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The Snake River, Eldorado River and Pilgrim River Salmon Escapement Enumeration and Sampling Project
Summary Report, 2006

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TO:

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C/o
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PROJECT SPONSORSHIP

Kawerak, Inc. operated these projects in cooperation with the Alaska Department of Fish and Game, Commercial Fisheries Division in Nome, Alaska.

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We would also like to acknowledge the hard work and dedication of the Kawerak, Inc. and NSEDC Fisheries Technicians. In addition, we thank the Nome office staff of the Alaska Department of Fish and Game for their assistance, resources and support, which were invaluable for making these projects a success.

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EXECUTIVE SUMMARY

The Kawerak, Inc. Fisheries Department operated salmon escapement enumeration and sampling projects on the Snake, Eldorado and Pilgrim Rivers during the 2006 season. These projects provided salmon escapement and biological (age, sex, and length) data to the Alaska Department of Fish and Game for the inseason management of fisheries resources in the Nome Subdistrict and Port Clarence District management areas. Escapement on the Snake River was counted from June 30 to September 12, 2006 at 32 Chinook (*Oncorhynchus tshawytscha*), 4,156 chum (*O. keta*), 74,022 pink (*O. gorbuscha*), 4,761 coho (*O. kisutch*) and 296 sockeye (*O. nerka*) salmon. Escapement on the Eldorado River, which is East of Cape Nome, was counted from June 26 to August 3, 2006 at 41 Chinook, 42,105 chum, 222,348 pink, 55 coho and 1 sockeye salmon. Escapement on the Pilgrim River was counted from June 29 to September 12, 2006 at 275 Chinook, 45,361 chum, 17,701 pink, 973 coho and 52,323 sockeye salmon.

Biological data (age, sex, and length) were collected from chum and coho salmon on the Snake and Pilgrim Rivers, from chum salmon on the Eldorado River and from sockeye and Chinook salmon on the Pilgrim River. The most abundant chum salmon returns to the Snake, Eldorado, and Pilgrim Rivers were from age class 0.3. In 2006, coho salmon returning to the Snake and Pilgrim Rivers were most abundantly represented by age class 2.1, from brood year 2002. In 2006, the sockeye salmon returns on the Pilgrim River were 45.9% age class 2.3, from brood year 2000, 28.8% age class 1.3, from brood year 2001, and 14.5% age class 1.2, from brood year 2002. Chinook salmon were sampled for age sex and length on the Pilgrim River. Of the 43 individual Chinook salmon sampled, 55.8% were female and 44.2% were male. The largest age class was age-1.3 (41.9%) followed by age-1.4 (25.6%), age-1.2 (23.2%), age 2.3 (4.7%) and age-1.1 (4.6%). Generally, males were larger than females of the same age group and the average length of Chinook salmon sampled was 716.3mm.

Environmental observations for stream temperature and stream stage height were taken daily at 0800 and 2000 hours. Snake River water temperature fluctuated between 4 ^{o}C and 14 ^{o}C from July 1 to September 11, 2006. Stream stage height on the Snake River decreased steadily from July 29 through September, with peaks in flow on July 20 and again on September 8. Eldorado River water temperature fluctuated between 4 ^{o}C and 16 ^{o}C from June 28 to August 3, 2006. Stream stage height on the Eldorado River gradually decreased from June 28 to July 15, however peaks were observed on June 27, July 18 and July 29, when heavy rain caused the water to rise. Pilgrim River water temperature fluctuated between 5^{o}C and 15^{o}C and stream stage height gradually decreased until September 7, 2006, when heavy rain created a spike in stage height.

SNAKE RIVER SALMON ESCAPEMENT ENUMERATION AND SAMPLING PROJECT

BACKGROUND

The 2006 season represents the twelfth consecutive year that Kawerak, Inc. has operated a salmon enumeration and sampling project on the Snake River (See Rob 1995b; Rob 1997b; Rob 1998b; Rob 1999c; Kohler 2000b; Kohler and Kneupfer 2001; Kohler and Kneupfer 2002; Waitman and Dunmall 2003; Dunmall 2004; Dunmall 2005, Burkhart and Dunmall 2006). A full picket weir has been used on the Snake River since the latter part of the 2002 season.

