scud to Butterfly	10	7	6	4
Butterfly to Chutine	10	8	4	2
Chutine to Shakes	4	1	1	0
Shakes to Tahltan River	12	20	6	11
Tahltan R to Tuya	1	0	0	0
Tributary Locations				
Kikake	0	0	1	1
Katete	6	5	5	4
West Fork	1	3	0	0
Porcupine	2	1	0	0
Scud	2	2	1	1
Christina	0	0	2	2
Chutine	7	10	16	18
Iskut Locations				
Iskut from Stikine to Craig	26	26	12	12
Craig River	16	4	5	5
Iskut upstream of Craig	14	30	7	7
Upriver Locations				
Tuya	2	3	0	1
Tahltan River	24	23	23	15
Little Tahltan	0	0	4	9
Tahltan Lake	67	73	67	77
Fisheries				
US Fisheries	0	0	0	0
Canadian Fisheries	186	176	249	223
Total	**500**	**500**	**493**	**493**
Summary				
Tracked or Recovered	485		481	
% Tags Accounted For	97.0%		97.6%	
Tracked at or Above Canadian Border		459		453
% Available to the Canadian Fishery		91.8%		91.9%

Table 9. Area of last detection/recovery for radio-tagged sockeye, Chinook, and coho salmon in 2005. Numbers for each river reach are counts of fish that were last detected there. Shaded zones are located downstream of the Canadian fisheries.

River, Location, or Reach	Sockeye	Chinook	Coho
Release Sites			
Release - Kakwan	0	2	0
Release - Rock Island	12	0	30
Stikine Mainstem Locations			
Downstream of Rock Island	8	5	12
Rock Island to Border	31	5	37
Border to Iskut	11	2	40
Iskut to Porcupine	11	2	7
Porcupine to Flood	8	1	11
Flood to Scud	3	15	10
Scud to Butterfly	6	1	3
Butterfly to Chutine	4	4	2
Chutine to Shakes	1	2	0
Shakes to Tahltan River	6	10	0
Tributary Locations			
Kikake	1	0	5
Katete	5	0	19
West Fork	0	0	6
Porcupine	0	0	6
Scud	1	0	7
Christina	2	0	0
Chutine	16	7	18
Iskut Locations			
Iskut from Stikine to Craig	12	6	24
Craig River	5	0	11
Iskut upstream of Craig	7	20	19
Upriver Locations			
Tahltan River	23	90	0
Little Tahltan	4	39	0
Tahltan Lake	67	0	0
Fisheries			
US Fisheries	0	8	0
Canadian Fisheries	249	150	1
Total	**493**	**369**	**268**
Summary			
Tracked or Recovered	481	367	238
% Tags Accounted For	97.6%	99.5%	88.8%

Table 10. Stock distribution of radio-tagged sockeye, Chinook, and coho salmon, by year. Fish were assigned to a stock based on their last detection location. The relative stock distribution was adjusted to account for harvests in the lower-river fisheries. The adjusted percentages were calculated on the assumption that fish caught in lower-river fisheries had the same relative stock distribution as the other fish tagged during that statistical week. Fish captured in upper-river fisheries and those never tracked were excluded from these analyses.

	Number of fish				Percent				Adjusted Percent			
	2004	2005			2004	2005			2004	2005		
Stock	Sockeye	Sockeye	Chinook	Coho	Sockeye	Sockeye	Chinook	Coho	Sockeye	Sockeye	Chinook	Coho
Tahltan Lake*	67	67	0	0	22.4%	28.9%	0.0%	0.0%	28.7%	35.0%	1.7%	0.0%
Little Tahltan	0	4	39	0	0.0%	1.7%	18.7%	0.0%	0.0%	1.6%	18.1%	0.0%
Tahltan River	24	23	90	0	8.0%	9.9%	43.1%	0.0%	8.6%	12.0%	41.4%	0.0%
Above Shakes	13	6	10	0	4.3%	2.6%	4.8%	0.0%	4.5%	3.4%	4.3%	0.0%
Butterfly to Shakes	14	5	6	2	4.7%	2.2%	2.9%	0.8%	5.1%	2.1%	3.5%	0.8%
Chutine	7	16	7	18	2.3%	6.9%	3.3%	7.6%	2.3%	7.2%	3.4%	7.6%
Flood to Butterfly	20	11	16	13	6.7%	4.7%	7.7%	5.5%	6.4%	5.5%	7.9%	5.5%
Border to Flood	48	30	5	70	16.1%	12.9%	2.4%	29.5%	14.7%	12.0%	3.1%	29.5%
Katete	6	5	0	19	2.0%	2.2%	0.0%	8.0%	2.0%	1.7%	0.0%	8.0%
Below Border **	37	39	10	49	12.4%	16.8%	4.8%	20.7%	7.7%	9.1%	2.6%	20.6%
Iskut	40	19	26	37	13.4%	8.2%	12.4%	15.6%	12.7%	7.6%	13.8%	15.6%
Craig	16	5	0	17	5.4%	2.2%	0.0%	7.2%	5.4%	2.0%	0.0%	7.3%
Other	7	2	0	12	2.3%	0.9%	0.0%	5.1%	1.9%	0.8%	0.0%	5.1%

* includes fish caught in Tahltan Lake fishery and in the First Nation fishery near Telegraph Creek.

** excludes fish caught in US fisheries.

Table 11. Swim speeds (km/d) for radio-tagged sockeye salmon released at Rock Island Eddy, 2004 and 2005, by river reach. For each reach, median, minimum, and maximum swim speeds are reported (n = sample size).

	2004				2005			
River Reach	Median	Min	Max	n	Median	Min	Max	n
Release to Boundary House	3.3	0.6	37.8	329	3.5	0.7	16.5	384
Release to Iskut Water Survey	4.0	1.7	17.2	58	3.4	1.6	8.1	26
Release to Iskut Snip	3.2	1.8	5.5	13	2.6	1.8	3.8	6
Release to Flood	6.8	2.4	13.7	164	7.5	3.0	14.2	185
Release to Butterfly	8.5	4.2	15.9	148	9.1	3.5	16.6	154
Release to Chutine	7.0	4.5	14.6	8	5.8	4.2	10.8	18
Release to Shakes Ck.	9.8	4.1	16.3	127	10.3	4.8	18.3	135
Release to Tuya	4.6	3.8	7.2	4	12.1	9.5	15.6	3
Release to Tahltan River	10.6	6.1	16.9	50	11.3	5.6	18.9	100
Release to Tahltan Lake	9.6	2.9	13.2	61	9.8	5.7	14.4	77
Boundary House to Iskut Water Survey	5.8	1.3	16.1	44	2.7	1.0	10.5	26
Boundary House to Iskut Snip	2.9	1.6	4.7	9	2.2	1.6	3.3	6
Boundary House to Flood	11.2	2.3	23.0	130	12.7	3.1	29.6	183
Boundary House to Butterfly	12.8	4.3	22.2	115	13.5	3.2	30.0	152
Boundary House to Chutine	7.0	5.0	16.1	7	6.6	4.2	10.8	16
Boundary House to Shakes Ck.	14.5	9.4	20.5	97	14.6	5.1	30.7	135
Boundary House to Tuya	4.4	4.0	4.9	3	13.8	10.5	19.8	3
Boundary House to Tahltan River	14.7	7.0	21.1	42	14.8	6.3	31.2	100
Boundary House to Tahltan Lake	11.6	8.5	15.5	45	11.2	5.9	19.0	77
Iskut Water Survey to Iskut Snip	0.9	0.4	2.3	13	0.6	0.4	1.1	6
Flood to Butterfly	15.8	2.4	29.7	135	18.0	2.1	35.1	154
Butterfly to Chutine	3.2	2.0	10.5	8	3.2	1.2	17.7	18
Butterfly to Shakes Ck.	20.2	2.2	30.9	127	21.3	4.6	33.3	134
Shakes Ck. to Tahltan River	17.3	3.0	38.8	50	19.2	3.6	33.2	100
Tahltan River to Tahltan Lake	6.1	4.2	10.0	37	5.7	3.5	8.2	77

Table 12. Within-individual comparisons of sockeye salmon swim speeds (km/d) in tributary reaches versus adjacent mainstem reaches.

			Paired t-statistics		
Year	Mainstem Reach	Tributary Reach	t value	df	*P*
2004	BH to Iskut WS	Iskut WS to Iskut Snip	4.39	8	0.002
2004	Flood to Butterfly	Butterfly to Chutine	3.52	5	0.017
2004	Shakes to Tahltan	Tahltan River to Tahltan Lake	8.72	36	< 0.0001
2005	BH to Iskut WS	Iskut WS to Iskut Snip	4.06	5	0.010
2005	Flood to Butterfly	Butterfly to Chutine	7.19	17	< 0.0001
2005	Shakes to Tahltan River	Tahltan River to Tahltan Lake	21.49	76	< 0.0001

Table 13. Comparisons of median sockeye salmon swim speeds (km/d) between years. Only the main reaches (n > 100 in both years) were analyzed. Statistically significant differences (Kruskal-Wallis) are highlighted in bold font.

	Travel speed (km/d)		Kruskal Wallis test	
Reach	2004	2005	H	*P*
Release to Boundary House	3.3	3.5	-1.11	0.27
Boundary House to Flood	11.2	12.7	-1.53	0.13
Flood to Butterfly	**15.8**	**18.0**	**-2.45**	**0.01**
Butterfly to Shakes	20.2	21.3	-1.01	0.31
Shakes to Tahltan	17.3	19.2	-1.53	0.13

Table 14. Swim speeds (km/d) for radio-tagged sockeye, Chinook and coho salmon, 2005. For each reach, median, minimum, and maximum swim speeds are reported (n = sample size).

	Rock Island Sockeye				Kakwan Chinook				Rock Island Coho			
River Reach	Median	Min	Max	n	Median	Min	Max	n	Median	Min	Max	n
Release to Boundary House	3.5	0.7	16.5	384	2.1	0.9	36.9	293	4.3	0.4	34.7	185
Release to Iskut Water Survey	3.4	1.6	8.1	26	2.9	1.5	5.3	27	4.1	1.4	17.0	56
Release to Craig River	3.0	2.7	4.9	5				0	2.9	1.3	7.6	17
Release to Iskut Snip	2.6	1.8	3.8	6	3.4	1.2	4.9	12	2.7	1.7	4.6	18
Release to Flood	7.5	3.0	14.2	185	4.4	2.3	10.6	188	5.9	2.2	13.9	43
Release to Butterfly	9.1	3.5	16.6	154	5.8	2.3	12.9	163	7.4	4.0	12.8	19
Release to Chutine	5.8	4.2	10.8	18	4.8	3.7	7.4	10	7.4	4.1	12.1	18
Release to Shakes Ck.	10.3	4.8	18.3	135	6.3	2.9	13.2	149	5.7	5.7	5.7	1
Release to Tuya	12.1	9.5	15.6	3	5.5	2.6	6.6	5				0
Release to Tahltan River	11.3	5.6	18.9	100	6.7	2.1	54.4	128				0
Release to Little Tahltan R.	10.9	5.4	18.3	95	6.0	3.2	19.4	85				0
Boundary House to Iskut Water Survey	2.7	1.0	10.5	26	3.3	1.2	16.1	24	4.6	0.7	21.6	56
Boundary House to Craig River	3.1	2.2	4.8	5				0	2.9	1.0	7.0	17
Boundary House to Iskut Snip	2.2	1.6	3.3	6	3.8	1.0	9.9	11	2.3	1.5	4.7	18
Boundary House to Flood	12.7	3.1	29.6	183	10.2	2.5	24.6	166	7.0	2.3	14.2	43
Boundary House to Butterfly	13.5	3.2	30.0	152	12.2	4.0	27.7	143	8.9	4.1	13.6	19
Boundary House to Chutine	6.6	4.2	10.8	16	6.9	4.2	17.9	10	8.2	4.8	12.5	18
Boundary House to Shakes Ck.	14.6	5.1	30.7	135	11.6	4.9	24.5	130	6.1	6.1	6.1	1
Boundary House to Tuya	13.8	10.5	19.8	3	7.8	4.2	9.9	4				0
Boundary House to Tahltan River	14.8	6.3	31.2	100	9.7	2.2	19.5	111				0
Boundary House to Little Tahltan R.	13.6	6.5	26.4	95	7.6	3.2	13.6	74				0
Iskut Water Survey to Craig River	4.1	2.2	6.3	5				0	2.3	0.6	6.3	17
Iskut Water Survey to Iskut Snip	0.6	0.4	1.1	6	1.8	0.3	3.2	12	0.7	0.3	3.7	18
Butterfly to Chutine	3.2	1.2	17.7	18	3.6	1.7	20.7	10	7.0	2.3	12.8	18
Butterfly to Shakes Ck.	21.3	4.6	33.3	134	10.5	3.5	22.1	148	9.5	9.5	9.5	1
Shakes Ck. to Tuya	14.9	9.9	18.5	3	5.5	0.9	6.6	5				0
Shakes Ck. to Tahltan River	19.2	3.6	33.2	100	7.9	0.9	20.4	124				0
Tahltan River to Little Tahltan	7.7	3.5	14.7	95	3.0	0.6	7.3	82				0

Table 15. Median reach-specific swim speeds (km/d) for radio-tagged sockeye and Chinook, by stock, 2004- 2005.

	Stock Group										
River Reach	Caught in Fishery	Iskut	Craig	Border to Flood	Flood to Butterfly	Chutine	Butterfly to Shakes	Above Shakes	Tahltan River	Tahltan Lake	Little Tahltan
Sockeye 2004											
Release to Border	3.3	3.6	3.7	3.8	3.0		2.8		3.1	3.5	
Border to Flood					8.1		10.5		10.3	13.2	
Flood to Butterfly							13.4	16.5	18.2	16.1	
Butterfly to Shakes								19.1	20.2	20.8	
Shakes to Tahltan									18.9	17.3	
Sockeye 2005											
Release to Border	3.4	3.6		3.0	4.4	4.2			3.1	4.3	
Border to Flood					8.9	8.8			11.3	13.5	
Flood to Butterfly						13.0			17.1	19.8	
Butterfly to Shakes									18.3	22.4	
Shakes to Tahltan									17.5	19.9	
Chinook 2005											
Release to Border	2.2	2.7			2.2				1.9		2.0
Border to Flood					5.9				10.0		11.5
Flood to Butterfly									16.5		18.1
Butterfly to Shakes								8.2	10.7		10.6
Shakes to Tahltan									6.8		9.3

FIGURES

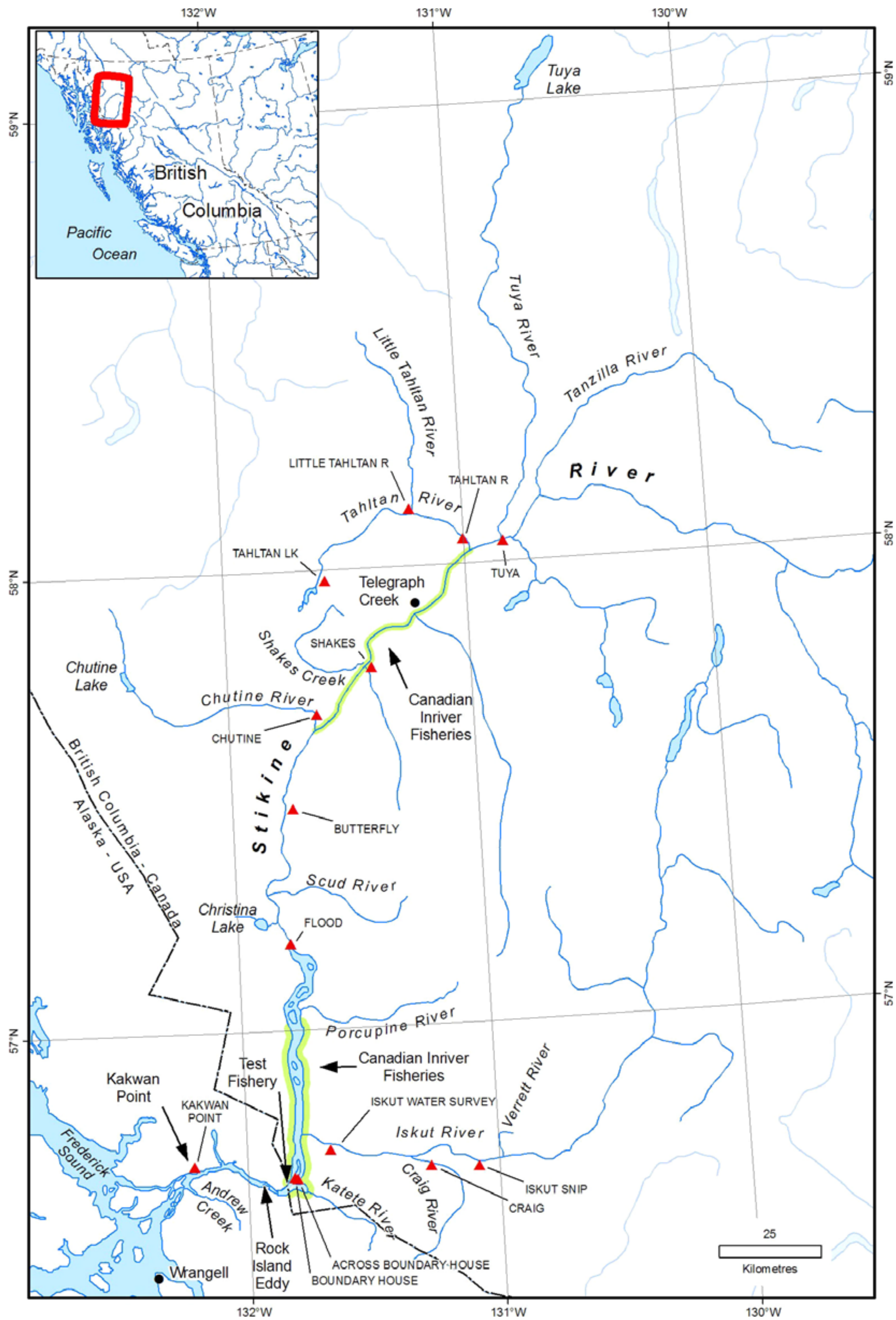


Figure 1. Map of the Stikine River drainage showing the location of the Rock Island Eddy and Kakwan Point tagging sites, fixed stations used during the 2004 and 2005 radiotelemetry studies (red triangles), and Canadian in-river fisheries.

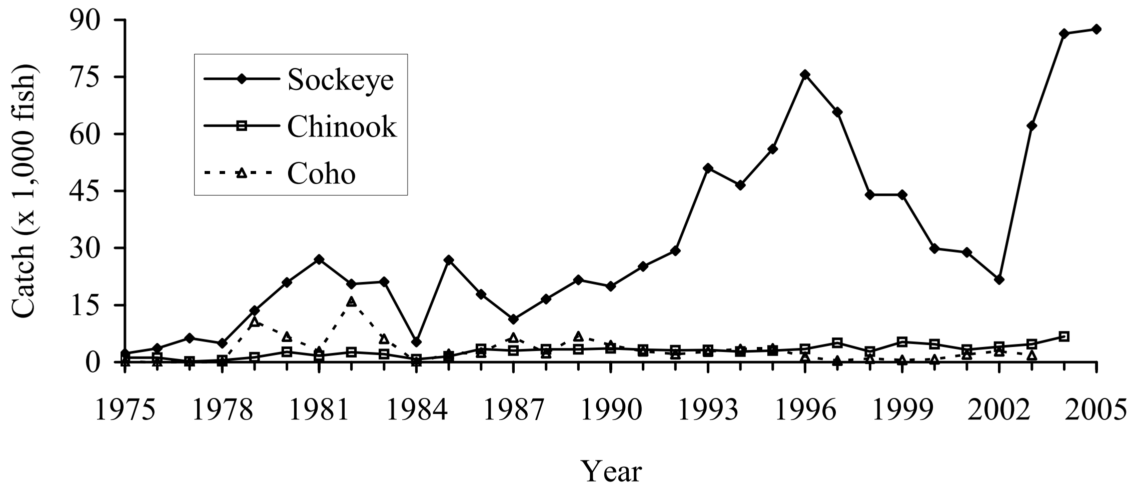


Figure 2. Catch of sockeye, Chinook, and coho salmon in Canadian fisheries in the Stikine River from 1975 to 2005.

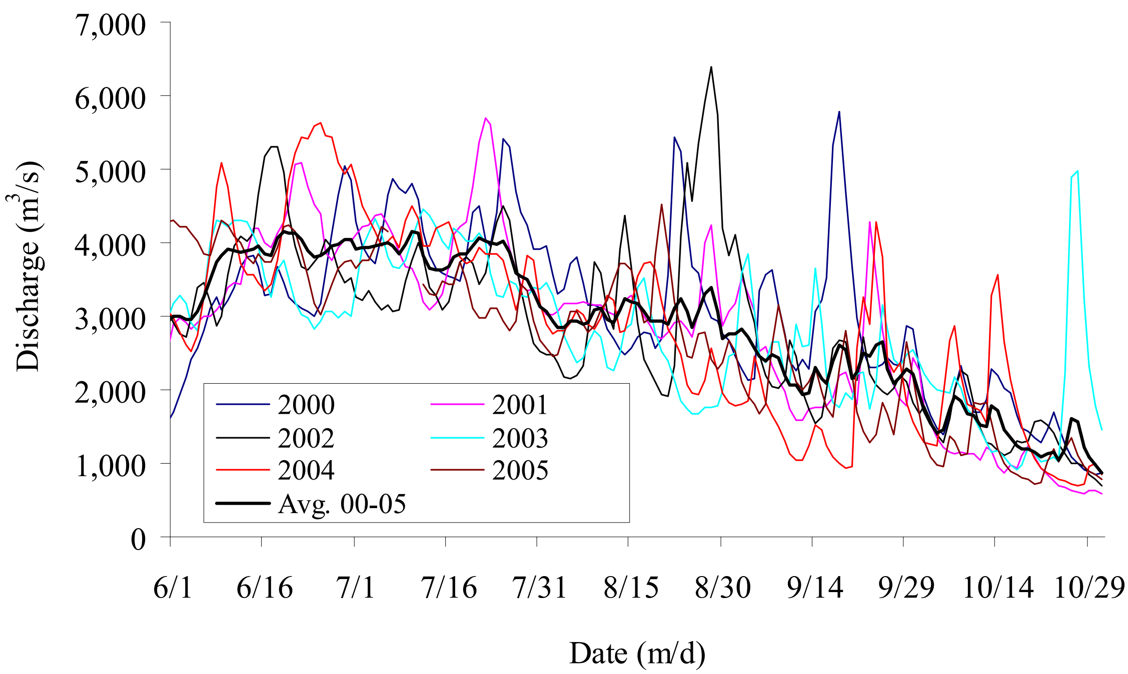


Figure 3. Discharge of the Stikine River from June through October, 2000-2005. These data were collected at a USGS station (#15024800; 56°42'29" latitude, 132°07'49" longitude) in the lower Stikine River (USGS 2006).

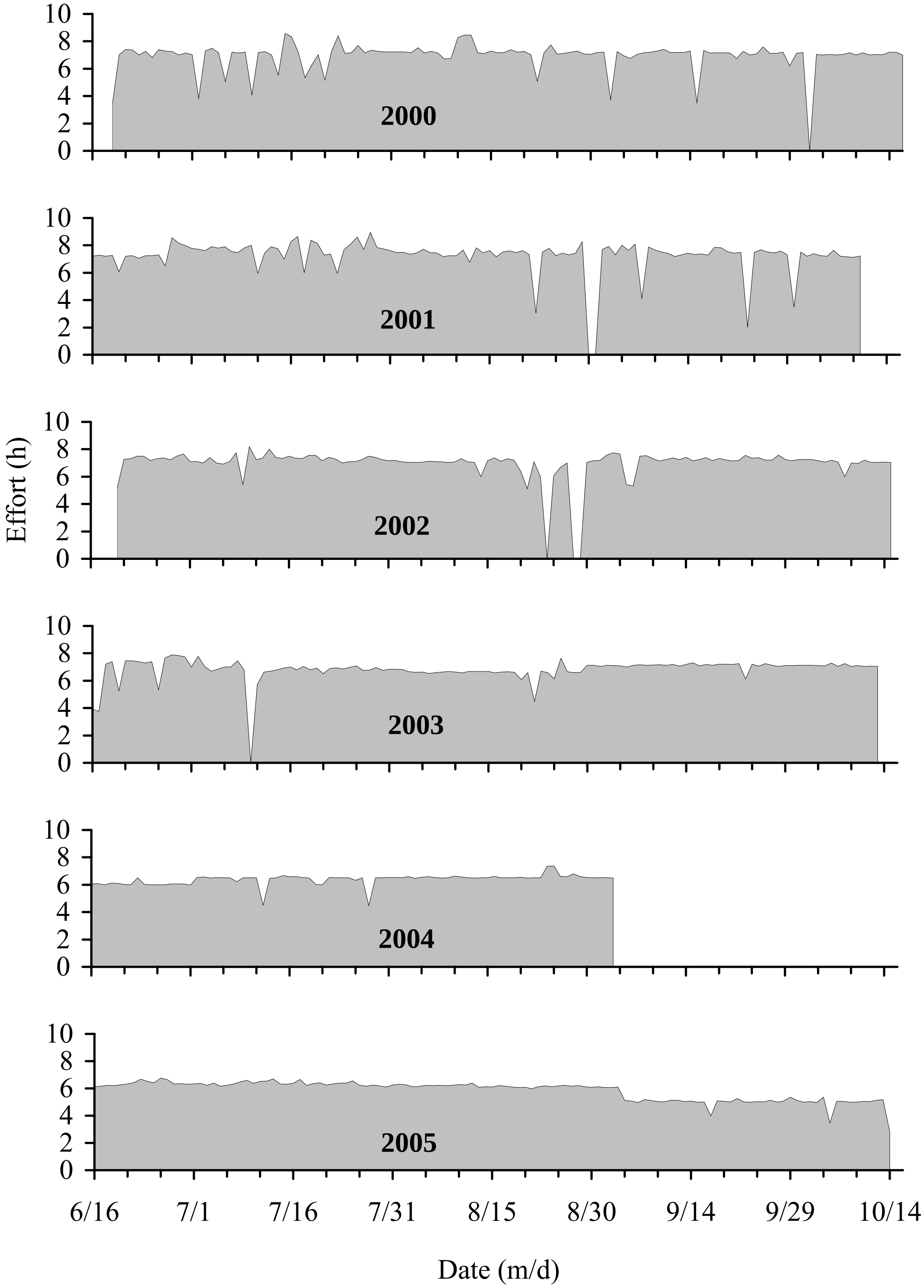


Figure 4. Daily set gillnet effort (hours) during Event 1 sampling in the Stikine River sockeye salmon mark-recapture study, 2000 to 2005.

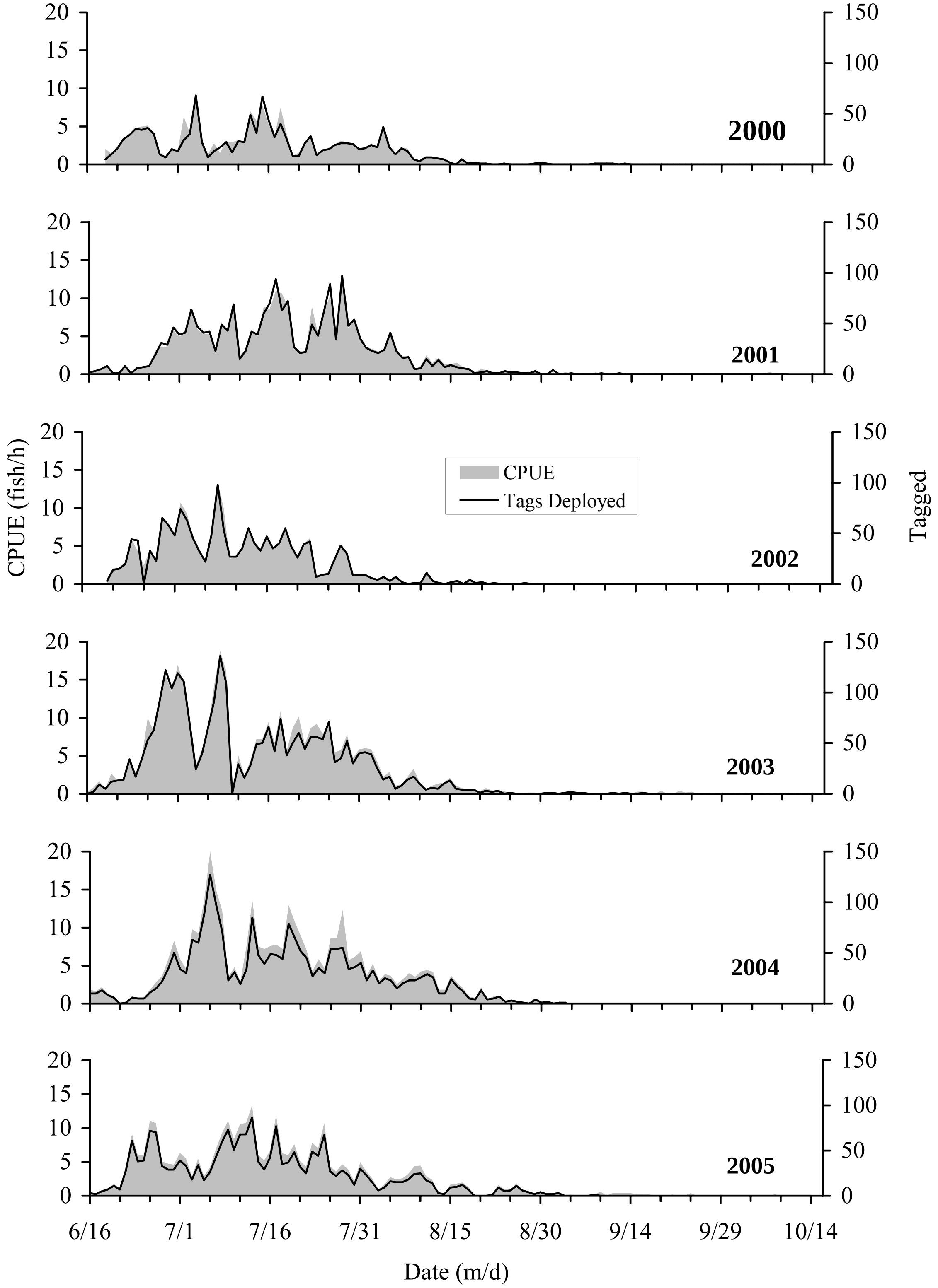


Figure 5. Daily catch per unit effort (CPUE) and the number of fish tagged during Event 1 sampling in the Stikine River sockeye salmon mark-recapture study, 2000 to 2005.

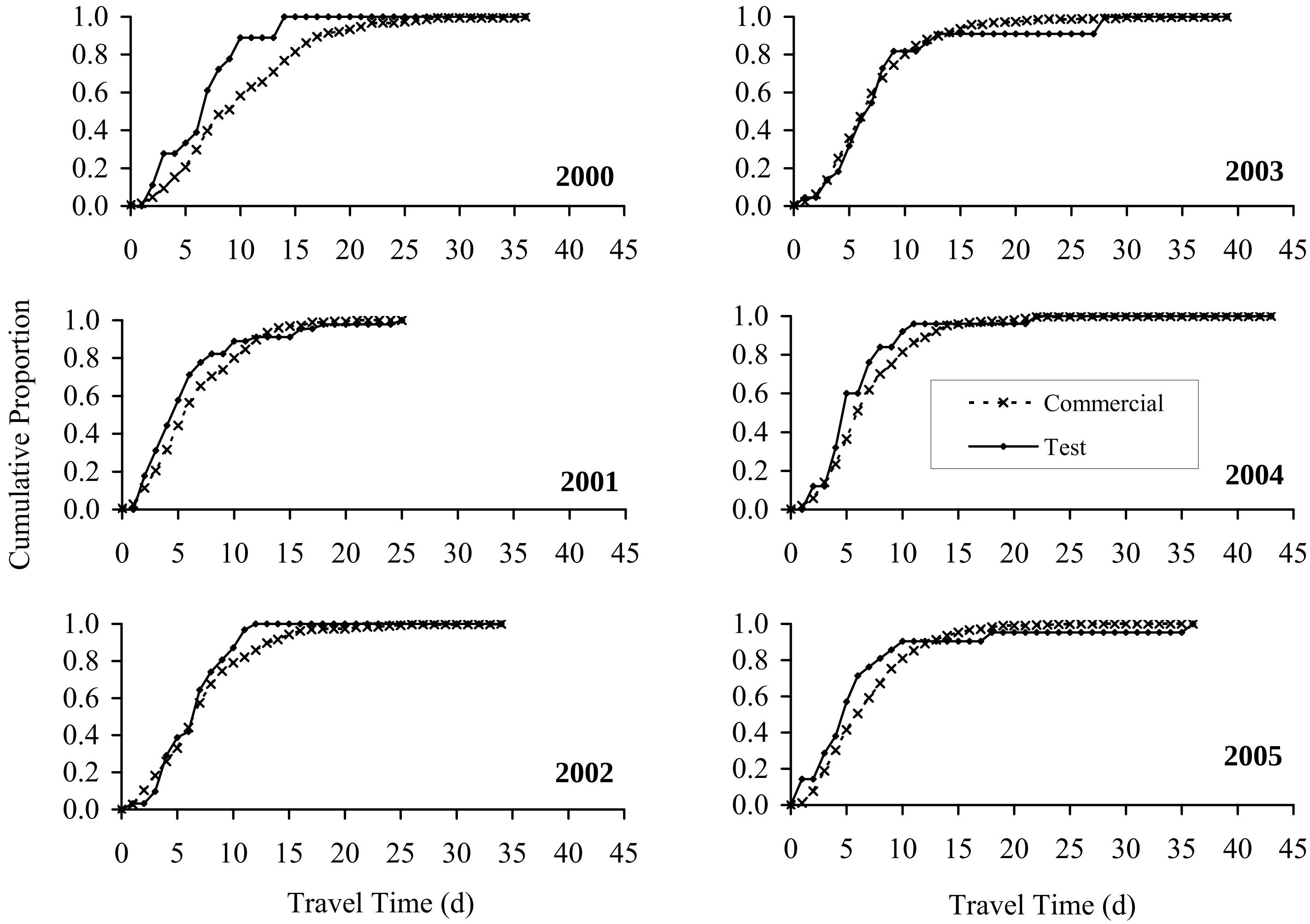


Figure 6. Cumulative frequency distributions of travel times (days) for sockeye salmon from release at Rock Island Eddy to recovery in the lower-river commercial and test fisheries, 2000 to 2005.

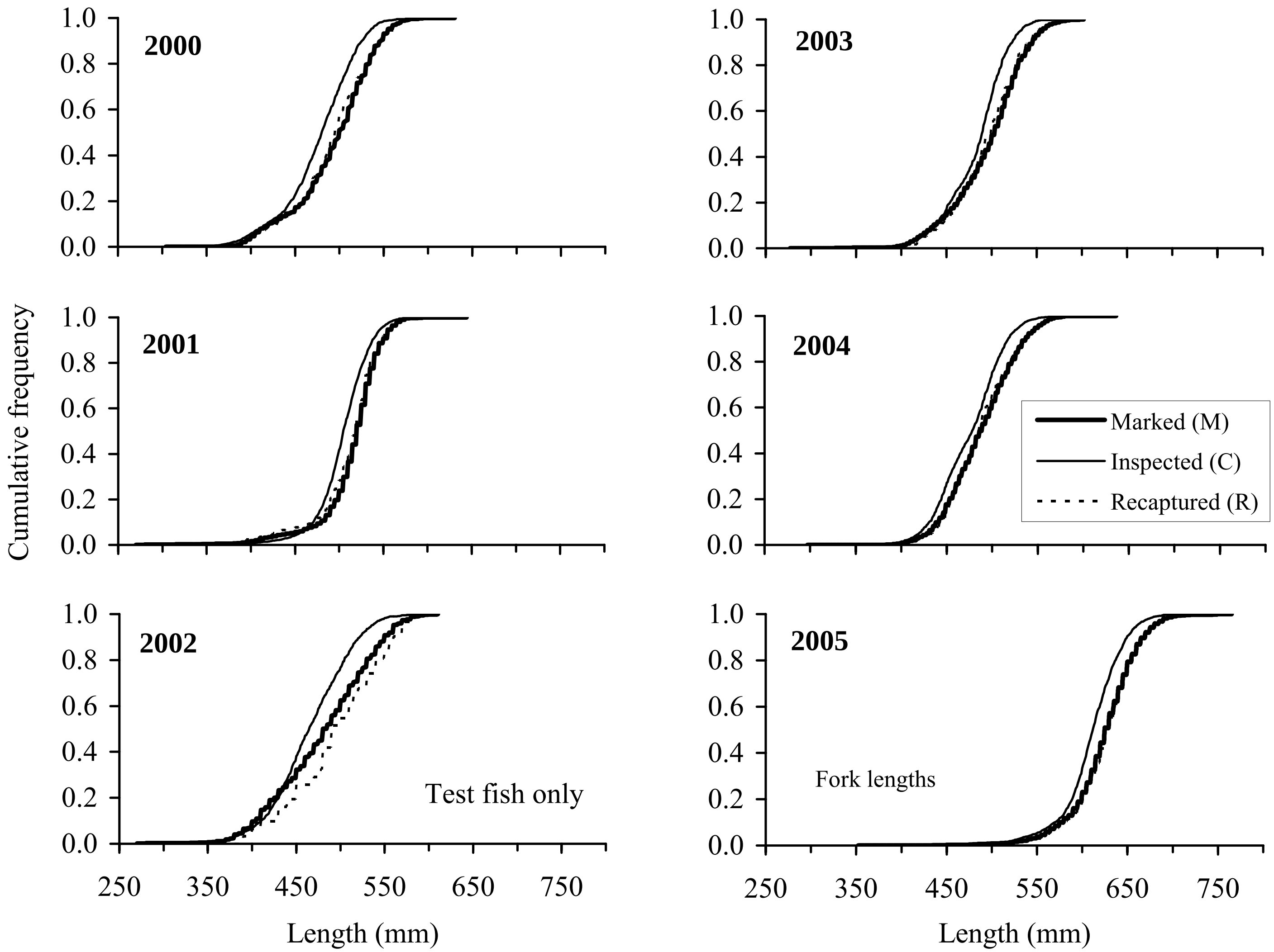


Figure 7. Cumulative length-frequency distributions for sockeye salmon tagged (M) during Event 1, and inspected (C) and recaptured (R) during Event 2 (commercial and test fisheries combined), 2000 to 2005. Post-orbital hypural (POH) lengths were compared from 2000 to 2004, and fork lengths (FL) were compared in 2005. Only fish sampled in the lower-river test fishery were used in 2002.

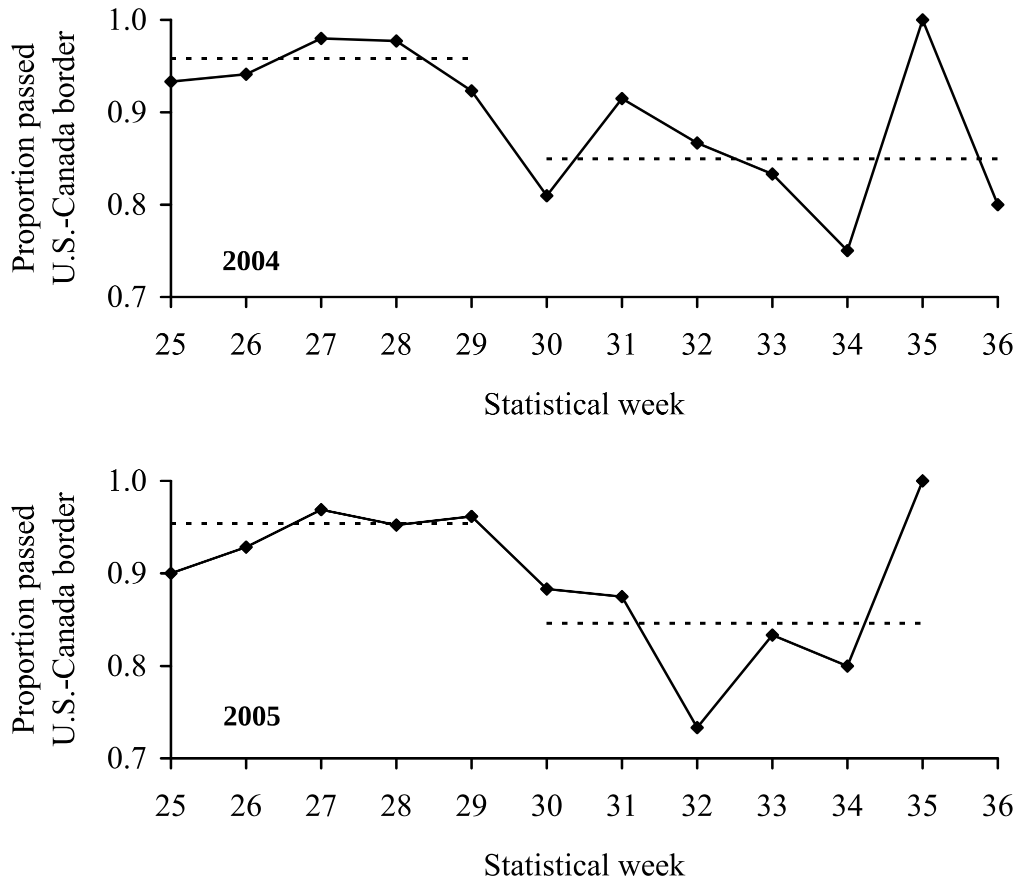


Figure 8. Proportion of radio-tagged sockeye salmon, by statistical week of tagging, that migrated upstream of the U.S.-Canada border during the 2004 and 2005 radiotelemetry studies. Dashed lines indicate the weighted-average proportions of fish that migrated passed the border during periods when the weekly proportions were not statistically different (i.e., weeks 25-29 and 30-36 in both years). These proportions were used to adjust the total number of marked fish available for recovery in the lower-river fisheries for all study years.

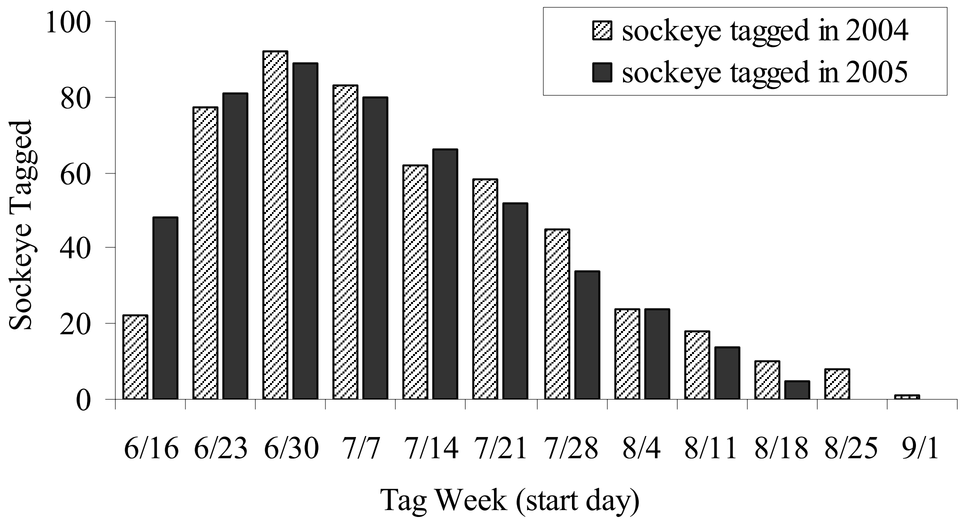


Figure 9. Weekly number of sockeye salmon radio-tagged at Rock Island Eddy in the lower Stikine River in 2004 and 2005.

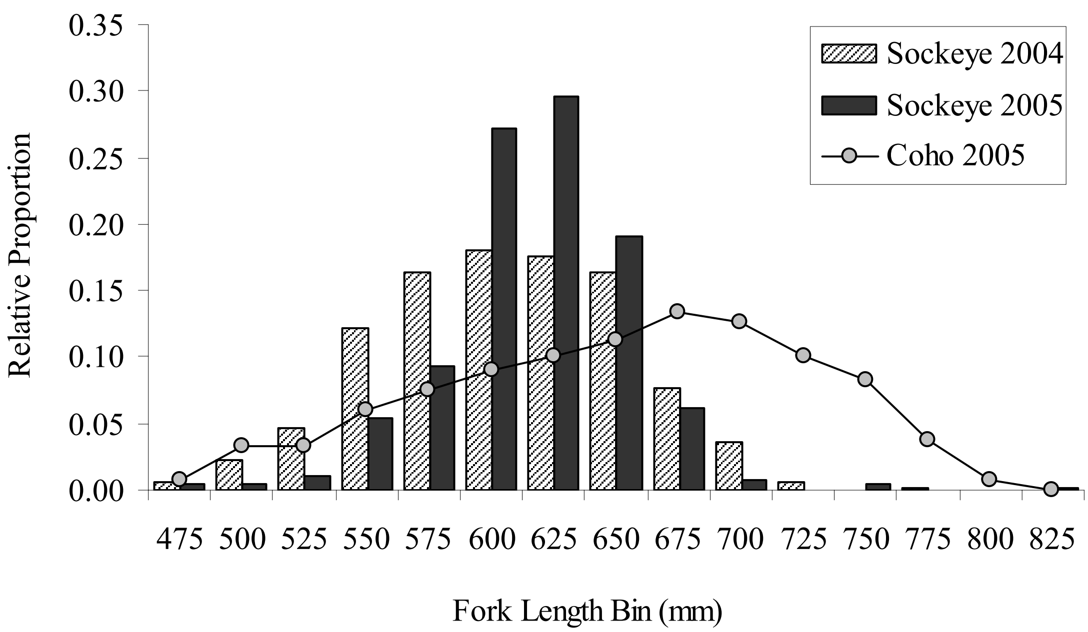


Figure 10. Relative length-frequency distribution for sockeye and coho salmon tagged at Rock Island Eddy in the lower Stikine River in 2004 and 2005.

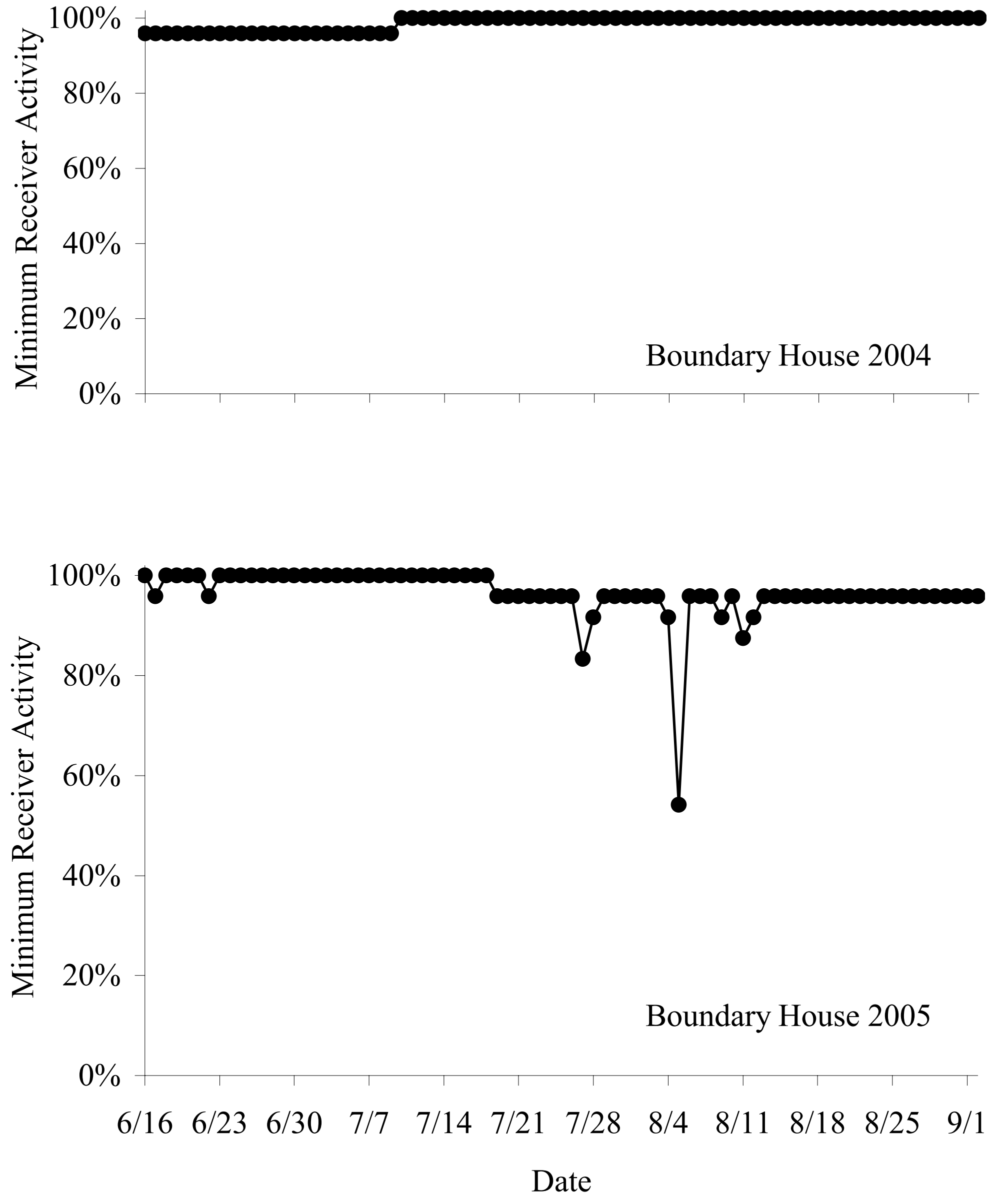


Figure 11. Daily receiver activity (percent of hours during which detection data were recorded) for the Boundary House fixed stations in 2004 and 2005. Receiver activity data are presented as minima because noise records and hourly battery-check data had been removed from the download files that were provided for these analyses.