OBJECTIVES

The objectives for the 2006 season were threefold:

1) To obtain daily and seasonal information regarding the run timing and magnitude of Chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*O. keta*), pink salmon (*O. gorbuscha*), coho salmon (*O. kisutch*) and sockeye salmon (*O. nerka*) escapement to the Snake River.

2) To obtain the age, sex and length (ASL) composition of the chum and coho salmon escapement to the Snake River.

3) To monitor environmental conditions for stream temperature and stream stage height at 0800 and 2000 hours daily.

METHODS

The Snake River project began at the approximate start of the salmon run. The site is located roughly 5 miles upstream from the mouth of the Snake River, (Section 18, T11S, R34W, KRM)(Stream No. 333-10-11200) (GPS location 03W 0473824 / 7157118)(Figure 1). A camp was constructed on the bluff adjacent to the river, and housed a crew of 2 fisheries technicians for the duration of the counting season.

Salmon enumeration was conducted at the Snake River project using a full picket weir. The technicians checked the weir throughout the day and during periods of normal peak diurnal salmon migration, which have been found in past enumeration projects to occur from approximately 2200 hours until dawn. The salmon were allowed to pass through the weir by removing pickets or by allowing the salmon to go into the live box for biological sampling, as needed. The technicians identified the fish to species as the salmon passed upstream, tallied and recorded the data in waterproof data booklets and then transcribed the data onto data sheets at the end of the sampling periods.

Age, sex and length (ASL) samples were obtained from salmon using a trap and live box. Chum and coho salmon were sampled for age, sex and length while pink and sockeye salmon were not sampled. Attempts were made to sample Chinook salmon for ASL, however insufficient Chinook salmon returned to the Snake River to allow for biological sampling. All data collected were recorded in a waterproof data booklet and later transcribed onto the appropriate data sheets. The trap and live box allowed for ease of collection of the ASL samples. They also made counting more accurate by eliminating the sample error associated with both species

identification and enumeration inherent with counting towers and reduced many staffing difficulties regarding time off and schedules.

Age, sex, length (ASL) sampling was conducted based on a pulse sampling design (Molyneaux and DuBois 1999). The sample size goal for each pulse was 160 chum salmon and three pulses were targeted. This sample size was selected so that simultaneous 95% confidence interval estimates of age composition proportions would be no wider than 0.20 (Bromaghin 1993). Recommended sample size was increased an additional 8 to 9% to account for unreadable scales. Each pulse sample was used to estimate the ASL composition of the run for a given temporal stratum. A weighted mean, with salmon passage during each defined stratum as the weight, was used to estimate age composition of the total season passage. A sample size goal of 160 coho salmon was used to obtain ASL information. A pulsed sampling design was not used for coho salmon because of their run timing during the season and the relatively low total number of coho counted in each river.

Salmon ages were determined by examining scale characteristics (Mosher 1968), sex was determined by examining external morphology, and length was determined by measuring from the middle of the eye to the fork of the tail (+/-1 mm). Scales were collected from the left side of the salmon approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gum cards and impressions were made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). European notation (e.g., 2.2; Koo 1962) was used to record ages: numerals preceding the decimal refer to number of freshwater annuli and numerals following the decimal refer to number of marine annuli. Total age from time of egg deposition or brood year is the sum of these numbers plus one.

Escapement and ASL data were examined for errors by recalculating the daily escapement data at the end of the season. Any errors found were investigated by referring back to the waterproof field notebooks. Corrected data were entered into an Excel spreadsheet for analysis and were then archived.

Environmental observations for stream temperature and stream stage height were taken daily at 0800 and 2000 hours. Stream temperatures were recorded to the nearest degree Celsius using a mercury-in-glass thermometer. Stream stage heights were taken by reading the staff gage to the nearest centimeter.

RESULTS

The escapement and enumeration project on the Snake River was conducted from June 30 to September 12, 2006. The total number of fish counted by species is as follows: 32 Chinook, 4,156 chum, 74,022 pink, 4,761 coho, 296 sockeye salmon and 615 Dolly Varden (Table 1, Figures 2 and 3). Historical total cumulative escapement is shown in Table 2.