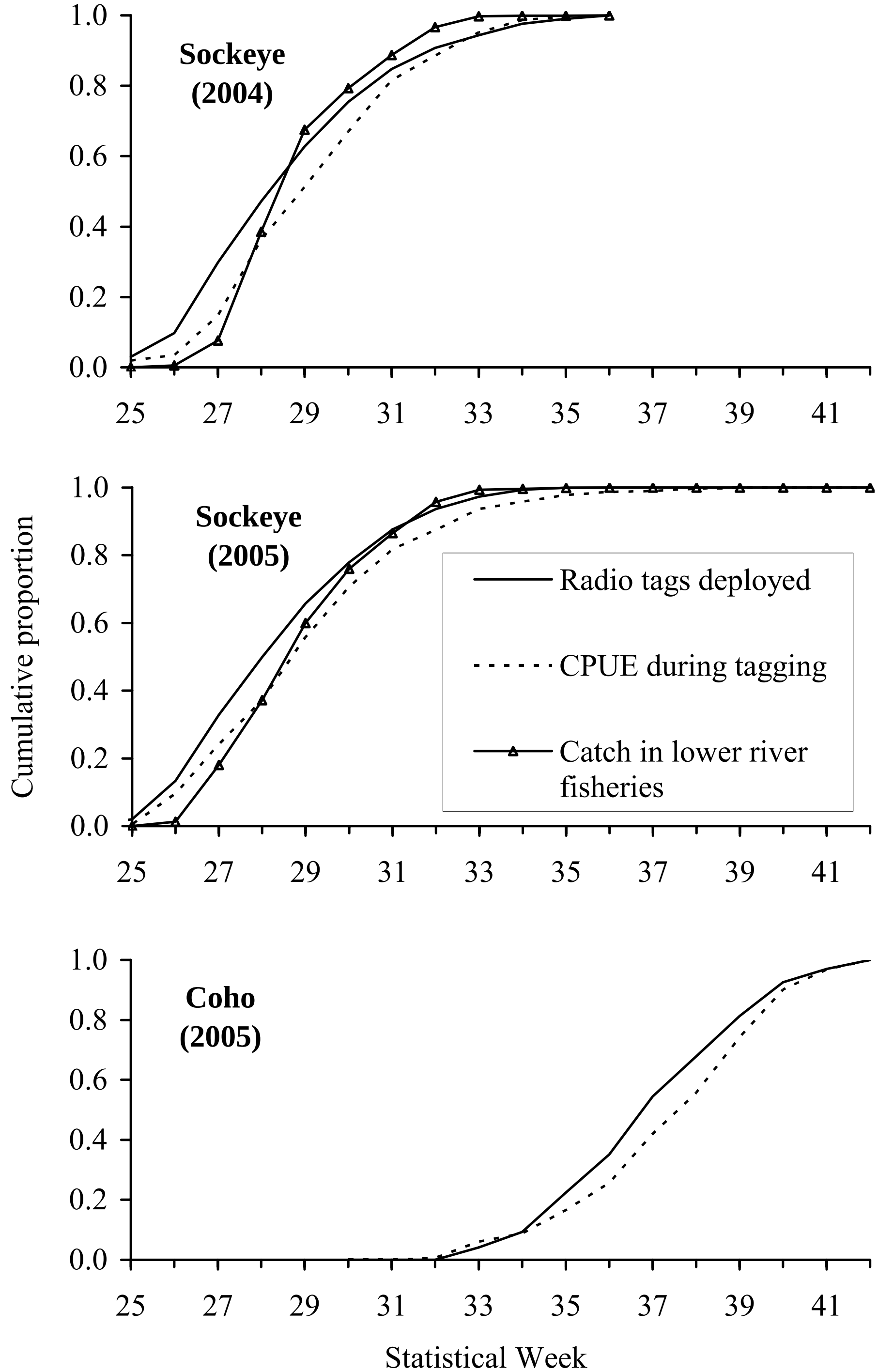


Figure 12. Cumulative relative proportions of the CPUE, radio tags deployed, and catch in the lower-river Canadian fisheries (commercial and test combined), for sockeye, Chinook, and coho salmon in 2004 and 2005 on the Stikine River.

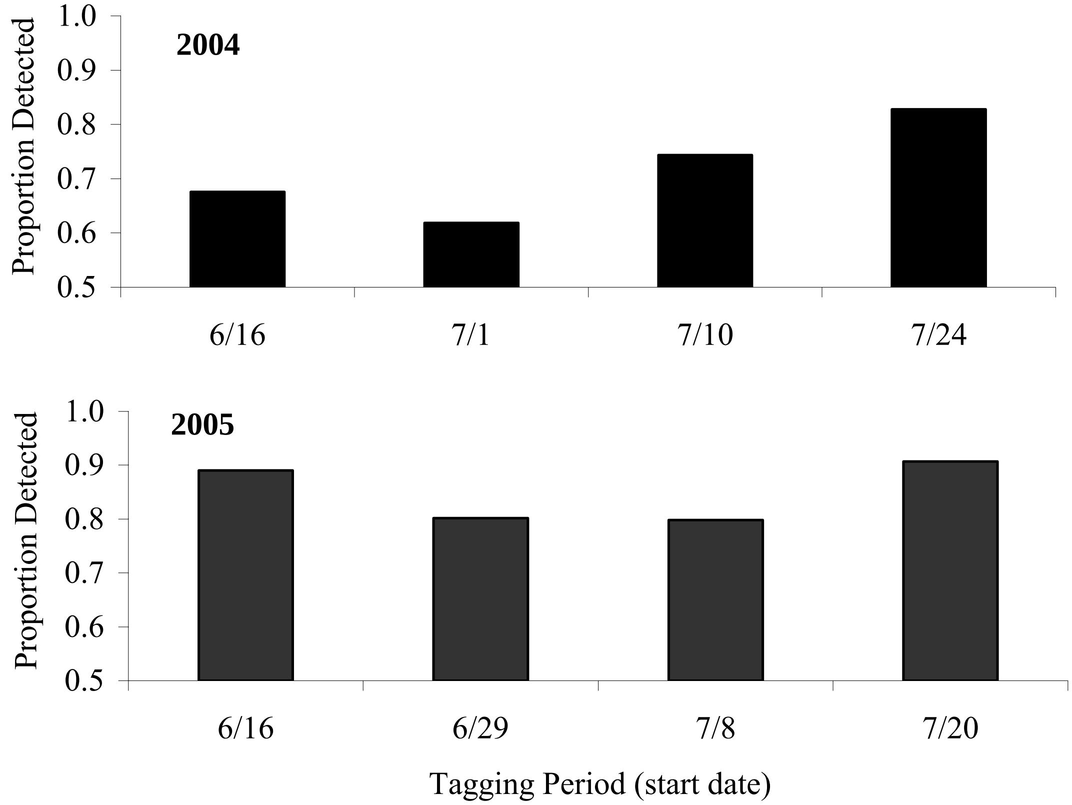


Figure 13. Temporal pattern in the detection efficiency of the Boundary House fixed-station receiver, by tagging period in 2004 and 2005. The study period was divided into four "tagging periods" with approximately equal numbers of tagged fish in each. The 25, 50, and 75% quintiles of the tag-date distribution were used to define the tagging periods.

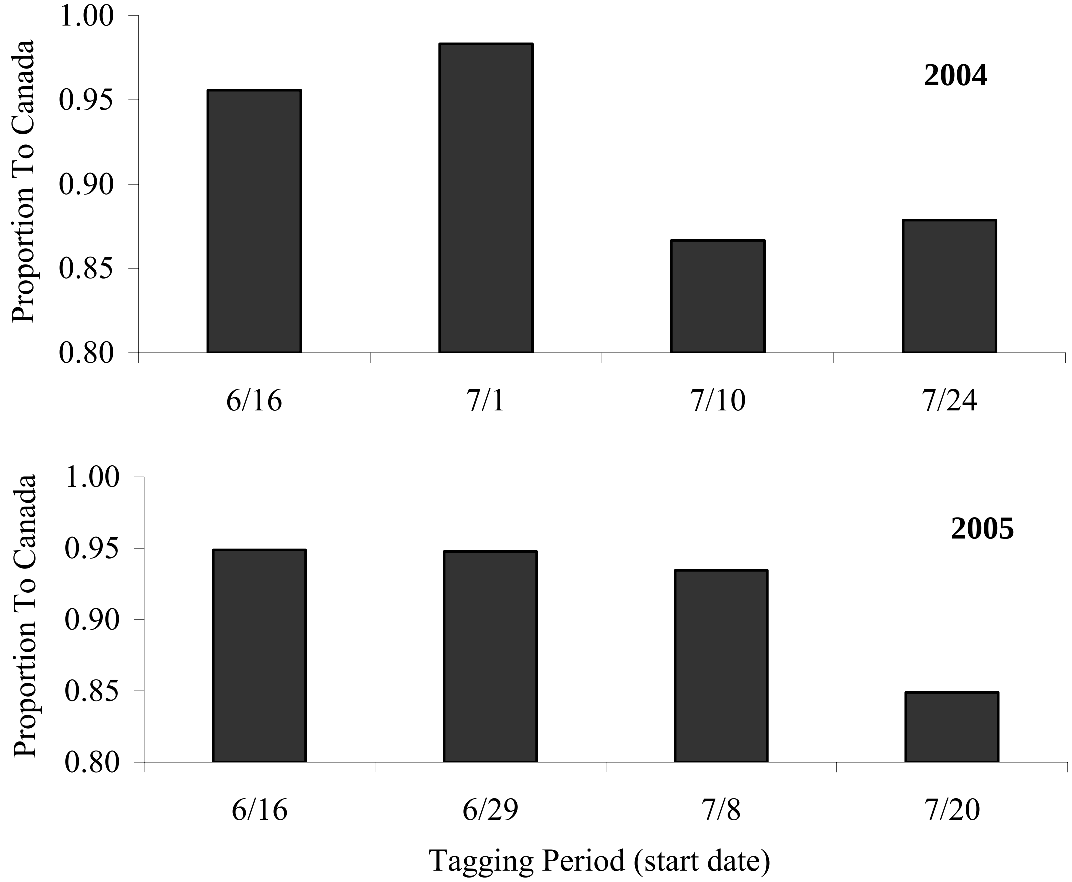


Figure 14. Temporal pattern in the proportion of tagged fish that were known to have entered Canada, by tagging period in 2004 and 2005. The study period was divided into four "tagging periods" with approximately equal numbers of fish tagged in each. The 25, 50, and 75% quintiles of the tag-date distribution were used to define the tagging periods.

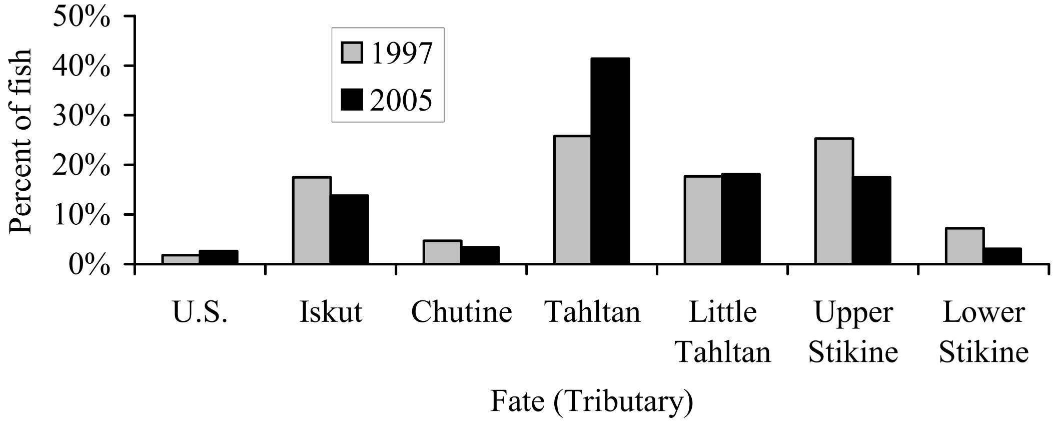


Figure 15. Comparison of Chinook salmon spawning distributions in the Stikine River drainage as determined from radiotelemetry studies conducted in 1997 and 2005.

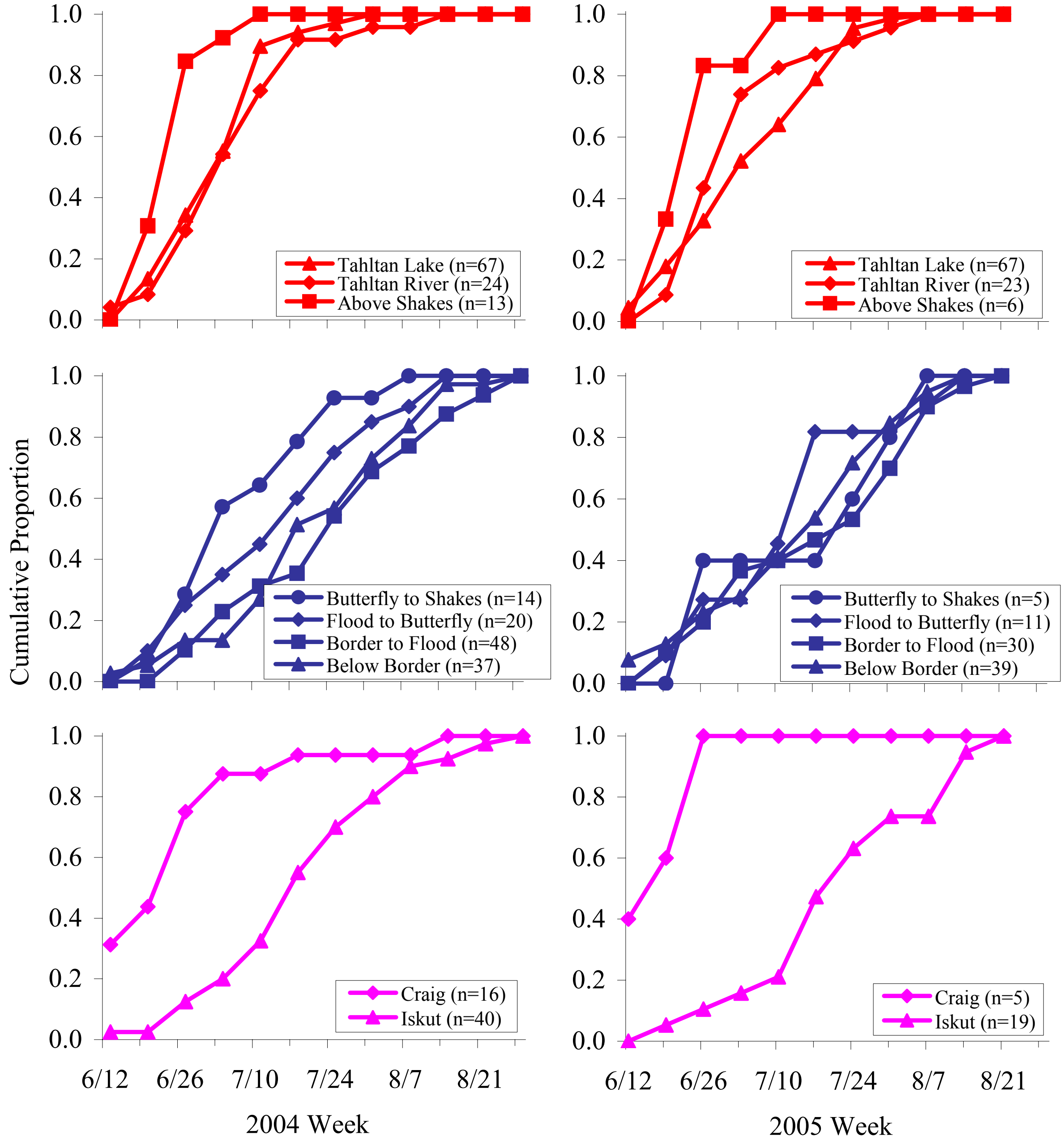


Figure 16. Run timing by stock for radio-tagged sockeye salmon in 2004 and 2005. Fish were assigned to a stock based on their last detection location. The tagging date (i.e., the date of Rock Island Eddy passage) was used as an index of run timing. Upper-river stocks are shown in red; Iskut stocks in pink; lower-river tributary stocks in green; and lower-river mainstem stocks in blue. Tagged fish recovered in fisheries were excluded from these analyses. Stocks represented by fewer than five individuals are not shown.

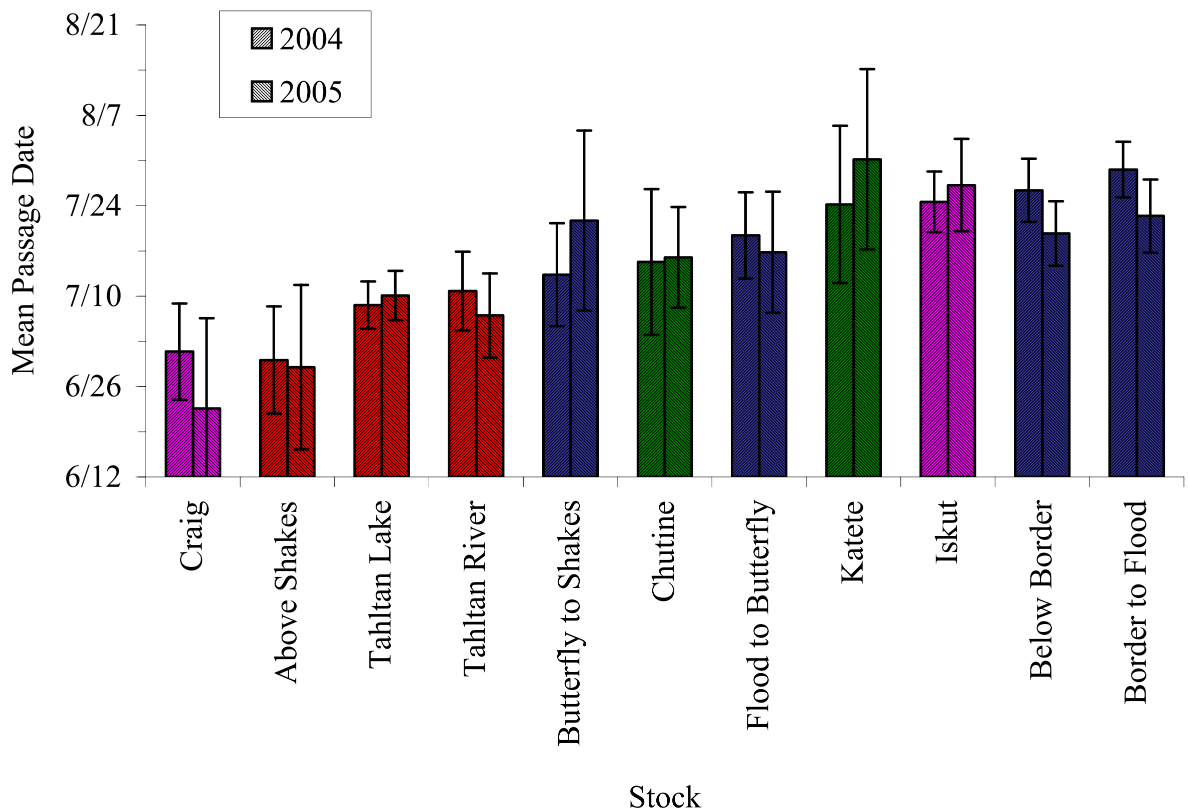


Figure 17. Comparison of sockeye salmon run timing between years. Fish were assigned to a stock based on their last detection location. Mean run timing dates were mean date of Rock Island Eddy passage (i.e., mean tagging date). Upper-river stocks are shown in red; Iskut stocks in pink; lower-river tributary stocks in green; and lower-river mainstem stocks in blue. Tagged fish recovered in fisheries were excluded from these analyses. Stocks represented by fewer than five individuals are not shown.

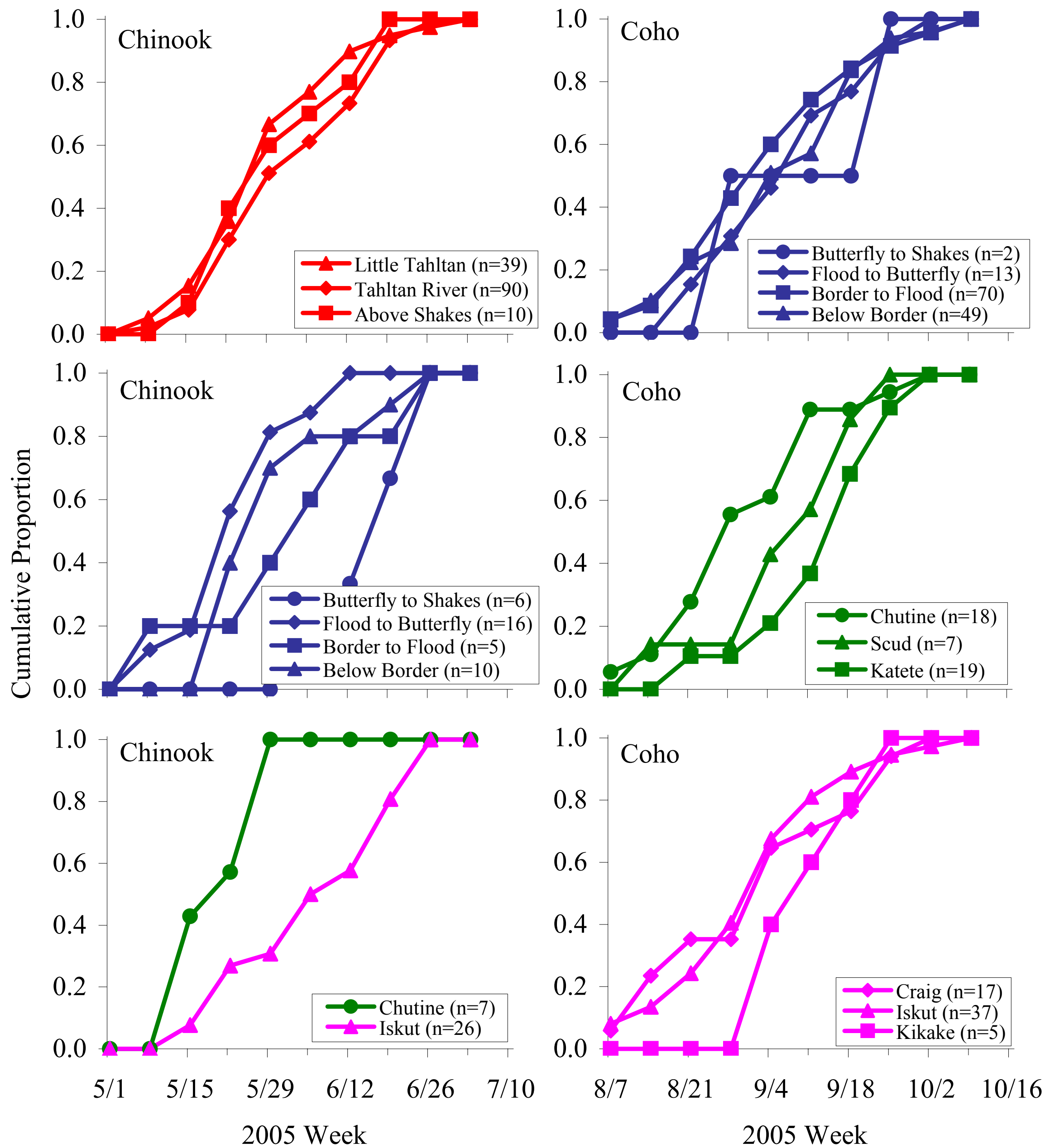
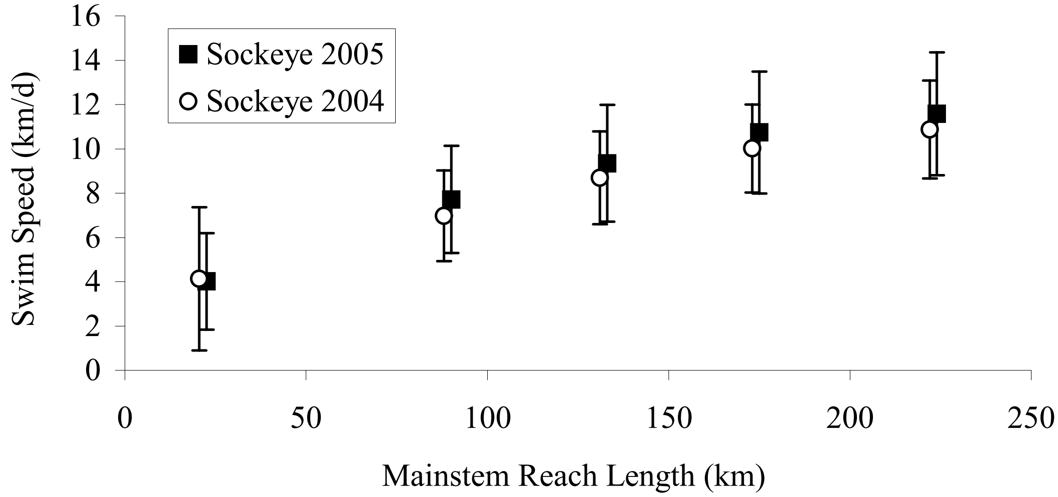


Figure 18. Run timing by stock for radio-tagged Chinook and coho salmon, 2005. Fish were assigned to a stock based on their last detection location. The tagging date (i.e., the date of Kakwan or Rock Island Eddy passage) was used as an index of run timing. Upper-river stocks are shown in red; Iskut stocks in pink; lower-river tributary stocks in green; and lower-river mainstem stocks in blue. Tagged fish recovered in fisheries were excluded from these analyses. Stocks represented by fewer than five individuals are not shown.



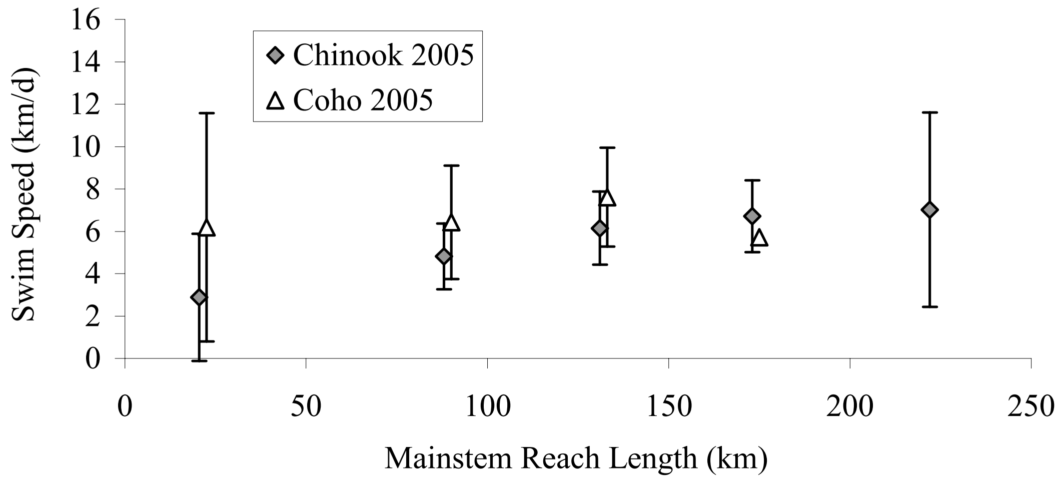


Figure 19. Mean swim speeds for sockeye, Chinook, and coho salmon measured for five mainstem river-reaches, each one starting at Rock Island Eddy and ending at one of the five mainstem fixed-station receivers (Boundary House, Flood, Butterfly, Shakes, and Tahltan). X-positions have been offset by ±1 km for presentation purposes. Error bars show ± one standard deviation of the mean swim speeds.

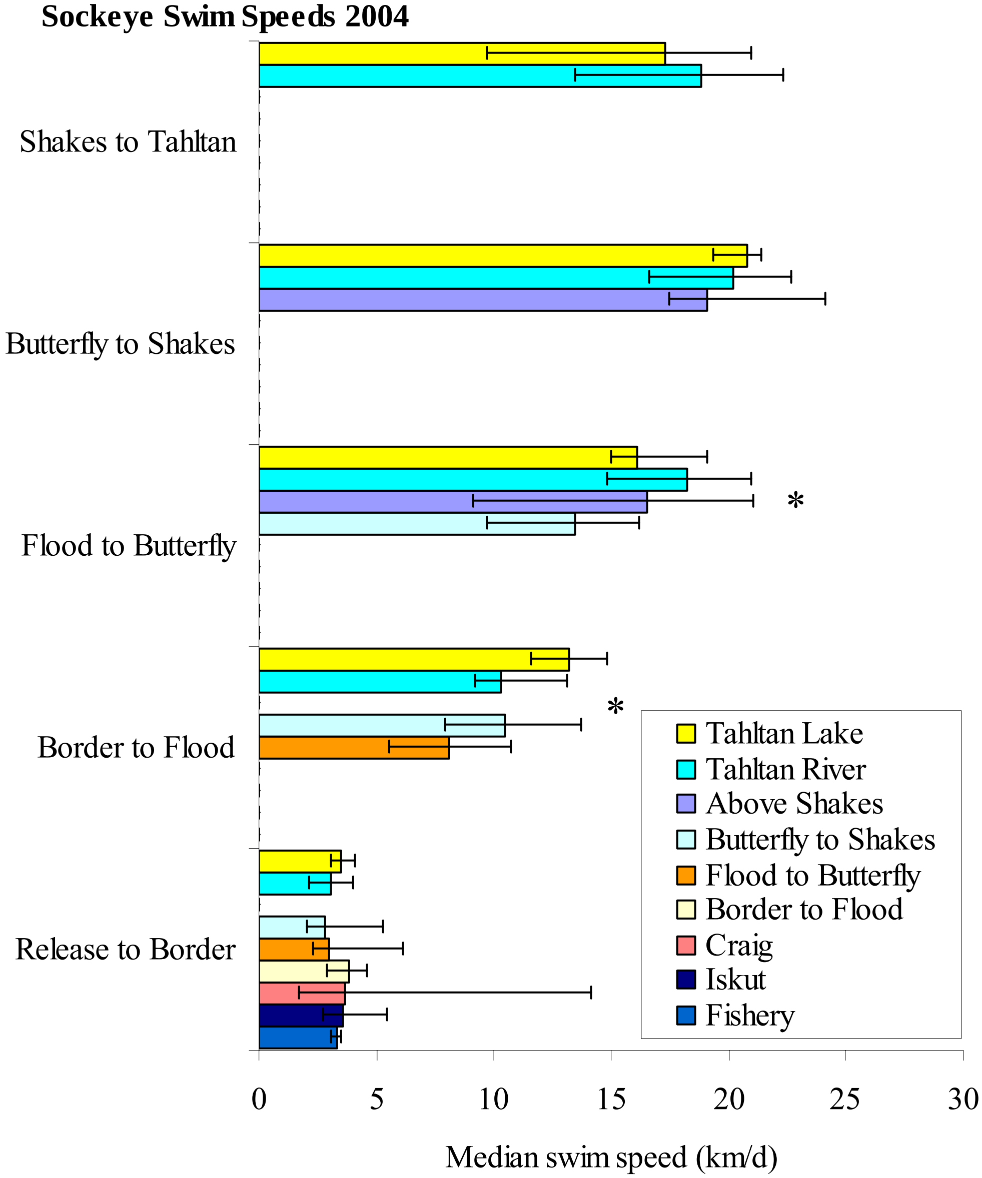


Figure 20. Median reach-specific and stock-specific swim speeds for sockeye in 2004. Error bars represent 95% confidence in the median values (generated using the method recommended in Zar, 1984). Statistical comparisons (see text) were done using non-parametric Kruskal-Wallis tests; overlapping error bars do not preclude statistical significance.

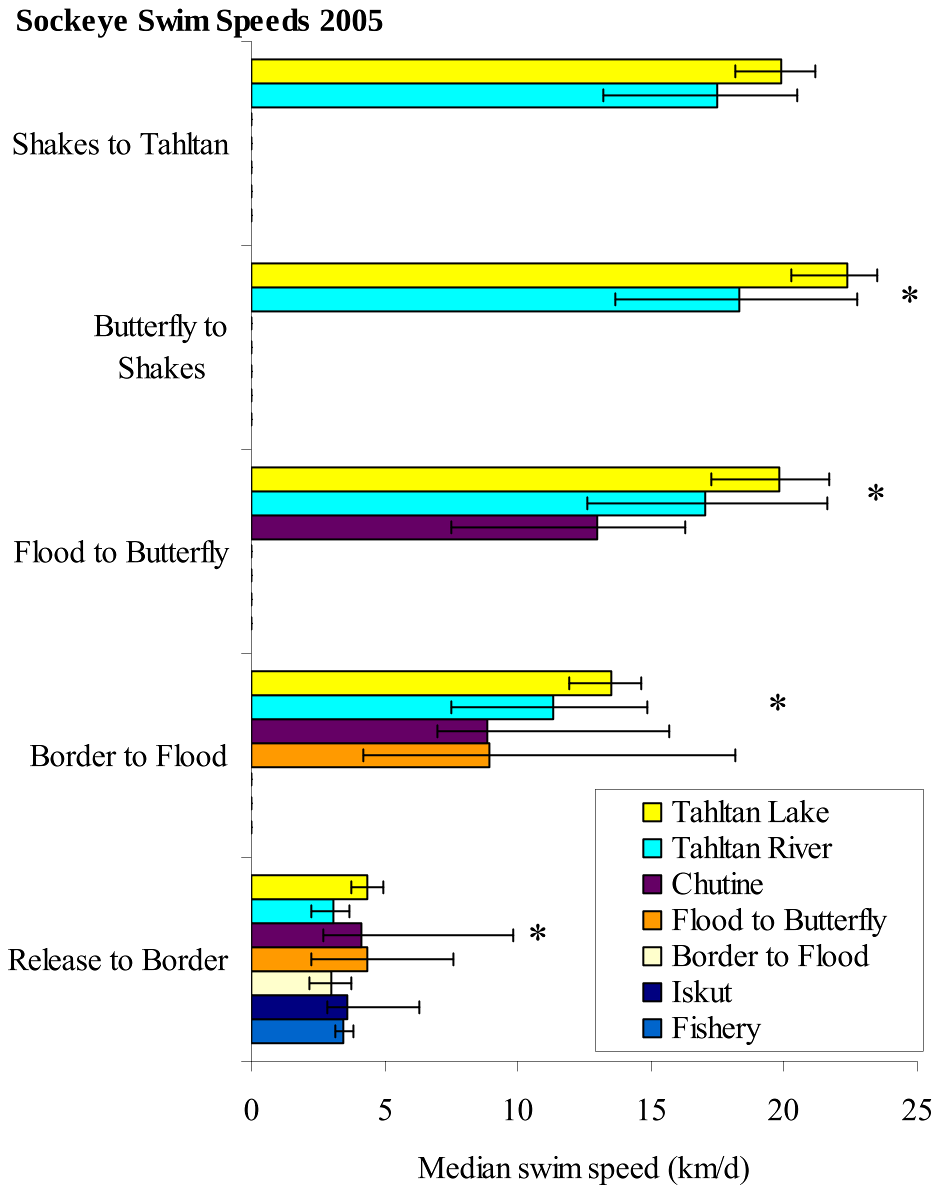


Figure 21. Median reach-specific and stock-specific swim speeds for sockeye in 2005. Error bars represent 95% confidence in the median values (generated using the method recommended in Zar, 1984). Statistical comparisons (see text) were done using non-parametric Kruskal-Wallis tests; overlapping error bars do not preclude statistical significance.

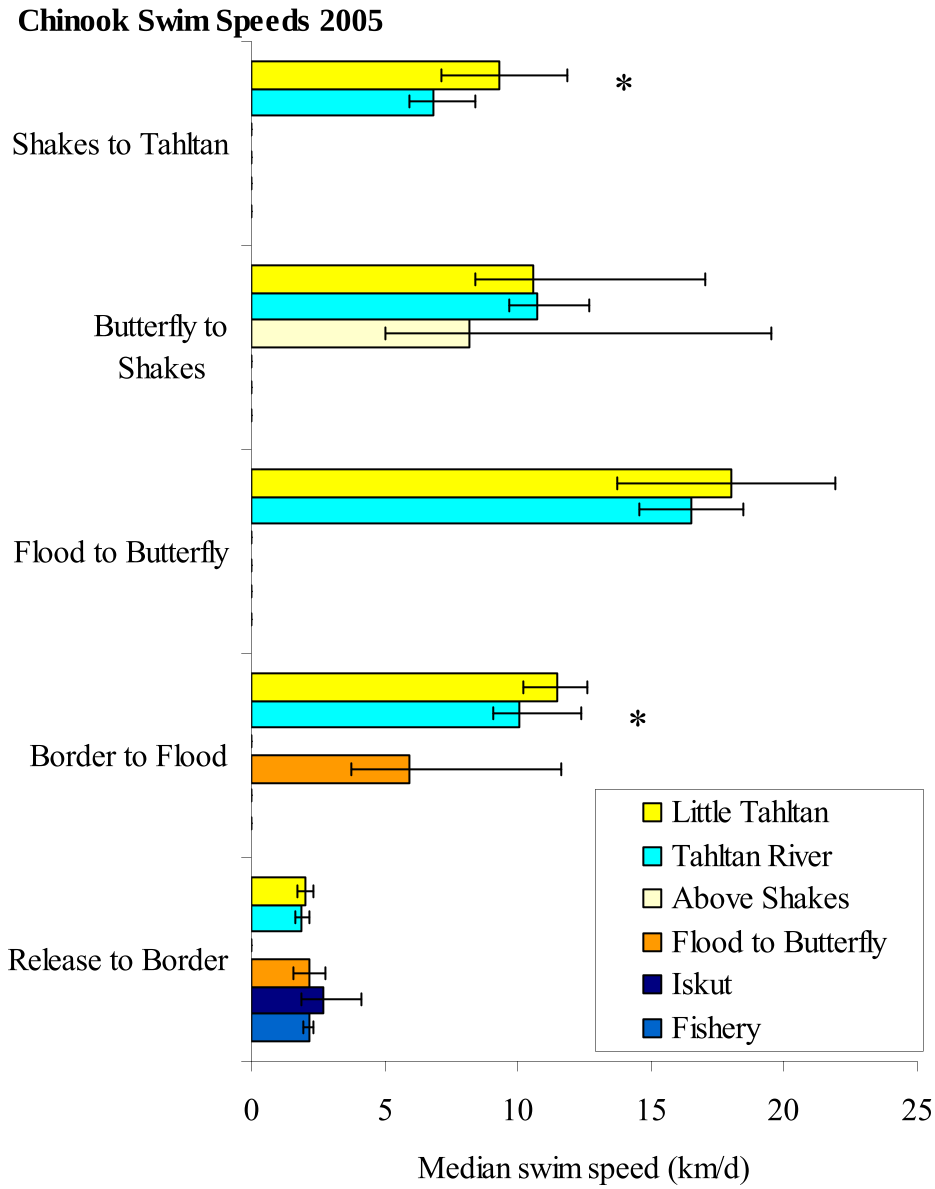


Figure 22. Median reach-specific and stock-specific swim speeds for Chinook in 2005. Error bars represent 95% confidence in the median values (generated using the method recommended in Zar, 1984). Statistical comparisons (see text) were done using non-parametric Kruskal-Wallis tests; overlapping error bars do not preclude statistical significance.

APPENDICES

Appendix A.1. Detection of size or sex selective sampling during a 2-sample mark recapture experiment and its effects on estimation of population size and population composition.

Size selective sampling: The Kolmogorov-Smirnov two sample test (Conover 1980) is used to detect significant evidence that size selective sampling occurred during the first or second sampling Events. The second sampling Event is evaluated by comparing the length frequency distribution of all fish marked during the first event (M) with that of marked fish recaptured during the second event (R), using the null test hypothesis of no difference. The first sampling Event is evaluated by comparing the length frequency distribution of all fish inspected for marks during the second event (C) with that of R. A third test, comparing M and C, is conducted and used to evaluate the results of the first two tests when sample sizes are small. Guidelines for small sample sizes are <30 for R and <100 for M or C.

Sex selective sampling: Contingency table analysis (Chi-square test) is generally used to detect significant evidence that sex selective sampling occurred during the first of second sampling Events. The counts of observed males to females are compared between M&R, C&R, and M&C as described above, using the null hypothesis that the probability that a sampled fish is male or female is independent of sample. When the proportions by gender are estimated for a sample (usually C), rather an observed for all fish in the sample, contingency table analysis is not appropriate and the proportions of females (or males) are compared between samples using a two sample test (e.g. Student's t-test).

M vs. R	**C vs. R**	**M vs. C**
Case I:		
Fail to reject H_o	Fail to reject H_o	Fail to reject H_o
There is no size/sex selectivity detected during either sampling Event.		
Case II:		
Reject H_o	Fail to reject H_o	Reject H_o
There is no size/sex selectivity detected during the first event but there is during the second-event sampling.		
Case III:		
Fail to reject H_o	Reject H_o	Reject H_o
There is no size/sex selectivity detected during the second event but there is during the first-event sampling.		
Case IV:		
Reject H_o	Reject H_o	Reject H_o
There is size/sex selectivity detected during both the first and second sampling events.		
Evaluation Required:		
Fail to reject H_o	Fail to reject H_o	Reject H_o

Sample sizes and powers of tests must be considered:

A. If sample sizes for M vs. R and C vs. R tests are not small and sample sizes for M vs. C test are very large, the M vs. C test is likely detecting small differences which have little potential to result in bias during estimation. *Case I* is appropriate.

B. If a) sample sizes for M vs. R are small, b) the M vs. R *P* is not large (~0.20 or less), and c) the C vs. R sample sizes are not small and/or the C vs. R *P* is fairly large (~0.30 or more), the rejection of the null in the M vs. C test was likely the result of size/sex selectivity during the second event which the M vs. R test was not powerful enough to detect. *Case I* may be considered but *Case II* is the recommended, conservative interpretation.

C. If a) sample sizes for C vs. R are small, b) the C vs. R *P* is not large (~0.20 or less), and c) the M vs. R sample sizes are not small and/or the M vs. R *P* is fairly large (~0.30 or more), the rejection of the null in the M vs. C test was likely the result of size/sex selectivity during the first event which the C vs. R test was not powerful enough to detect. *Case I* may be considered but *Case III* is the recommended, conservative interpretation.

D. If a) sample sizes for C vs. R and M vs. R are both small, and b) both the C vs. R and M vs. R ps are not large (~0.20 or less), the rejection of the null in the M vs. C test may be the result of size/sex selectivity during both Events which the C vs. R and M vs. R tests were not powerful enough to detect. *Cases I, II, or III* may be considered but *Case IV* is the recommended, conservative interpretation.

Case I. Abundance is calculated using a Petersen-type model from the entire data set without stratification. Composition parameters may be estimated after pooling length, sex, and age data from both sampling Events.

Case II. Abundance is calculated using a Petersen-type model from the entire data set without stratification. Composition parameters may be estimated using length, sex, and age data from the first sampling Event without stratification. If composition is estimated from second-event data or after pooling both sampling Events, data must first be stratified to eliminate variability in capture probability (detected by the M vs. R test) within strata. Composition parameters are estimated within strata, and abundance for each stratum needs to be estimated using a Petersen-type formula. Overall composition parameters are estimated by combining stratum estimates weighted by estimated stratum abundance according to the formulae below.

Case III. Abundance is calculated using a Petersen-type model from the entire data set without stratification. Composition parameters may be estimated using length, sex, and age data from the second sampling Event without stratification. If composition is estimated from first-event data or after pooling both sampling Events, data must first be stratified to eliminate variability in capture probability (detected by the C vs. R test) within strata. Composition parameters are estimated within strata, and abundance for each stratum needs to be estimated using a Petersen-type type formula. Overall composition parameters are estimated by combining stratum estimates weighted by estimated stratum abundance according to the formulae below.

Case IV. Data must be stratified to eliminate variability in capture probability within strata for at least one or both sampling Events. Abundance is calculated using a Petersen-type model for each stratum, and estimates are summed across strata to estimate overall abundance. Composition parameters may be estimated within the strata as determined above, but only using data from sampling Events where stratification has eliminated variability in capture probabilities within strata. If data from both sampling Events are to be used, further stratification may be necessary to meet the condition of capture homogeneity within strata for both Events. Overall composition parameters are estimated by combining stratum estimates weighted by estimated stratum abundance.

Appendix B.1. Inclusive dates for statistical weeks, 2000 to 2005.

Stat	2000		2001		2002		2003		2004		2005	
Week	From	To	From	To	From	To	From	To	From	To	From	To
1	1-Jan	1-Jan	1-Jan	6-Jan	1-Jan	5-Jan	1-Jan	4-Jan	1-Jan	3-Jan	1-Jan	1-Jan
2	2-Jan	8-Jan	7-Jan	13-Jan	6-Jan	12-Jan	5-Jan	11-Jan	4-Jan	10-Jan	2-Jan	8-Jan
3	9-Jan	15-Jan	14-Jan	20-Jan	13-Jan	19-Jan	12-Jan	18-Jan	11-Jan	17-Jan	9-Jan	15-Jan
4	16-Jan	22-Jan	21-Jan	27-Jan	20-Jan	26-Jan	19-Jan	25-Jan	18-Jan	24-Jan	16-Jan	22-Jan
5	23-Jan	29-Jan	28-Jan	3-Feb	27-Jan	2-Feb	26-Jan	1-Feb	25-Jan	31-Jan	23-Jan	29-Jan
6	30-Jan	5-Feb	4-Feb	10-Feb	3-Feb	9-Feb	2-Feb	8-Feb	1-Feb	7-Feb	30-Jan	5-Feb
7	6-Feb	12-Feb	11-Feb	17-Feb	10-Feb	16-Feb	9-Feb	15-Feb	8-Feb	14-Feb	6-Feb	12-Feb
8	13-Feb	19-Feb	18-Feb	24-Feb	17-Feb	23-Feb	16-Feb	22-Feb	15-Feb	21-Feb	13-Feb	19-Feb
9	20-Feb	26-Feb	25-Feb	3-Mar	24-Feb	2-Mar	23-Feb	1-Mar	22-Feb	28-Feb	20-Feb	26-Feb
10	27-Feb	4-Mar	4-Mar	10-Mar	3-Mar	9-Mar	2-Mar	8-Mar	29-Feb	6-Mar	27-Feb	5-Mar
11	5-Mar	11-Mar	11-Mar	17-Mar	10-Mar	16-Mar	9-Mar	15-Mar	7-Mar	13-Mar	6-Mar	12-Mar
12	12-Mar	18-Mar	18-Mar	24-Mar	17-Mar	23-Mar	16-Mar	22-Mar	14-Mar	20-Mar	13-Mar	19-Mar
13	19-Mar	25-Mar	25-Mar	31-Mar	24-Mar	30-Mar	23-Mar	29-Mar	21-Mar	27-Mar	20-Mar	26-Mar
14	26-Mar	1-Apr	1-Apr	7-Apr	31-Mar	6-Apr	30-Mar	5-Apr	28-Mar	3-Apr	27-Mar	2-Apr
15	2-Apr	8-Apr	8-Apr	14-Apr	7-Apr	13-Apr	6-Apr	12-Apr	4-Apr	10-Apr	3-Apr	9-Apr
16	9-Apr	15-Apr	15-Apr	21-Apr	14-Apr	20-Apr	13-Apr	19-Apr	11-Apr	17-Apr	10-Apr	16-Apr
17	16-Apr	22-Apr	22-Apr	28-Apr	21-Apr	27-Apr	20-Apr	26-Apr	18-Apr	24-Apr	17-Apr	23-Apr
18	23-Apr	29-Apr	29-Apr	5-May	28-Apr	4-May	27-Apr	3-May	25-Apr	1-May	24-Apr	30-Apr
19	30-Apr	6-May	6-May	12-May	5-May	11-May	4-May	10-May	2-May	8-May	1-May	7-May
20	7-May	13-May	13-May	19-May	12-May	18-May	11-May	17-May	9-May	15-May	8-May	14-May
21	14-May	20-May	20-May	26-May	19-May	25-May	18-May	24-May	16-May	22-May	15-May	21-May
22	21-May	27-May	27-May	2-Jun	26-May	1-Jun	25-May	31-May	23-May	29-May	22-May	28-May
23	28-May	3-Jun	3-Jun	9-Jun	2-Jun	8-Jun	1-Jun	7-Jun	30-May	5-Jun	29-May	4-Jun
24	4-Jun	10-Jun	10-Jun	16-Jun	9-Jun	15-Jun	8-Jun	14-Jun	6-Jun	12-Jun	5-Jun	11-Jun
25	11-Jun	17-Jun	17-Jun	23-Jun	16-Jun	22-Jun	15-Jun	21-Jun	13-Jun	19-Jun	12-Jun	18-Jun
26	18-Jun	24-Jun	24-Jun	30-Jun	23-Jun	29-Jun	22-Jun	28-Jun	20-Jun	26-Jun	19-Jun	25-Jun
27	25-Jun	1-Jul	1-Jul	7-Jul	30-Jun	6-Jul	29-Jun	5-Jul	27-Jun	3-Jul	26-Jun	2-Jul

Appendix B.1 (continued). Inclusive dates for statistical weeks, 2000-2005.