The weighted by strata chum salmon data are used for reporting because ASL differences were observed, dependent on what time during the season the chum salmon returned. A total of 537 readable ASL samples were taken from chum salmon (Table 3). Overall, it was determined that 1.3% of returning chum salmon were age 0.2 from brood year 2003, 63.4% were age 0.3 from brood year 2002, 24.9% were age 0.4 from brood year 2001 and 10.4% were age 0.5 from brood year 2000. In the early part of the season, July 1 - July 12, 60.3% of the returning chum salmon were male and 39.7% were female. In the latter part of the season, July 27 - September 11,

female chum salmon represented 63.6% of the return and males accounted for 36.4% of returning chum salmon. In the early part of the season, from July 1 - July 12, zero age 0.2 chum salmon were sampled but 402 chum salmon age 0.5 passed the escapement project, and in the latter part of the season, from July 27 - September 11, 8 age 0.5 chum salmon and 25 age 0.2 chum salmon migrated upstream. Overall in the 2006 season, 53.9% of the returning chum salmon were female, and 46.1% were male. Generally, chum salmon increased in length with increasing age, and males were longer than females at any given age (Table 3). Average lengths of chum salmon age 0.2 were 507 mm, age 0.3 were 557 mm, age 0.4 were 576 mm, and age 0.5 chum salmon were an average length of 626 mm. Overall, male chum salmon were 590 mm, and females were an average length of 550 mm.

A total of 244 readable ASL samples were taken from coho salmon (Table 4). It was determined that 6.2% of the returning coho salmon were age 1.1 from brood year 2003, 91.0% were age 2.1 from brood year 2002, and 2.8% were age 3.1 from brood year 2001. Through the 2006 season, 49.2% of the returning coho salmon were male, and 50.8% were female. Generally, coho salmon increased in length with increasing age, and males were longer than females at any given age (Table 4). Average lengths of coho salmon age 1.1 were 554 mm, age 2.1 were 559 mm, and coho salmon age 3.1 were an average length of 556 mm. Overall, male coho salmon were an average length of 567 mm, and females were an average length of 551 mm.

Environmental conditions were monitored on the Snake River for stream temperature and stream stage height. Water temperature fluctuated between 4 ^{o}C and 14 ^{o}C from July 1 to September 11, 2006 (Figure 4). Stream stage height on the Snake River decreased steadily from July 29 through September, with peaks in flow on July 20 and again on September 8 (Figure 5).

Eldorado River Salmon Escapement Enumeration and Sampling Project

BACKGROUND

The 2006 season represents the twelfth consecutive year that Kawerak, Inc. has operated a salmon enumeration and sampling project on the Eldorado River (See Rob 1995a; Rob 1997a; Rob 1998a; Rob 1999a, Kohler 2000a; Kohler 2001; Kohler 2002; Waitman and Dunmall 2003; Dunmall 2004; Dunmall 2005; Burkhart and Dunmall 2006). A full picket weir has been used on the Eldorado River since the beginning of the 2003 season.

OBJECTIVES

The objectives for the 2006 season were threefold:

1) To obtain daily and seasonal information regarding the run timing and magnitude of Chinook, chum, pink, coho, and sockeye salmon escapement to the Eldorado River.

2) To obtain the age, sex and length (ASL) composition of the chum salmon escapement to the Eldorado River.

3) To monitor environmental conditions for stream temperature and stream stage height at 0800 and 2000 hours daily.

METHODS

The Eldorado River project began at the approximate start of the salmon run. The site is located roughly 15 miles upstream from the Safety Sound Bridge (Section 35, T11S, R33W, KRM)(Stream No. 333-10-1150-2030)(GPS location 03W 0503004 / 7160922)(Figure 1). A camp was constructed on the bluff adjacent to the river, and housed a crew of 2 fisheries technicians for the duration of the season.

Salmon enumeration was conducted at the Eldorado River project using a full picket weir. The technicians checked the weir throughout the day and during periods of normal peak diurnal salmon migration, which have been found in past enumeration projects to occur from approximately 2200 hours until dawn. The salmon were allowed to pass through the weir by removing weir pickets or by allowing the salmon to go into the live box for biological sampling as needed. The technicians identified the fish to species as the salmon passed upstream, tallied and recorded the data in waterproof data booklets and then transcribed the data onto data sheets at the end of the sampling periods.