Stat	2000		2001		2002		2003		2004		2005	
Week	From	To	From	To	From	To	From	To	From	To	From	To
28	2-Jul	8-Jul	8-Jul	14-Jul	7-Jul	13-Jul	6-Jul	12-Jul	4-Jul	10-Jul	3-Jul	9-Jul
29	9-Jul	15-Jul	15-Jul	21-Jul	14-Jul	20-Jul	13-Jul	19-Jul	11-Jul	17-Jul	10-Jul	16-Jul
30	16-Jul	22-Jul	22-Jul	28-Jul	21-Jul	27-Jul	20-Jul	26-Jul	18-Jul	24-Jul	17-Jul	23-Jul
31	23-Jul	29-Jul	29-Jul	4-Aug	28-Jul	3-Aug	27-Jul	2-Aug	25-Jul	31-Jul	24-Jul	30-Jul
32	30-Jul	5-Aug	5-Aug	11-Aug	4-Aug	10-Aug	3-Aug	9-Aug	1-Aug	7-Aug	31-Jul	6-Aug
33	6-Aug	12-Aug	12-Aug	18-Aug	11-Aug	17-Aug	10-Aug	16-Aug	8-Aug	14-Aug	7-Aug	13-Aug
34	13-Aug	19-Aug	19-Aug	25-Aug	18-Aug	24-Aug	17-Aug	23-Aug	15-Aug	21-Aug	14-Aug	20-Aug
35	20-Aug	26-Aug	26-Aug	1-Sep	25-Aug	31-Aug	24-Aug	30-Aug	22-Aug	28-Aug	21-Aug	27-Aug
36	27-Aug	2-Sep	2-Sep	8-Sep	1-Sep	7-Sep	31-Aug	6-Sep	29-Aug	4-Sep	28-Aug	3-Sep
37	3-Sep	9-Sep	9-Sep	15-Sep	8-Sep	14-Sep	7-Sep	13-Sep	5-Sep	11-Sep	4-Sep	10-Sep
38	10-Sep	16-Sep	16-Sep	22-Sep	15-Sep	21-Sep	14-Sep	20-Sep	12-Sep	18-Sep	11-Sep	17-Sep
39	17-Sep	23-Sep	23-Sep	29-Sep	22-Sep	28-Sep	21-Sep	27-Sep	19-Sep	25-Sep	18-Sep	24-Sep
40	24-Sep	30-Sep	30-Sep	6-Oct	29-Sep	5-Oct	28-Sep	4-Oct	26-Sep	2-Oct	25-Sep	1-Oct
41	1-Oct	7-Oct	7-Oct	13-Oct	6-Oct	12-Oct	5-Oct	11-Oct	3-Oct	9-Oct	2-Oct	8-Oct
42	8-Oct	14-Oct	14-Oct	20-Oct	13-Oct	19-Oct	12-Oct	18-Oct	10-Oct	16-Oct	9-Oct	15-Oct
43	15-Oct	21-Oct	21-Oct	27-Oct	20-Oct	26-Oct	19-Oct	25-Oct	17-Oct	23-Oct	16-Oct	22-Oct
44	22-Oct	28-Oct	28-Oct	3-Nov	27-Oct	2-Nov	26-Oct	1-Nov	24-Oct	30-Oct	23-Oct	29-Oct
45	29-Oct	4-Nov	4-Nov	10-Nov	3-Nov	9-Nov	2-Nov	8-Nov	31-Oct	6-Nov	30-Oct	5-Nov
46	5-Nov	11-Nov	11-Nov	17-Nov	10-Nov	16-Nov	9-Nov	15-Nov	7-Nov	13-Nov	6-Nov	12-Nov
47	12-Nov	18-Nov	18-Nov	24-Nov	17-Nov	23-Nov	16-Nov	22-Nov	14-Nov	20-Nov	13-Nov	19-Nov
48	19-Nov	25-Nov	25-Nov	1-Dec	24-Nov	30-Nov	23-Nov	29-Nov	21-Nov	27-Nov	20-Nov	26-Nov
49	26-Nov	2-Dec	2-Dec	8-Dec	1-Dec	7-Dec	30-Nov	6-Dec	28-Nov	4-Dec	27-Nov	3-Dec
50	3-Dec	9-Dec	9-Dec	15-Dec	8-Dec	14-Dec	7-Dec	13-Dec	5-Dec	11-Dec	4-Dec	10-Dec
51	10-Dec	16-Dec	16-Dec	22-Dec	15-Dec	21-Dec	14-Dec	20-Dec	12-Dec	18-Dec	11-Dec	17-Dec
52	17-Dec	23-Dec	23-Dec	29-Dec	22-Dec	28-Dec	21-Dec	27-Dec	19-Dec	25-Dec	18-Dec	24-Dec
53	24-Dec	30-Dec	30-Dec	31-Dec	29-Dec	31-Dec	28-Dec	31-Dec	26-Dec	1-Jan	25-Dec	31-Dec

Appendix C.1. Set gillnet fishing effort, catch, catch per hour, and the number of fish tagged during the Stikine River sockeye salmon mark-recapture study, 2000.

	Stat	Net	Effort	Catch		Tagged		CPUE	
Date	Week	Type[a]	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
19-Jun	26	120	3.4	7	7	5	5	2.04	0.012
20-Jun	26	120	7.0	10	17	10	15	1.43	0.020
21-Jun	26	120	7.4	16	33	16	31	2.16	0.032
22-Jun	26	120	7.4	25	58	25	56	3.39	0.051
23-Jun	26	120	7.0	28	86	29	85	4.00	0.074
24-Jun	26	120	7.3	35	121	35	120	4.82	0.102
25-Jun	27	120	6.8	34	155	34	154	4.99	0.130
26-Jun	27	85	7.4	38	193	36	190	5.14	0.159
27-Jun	27	77	7.3	30	223	30	220	4.12	0.183
28-Jun	27	77	7.3	10	233	10	230	1.38	0.191
29-Jun	27	59	7.0	7	240	7	237	1.00	0.196
30-Jun	27	59	7.2	15	255	15	252	2.10	0.208
1-Jul	27	59	7.0	13	268	13	265	1.85	0.219
2-Jul	28	59	3.8	24	292	24	289	6.26	0.255
3-Jul	28	77	7.3	30	322	30	319	4.11	0.278
4-Jul	28	59	7.5	68	390	68	387	9.07	0.330
5-Jul	28	59	7.2	22	412	22	409	3.07	0.347
6-Jul	28	59	5.1	7	419	7	416	1.38	0.355
7-Jul	28	59	7.2	20	439	13	429	2.78	0.371
8-Jul	28	59	7.2	11	450	17	446	1.54	0.380
9-Jul	29	68	7.2	22	472	22	468	3.06	0.397
10-Jul	29	68	4.1	12	484	12	480	2.91	0.414
11-Jul	29	68	7.2	23	507	23	503	3.20	0.432
12-Jul	29	68	7.3	22	529	22	525	3.03	0.449
13-Jul	29	120	7.0	49	578	49	574	7.00	0.489
14-Jul	29	92	5.6	32	610	31	605	5.77	0.522
15-Jul	29	95	8.6	67	677	67	672	7.81	0.566
16-Jul	30	120	8.3	44	721	44	716	5.28	0.597
17-Jul	30	120	7.2	27	748	27	743	3.74	0.618
18-Jul	30	120	5.3	40	788	40	783	7.50	0.661
19-Jul	30	120	6.3	25	813	25	808	4.00	0.683
20-Jul	30	120	7.0	8	821	8	816	1.14	0.690
21-Jul	30	120	5.2	8	829	8	824	1.55	0.699
22-Jul	30	120	7.3	21	850	21	845	2.90	0.715
23-Jul	31	120	8.4	28	878	28	873	3.33	0.734

Appendix C.1 continued.

	Stat	Net	Effort	Catch		Tagged		CPUE	
Date	Week	Type[a]	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
24-Jul	31	120	7.1	9	887	9	882	1.26	0.741
25-Jul	31	98	7.2	14	901	14	896	1.95	0.753
26-Jul	31	98	7.7	15	916	15	911	1.95	0.764
27-Jul	31	98	7.2	19	935	19	930	2.65	0.779
28-Jul	31	98	7.4	23	958	21	951	3.13	0.797
29-Jul	31	98	7.3	21	979	21	972	2.89	0.813
30-Jul	32	98	7.2	20	999	20	992	2.76	0.829
31-Jul	32	98	7.2	15	1,014	15	1,007	2.07	0.841
1-Aug	32	98	7.2	15	1,029	16	1,023	2.07	0.852
2-Aug	32	98	7.2	20	1,049	19	1,042	2.76	0.868
3-Aug	32	98	7.2	17	1,066	17	1,059	2.37	0.882
4-Aug	32	120	7.5	37	1,103	37	1,096	4.91	0.910
5-Aug	32	120	7.2	17	1,120	17	1,113	2.38	0.923
6-Aug	33	105	7.3	11	1,131	10	1,123	1.51	0.932
7-Aug	33	120	7.2	16	1,147	16	1,139	2.24	0.945
8-Aug	33	120	6.7	14	1,161	13	1,152	2.08	0.957
9-Aug	33	120	6.8	5	1,166	5	1,157	0.74	0.961
10-Aug	33	120	8.3	3	1,169	3	1,160	0.36	0.963
11-Aug	33	120	8.5	7	1,176	7	1,167	0.83	0.968
12-Aug	33	120	8.5	7	1,183	7	1,174	0.83	0.972
13-Aug	34	120	7.2	6	1,189	6	1,180	0.84	0.977
14-Aug	34	120	7.1	5	1,194	5	1,185	0.70	0.981
15-Aug	34	120	7.3	2	1,196	2	1,187	0.27	0.983
16-Aug	34	120	7.2	0	1,196	0	1,187	0.00	0.983
17-Aug	34	120	7.2	5	1,201	5	1,192	0.70	0.987
18-Aug	34	120	7.4	1	1,202	1	1,193	0.14	0.987
19-Aug	34	120	7.2	2	1,204	2	1,195	0.28	0.989
20-Aug	35	120	7.3	1	1,205	1	1,196	0.14	0.990
21-Aug	35	120	7.0	1	1,206	1	1,197	0.14	0.991
22-Aug	35	120	5.1	0	1,206	0	1,197	0.00	0.991
23-Aug	35	120	7.2	0	1,206	0	1,197	0.00	0.991
24-Aug	35	120	7.8	2	1,208	1	1,198	0.26	0.992
25-Aug	35	120	7.1	0	1,208	0	1,198	0.00	0.992
26-Aug	35	90	7.1	0	1,208	0	1,198	0.00	0.992
27-Aug	36	120	7.2	0	1,208	0	1,198	0.00	0.992

Appendix C.1 continued.

Date	Stat Week	Net Type[a]	Effort (h)	Catch Daily	Catch Cum.	Tagged Daily	Tagged Cum.	CPUE Daily	CPUE Cum.%
28-Aug	36	120	7.3	0	1,208	0	1,198	0.00	0.992
29-Aug	36	120	7.1	1	1,209	1	1,199	0.14	0.993
30-Aug	36	120	7.0	2	1,211	2	1,201	0.28	0.994
31-Aug	36	120	7.2	1	1,212	1	1,202	0.14	0.995
1-Sep	36	120	7.2	0	1,212	0	1,202	0.00	0.995
2-Sep	36	120	3.8	0	1,212	0	1,202	0.00	0.995
3-Sep	37	120	7.3	0	1,212	0	1,202	0.00	0.995
4-Sep	37	120	6.9	0	1,212	0	1,202	0.00	0.995
5-Sep	37	120	6.8	0	1,212	0	1,202	0.00	0.995
6-Sep	37	120	7.0	0	1,212	0	1,202	0.00	0.995
7-Sep	37	120	7.2	0	1,212	0	1,202	0.00	0.995
8-Sep	37	120	7.2	1	1,213	1	1,203	0.14	0.996
9-Sep	37	120	7.3	1	1,214	1	1,204	0.14	0.997
10-Sep	38	120	7.4	1	1,215	1	1,205	0.13	0.998
11-Sep	38	120	7.2	1	1,216	1	1,206	0.14	0.998
12-Sep	38	120	7.2	1	1,217	0	1,206	0.14	0.999
13-Sep	38	120	7.2	0	1,217	1	1,207	0.00	0.999
14-Sep	38	120	7.3	0	1,217	0	1,207	0.00	0.999
15-Sep	38	120	3.5	0	1,217	0	1,207	0.00	0.999
16-Sep	38	120	7.3	0	1,217	0	1,207	0.00	0.999
17-Sep	39	120	7.2	0	1,217	0	1,207	0.00	0.999
18-Sep	39	120	7.2	0	1,217	0	1,207	0.00	0.999
19-Sep	39	120	7.2	0	1,217	0	1,207	0.00	0.999
20-Sep	39	120	7.2	0	1,217	0	1,207	0.00	0.999
21-Sep	39	120	6.8	0	1,217	0	1,207	0.00	0.999
22-Sep	39	120	7.3	0	1,217	0	1,207	0.00	0.999
23-Sep	39	120	7.0	0	1,217	0	1,207	0.00	0.999
24-Sep	40	120	7.1	0	1,217	0	1,207	0.00	0.999
25-Sep	40	120	7.6	0	1,217	0	1,207	0.00	0.999
26-Sep	40	120	7.1	0	1,217	0	1,207	0.00	0.999
27-Sep	40	120	7.1	0	1,217	0	1,207	0.00	0.999
28-Sep	40	120	7.2	0	1,217	0	1,207	0.00	0.999
29-Sep	40	120	6.2	0	1,217	0	1,207	0.00	0.999
30-Sep	40	120	7.1	0	1,217	0	1,207	0.00	0.999
1-Oct	41	120	7.2	0	1,217	0	1,207	0.00	0.999

Appendix C.1 continued.

	Stat	Net	Effort	Catch		Tagged		CPUE	
Date	Week	Type[a]	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
2-Oct	41		0.0		1,217	0	1,207		0.999
3-Oct	41	120	7.0	0	1,217	0	1,207	0.00	0.999
4-Oct	41	120	7.0	0	1,217	0	1,207	0.00	0.999
5-Oct	41	120	7.0	0	1,217	0	1,207	0.00	0.999
6-Oct	41	120	7.0	0	1,217	0	1,207	0.00	0.999
7-Oct	41	120	7.0	0	1,217	0	1,207	0.00	0.999
8-Oct	42	120	7.2	0	1,217	0	1,207	0.00	0.999
9-Oct	42	120	7.0	0	1,217	0	1,207	0.00	0.999
10-Oct	42	120	7.2	0	1,217	0	1,207	0.00	0.999
11-Oct	42	120	7.0	0	1,217	0	1,207	0.00	0.999
12-Oct	42	120	7.0	1	1,218	0	1,207	0.14	1.000
13-Oct	42	120	7.0	0	1,218	0	1,207	0.00	1.000
14-Oct	42	120	7.2	0	1,218	0	1,207	0.00	1.000
15-Oct	43	120	7.2	0	1,218	0	1,207	0.00	1.000
16-Oct	43	120	7.0	0	1,218	0	1,207	0.00	1.000
Total			832			1,207		175	

Appendix C.2. Set gillnet fishing effort, catch, catch per hour, and the number of fish tagged during the Stikine River sockeye salmon mark-recapture study, 2001.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	Size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
16-Jun	24	5 3/8"	7.2	2	2	2	2	0.28	0.001
17-Jun	25	5 3/8"	7.3	3	5	3	5	0.41	0.003
18-Jun	25	5 3/8"	7.2	5	10	5	10	0.69	0.005
19-Jun	25	5 3/8"	7.3	8	18	8	18	1.10	0.009
20-Jun	25	5"	6.1	1	19	1	19	0.16	0.010
21-Jun	25	5"	7.2	1	20	1	20	0.14	0.010
22-Jun	25	5"	7.3	9	29	8	28	1.24	0.015
23-Jun	25	5"	7.1	1	30	1	29	0.14	0.015
24-Jun	26	5"	7.2	6	36	6	35	0.83	0.019
25-Jun	26	5"	7.3	7	43	7	42	0.97	0.022
26-Jun	26	5"	7.3	8	51	8	50	1.09	0.026
27-Jun	26	5"	6.5	20	71	19	69	3.07	0.038
28-Jun	26	5"	8.6	31	102	31	100	3.62	0.051
29-Jun	26	5"	8.2	29	131	29	129	3.55	0.064
30-Jun	26	5"	8.0	46	177	46	175	5.76	0.086
1-Jul	27	5"	7.8	39	216	39	214	5.01	0.104
2-Jul	27	5"	7.7	41	257	41	255	5.31	0.124
3-Jul	27	5"	7.6	64	321	64	319	8.40	0.155
4-Jul	27	5"	7.9	47	368	47	366	5.95	0.177
5-Jul	27	5"	7.8	41	409	41	407	5.26	0.197
6-Jul	27	5"	7.9	42	451	42	449	5.31	0.216
7-Jul	27	5"	7.6	24	475	23	472	3.18	0.228
8-Jul	28	5"	7.5	49	524	49	521	6.56	0.253
9-Jul	28	5"	7.8	43	567	43	564	5.50	0.273
10-Jul	28	5"	8.0	70	637	69	633	8.75	0.305
11-Jul	28	5"	6.0	15	652	15	648	2.52	0.315
12-Jul	28	5"	7.4	24	676	23	671	3.23	0.327
13-Jul	28	5"	7.9	44	720	42	713	5.57	0.347
14-Jul	28	5"	7.8	39	759	39	752	5.03	0.366
15-Jul	29	5"	7.0	62	821	60	812	8.86	0.399
16-Jul	29	5"	8.3	71	892	70	882	8.58	0.431
17-Jul	29	5"	8.7	95	987	94	976	10.98	0.472
18-Jul	29	5"	6.0	64	1,051	63	1,039	10.62	0.511
19-Jul	29	5"	8.4	75	1,126	72	1,111	8.96	0.544
20-Jul	29	5"	8.2	27	1,153	27	1,138	3.31	0.557
21-Jul	29	5"	7.3	22	1,175	21	1,159	3.02	0.568

Appendix C.2 continued.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	Size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
22-Jul	30	5"	7.4	22	1,197	22	1,181	2.99	0.579
23-Jul	30	5"	6.0	53	1,250	49	1,230	8.91	0.612
24-Jul	30	5"	7.7	41	1,291	38	1,268	5.35	0.632
25-Jul	30	5"	8.1	66	1,357	62	1,330	8.16	0.662
26-Jul	30	5"	8.6	89	1,446	89	1,419	10.34	0.700
27-Jul	30	5"	7.7	35	1,481	34	1,453	4.54	0.717
28-Jul	30	5"	9.0	107	1,588	97	1,550	11.94	0.762
29-Jul	31	5"	7.9	48	1,636	48	1,598	6.11	0.784
30-Jul	31	5"	7.8	57	1,693	54	1,652	7.35	0.812
31-Jul	31	5"	7.6	36	1,729	35	1,687	4.72	0.829
1-Aug	31	5"	7.5	27	1,756	26	1,713	3.61	0.843
2-Aug	31	5"	7.5	25	1,781	23	1,736	3.34	0.855
3-Aug	31	5"	7.3	22	1,803	21	1,757	3.00	0.866
4-Aug	31	5"	7.5	24	1,827	24	1,781	3.22	0.878
5-Aug	32	5"	7.7	41	1,868	41	1,822	5.31	0.898
6-Aug	32	5"	7.5	24	1,892	23	1,845	3.21	0.910
7-Aug	32	5"	7.5	18	1,910	16	1,861	2.41	0.919
8-Aug	32	5"	7.2	17	1,927	17	1,878	2.37	0.927
9-Aug	32	5"	7.3	4	1,931	5	1,883	0.55	0.929
10-Aug	32	5"	7.3	8	1,939	6	1,889	1.10	0.934
11-Aug	32	5"	7.7	19	1,958	15	1,904	2.48	0.943
12-Aug	33	5"	6.8	10	1,968	8	1,912	1.48	0.948
13-Aug	33	5"	7.8	17	1,985	14	1,926	2.17	0.956
14-Aug	33	5"	7.5	10	1,995	7	1,933	1.34	0.961
15-Aug	33	5"	7.6	10	2,005	9	1,942	1.31	0.966
16-Aug	33	5"	7.2	11	2,016	7	1,949	1.53	0.972
17-Aug	33	5"	7.5	7	2,023	6	1,955	0.93	0.975
18-Aug	33	5"	7.6	6	2,029	5	1,960	0.79	0.978
19-Aug	34	5"	7.5	2	2,031	1	1,961	0.27	0.979
20-Aug	34	5 3/8"	7.6	5	2,036	2	1,963	0.66	0.982
21-Aug	34	5 3/8"	7.3	4	2,040	3	1,966	0.55	0.984
22-Aug	34	5 3/8"	3.1	1	2,041	1	1,967	0.33	0.985
23-Aug	34	5 3/8"	7.5	1	2,042	1	1,968	0.13	0.985
24-Aug	34	5 3/8"	7.8	4	2,046	3	1,971	0.51	0.987
25-Aug	34	5 3/8"	7.2	3	2,049	2	1,973	0.41	0.989
26-Aug	35	5 3/8"	7.4	2	2,051	2	1,975	0.27	0.990

Appendix C.2 continued.

Date	Stat Week	Mesh Size	Effort (h)	Catch Daily	Catch Cum.	Tagged Daily	Tagged Cum.	CPUE Daily	CPUE Cum.%
27-Aug	35	5 3/8"	7.3	1	2,052	1	1,976	0.14	0.990
28-Aug	35	5 3/8"	7.4	1	2,053	1	1,977	0.13	0.991
29-Aug	35	5 3/8"	8.3	3	2,056	3	1,980	0.36	0.992
30-Aug	35	5 3/8"	0.0	0	2,056	0	1,980		0.992
31-Aug	35	5 3/8"	0.0	0	2,056	0	1,980		0.992
1-Sep	35	5 3/8"	7.7	2	2,058	4	1,984	0.26	0.993
2-Sep	36	5 3/8"	7.9	0	2,058	0	1,984	0.00	0.993
3-Sep	36	5 3/8"	7.3	2	2,060	0	1,984	0.27	0.994
4-Sep	36	5 3/8"	8.0	1	2,061	1	1,985	0.12	0.995
5-Sep	36	5 3/8"	7.6	0	2,061	0	1,985	0.00	0.995
6-Sep	36	5 3/8"	8.1	1	2,062	0	1,985	0.12	0.995
7-Sep	36	5 3/8"	4.1	0	2,062	0	1,985	0.00	0.995
8-Sep	36	5 3/8"	7.9	2	2,064	0	1,985	0.25	0.996
9-Sep	37	5 3/8"	7.7	1	2,065	1	1,986	0.13	0.997
10-Sep	37	5 3/8"	7.5	0	2,065	0	1,986	0.00	0.997
11-Sep	37	5 3/8"	7.4	0	2,065	0	1,986	0.00	0.997
12-Sep	37	5 3/8"	7.2	1	2,066	1	1,987	0.14	0.997
13-Sep	37	5 3/8"	7.3	0	2,066	0	1,987	0.00	0.997
14-Sep	37	5 3/8"	7.4	0	2,066	0	1,987	0.00	0.997
15-Sep	37	5 3/8"	7.3	0	2,066	0	1,987	0.00	0.997
16-Sep	38	5 3/8"	7.4	0	2,066	0	1,987	0.00	0.997
17-Sep	38	5 3/8"	7.3	0	2,066	0	1,987	0.00	0.997
18-Sep	38	5 3/8"	7.9	1	2,067	0	1,987	0.13	0.998
19-Sep	38	5 3/8"	7.8	1	2,068	0	1,987	0.13	0.998
20-Sep	38	5 3/8"	7.5	0	2,068	0	1,987	0.00	0.998
21-Sep	38	5 3/8"	7.4	0	2,068	0	1,987	0.00	0.998
22-Sep	38	5 3/8"	7.5	0	2,068	0	1,987	0.00	0.998
23-Sep	39	5 3/8"	2.0	0	2,068	0	1,987	0.00	0.998
24-Sep	39	5 3/8"	7.5	0	2,068	0	1,987	0.00	0.998
25-Sep	39	5 3/8"	7.7	0	2,068	0	1,987	0.00	0.998
26-Sep	39	5 3/8"	7.5	0	2,068	0	1,987	0.00	0.998
27-Sep	39	5 3/8"	7.5	0	2,068	0	1,987	0.00	0.998
28-Sep	39	5 3/8"	7.6	1	2,069	0	1,987	0.13	0.998
29-Sep	39	5 3/8"	7.3	0	2,069	0	1,987		0.998
30-Sep	40	5 3/8"	3.5	0	2,069	0	1,987	0.00	0.998
1-Oct	40	5 3/8"	7.5	0	2,069	0	1,987	0.00	0.998

Appendix C.2 continued.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	Size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
2-Oct	40	5 3/8"	7.2	0	2,069	0	1,987	0.00	0.998
3-Oct	40	5 3/8"	7.4	0	2,069	0	1,987	0.00	0.998
4-Oct	40	5 3/8"	7.3	0	2,069	0	1,987	0.00	0.998
5-Oct	40	5 3/8"	7.2	0	2,069	0	1,987	0.00	0.998
6-Oct	40	5 3/8"	7.6	1	2,070	0	1,987	0.13	0.999
7-Oct	41	5 3/8"	7.2	2	2,072	0	1,987	0.28	1.000
8-Oct	41	5 3/8"	7.2	0	2,072	0	1,987	0.00	1.000
9-Oct	41	5 3/8"	7.1	0	2,072	0	1,987	0.00	1.000
10-Oct	41	5 3/8"	7.2	0	2,072	0	1,987	0.00	1.000
Total			846.6			1,987		269.4	

Appendix C.3. Set gillnet fishing effort, catch, catch per hour, and the number of fish tagged during the Stikine River sockeye salmon mark-recapture study, 2002.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
20-Jun	25	5"	5.2	4	4	3	3	0.77	0.004
21-Jun	25	5"	7.3	15	19	14	17	2.06	0.013
22-Jun	25	5"	7.3	15	34	15	32	2.05	0.023
23-Jun	26	5"	7.5	21	55	20	52	2.80	0.036
24-Jun	26	5"	7.5	44	99	44	96	5.87	0.063
25-Jun	26	5"	7.2	31	130	43	139	4.32	0.083
26-Jun	26	5"	7.3	18	148	0	139	2.47	0.094
27-Jun	26	5"	7.4	33	181	33	172	4.48	0.115
28-Jun	26	5"	7.2	23	204	23	195	3.18	0.130
29-Jun	26	5"	7.5	65	269	65	260	8.67	0.170
30-Jun	27	5"	7.7	58	327	58	318	7.57	0.206
1-Jul	27	5"	7.1	48	375	48	366	6.76	0.237
2-Jul	27	5"	7.1	76	451	74	440	10.70	0.287
3-Jul	27	5"	7.0	65	516	63	503	9.29	0.330
4-Jul	27	5"	7.4	45	561	45	548	6.09	0.358
5-Jul	27	5"	7.0	33	594	33	581	4.71	0.380
6-Jul	27	5"	6.9	22	616	22	603	3.18	0.395
7-Jul	28	5"	7.1	39	655	48	651	5.49	0.420
8-Jul	28	5"	7.8	104	759	98	749	13.42	0.483
9-Jul	28	5"	5.4	54	813	54	803	9.97	0.529
10-Jul	28	5"	8.2	27	840	27	830	3.29	0.544
11-Jul	28	5"	7.3	26	866	27	857	3.59	0.561
12-Jul	28	5"	7.4	35	901	35	892	4.76	0.583
13-Jul	28	5"	8.0	56	957	55	947	7.00	0.616
14-Jul	29	5"	7.4	42	999	40	987	5.66	0.642
15-Jul	29	5"	7.3	33	1,032	33	1,020	4.50	0.663
16-Jul	29	5"	7.5	47	1,079	47	1,067	6.27	0.692
17-Jul	29	5"	7.4	35	1,114	35	1,102	4.76	0.714
18-Jul	29	5"	7.3	40	1,154	40	1,142	5.45	0.739
19-Jul	29	5"	7.6	55	1,209	55	1,197	7.28	0.773
20-Jul	29	5"	7.6	37	1,246	37	1,234	4.90	0.796
21-Jul	30	5"	7.2	26	1,272	26	1,260	3.63	0.813
22-Jul	30	5"	7.4	39	1,311	39	1,299	5.26	0.837
23-Jul	30	5"	7.3	44	1,355	42	1,341	6.04	0.865
24-Jul	30	5"	7.0	8	1,363	7	1,348	1.14	0.871
25-Jul	30	5"	7.1	9	1,372	9	1,357	1.27	0.877

Appendix C.3 continued.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
26-Jul	30	5"	7.1	11	1,383	10	1,367	1.55	0.884
27-Jul	30	5"	7.3	24	1,407	24	1,391	3.31	0.899
28-Jul	31	5"	7.5	38	1,445	38	1,429	5.07	0.923
29-Jul	31	5"	7.4	31	1,476	30	1,459	4.18	0.942
30-Jul	31	5"	7.3	9	1,485	9	1,468	1.24	0.948
31-Jul	31	5"	7.2	9	1,494	9	1,477	1.26	0.954
1-Aug	31	5"	7.2	9	1,503	9	1,486	1.25	0.960
2-Aug	31	5"	7.1	6	1,509	6	1,492	0.85	0.963
3-Aug	31	5"	7.1	4	1,513	4	1,496	0.57	0.966
4-Aug	32	5"	7.0	7	1,520	7	1,503	1.00	0.971
5-Aug	32	5"	7.1	3	1,523	3	1,506	0.43	0.973
6-Aug	32	5"	7.1	7	1,530	7	1,513	0.98	0.977
7-Aug	32	5"	7.1	2	1,532	2	1,515	0.28	0.979
8-Aug	32	5"	7.1	0	1,532	0	1,515	0.00	0.979
9-Aug	32	5"	7.0	1	1,533	1	1,516	0.14	0.979
10-Aug	32	5"	7.1	1	1,534	1	1,517	0.14	0.980
11-Aug	33	5"	7.3	11	1,545	11	1,528	1.51	0.987
12-Aug	33	5"	7.1	3	1,548	3	1,531	0.42	0.989
13-Aug	33	5"	7.0	1	1,549	1	1,532	0.14	0.990
14-Aug	33	5"	6.0	0	1,549	0	1,532	0.00	0.990
15-Aug	33	5"	7.2	2	1,551	2	1,534	0.28	0.991
16-Aug	33	5"	7.4	3	1,554	3	1,537	0.41	0.993
17-Aug	33	5"	7.1	0	1,554	0	1,537	0.00	0.993
18-Aug	34	5"	7.3	4	1,558	4	1,541	0.55	0.995
19-Aug	34	5"	7.2	2	1,560	1	1,542	0.28	0.997
20-Aug	34	5"	6.4	2	1,562	2	1,544	0.31	0.998
21-Aug	34	5.5"	5.1	0	1,562	0	1,544	0.00	0.998
22-Aug	34	5.5"	7.1	1	1,563	1	1,545	0.14	0.999
23-Aug	34	5.5"	6.0	0	1,563	0	1,545	0.00	0.999
24-Aug	34	5.5"	0.0	0	1,563	0	1,545		0.999
25-Aug	35	5.5"	6.1	0	1,563	0	1,545	0.00	0.999
26-Aug	35	5.5"	6.7	0	1,563	0	1,545	0.00	0.999
27-Aug	35	5.5"	7.0	1	1,564	1	1,546	0.14	0.999
28-Aug	35	5.5"	0.0	0	1,564	0	1,546		0.999
29-Aug	35	5.5"	0.0	0	1,564	0	1,546		0.999
30-Aug	35	5.5"	7.1	1	1,565	0	1,546	0.14	1.000

Appendix C.3 continued.

Date	Stat Week	Mesh size	Effort (h)	Catch		Tagged		CPUE	
				Daily	Cum.	Daily	Cum.	Daily	Cum.%
31-Aug	35	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
1-Sep	36	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
2-Sep	36	5.5"	7.6	0	1,565	0	1,546	0.00	1.000
3-Sep	36	5.5"	7.7	0	1,565	0	1,546	0.00	1.000
4-Sep	36	5.5"	7.7	0	1,565	0	1,546	0.00	1.000
5-Sep	36	5.5"	5.4	0	1,565	0	1,546	0.00	1.000
6-Sep	36	5.5"	5.3	0	1,565	0	1,546	0.00	1.000
7-Sep	36	5.5"	7.5	0	1,565	0	1,546	0.00	1.000
8-Sep	37	5.5"	7.5	0	1,565	0	1,546	0.00	1.000
9-Sep	37	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
10-Sep	37	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
11-Sep	37	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
12-Sep	37	5.5"	7.4	0	1,565	0	1,546	0.00	1.000
13-Sep	37	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
14-Sep	37	5.5"	7.4	0	1,565	0	1,546	0.00	1.000
15-Sep	38	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
16-Sep	38	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
17-Sep	38	5.5"	7.4	0	1,565	0	1,546	0.00	1.000
18-Sep	38	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
19-Sep	38	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
20-Sep	38	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
21-Sep	38	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
22-Sep	39	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
23-Sep	39	5.5"	7.6	0	1,565	0	1,546	0.00	1.000
24-Sep	39	5.5"	7.4	0	1,565	0	1,546	0.00	1.000
25-Sep	39	5.5"	7.4	0	1,565	0	1,546	0.00	1.000
26-Sep	39	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
27-Sep	39	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
28-Sep	39	5.5"	7.6	0	1,565	0	1,546	0.00	1.000
29-Sep	40	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
30-Sep	40	5.5"	7.2	0	1,565	0	1,546	0.00	1.000
1-Oct	40	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
2-Oct	40	5.5"	7.3	0	1,565	0	1,546	0.00	1.000
3-Oct	40	5.4"	7.3	0	1,565	0	1,546	0.00	1.000
4-Oct	40	5.4"	7.2	0	1,565	0	1,546	0.00	1.000
5-Oct	40	5.4"	7.1	0	1,565	0	1,546	0.00	1.000

Appendix C.3 continued.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
6-Oct	41	5.4"	7.2	0	1,565	0	1,546	0.00	1.000
7-Oct	41	5.4"	7.1	0	1,565	0	1,546	0.00	1.000
8-Oct	41	5.4"	6.0	0	1,565	0	1,546	0.00	1.000
9-Oct	41	5.4"	7.0	0	1,565	0	1,546	0.00	1.000
10-Oct	41	5.4"	7.0	0	1,565	0	1,546	0.00	1.000
11-Oct	41	5.4"	7.2	0	1,565	0	1,546	0.00	1.000
12-Oct	41	5.4"	7.1	0	1,565	0	1,546	0.00	1.000
13-Oct	42	5.4"	7.0	0	1,565	0	1,546	0.00	1.000
14-Oct	42	5.4"	7.1	0	1,565	0	1,546	0.00	1.000
15-Oct	42	5.4"	7.1	0	1,565	0	1,546	0.00	1.000
Total			812.0			1,546		215.2	

Appendix C.4. Set gillnet fishing effort, catch, catch per hour, and the number of fish tagged during the Stikine River sockeye salmon mark-recapture study, 2003.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	Size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
14-Jun	24	5"	4.1	2	2	1	1	0.49	0.001
15-Jun	25	5"	7.4	2	4	3	4	0.27	0.002
16-Jun	25	5"	3.9	1	5	0	4	0.26	0.003
17-Jun	25	5"	3.8	3	8	2	6	0.80	0.005
18-Jun	25	5"	7.2	12	20	9	15	1.66	0.009
19-Jun	25	5"	7.4	5	25	5	20	0.68	0.011
20-Jun	25	5"	5.3	14	39	12	32	2.67	0.018
21-Jun	25	5"	7.5	13	52	13	45	1.74	0.022
22-Jun	26	5"	7.5	15	67	14	59	2.01	0.027
23-Jun	26	5"	7.4	34	101	34	93	4.60	0.039
24-Jun	26	5"	7.3	20	121	17	110	2.75	0.046
25-Jun	26	5"	7.4	35	156	34	144	4.73	0.059
26-Jun	26	5"	5.3	53	209	53	197	9.94	0.084
27-Jun	26	5"	7.7	63	272	63	260	8.22	0.106
28-Jun	26	5"	7.9	92	364	92	352	11.67	0.136
29-Jun	27	5"	7.9	122	486	122	474	15.54	0.176
30-Jun	27	5"	7.8	104	590	104	578	13.42	0.211
1-Jul	27	5"	7.0	119	709	119	697	17.00	0.255
2-Jul	27	5"	7.8	111	820	111	808	14.26	0.292
3-Jul	27	5"	7.0	68	888	68	876	9.67	0.317
4-Jul	27	5"	6.7	25	913	24	900	3.73	0.326
5-Jul	27	5"	6.8	40	953	39	939	5.85	0.342
6-Jul	28	5"	7.0	60	1,013	65	1,004	8.57	0.364
7-Jul	28	5"	7.0	99	1,112	91	1,095	14.14	0.400
8-Jul	28	5"	7.5	140	1,252	136	1,231	18.79	0.449
9-Jul	28	5"	6.8	110	1,362	109	1,340	16.18	0.491
10-Jul	28		0.0		1,362	0	1,340		0.491
11-Jul	28	5"	5.7	29	1,391	29	1,369	5.07	0.504
12-Jul	28	5"	6.6	16	1,407	16	1,385	2.41	0.510
13-Jul	29	5"	6.7	29	1,436	28	1,413	4.33	0.522
14-Jul	29	5"	6.8	49	1,485	49	1,462	7.21	0.540
15-Jul	29	5"	6.9	50	1,535	50	1,512	7.23	0.559
16-Jul	29	5"	7.0	66	1,601	66	1,578	9.43	0.583
17-Jul	29	5"	6.8	46	1,647	42	1,620	6.76	0.601
18-Jul	29	5"	7.1	77	1,724	74	1,694	10.92	0.629
19-Jul	29	5"	6.8	39	1,763	38	1,732	5.74	0.644

Appendix C.4 continued.

Date	Stat Week	Mesh Size	Effort (h)	Catch Daily	Catch Cum.	Tagged Daily	Tagged Cum.	CPUE Daily	CPUE Cum.%
20-Jul	30	5"	6.9	60	1,823	50	1,782	8.67	0.666
21-Jul	30	5"	6.5	66	1,889	60	1,842	10.15	0.693
22-Jul	30	5"	6.9	45	1,934	44	1,886	6.52	0.710
23-Jul	30	5"	7.0	60	1,994	56	1,942	8.63	0.732
24-Jul	30	5"	6.9	63	2,057	56	1,998	9.17	0.756
25-Jul	30	5"	7.0	55	2,112	54	2,052	7.88	0.776
26-Jul	30	5"	7.1	65	2,177	71	2,123	9.18	0.800
27-Jul	31	5"	6.8	37	2,214	31	2,154	5.48	0.814
28-Jul	31	5"	6.8	39	2,253	35	2,189	5.76	0.829
29-Jul	31	5"	7.0	54	2,307	52	2,241	7.75	0.849
30-Jul	31	5"	6.8	32	2,339	30	2,271	4.74	0.861
31-Jul	31	5"	6.8	40	2,379	40	2,311	5.85	0.876
1-Aug	31	5"	6.8	41	2,420	41	2,352	6.00	0.892
2-Aug	31	5"	6.8	40	2,460	39	2,391	5.87	0.907
3-Aug	32	5"	6.7	28	2,488	25	2,416	4.21	0.918
4-Aug	32	5"	6.6	15	2,503	14	2,430	2.27	0.924
5-Aug	32	5"	6.6	19	2,522	17	2,447	2.86	0.931
6-Aug	32	5"	6.5	7	2,529	5	2,452	1.07	0.934
7-Aug	32	5"	6.6	8	2,537	8	2,460	1.22	0.937
8-Aug	32	5"	6.6	15	2,552	14	2,474	2.26	0.943
9-Aug	32	5"	6.7	22	2,574	17	2,491	3.30	0.952
10-Aug	33	5"	6.6	10	2,584	10	2,501	1.51	0.956
11-Aug	33	5"	6.6	4	2,588	4	2,505	0.61	0.957
12-Aug	33	5"	6.7	7	2,595	6	2,511	1.05	0.960
13-Aug	33	5"	6.7	9	2,604	5	2,516	1.35	0.963
14-Aug	33	5"	6.7	10	2,614	10	2,526	1.50	0.967
15-Aug	33	5"	6.7	14	2,628	13	2,539	2.09	0.973
16-Aug	33	5"	6.6	7	2,635	5	2,544	1.07	0.975
17-Aug	34	5"	6.6	5	2,640	4	2,548	0.75	0.977
18-Aug	34	5"	6.7	4	2,644	4	2,552	0.60	0.979
19-Aug	34	5"	6.6	4	2,648	4	2,556	0.60	0.981
20-Aug	34	5"	6.1	2	2,650	1	2,557	0.33	0.981
21-Aug	34	5"	6.6	5	2,655	3	2,560	0.76	0.983
22-Aug	34	5"	4.5	2	2,657	2	2,562	0.45	0.984
23-Aug	34	5"	6.7	3	2,660	3	2,565	0.45	0.986
24-Aug	35	5"	6.6	2	2,662	0	2,565	0.30	0.986

Appendix C.4 continued.

	Stat	Mesh	Effort	Catch		Tagged		CPUE	
Date	Week	Size	(h)	Daily	Cum.	Daily	Cum.	Daily	Cum.%
25-Aug	35	5"	6.1	1	2,663	1	2,566	0.16	0.987
26-Aug	35	5"	7.6	1	2,664	0	2,566	0.13	0.987
27-Aug	35	5"	6.7		2,664	0	2,566	0.00	0.987
28-Aug	35	5"	6.6	1	2,665	0	2,566	0.15	0.988
29-Aug	35	5"	6.6	1	2,666	0	2,566	0.15	0.988
30-Aug	35	5"	7.1	1	2,667	0	2,566	0.14	0.988
31-Aug	36	5"	7.1	1	2,668	1	2,567	0.14	0.989
1-Sep	36	5"	7.1	1	2,669	1	2,568	0.14	0.989
2-Sep	36	5"	7.1	1	2,670	0	2,568	0.14	0.989
3-Sep	36	5.4"	7.1	1	2,671	1	2,569	0.14	0.990
4-Sep	36	5.4"	7.1	2	2,673	2	2,571	0.28	0.991
5-Sep	36	5.4"	7.0	1	2,674	1	2,572	0.14	0.991
6-Sep	36	5.4"	7.1	1	2,675	1	2,573	0.14	0.991
7-Sep	37	5.4"	7.2		2,675	0	2,573	0.00	0.991
8-Sep	37	5.4"	7.1		2,675	0	2,573	0.00	0.991
9-Sep	37	5.4"	7.2		2,675	0	2,573	0.00	0.991
10-Sep	37	5.4"	7.2		2,675	0	2,573	0.00	0.991
11-Sep	37	5.4"	7.1	1	2,676	1	2,574	0.14	0.992
12-Sep	37	5.4"	7.2		2,676	0	2,574	0.00	0.992
13-Sep	37	5.4"	7.1	1	2,677	1	2,575	0.14	0.992
14-Sep	38	5.4"	7.2		2,677	0	2,575	0.00	0.992
15-Sep	38	5.4"	7.3	2	2,679	0	2,575	0.27	0.993
16-Sep	38	5.4"	7.1	2	2,681	1	2,576	0.28	0.993
17-Sep	38	5.4"	7.2		2,681	0	2,576	0.00	0.993
18-Sep	38	5.4"	7.1		2,681	0	2,576	0.00	0.993
19-Sep	38	5.4"	7.2	3	2,684	0	2,576	0.42	0.995
20-Sep	38	5.4"	7.2		2,684	0	2,576	0.00	0.995
21-Sep	39	5.4"	7.2		2,684	0	2,576	0.00	0.995
22-Sep	39	5.4"	7.3	3	2,687	0	2,576	0.41	0.996
23-Sep	39	5.4"	6.1	1	2,688	0	2,576	0.16	0.996
24-Sep	39	5.4"	7.2	2	2,690	0	2,576	0.28	0.997
25-Sep	39	5.4"	7.1		2,690	0	2,576	0.00	0.997
26-Sep	39	5.4"	7.3		2,690	0	2,576	0.00	0.997
27-Sep	39	5.4"	7.1	1	2,691	0	2,576	0.14	0.997
28-Sep	40	5.4"	7.0	1	2,692	0	2,576	0.14	0.997
29-Sep	40	5.4"	7.1		2,692	0	2,576	0.00	0.997

Appendix C.4 continued.

Date	Stat Week	Mesh Size	Effort (h)	Catch		Tagged		CPUE	
				Daily	Cum.	Daily	Cum.	Daily	Cum.%
30-Sep	40	5.4"	7.1		2,692	0	2,576	0.00	0.997
1-Oct	40	5.4"	7.1	1	2,693	0	2,576	0.14	0.998
2-Oct	40	5.4"	7.1		2,693	0	2,576	0.00	0.998
3-Oct	40	5.4"	7.1		2,693	0	2,576	0.00	0.998
4-Oct	40	5.4"	7.1		2,693	0	2,576	0.00	0.998
5-Oct	41	5.4"	7.1		2,693	0	2,576	0.00	0.998
6-Oct	41	5.4"	7.3	1	2,694	0	2,576	0.14	0.998
7-Oct	41	5.4"	7.0	1	2,695	0	2,576	0.14	0.999
8-Oct	41	5.4"	7.3	1	2,696	0	2,576	0.14	0.999
9-Oct	41	5.4"	7.1	1	2,697	0	2,576	0.14	0.999
10-Oct	41	5.4"	7.1		2,697	0	2,576	0.00	0.999
11-Oct	41	5.4"	7.0	1	2,698	0	2,576	0.14	1.000
12-Oct	42	5.4"	7.1		2,698	0	2,576	0.00	1.000
13-Oct	42	5.4"	7.1	1	2,699	0	2,576	0.14	1.000
Total			829.0			2,576		386.3	

Appendix C.5. Set gillnet fishing effort, catch, catch per hour, and the number of fish tagged during the Stikine River sockeye salmon mark-recapture study, 2004.

	Stat	Mesh	Effort	Catch		Tagged				CPUE	
Date	Week	Size	(h)	Daily	Cum.	Spag.	Radio	Total	Cum.	Daily	Cum.%
15-Jun	25	5"	6.2	0	0	0	0	0	0	0.00	0.000
16-Jun	25	5"	6.1	11	11	5	5	10	10	1.82	0.005
17-Jun	25	5"	6.1	10	21	5	5	10	20	1.64	0.010
18-Jun	25	5"	6.0	13	34	8	5	13	33	2.17	0.016
19-Jun	25	5"	6.1	8	42	8	0	8	41	1.31	0.019
20-Jun	26	5"	6.1	6	48	0	6	6	47	0.98	0.022
21-Jun	26	5"	6.0	0	48	0	0	0	47	0.00	0.022
22-Jun	26	5"	6.0	1	49	0	1	1	48	0.17	0.022
23-Jun	26	5"	6.5	6	55	0	6	6	54	0.92	0.025
24-Jun	26	5"	6.0	5	60	0	5	5	59	0.83	0.027
25-Jun	26	5"	6.0	5	65	0	5	5	64	0.83	0.029
26-Jun	26	5"	6.0	11	76	0	11	11	75	1.83	0.034
27-Jun	27	5"	6.0	17	93	5	10	15	90	2.83	0.042
28-Jun	27	5"	6.1	22	115	1	21	22	112	3.63	0.052
29-Jun	27	5"	6.1	35	150	15	19	34	146	5.79	0.068
30-Jun	27	5"	6.1	50	200	36	14	50	196	8.26	0.091
1-Jul	27	5"	6.0	35	235	21	13	34	230	5.85	0.107
2-Jul	27	5"	6.5	30	265	16	14	30	260	4.59	0.120
3-Jul	27	5"	6.6	64	329	54	9	63	323	9.75	0.147
4-Jul	28	5"	6.5	60	389	46	14	60	383	9.25	0.172
5-Jul	28	5"	6.5	90	479	75	14	89	472	13.78	0.210
6-Jul	28	5"	6.5	130	609	113	14	127	599	20.00	0.265
7-Jul	28	5"	6.5	97	706	83	14	97	696	14.88	0.306
8-Jul	28	5"	6.2	76	782	57	14	71	767	12.23	0.340
9-Jul	28	5"	6.5	23	805	9	14	23	790	3.54	0.350
10-Jul	28	5"	6.5	31	836	28	3	31	821	4.77	0.363
11-Jul	29	5"	6.5	19	855	7	12	19	840	2.92	0.371
12-Jul	29	5"	4.5	34	889	20	14	34	874	7.56	0.392
13-Jul	29	5"	6.5	88	977	73	12	85	959	13.61	0.429
14-Jul	29	5"	6.5	49	1,026	35	13	48	1,007	7.52	0.450
15-Jul	29	5"	6.7	48	1,074	27	12	39	1,046	7.20	0.470
16-Jul	29	5"	6.6	50	1,124	36	13	49	1,095	7.58	0.491
17-Jul	29	5"	6.6	51	1,175	46	2	48	1,143	7.75	0.512
18-Jul	30	5"	6.5	47	1,222	35	9	44	1,187	7.19	0.532
19-Jul	30	5"	6.5	84	1,306	78	1	79	1,266	12.96	0.568
20-Jul	30	5"	6.0	65	1,371	53	12	65	1,331	10.80	0.598

Appendix C.5 continued.