Age, sex and length (ASL) samples were obtained from salmon using a trap and live box. Chum salmon were sampled for age, sex and length while pink, Chinook, coho and sockeye salmon were not sampled. All data collected were recorded in a waterproof data booklet and later transcribed onto the appropriate data sheets. The trap and live box allowed for ease of collection of the ASL samples. They also made counting more accurate by eliminating the sample error associated with both species identification and enumeration inherent with counting towers and reduced many staffing difficulties regarding time off and schedules.

Age, sex, length (ASL) sampling was conducted based on a pulse sampling design (Molyneaux and DuBois 1999). The sample size goal for each pulse was 160 chum salmon and three pulses were targeted. This sample size was selected so that simultaneous 95% confidence interval

estimates of age composition proportions would be no wider than 0.20 (Bromaghin 1993). Recommended sample size was increased an additional 8 to 9% to account for unreadable scales. Each pulse sample was used to estimate the ASL composition of the run for a given temporal stratum. A weighted mean, with salmon passage during each defined stratum as the weight, was used to estimate age composition of the total season passage.

Salmon ages were determined by examining scale characteristics (Mosher 1968), sex was determined by examining external morphology, and length was determined by measuring from the middle of the eye to the fork of the tail (+/- 1 mm). Scales were collected from the left side of the salmon approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gum cards and impressions made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). European notation (e.g., 2.2; Koo 1962) was used to record ages: numerals preceding the decimal refer to number of freshwater annuli and numerals following the decimal refer to number of marine annuli. Total age from time of egg deposition or brood year is the sum of these numbers plus one.

Escapement and ASL data were examined for errors by recalculating the daily escapement data at the end of the season. Any errors found were investigated by referring back to the waterproof field notebooks. Corrected data were entered into an Excel spreadsheet for analysis and were then archived.

Environmental observations for stream temperature and stream stage height were taken daily at 0800 and 2000 hours. Stream temperatures were recorded to the nearest degree Celsius using a mercury-in-glass thermometer. Stream stage heights were taken by reading the staff gage to the nearest centimeter.

RESULTS

The escapement and enumeration project on the Eldorado River was conducted from June 26 to August 3, 2006. The total number of fish counted by species is as follows: 41 Chinook, 42,105 chum, 222,348 pink, 55 coho, 1 sockeye salmon and 65 Dolly Varden (Table 5, Figures 7 and 8). Historical total cumulative escapement is shown in Table 6.

For the Eldorado River, the un-weighted data are used for reporting because the ASL information obtained remained similar regardless of when during the season the salmon returned. A total of 459 readable samples were taken from chum salmon (Table 7). It was determined that 0.4% of returning chum salmon were age 0.2 from brood year 2003, 57.5% were age 0.3 from brood year 2002, 40.9% were age 0.4 from brood age 2001, and 1.1% were age 0.5 from brood year 2000. Overall in the 2006 season, 53.6% of the returning chum salmon were female, and 46.4% were male. Generally, chum salmon increased in length with increasing age, and males were longer than females at any given age (Table 7). Average lengths of chum salmon age 0.2 were 513 mm, age 0.3 were 572 mm, age 0.4 were 595 mm, and age 0.5 chum salmon were an average length of 595 mm. Overall, male chum salmon were an average length of 578 mm, and females were an average length of 581 mm.

Environmental conditions were monitored on the Eldorado River for stream temperature and stream stage height. Eldorado River water temperature fluctuated between 4 ^{o}C and 16 ^{o}C from June 28 to August 3, 2006 (Figure 9). Stream stage height on the Eldorado River gradually

decreased from Jun 28 to July 15, however peaks were observed on July 18 and July 29, when heavy rain caused the water to rise (Figure 10).

Pilgrim River Salmon Escapement Enumeration and Sampling Project

BACKGROUND

The 2006 season represents the eighth year that a salmon enumeration and sampling project has operated on the Pilgrim River. (See Rob 1999b; Kohler and Kneupfer 2000; Waitman and Dunmall 2003; Dunmall 2004; Dunmall 2005; Burkhart and Dunmall 2006). This is the fifth consecutive season at the present site, and the fourth season using a resistance-board weir.