	Stat	Mesh	Effort	Catch		Tagged				CPUE	
Date	Week	Size	(h)	Daily	Cum.	Spag.	Radio	Total	Cum.	Daily	Cum.%
21-Jul	30	5"	6.0	54	1,425	41	11	52	1,383	9.00	0.622
22-Jul	30	5"	6.5	46	1,471	42	3	45	1,428	7.04	0.642
23-Jul	30	5"	6.5	28	1,499	9	18	27	1,455	4.31	0.654
24-Jul	30	5"	6.5	38	1,537	26	9	35	1,490	5.85	0.670
25-Jul	31	5"	6.5	30	1,567	22	8	30	1,520	4.60	0.683
26-Jul	31	5"	6.3	55	1,622	46	8	54	1,574	8.68	0.706
27-Jul	31	5"	6.5	56	1,678	53	1	54	1,628	8.62	0.730
28-Jul	31	5"	4.5	55	1,733	43	12	55	1,683	12.31	0.764
29-Jul	31	5"	6.5	37	1,770	26	8	34	1,717	5.69	0.780
30-Jul	31	5"	6.5	40	1,810	29	7	36	1,753	6.15	0.797
31-Jul	31	5"	6.5	45	1,855	37	3	40	1,793	6.89	0.816
1-Aug	32	5"	6.5	24	1,879	18	5	23	1,816	3.67	0.826
2-Aug	32	5"	6.5	34	1,913	28	5	33	1,849	5.23	0.840
3-Aug	32	5"	6.6	20	1,933	15	5	20	1,869	3.03	0.849
4-Aug	32	5"	6.5	25	1,958	20	5	25	1,894	3.87	0.859
5-Aug	32	5"	6.6	24	1,982	18	5	23	1,917	3.66	0.870
6-Aug	32	5"	6.6	17	1,999	11	4	15	1,932	2.58	0.877
7-Aug	32	5"	6.5	21	2,020	19	1	20	1,952	3.21	0.885
8-Aug	33	5.4"	6.5	26	2,046	20	3	23	1,975	4.01	0.897
9-Aug	33	5.4"	6.5	23	2,069	20	3	23	1,998	3.54	0.906
10-Aug	33	5.4"	6.6	28	2,097	23	3	26	2,024	4.22	0.918
11-Aug	33	5.4"	6.6	29	2,126	26	3	29	2,053	4.42	0.930
12-Aug	33	5.4"	6.5	27	2,153	23	3	26	2,079	4.15	0.942
13-Aug	33	5.4"	6.5	12	2,165	7	3	10	2,089	1.85	0.947
14-Aug	33	5.4"	6.5	12	2,177	10	0	10	2,099	1.85	0.952
15-Aug	34	5.4"	6.5	24	2,201	21	3	24	2,123	3.68	0.962
16-Aug	34	5.4"	6.6	18	2,219	14	3	17	2,140	2.72	0.969
17-Aug	34	5.4"	6.5	13	2,232	9	3	12	2,152	1.99	0.975
18-Aug	34	5.4"	6.5	6	2,238	2	3	5	2,157	0.92	0.977
19-Aug	34	5.4"	6.5	5	2,243	1	3	4	2,161	0.77	0.980
20-Aug	34	5.4"	6.6	14	2,257	12	1	13	2,174	2.14	0.985
21-Aug	34	5.4"	6.5	4	2,261	4	0	4	2,178	0.62	0.987
22-Aug	35	5.4"	6.5	6	2,267	4	1	5	2,183	0.92	0.990
23-Aug	35	5.4"	6.5	7	2,274	6	1	7	2,190	1.08	0.993
24-Aug	35	5.4"	7.4	3	2,277	1	1	2	2,192	0.41	0.994
25-Aug	35	5.4"	7.4	3	2,280	2	1	3	2,195	0.41	0.995

Appendix C.5 continued.

Date	Stat Week	Mesh Size	Effort (h)	Catch		Tagged				CPUE	
				Daily	Cum.	Spag.	Radio	Total	Cum.	Daily	Cum.%
26-Aug	35	5.4"	6.6	2	2,282	0	2	2	2,197	0.30	0.996
27-Aug	35	5.4"	6.6	1	2,283	0	1	1	2,198	0.15	0.996
28-Aug	35	5.4"	6.8	0	2,283	0	0	0	2,198	0.00	0.996
29-Aug	36	5.4"	6.6	4	2,287	2	2	4	2,202	0.61	0.998
30-Aug	36	5.4"	6.5	1	2,288	0	1	1	2,203	0.15	0.998
31-Aug	36	5.4"	6.5	2	2,290	1	1	2	2,205	0.31	0.999
1-Sep	36	5.4"	6.5	0	2,290	0	0	0	2,205	0.00	0.999
2-Sep	36	5.4"	6.5	1	2,291	0	1	1	2,206	0.15	1.000
3-Sep	36	5.4"	6.5	1	2,292	1	0	1	2,207	0.15	1.000
Total			517.4			1,707	500	2,207		362.7	

Appendix C.6. Set gillnet fishing effort, catch, catch per hour, and the number of fish tagged during the Stikine River sockeye salmon mark-recapture study, 2005.

	Stat	Effort	Catch		Tagged				CPUE	
Date	Week	(h)	Daily	Cum.	Spag.	Radio	Total	Cum.	Daily	Cum.%
16-Jun	25	6.1	3	3	0	3	3	3	0.49	0.001
17-Jun	25	6.2	2	5	0	2	2	5	0.32	0.002
18-Jun	25	6.2	5	10	0	5	5	10	0.80	0.005
19-Jun	26	6.2	7	17	0	7	7	17	1.13	0.008
20-Jun	26	6.3	11	28	0	11	11	28	1.75	0.014
21-Jun	26	6.3	7	35	0	7	7	35	1.11	0.017
22-Jun	26	6.4	29	64	15	13	28	63	4.51	0.031
23-Jun	26	6.7	61	125	52	9	61	124	9.13	0.059
24-Jun	26	6.5	39	164	29	9	38	162	5.98	0.077
25-Jun	26	6.4	39	203	39	0	39	201	6.07	0.095
26-Jun	27	6.8	75	278	56	16	72	273	11.08	0.129
27-Jun	27	6.6	71	349	54	16	70	343	10.71	0.162
28-Jun	27	6.3	32	381	17	16	33	376	5.06	0.177
29-Jun	27	6.4	30	411	14	15	29	405	4.72	0.192
30-Jun	27	6.3	29	440	12	17	29	434	4.60	0.206
1-Jul	27	6.3	40	480	23	16	39	473	6.32	0.225
2-Jul	27	6.4	35	515	33	0	33	506	5.49	0.242
3-Jul	28	6.2	18	533	4	14	18	524	2.89	0.251
4-Jul	28	6.4	35	568	20	14	34	558	5.47	0.267
5-Jul	28	6.2	18	586	4	13	17	575	2.92	0.276
6-Jul	28	6.2	26	612	11	15	26	601	4.17	0.289
7-Jul	28	6.3	44	656	29	14	43	644	6.95	0.310
8-Jul	28	6.5	60	716	46	14	60	704	9.27	0.339
9-Jul	28	6.6	73	789	73	0	73	777	11.06	0.372
10-Jul	29	6.4	53	842	38	13	51	828	8.31	0.398
11-Jul	29	6.5	69	911	55	13	68	896	10.58	0.430
12-Jul	29	6.5	70	981	55	13	68	964	10.72	0.463
13-Jul	29	6.7	89	1,070	74	13	87	1,051	13.28	0.503
14-Jul	29	6.3	38	1,108	25	13	38	1,089	6.01	0.521
15-Jul	29	6.3	33	1,141	16	13	29	1,118	5.24	0.537
16-Jul	29	6.4	42	1,183	42	0	42	1,160	6.59	0.558
17-Jul	30	6.7	79	1,262	68	9	77	1,237	11.86	0.594
18-Jul	30	6.2	39	1,301	24	11	35	1,272	6.26	0.613
19-Jul	30	6.4	38	1,339	27	10	37	1,309	5.98	0.631
20-Jul	30	6.4	49	1,388	38	10	48	1,357	7.63	0.654
21-Jul	30	6.3	32	1,420	22	10	32	1,389	5.12	0.670
22-Jul	30	6.3	27	1,447	15	10	25	1,414	4.27	0.683

Appendix C.6 continued.

Date	Stat Week	Effort (h)	Catch		Tagged				CPUE	
			Daily	Cum.	Spag.	Radio	Total	Cum.	Daily	Cum.%
23-Jul	30	6.4	50	1,497	49	0	49	1,463	7.81	0.707
24-Jul	31	6.4	45	1,542	35	9	44	1,507	7.03	0.728
25-Jul	31	6.6	70	1,612	59	8	67	1,574	10.69	0.761
26-Jul	31	6.2	27	1,639	20	7	27	1,601	4.33	0.774
27-Jul	31	6.2	22	1,661	14	8	22	1,623	3.57	0.785
28-Jul	31	6.3	29	1,690	20	8	28	1,651	4.64	0.799
29-Jul	31	6.2	24	1,714	15	8	23	1,674	3.88	0.811
30-Jul	31	6.1	13	1,727	12	0	12	1,686	2.13	0.817
31-Jul	32	6.3	31	1,758	25	5	30	1,716	4.96	0.833
1-Aug	32	6.3	23	1,781	18	5	23	1,739	3.65	0.844
2-Aug	32	6.3	16	1,797	10	5	15	1,754	2.55	0.852
3-Aug	32	6.1	6	1,803	3	3	6	1,760	0.98	0.855
4-Aug	32	6.2	10	1,813	2	7	9	1,769	1.63	0.859
5-Aug	32	6.2	17	1,830	11	5	16	1,785	2.73	0.868
6-Aug	32	6.2	15	1,845	15	0	15	1,800	2.42	0.875
7-Aug	33	6.2	16	1,861	12	3	15	1,815	2.57	0.883
8-Aug	33	6.2	20	1,881	15	3	18	1,833	3.23	0.893
9-Aug	33	6.2	27	1,908	21	3	24	1,857	4.34	0.906
10-Aug	33	6.3	28	1,936	22	3	25	1,882	4.46	0.920
11-Aug	33	6.3	18	1,954	14	3	17	1,899	2.88	0.929
12-Aug	33	6.4	15	1,969	11	3	14	1,913	2.34	0.936
13-Aug	33	6.1	3	1,972	3	0	3	1,916	0.49	0.937
14-Aug	34	6.1	2	1,974	1	1	2	1,918	0.33	0.938
15-Aug	34	6.1	10	1,984	6	3	9	1,927	1.64	0.943
16-Aug	34	6.2	11	1,995	8	2	10	1,937	1.77	0.949
17-Aug	34	6.2	12	2,007	10	2	12	1,949	1.94	0.955
18-Aug	34	6.1	8	2,015	5	2	7	1,956	1.31	0.959
19-Aug	34	6.1	0	2,015	0	0	0	1,956	0.00	0.959
20-Aug	34	6.1	0	2,015	0	0	0	1,956	0.00	0.959
21-Aug	35	6.0	0	2,015	0	0	0	1,956	0.00	0.959
22-Aug	35	6.1	1	2,016	0	1	1	1,957	0.16	0.959
23-Aug	35	6.2	10	2,026	7	2	9	1,966	1.62	0.964
24-Aug	35	6.1	6	2,032	5	0	5	1,971	0.98	0.967
25-Aug	35	6.2	6	2,038	6	0	6	1,977	0.97	0.970
26-Aug	35	6.2	11	2,049	11	0	11	1,988	1.77	0.975
27-Aug	35	6.2	6	2,055	6	0	6	1,994	0.97	0.978
28-Aug	36	6.2	4	2,059	4	0	4	1,998	0.65	0.980

Appendix C.6 continued.

	Stat	Effort	Catch		Tagged				CPUE	
Date	Week	(h)	Daily	Cum.	Spag.	Radio	Total	Cum.	Daily	Cum.%
29-Aug	36	6.1	2	2,061	2	0	2	2,000	0.33	0.981
30-Aug	36	6.1	4	2,065	4	0	4	2,004	0.66	0.983
31-Aug	36	6.1	2	2,067	2	0	2	2,006	0.33	0.984
1-Sep	36	6.1	2	2,069	2	0	2	2,008	0.33	0.985
2-Sep	36	6.1	4	2,073	3	0	3	2,011	0.66	0.987
3-Sep	36	6.1	0	2,073	0	0	0	2,011	0.00	0.987
4-Sep	37	5.1	1	2,074	0	0	0	2,011	0.20	0.988
5-Sep	37	5.1	0	2,074	0	0	0	2,011	0.00	0.988
6-Sep	37	5.0	0	2,074	0	0	0	2,011	0.00	0.988
7-Sep	37	5.2	0	2,074	0	0	0	2,011	0.00	0.988
8-Sep	37	5.1	1	2,075	1	0	1	2,012	0.20	0.988
9-Sep	37	5.0	3	2,078	0	0	0	2,012	0.60	0.990
10-Sep	37	5.0	0	2,078	0	0	0	2,012	0.00	0.990
11-Sep	38	5.1	2	2,080	0	0	0	2,012	0.39	0.991
12-Sep	38	5.1	2	2,082	0	0	0	2,012	0.39	0.993
13-Sep	38	5.0	2	2,084	0	0	0	2,012	0.40	0.994
14-Sep	38	5.1	2	2,086	0	0	0	2,012	0.39	0.995
15-Sep	38	5.0	1	2,087	0	0	0	2,012	0.20	0.996
16-Sep	38	5.0	1	2,088	0	0	0	2,012	0.20	0.996
17-Sep	38	4.0	1	2,089	0	0	0	2,012	0.25	0.997
18-Sep	39	5.1	0	2,089	0	0	0	2,012	0.00	0.997
19-Sep	39	5.1	0	2,089	0	0	0	2,012	0.00	0.997
20-Sep	39	5.0	0	2,089	0	0	0	2,012	0.00	0.997
21-Sep	39	5.3	1	2,090	0	0	0	2,012	0.19	0.998
22-Sep	39	5.0	0	2,090	0	0	0	2,012	0.00	0.998
23-Sep	39	5.0	0	2,090	0	0	0	2,012	0.00	0.998
24-Sep	39	5.0	2	2,092	0	0	0	2,012	0.40	0.999
25-Sep	40	5.0	0	2,092	0	0	0	2,012	0.00	0.999
26-Sep	40	5.1	0	2,092	0	0	0	2,012	0.00	0.999
27-Sep	40	5.0	0	2,092	0	0	0	2,012	0.00	0.999
28-Sep	40	5.1	0	2,092	0	0	0	2,012	0.00	0.999
29-Sep	40	5.4	1	2,093	0	0	0	2,012	0.19	0.999
30-Sep	40	5.1	0	2,093	0	0	0	2,012	0.00	0.999
1-Oct	40	5.0	0	2,093	0	0	0	2,012	0.00	0.999
2-Oct	41	5.0	0	2,093	0	0	0	2,012	0.00	0.999
3-Oct	41	5.0	0	2,093	0	0	0	2,012	0.00	0.999
4-Oct	41	5.4	0	2,093	0	0	0	2,012	0.00	0.999

Appendix C.6 continued.

Date	Stat Week	Effort (h)	Catch		Tagged				CPUE	
			Daily	Cum.	Spag.	Radio	Total	Cum.	Daily	Cum.%
5-Oct	41	3.5	0	2,093	0	0	0	2,012	0.00	0.999
6-Oct	41	5.1	0	2,093	0	0	0	2,012	0.00	0.999
7-Oct	41	5.1	0	2,093	0	0	0	2,012	0.00	0.999
8-Oct	41	5.0	1	2,094	0	0	0	2,012	0.20	1.000
9-Oct	42	5.0	0	2,094	0	0	0	2,012	0.00	1.000
10-Oct	42	5.1	0	2,094	0	0	0	2,012	0.00	1.000
11-Oct	42	5.0	0	2,094	0	0	0	2,012	0.00	1.000
12-Oct	42	5.1	0	2,094	0	0	0	2,012	0.00	1.000
13-Oct	42	5.2	0	2,094	0	0	0	2,012	0.00	1.000
14-Oct	42	2.8	0	2,094	0	0	0	2,012	0.00	1.000
Total		705			1,519	493	2,012		328	

Appendix D.1. Number of sockeye salmon caught and tags recovered, by statistical week, in the commercial and test fisheries in the lower Stikine River, 2000.

Stat.	Catch						Tag Recoveries					
Week	Comm.	Cum.	Test	Cum.	Total	Cum.	Comm.	Cum.	Test	Cum.	Total	Cum.
20		0	0	0	0	0		0	0	0	0	0
21		0	0	0	0	0		0	0	0	0	0
22		0	0	0	0	0		0	0	0	0	0
23		0	0	0	0	0		0	0	0	0	0
24		0	1	1	1	1		0	0	0	0	0
25		0	3	4	3	4		0	0	0	0	0
26		0	154	158	154	158		0	0	0	0	0
27	3,539	3,539	289	447	3,828	3,986	6	6	1	1	7	7
28	5,909	9,448	771	1,218	6,680	10,666	23	29	0	1	23	30
29	3,830	13,278	580	1,798	4,410	15,076	25	54	5	6	30	60
30	2,817	16,095	357	2,155	3,174	18,250	17	71	5	11	22	82
31	1,948	18,043	89	2,244	2,037	20,287	25	96	1	12	26	108
32	1,671	19,714	74	2,318	1,745	22,032	36	132	1	13	37	145
33	626	20,340	42	2,360	668	22,700	14	146	3	16	17	162
34	117	20,457	4	2,364	121	22,821	3	149	2	18	5	167
35	15	20,472	0	2,364	15	22,836	3	152	0	18	3	170
36	0	20,472	2	2,366	2	22,838		152	0	18	0	170
37	0	20,472	3	2,369	3	22,841		152	0	18	0	170
38		20,472	7	2,376	7	22,848		152	0	18	0	170
39		20,472	0	2,376	0	22,848		152	0	18	0	170
40		20,472	2	2,378	2	22,850		152	0	18	0	170
41		20,472	0	2,378	0	22,850		152	0	18	0	170
42		20,472	0	2,378	0	22,850		152	0	18	0	170
43		20,472	0	2,378	0	22,850		152	0	18	0	170

[a]An additional 5 tagged fish were recovered in the commercial fishery for which the date of capture was unknown. In total, there were 157 tagged fish recovered in the commercial fishery.

Appendix D.2. Number of sockeye salmon caught and tags recovered, by statistical week, in the commercial and test fisheries in the lower Stikine River, 2001.

Stat.	Catch						Tag recoveries					
Week	Comm.	Cum.	Test	Cum.	Total	Cum.	Comm.	Cum.	Test	Cum.	Total	Cum.
20		0	0	0	0	0		0	0	0	0	0
21		0	0	0	0	0		0	0	0	0	0
22		0	0	0	0	0		0	0	0	0	0
23		0	0	0	0	0		0	0	0	0	0
24		0	6	6	6	6		0	0	0	0	0
25		0	4	10	4	10		0	0	0	0	0
26	237	237	479	489	716	726	0	0	2	2	2	2
27	3,402	3,639	797	1,286	4,199	4,925	5	5	7	9	12	14
28	4,183	7,822	756	2,042	4,939	9,864	51	56	12	21	63	77
29	3,035	10,857	427	2,469	3,462	13,326	22	78	3	24	25	102
30	3,091	13,948	372	2,841	3,463	16,789	36	114	5	29	41	143
31	5,318	19,266	135	2,976	5,453	22,242	150	264	4	33	154	297
32	568	19,834	117	3,093	685	22,927	26	290	6	39	32	329
33	29	19,863	107	3,200	136	23,063	1	291	2	41	3	332
34	0	19,863	50	3,250	50	23,113	0	291	4	45	4	336
35	3	19,866	10	3,260	13	23,126	0	291	0	45	0	336
36	6	19,872	5	3,265	11	23,137	0	291	0	45	0	336
37		19,872	6	3,271	6	23,143		291	0	45	0	336
38		19,872	3	3,274	3	23,146		291	0	45	0	336
39		19,872	4	3,278	4	23,150		291	0	45	0	336
40		19,872	3	3,281	3	23,153		291	0	45	0	336
41		19,872	0	3,281	0	23,153		291	0	45	0	336
42		19,872	0	3,281	0	23,153		291	0	45	0	336
43		19,872	0	3,281	0	23,153		291	0	45	0	336

Appendix D.3. Number of sockeye salmon caught and tags recovered, by statistical week, in the commercial and test fisheries in the lower Stikine River, 2002.

Stat.	Catch						Tag recoveries					
Week	Comm.	Cum.	Test	Cum.	Total	Cum.	Comm.	Cum.	Test	Cum.	Total	Cum.
19			0	0	0	0			0	0	0	0
20			0	0	0	0			0	0	0	0
21			0	0	0	0			0	0	0	0
22			0	0	0	0			0	0	0	0
23			13	13	13	13			0	0	0	0
24			36	49	36	49			0	0	0	0
25			76	125	76	125			0	0	0	0
26	844	844	679	804	1,523	1,648	1	1	2	2	3	3
27	1,780	2,624	1,116	1,920	2,896	4,544	13	14	5	7	18	21
28	1,462	4,086	778	2,698	2,240	6,784	38	52	9	16	47	68
29	1,674	5,760	925	3,623	2,599	9,383	58	110	10	26	68	136
30	2,185	7,945	405	4,028	2,590	11,973	59	169	3	29	62	198
31	2,394	10,339	224	4,252	2,618	14,591	90	259	1	30	91	289
32	71	10,410	76	4,328	147	14,738	2	261	1	31	3	292
33	9	10,419	33	4,361	42	14,780	1	262	1	32	2	294
34	1	10,420	20	4,381	21	14,801	0	262	0	32	0	294
35		10,420	8	4,389	8	14,809		262	0	32	0	294
36		10,420	5	4,394	5	14,814		262	0	32	0	294
37		10,420	3	4,397	3	14,817		262	0	32	0	294
38		10,420	4	4,401	4	14,821		262	0	32	0	294
39		10,420	4	4,405	4	14,825		262	0	32	0	294
40		10,420	3	4,408	3	14,828		262	0	32	0	294
41		10,420	3	4,411	3	14,831		262	0	32	0	294
42		10,420	1	4,412	1	14,832		262	0	32	0	294

[a] An additional 3 fish were recovered in the commercial (2) and test (1) fisheries; however, the date of recovery was unknown. In total, 297 tagged fish were recovered in 2002.

Appendix D.4. Number of sockeye salmon caught and tags recovered, by statistical week, in the commercial and test fisheries in the lower Stikine River, 2003.

Stat.	Catch						Tag recoveries					
Week	Comm.	Cum.	Test	Cum.	Total	Cum.	Comm.	Cum.	Test	Cum.	Total	Cum.
19		0	0	0	0	0		0	0	0	0	0
20		0	0	0	0	0		0	0	0	0	0
21		0	0	0	0	0		0	0	0	0	0
22		0	0	0	0	0		0	0	0	0	0
23		0	0	0	0	0		0	0	0	0	0
24		0	7	7	7	7		0	0	0	0	0
25		0	147	154	147	154		0	0	0	0	0
26	832	832	892	1,046	1,724	1,878	0	0	1	1	1	1
27	7,455	8,287	338	1,384	7,793	9,671	37	37	5	6	42	43
28	13,856	22,143	446	1,830	14,302	23,973	167	204	4	10	171	214
29	9,589	31,732	520	2,350	10,109	34,082	115	319	5	15	120	334
30	11,640	43,372	372	2,722	12,012	46,094	137	456	4	19	141	475
31	6,743	50,115	198	2,920	6,941	53,035	93	549	2	21	95	570
32	1,488	51,603	131	3,051	1,619	54,654	35	584	2	23	37	607
33	19	51,622	44	3,095	63	54,717	1	585	0	23	1	608
34	103	51,725	126	3,221	229	54,946	4	589	1	24	5	613
35	10	51,735	61	3,282	71	55,017	0	589	2	26	2	615
36	0	51,735	21	3,303	21	55,038	0	589	0	26	0	615
37		51,735	20	3,323	20	55,058		589	0	26	0	615
38		51,735	20	3,343	20	55,078		589	0	26	0	615
39		51,735	2	3,345	2	55,080		589	0	26	0	615
40		51,735	7	3,352	7	55,087		589	0	26	0	615
41		51,735	3	3,355	3	55,090		589	0	26	0	615
42		51,735	1	3,356	1	55,091		589	0	26	0	615

Appendix D.5. Number of sockeye salmon caught and tags recovered, by statistical week, in the commercial and test fisheries in the lower Stikine River, 2004.

Stat.	Catch						Tag recoveries					
Week	Comm.	Cum.	Test	Cum.	Total	Cum.	Comm.	Cum.	Test	Cum.	Total	Cum.
26	281	281	143	143	424	424	0	0	3	3	3	3
27	5,187	5,468	408	551	5,595	6,019	10	10	1	4	11	14
28	24,320	29,788	57	608	24,377	30,396	122	132	1	5	123	137
29	22,886	52,674	0	608	22,886	53,282	211	343	0	5	211	348
30	9,116	61,790	146	754	9,262	62,544	103	446	6	11	109	457
31	7,243	69,033	189	943	7,432	69,976	114	560	3	14	117	574
32	6,186	75,219	83	1,026	6,269	76,245	95	655	2	16	97	671
33	2,275	77,494	145	1,171	2,420	78,665	29	684	3	19	32	703
34	30	77,524	88	1,259	118	78,783	1	685	3	22	4	707
35	5	77,529	44	1,303	49	78,832	1	686	3	25	4	711
36	1	77,530	24	1,327	25	78,857	0	686	1	26	1	712
37	0	77,530	8	1,335	8	78,865	0	686	0	26	0	712
38		77,530	1	1,336	1	78,866		686	0	26	0	712
39		77,530	1	1,337	1	78,867		686	0	26	0	712
40		77,530	1	1,338	1	78,868		686	0	26	0	712
41		77,530	0	1,338	0	78,868		686	0	26	0	712
42		77,530	0	1,338	0	78,868		686	0	26	0	712

Appendix D.6. Number of sockeye salmon caught and tags recovered, by statistical week, in the commercial and test fisheries in the lower Stikine River, 2005.

Stat	Catch						Tag recoveries					
Week	Comm.	Cum.	Test	Cum.	Total	Cum.	Comm.	Cum.	Test	Cum.	Total	Cum.
24	5	5			5	5		0			0	0
25	22	27			22	27		0			0	0
26	650	677	345	345	995	1,022		0	0	0	0	0
27	13,608	14,285	63	408	13,671	14,693	71	71	0	0	71	71
28	15,647	29,932		408	15,647	30,340	139	210			139	210
29	18,580	48,512		408	18,580	48,920	240	450			240	450
30	13,131	61,643		408	13,131	62,051	238	688			238	688
31	8,243	69,886	289	697	8,532	70,583	90	778	8	8	98	786
32	7,256	77,142	340	1,037	7,596	78,179	81	859	0	8	81	867
33	2,810	79,952	111	1,148	2,921	81,100	18	877	2	10	20	887
34		79,952	175	1,323	175	81,275		877	4	14	4	891
35		79,952	218	1,541	218	81,493		877	3	17	3	894
36		79,952	82	1,623	82	81,575		877	4	21	4	898
37		79,952	14	1,637	14	81,589		877	0	21	0	898
38		79,952	9	1,646	9	81,598		877	0	21	0	898
39		79,952	1	1,647	1	81,599		877	0	21	0	898
40		79,952	0	1,647	0	81,599		877	0	21	0	898
41		79,952	4	1,651	4	81,603		877	0	21	0	898
42		79,952	0	1,651	0	81,603		877	0	21	0	898

Appendix E.1. Transition matrix showing the number of tagged sockeye salmon available for recovery (M), and the number of fish inspected (C) and recaptured (R) in the lower Stikine River commercial and test fisheries (pooled), by statistical week, 2000.

Week of	Week of Recovery																	Tags	Tags	Recapture
Tagging	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Unk[a]	Recaptured	Available	Rate
26				7	10	7	1											1	26	115	0.226
27					13	10	1	1	1									1	27	139	0.194
28						13	10	4	3									4	34	173	0.197
29							7	15	7										29	216	0.134
30							3	6	13	1	1								24	165	0.145
31									11	1									12	108	0.111
32									1	12	1								14	120	0.117
33										3	3								6	52	0.115
34												3							3	18	0.167
35																			0	3	0.000
36																			0	3	0.000
37																			0	2	0.000
38																			0	3	0.000
Unk[a]									1										1	0	
Recaptured	0	0	0	7	23	30	22	26	37	17	5	3	0	0	0	0	0	6	176	1,117	0.158
Inspected	1	3	154	3,828	6,680	4,410	3,174	2,037	1,745	668	121	15	2	3	7	0	2		22,850		
Mark Rate	0.000	0.000	0.000	0.002	0.003	0.007	0.007	0.013	0.021	0.025	0.041	0.200	0.000	0.000	0.000	-	0.000		0.008		

[a] Recaptures where the week of tagging or recovery was unknown. These recaptures were not used in abundance calculations.

Pooling to estimate abundance consisted of tagging weeks 26, 27-28, 29-30, 31-38; and recovery weeks 24-28, 29-30, 31, 32-33, 34-40.

Appendix E.2. Transition matrix showing the number of tagged sockeye salmon available for recovery (M), and the number of fish inspected (C) and recaptured (R) in the lower Stikine River commercial and test fisheries (pooled), by statistical week, 2001.

Week of	Week of Recovery																	Tags	Tags	Recapture
Tagging	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Recaptured	Applied	Rate
24				2														2	2	1.000
25																		0	26	0.000
26			2	9	4													15	140	0.107
27				1	52	4												57	284	0.201
28					7	20	14	7										48	268	0.179
29						1	22	39	3									65	389	0.167
30							5	88	6		1							100	332	0.301
31								20	16	1								37	196	0.189
32									7	1	1							9	104	0.087
33										1	2							3	47	0.064
34																		0	11	0.000
35																		0	9	0.000
36																		0	1	0.000
37																		0	2	0.000
Recaptured	0	0	2	12	63	25	41	154	32	3	4	0	0	0	0	0	0	336	1811	0.186
Inspected	6	4	716	4,199	4,939	3,462	3,463	5,453	685	136	50	13	11	6	3	4	3	23,153		
Mark Rate	0.000	0.000	0.003	0.003	0.013	0.007	0.012	0.028	0.047	0.022	0.080	0.000	0.000	0.000	0.000	0.000	0.000	0.015		

Pooling to estimate abundance consisted of tagging weeks 24-26, 27-37; and recovery weeks 24-27, 28, 29, 20, 21, 32-40.

Appendix E.3. Transition matrix showing the number of tagged sockeye salmon available for recovery (M), and the number of fish inspected (C) and recaptured (R) in the lower Stikine River commercial and test fisheries (pooled), by statistical week, 2002.

Week of	Week of Recovery																					Tags	Tags	Recapture
Tagging	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Unk[a]	Recaptured	Available	Rate
25				2	2																	4	31	0.129
26				1	14	10	4	3	1												1	34	218	0.156
27					2	36	16	5	1													60	328	0.183
28						1	46	15														62	329	0.188
29							1	38	35													74	274	0.270
30								1	36		1											38	133	0.286
31									19	3												22	89	0.247
32																						0	18	0.000
33											1											1	17	0.059
34																						0	7	0.000
35																						0	1	0.000
Unk[a]							1														1	2		
Recaptured	0	0	0	3	18	47	68	62	92	3	2	0	0	0	0	0	0	0	0	0	2	297	1,445	0.206
Inspected	13	36	76	1,523	2,896	2,240	2,599	2,590	2,618	147	42	21	8	5	3	4	4	3	3	1		14,832		
Mark Rate	0.000	0.000	0.000	0.002	0.006	0.021	0.026	0.024	0.035	0.020	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.020		

[a] Recaptures where the date of tagging or recovery was unknown. These recaptures were not used in abundance calculations.

Pooling to estimate abundance consisted of tagging weeks 25-28, 29-35; and recovery weeks 23-26, 27, 28-30, 31-42.

Appendix E.4. Transition matrix showing the number of tagged sockeye salmon available for recovery (M), and the number of fish inspected (C) and recaptured (R) in the lower Stikine River commercial and test fisheries (pooled), by statistical week, 2003.

Week of	Week of Recapture																			Tags	Tags	Recapture
Tagging	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Recaptured	Available	Rate
24																				0	1	0.000
25			1	1	2															4	42	0.095
26				36	36	7	1		1											81	293	0.276
27				4	119	46	6	3	1											179	561	0.319
28					14	61	30	5	1											111	426	0.261
29						3	72	8	1											84	332	0.253
30							23	63	13											99	332	0.298
31								14	18			2								34	227	0.150
32									2		1									3	85	0.035
33										1	3									4	45	0.089
34											1									1	18	0.056
35																				0	1	0.000
36																				0	6	0.000
37																				0	2	0.000
38																				0	1	0.000
Unk[a]				1		3	10	2												16		
Recaptured	0	0	1	42	171	120	142	95	37	1	5	2	0	0	0	0	0	0	0	616	2,372	0.260
Inspected	7	147	1,724	7,793	14,302	10,109	12,012	6,941	1,619	63	229	71	21	20	20	2	7	3	1	55,091		
Mark Rate	0.000	0.000	0.001	0.005	0.012	0.012	0.012	0.014	0.023	0.016	0.022	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011		

[a] Recaptures where the week of tagging was unknown. These recaptures were not used in abundance calculations.

Pooling to estimate abundance consisted of tagging weeks 24-26, 27, 28-30, 31, 32-38; and recovery weeks 24-27, 28-31, 32-42.

Appendix E.5. Transition matrix showing the number of tagged sockeye salmon available for recovery (M), and the number of fish inspected (C) and recaptured (R) in the lower Stikine River commercial and test fisheries (pooled), by statistical week, 2004.

Week of	Week of Recovery															Tags	Tags	Recapture
Tagging	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Recaptured	Available	Rate
25	2	8														10	39	0.256
26		2	5	1			1									9	32	0.281
27		1	82	17	2	1										103	240	0.429
28			33	180	34	9	2									258	479	0.539
29				9	59	34	6									108	306	0.353
30					13	60	17	1								91	292	0.312
31						11	60	8								79	260	0.304
32							11	15	1	1						28	136	0.206
33								7	2							9	125	0.072
34									1	2						3	65	0.046
35										1	1					2	18	0.111
36																0	7	0.000
Unk[a]	1		3	4	1	2		1								12		
Recaptured	3	11	123	211	109	117	97	32	4	4	1	0	0	0	0	712	1,999	0.356
Inspected	424	5,595	24,377	22,886	9,262	7,432	6,269	2,420	118	49	25	8	1	1	1	78,868		
Mark Rate	0.007	0.002	0.005	0.009	0.012	0.016	0.015	0.013	0.034	0.082	0.040	0.000	0.000	0.000	0.000	0.01		

[a] Recaptures where the week of tagging was unknown. These recaptures were not used in abundance calculations.

Pooling to estimate abundance consisted of tagging weeks 25-27, 28, 29, 30, 31, 32-36; and recovery weeks 26-27, 28, 29, 30, 31, 32, 33, 34-40.

Appendix E.6. Transition matrix showing the number of tagged sockeye salmon available for recovery (M), and the number of fish inspected (C) and recaptured (R) in the lower Stikine River commercial and test fisheries (pooled), by statistical week, 2005.

Week of	Week of Recapture																		Tags	Tags	Recapture
Tagging	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	Recaptured	Available	Rate
25																			0	9	0.000
26				57	25	5	3												90	181	0.497
27				14	96	51	8												169	292	0.579
28					18	107	36	5											166	258	0.643
29						76	127	24	3										230	366	0.628
30							61	49	14										124	259	0.479
31								17	54	5			1						77	190	0.405
32									9	14	1								24	93	0.258
33										1	3	1							5	98	0.051
34												2							2	33	0.061
35													3						3	33	0.091
36																			0	14	0.000
37																			0	1	0.000
Unk[a]						1	3	3	1										8		
Recaptured		0	0	71	139	240	238	98	81	20	4	3	4	0	0	0	0	0	898	1,827	0.492
Inspected[a]	5	22	995	13,671	15,647	18,580	13,131	8,532	7,596	2,921	175	218	82	14	9	1	0	4	81,598		
Mark Rate	0.000	0.000	0.000	0.005	0.009	0.013	0.018	0.011	0.011	0.007	0.023	0.014	0.049	0.000	0.000	0.000		0.000	0.0110		

[a] Recaptures where the week of tagging was unknown. These recaptures were not used in abundance calculations.

Pooling to estimate abundance consisted of tagging weeks 25-26, 27-29, 30-31, 32, 33-37; and recovery weeks 25-27, 28, 29, 30-31, 32, 33, 34-41.

Appendix F.1. Age, sex, and length composition of sockeye salmon tagged in the lower Stikine River, 2000.

		Brood Year and Age Class											
		1997	1996	1996	1996	1995	1995	1995	1994	1994	1994	1993	
Sex	Statistic	0.2	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	4.2	Total
Males	N	20	14	119	1	2	160	61	4	16	15	3	415
	Percent	2.0	1.4	11.9	0.1	0.2	16.0	6.1	0.4	1.6	1.5	0.3	41.6
	SE	0.4	0.4	1.0	0.1	0.1	1.2	0.8	0.2	0.4	0.4	0.2	1.6
	Avg. POH	433	530	438	295	513	537	485	534	536	507	522	493
	SD	53.4	24.2	43.2		10.6	25.7	38.8	39.4	31.1	20.0	20.6	57.2
Females	N	3	22	87			246	131	1	22	65	6	583
	Percent	0.3	2.2	8.7			24.6	13.1	0.1	2.2	6.5	0.6	58.4
	SE	0.2	0.5	0.9			1.4	1.1	0.1	0.5	0.8	0.2	1.6
	Avg. POH	415	517	464			518	476	540	517	492	506	497
	SD	34.6	20.3	28.2			22.5	23.4		22.8	24.7	12.7	33.0
Sexes	N	23	36	206	1	2	406	192	5	38	80	9	998
Combined	Percent	2.3	3.6	20.6	0.1	0.2	40.7	19.2	0.5	3.8	8.0	0.9	100.0
	SE	0.5	0.6	1.3	0.1	0.1	1.6	1.2	0.2	0.6	0.9	0.3	
	Avg. POH	431	522	449	295	513	526	479	535	525	495	511	496
	SD	51.1	22.5	39.7		10.6	25.4	29.4	34.3	27.8	24.4	16.5	44.7

Appendix F.2. Age, sex, and length composition of sockeye salmon tagged in the lower Stikine River, 2001.

		Brood Year and Age Class											
		1998	1998	1997	1997	1996	1996	1995	1995	1995	1994	1994	
Sex	Statistic	0.2	1.1	0.3	1.2	1.3	2.2	1.4	2.3	3.2	3.3	4.2	Total
Males	N	2	2	32	43	392	15		42	2	7	1	538
	Percent	0.2	0.2	2.8	3.7	33.8	1.3		3.6	0.2	0.6	0.1	46.4
	SE	0.1	0.1	0.5	0.6	1.4	0.3		0.5	0.1	0.2	0.1	1.5
	Avg. POH	493	428	518	458	528	498		527	530	489	480	520
	SD	38.9	215.7	40.1	59.1	26.9	38.8		25.3	63.6	55.9		39.3
Females	N	1		35	33	486	25	3	30	3	5	1	622
	Percent	0.1		3.0	2.8	41.9	2.2	0.3	2.6	0.3	0.4	0.1	53.6
	SE	0.1		0.5	0.5	1.4	0.4	0.1	0.5	0.1	0.2	0.1	1.5
	Avg. POH	395		508	475	515	493	518	516	502	510	465	511
	SD			25.9	52.3	25.3	32.1	5.8	17.5	16.1	14.6		29.3
Sexes Combined	N	3	2	67	76	878	40	3	72	5	12	2	1160
	Percent	0.3	0.2	5.8	6.6	75.7	3.4	0.3	6.2	0.4	1.0	0.2	100.0
	SE	0.1	0.1	0.7	0.7	1.3	0.5	0.1	0.7	0.2	0.3	0.1	
	Avg. POH	460	428	513	465	521	495	518	522	513	498	473	515
	SD	62.6	215.7	33.5	56.5	26.8	34.3	5.8	22.9	37.2	43.5	10.6	34.5

Appendix F.3. Age, sex, and length composition of sockeye salmon tagged in the lower Stikine River, 2002.

		Brood Year and Age Class										
		1999	1999	1998	1998	1997	1997	1997	1996	1996	1995	
Sex	Statistic	0.2	1.1	0.3	1.2	0.4	1.3	2.2	2.3	3.2	3.3	Total
Males	N	30	1	9	172	1	89	9	8	20		339
	Percent	4.3	0.1	1.3	24.4	0.1	12.6	1.3	1.1	2.8		48.1
	SE	0.8	0.1	0.4	1.6	0.1	1.3	0.4	0.4	0.6		1.9
	Avg. POH	411	280	543	453	590	546	501	554	508		483
	SD	34.5		30.6	45.9		26.3	26.5	24.0	25.9		61.7
Females	N	3	1	6	182		98	29	1	45	1	366
	Percent	0.4	0.1	0.9	25.8		13.9	4.1	0.1	6.4	0.1	51.9
	SE	0.2	0.1	0.3	1.6		1.3	0.7	0.1	0.9	0.1	1.9
	Avg. POH	417	280	522	453		524	476	560	506	530	480
	SD	40.4		21.4	31.1		32.1	32.3		22.3		45.4
Sexes	N	33	2	15	354	1	187	38	9	65	1	705
Combined	Percent	4.7	0.3	2.1	50.2	0.1	26.5	5.4	1.3	9.2	0.1	100.0
	SE	0.8	0.2	0.5	1.9	0.1	1.7	0.9	0.4	1.1	0.1	
	Avg. POH	411	280	535	453	590	535	482	554	506	530	482
	SD	34.4	0.0	28.5	38.9		31.4	32.6	22.6	23.3		53.9

Appendix F.4. Age, sex, and length composition of sockeye salmon tagged in the lower Stikine River, 2003.

		Brood Year and Age Class										
		2000	2000	1999	1999	1998	1998	1997	1997	1996	1996	
Sex	Statistic	0.2	1.1	0.3	1.2	1.3	2.2	2.3	3.2	3.3	4.2	Total
Males	N	17	1	17	103	219	32	16	3	1	1	410
	Percent	2.1	0.1	2.1	12.8	27.2	4.0	2.0	0.4	0.1	0.1	50.9
	SE	0.5	0.1	0.5	1.2	1.6	0.7	0.5	0.2	0.1	0.1	1.8
	Avg. POH	431	335	532	443	529	474	530	492	546	470	498
	SD	35.5		20.7	38.0	24.2	25.3	22.8	40.3			49.8
Females	N	11		5	51	249	57	16	5	2		396
	Percent	1.4		0.6	6.3	30.9	7.1	2.0	0.6	0.2		49.1
	SE	0.4		0.3	0.9	1.6	0.9	0.5	0.3	0.2		1.8
	Avg. POH	445		503	461	509	473	507	489	514		496
	SD	39.5		19.8	25.4	19.2	18.3	19.6	27.9	8.0		29.2
Sexes	N	28	1	22	154	468	89	32	8	3	1	806
Combined	Percent	3.5	0.1	2.7	19.1	58.1	11.0	4.0	1.0	0.4	0.1	100.0
	SE	0.6	0.1	0.6	1.4	1.7	1.1	0.7	0.3	0.2	0.1	
	Avg. POH	436	335	526	449	518	473	519	490	524	470	497
	SD	37.0		23.6	35.3	23.8	21.0	24.1	30.2	19.3		41.0

Appendix F.5. Age, sex, and length composition of sockeye salmon tagged in the lower Stikine River, 2004.

		Brood Year and Age Class										
		2001	2000	2000	1999	1999	1998	1998	1998	1997	1997	
Sex	Statistic	0.2	0.3	1.2	1.3	2.2	1.4	2.3	3.2	2.4	3.3	Total
Males	N	13	78	352	323	65	2	27	3	1	2	866
	Percent	0.7	4.0	18.0	16.5	3.3	0.1	1.4	0.2	0.1	0.1	44.4
	SE	0.2	0.4	0.9	0.8	0.4	0.1	0.3	0.1	0.1	0.1	1.1
	Avg. POH	463	533	458	526	478	527	520	463	526	517	494
	SD	39.6	25.5	31.2	38.6	23.3	64.3	23.9	30.5		18.0	46.8
Females	N	8	109	422	346	158	5	28	10			1086
	Percent	0.4	5.6	21.6	17.7	8.1	0.3	1.4	0.5			55.6
	SE	0.1	0.5	0.9	0.9	0.6	0.1	0.3	0.2			1.1
	Avg. POH	458	504	464	506	461	521	506	471			482
	SD	19.9	18.4	20.9	20.9	37.9	18.4	17.7	18.2			31.8
Sexes	N	21	187	774	669	223	7	55	13	1	2	1952
Combined	Percent	1.1	9.6	39.7	34.3	11.4	0.4	2.8	0.7	0.1	0.1	100.0
	SE	0.2	0.7	1.1	1.1	0.7	0.1	0.4	0.2	0.1	0.1	
	Avg. POH	461	516	462	516	466	523	513	469	526	517	488
	SD	32.9	25.8	26.3	32.4	35.1	30.4	22.1	20.4		18.0	39.6

Appendix F.6. Age, sex, and length composition of sockeye salmon tagged in the lower Stikine River, 2005.

		Brood Year and Age Class										
		2002	2001	2001	2000	2000	1999	1999	1999	1999	1998	
Sex	Statistic	1.1	0.3	1.2	1.3	2.2	1.4	2.3	3.2	4.1	3.3	Total
Males	N	2	16	15	214	5		23	2	1		278
	Percent	0.3	2.7	2.5	35.9	0.8		3.9	0.3	0.2		46.6
	SE	0.2	0.7	0.6	2.0	0.4		0.8	0.2	0.2		2.0
	Avg. POH	410	526	471	514	459		506	479	434		509
	SD	117.0	20.1	58.1	20.2	21.5		24.3	2.6			29.4
Females	N		17	15	239	10	1	25	10		1	318
	Percent		2.9	2.5	40.1	1.7	0.2	4.2	1.7		0.2	53.4
	SE		0.7	0.6	2.0	0.5	0.2	0.8	0.5		0.2	2.0
	Avg. POH		491	449	497	456	511	491	467		514	492
	SD		15.7	15.4	20.4	15.6		24.3	17.9			23.8
Sexes	N	2	33	30	453	15	1	48	12	1	1	596
Combined	Percent	0.3	5.5	5.0	76.0	2.5	0.2	8.1	2.0	0.2	0.2	100.0
	SE	0.2	0.9	0.9	1.8	0.6	0.2	1.1	0.6	0.2	0.2	
	Avg. POH	410	508	460	505	457	511	498	469	434	514	500
	SD	117.0	25.0	43.3	22.0	17.0		25.2	17.0			28.0

Appendix G.1. Gillnet fishing effort, catch, catch per hour, and the number of fish tagged during the Stikine River coho salmon radiotelemetry study, 2005.

Stat Week	Week Ending	Mesh Size (in.)	Net Length (avg, m)	Hanging Ratio	Effort (h)	Catch (# fish)	Radio Tags Weekly	Radio Tags Cum.	CPUE (fish/h) Weekly	CPUE (fish/h) Cum.%
30	23-Jul	5.0	88	2:01	45	1	0	0	0.02	0.001
31	30-Jul	5.0	99	3:01	44	0	0	0	0.00	0.001
32	6-Aug	5.0	103	2.5:01	44	3	0	0	0.07	0.006
33	13-Aug	5.0	97	2.5:01	44	38	11	11	0.87	0.061
34	20-Aug	5.0	83	2.5:01	43	18	14	25	0.42	0.088
35	27-Aug	5.0	94	2.5:01	43	52	35	60	1.21	0.165
36	3-Sep	5.4	100	2.5:01	43	61	34	94	1.43	0.256
37	10-Sep	5.4	100	2.5:01	36	91	52	146	2.56	0.419
38	17-Sep	5.4	100	2.5:01	34	74	36	182	2.15	0.557
39	24-Sep	5.4	107	2.5:01	35	103	36	218	2.91	0.742
40	1-Oct	5.4	100	4:01	36	89	30	248	2.49	0.901
41	8-Oct	5.4	100	4:01	34	36	12	260	1.06	0.968
42	15-Oct	5.4	107	4:01	28	14	8	268	0.50	1.000
Total					507	580	268		15.69	