OBJECTIVES

The objectives for the 2006 season were threefold:

1) To obtain daily and seasonal information regarding the run timing and magnitude of Chinook, chum, pink, coho, and sockeye salmon escapement to the Pilgrim River.

2) To obtain the age, sex and length (ASL) composition of the Chinook, chum, coho, and sockeye salmon escapement to the Pilgrim River.

3) To monitor environmental conditions for stream temperature and stream stage height at 0800 and 2000 hours daily.

METHODS

The Pilgrim River project began at the approximate start of the salmon run. The site is located roughly 6.5 miles downstream of the Kougarok Highway Bridge (Section 27, T4S, R30W, KRM)(Stream No. 333-10-1150-2030)(GPS location 03W 0508265 / 7219936)(Figure 1). A camp was constructed on the bluff adjacent to the river, and housed a crew of 2 fisheries technicians for the duration of the counting season and 3 fisheries technicians during peak salmon runs.

Salmon enumeration was conducted at the Pilgrim River project using a resistance-board weir. The technicians checked the weir throughout the day and during periods of normal peak diurnal salmon migration, which have been found in past enumeration projects to occur from approximately 2200 hours until dawn. The salmon were passed by allowing them to go into the live box for biological sampling as needed or allowing them to pass through the live trap. The technicians identified the fish to species as the salmon passed upstream, tallied and recorded the data in waterproof data booklets and then transcribed the data into data sheets at the end of the sampling periods.

Age, sex and length (ASL) samples were obtained from salmon using a trap and live box. Chinook, chum, coho, and sockeye salmon were sampled for age, sex and length while pink salmon were not sampled. All data collected were recorded in a waterproof data booklet and later transcribed onto the appropriate data sheets. The trap and live box allowed for ease of collection of the ASL samples. They also made counting more accurate by eliminating the sample error associated with both species identification and enumeration inherent with counting towers and reduced many staffing difficulties regarding time off and schedules.

ASL sampling was conducted based on a pulse sampling design (Molyneaux and DuBois 1999). The sample size goal for each pulse was 160 chum salmon, and 160 sockeye salmon and three pulses were targeted for each species. This sample size was selected so that simultaneous 95%

confidence interval estimates of age composition proportions would be no wider than 0.20 (Bromaghin 1993). Recommended sample size was increased an additional 8 to 9% to account for unreadable scales. Each pulse sample was used to estimate the ASL composition of the run for a given temporal stratum. A weighted mean, with salmon passage during each defined stratum as the weight, was used to estimate age composition of the total season passage. A total of 160 coho salmon were sampled for ASL. A pulsed sampling design was not used for coho salmon because of their run timing during the season and the relatively low total number of coho counted in each river.

Salmon ages were determined by examining scale characteristics (Mosher 1968), sex was determined by examining external morphology, and length was determined by measuring from the middle of the eye to the fork of the tail (+/- 1 mm). Scales were collected from the left side of the salmon approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gum cards and impressions made on cellulose acetate cards with a heated hydraulic press (Clutter and Whitesel 1956). European notation (e.g., 2.2; Koo 1962) was used to record ages: numerals preceding the decimal refer to number of freshwater annuli and numerals following the decimal refer to number of marine annuli. Total age from time of egg deposition or brood year is the sum of these numbers plus one.

The total daily escapements were communicated daily via satellite phone to Kawerak Biologists and ADF&G Area Managers. Escapement and ASL data were examined for errors by recalculating the daily escapement data at the end of the season. Any errors found were investigated by referring back to the waterproof field notebooks. Corrected data were entered into an Excel spreadsheet for analysis and were then archived.

Environmental observations for stream temperature and stream stage height were taken daily at 0800 and 2000 hours. Stream temperatures were recorded to the nearest degree Celsius using a mercury-in-glass thermometer. Stream stage heights were taken by reading the staff gage to the nearest centimeter.

RESULTS

The escapement and enumeration project on the Pilgrim River was conducted from June 29 to September 12, 2006. The total number of fish counted by species is as follows: 275 Chinook, 45,361 chum, 17,701 pink, 973 coho and 52,323 sockeye salmon and 554 Dolly Varden (Table 8, Figures 12 and 13). Historical total cumulative escapement is shown in Table 9.

Age, sex and length (ASL) samples were collected from chum, coho, and sockeye salmon. For the Pilgrim River, the un-weighted data are used for reporting because only small ASL differences were observed depending on when during the season the salmon returned. A total of 611 readable ASL samples were taken from chum salmon (Table 10). It was determined that 2.1% of returning chum salmon were age 0.2 from brood year 2003, 50.7% were age 0.3 from brood year 2002, 47.0% age 0.4 from brood year 2001, and 0.2% were age 0.5 from brood year 2000. Through the 2006 season, 46.5% of the returning chum salmon were male, and 53.5% were female. Generally, chum salmon increased in length with increasing age, and males were longer than females at any given age (Table 10). Average lengths of chum salmon age 0.2 were 537 mm, age 0.3 were 547 mm, age 0.4 were 571 mm, and chum salmon age 0.5 were an

average length of 530 mm. Overall, male chum salmon were an average length of 588 mm, and females were an average length of 551 mm.

A total of 196 readable ASL samples were taken from coho salmon (Table 11). It was determined that 21.4% of returning coho salmon were age 1.1 from brood year 2003, 77.0% were from age 2.1 from brood year 2002 and 1.5% were from brood year 2001. Through the 2006 season, 54.1% of the returning coho salmon were male, and 45.9% were female. Generally, coho salmon increased in length with increasing age, and interestingly, females were longer than males at any given age, although the difference in average length is small (Table 11). Average lengths of coho salmon age 1.1 were 522 mm, age 2.1 coho salmon were an average length of 536 mm and age 3.1 coho were an average length of 559. Overall, male coho salmon were an average length of 532 mm, and females were an average length of 534 mm.

A total of 708 readable ASL samples were taken from sockeye salmon (Table12). It was determined that 14.5% of the returning sockeye salmon were age 1.2 from brood year 2002, 10.4% were age 2.2 from brood year 2001, 29.4% were age 1.3 from brood year 2001, 47.6% were age 2.3 from brood year 2000, and 0.1% were age 2.4 from brood year 1999. Throughout the 2006 season, 50.7% of the returning sockeye salmon were female, and 49.3% were male. Generally, male sockeye salmon were longer than females at any given age, although older salmon were not necessarily longer than younger salmon (Table12). Average lengths of sockeye salmon age 1.2 were 491 mm, age 1.3 were 549 mm, age 2.2 were 499 mm, age 2.3 were 563 mm, and sockeye salmon age 2.4 were an average length of 617 mm. Overall, male sockeye salmon were an average length of 567 mm, and females were an average length of 517 mm.

A total of 43 readable ASL samples were taken from Chinook salmon (Table 13). It was determined that 4.6% of returning coho salmon were age 1.1 from brood year 2003, 23.2% were from age 1.2 from brood year 2002, 41.9% were from age 1.3 from brood year 2001, 25.6% were from age 1.4 from brood year 2000 and 4.7% were from age 2.3 from brood year 2000. Through the 2006 season, 44.2% of the returning coho salmon were male, and 55.8% were female. Generally, Chinook salmon increased in length with increasing age, males were longer than females at any given age except age 1.2 (Table 12). Average lengths of Chinook salmon age 1.1 were 384 mm, age 1.2 were 586 mm, age 1.3 were 745 mm, age 1.4 were 843 mm and age 2.3 Chinook salmon were an average length of 749 mm. Overall, male Chinook salmon were an average length of 757 mm, and females were an average length of 685 mm.

Pilgrim River water temperature fluctuated between 5^{o}C and 15^{o}C (Figure 14) and stream stage height gradually decreased until September 7, 2006 when heavy rain created a spike in stage height (Figure 15).

DISCUSSION

The 2006 season represents the twelfth consecutive year that Kawerak has operated an enumeration project on the Snake River and Eldorado River, and the eighth year an enumeration project has operated on the Pilgrim River. This is the sixth consecutive year that the Snake project has operated through the coho season, and the forth consecutive year that the Pilgrim River enumeration project has operated through the coho season.

Chum

In 2006, the Snake, Eldorado, and Pilgrim Rivers each demonstrated different trends in returns of chum salmon when comparing between rivers, but similar within each river as compared to

previous years' returns. The Snake River experienced a slight increase in the return of chum salmon over the previous years, and the season ended with the Snake River having the highest returns of chum salmon since 1998 (Table 2). Both the Eldorado and Pilgrim Rivers experienced the largest return of chum on record (Tables 6, 9).

Coho

The 2006 coho salmon return to the Snake River marked the largest return of coho salmon to the Snake River in the past eleven years (Table 2). The Eldorado River did not count through the coho season in 2006 due to a lack of funding. The Pilgrim River experienced a major increase in the coho salmon return in comparison to the return from 2005 but remains well below the record year in 2004 (Table 10).

Sockeye

The Snake River experienced a large amount of sockeye salmon escaping past the weir in comparison to the past ten years this project has operated on the Snake River (Table 2). Only one sockeye was counted at the Eldorado River (Table 6). Sockeye salmon returns to the Pilgrim River have remained relatively high in comparison to returns prior to the 2003 season (Table 9). The high returns to the Pilgrim River may be linked to the lake fertilization that was conducted on Salmon Lake. Salmon Lake is the spawning ground for the sockeye salmon that return to the Pilgrim River and was fertilized from1997 to 2001 and then again in 2004 and 2005.

Chinook

The return of Chinook salmon to the Snake and Eldorado Rivers continues to remain constant, while the Chinook salmon returns to the Pilgrim River have experienced a sharp decline compared to returns in 2003 and 2004 (Table 10). This large decline of Chinook salmon returning to the Pilgrim River may be a result of harvest due to the increased subsistence pressure from large sockeye returns, or the decline may be the result of marine or freshwater survival.

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Table 1. Expanded daily and cumulative migration of all salmon past the Snake River enumeration camp, 2006.

Date	Daily						Cumulative					
2006	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Chinook	Chum	Pink	Coho	Sockeye	Dolly
6/30/2006	0	0	0	0	0	0	0	0	0	0	0	0
7/1/2006	0	1	0	0	0	0	0	1	0	0	0	0
7/2/2006	0	1	0	0	0	0	0	2	0	0	0	0
7/3/2006	0	0	1	0	0	0	0	2	1	0	0	0
7/4/2006	0	4	1	0	0	2	0	6	2	0	0	2
7/5/2006	0	16	0	0	0	2	0	22	2	0	0	4
7/6/2006	0	14	11	0	0	6	0	36	13	0	0	10
7/7/2006	0	12	2	0	0	4	0	48	15	0	0	14
7/8/2006	0	11	5	0	0	11	0	59	20	0	0	25
7/9/2006	0	122	696	0	0	28	0	181	716	0	0	53
7/10/2006	0	171	646	1	0	75	0	352	1,362	1	0	128
7/11/2006	0	700	2,981	0	0	432	0	1,052	4,343	1	0	560
7/12/2006	0	2	288	1	0	12	0	1,054	4,631	2	0	572
7/13/2006	0	7	102	0	0	2	0	1,061	4,733	2	0	574
7/14/2006	0	19	119	2	0	14	0	1,080	4,852	4	0	588
7/15/2006	0	17	2,917	2	0	16	0	1,097	7,769	6	0	604
7/16/2006	0	17	794	0	0	0	0	1,114	8,563	6	0	604
7/17/2006	0	606	17,937	0	0	0	0	1,720	26,500	6	0	604
7/18/2006	1	312	6,493	0	0	0	1	2,032	32,993	6	0	604
7/19/2006	1	94	143	0	2	0	2	2,126	33,136	6	2	604
7/20/2006	1	55	2,738	0	5	0	3	2,181	35,874	6	7	604
7/21/2006	0	38	2,670	1	2	0	3	2,219	38,544	7	9	604
7/22/2006	1	94	5,483	0	28	0	4	2,313	44,027	7	37	604
7/23/2006	0	195	4,357	1	15	0	4	2,508	48,384	8	52	604
7/24/2006	0	230	3,764	13	29	0	4	2,738	52,148	21	81	604
7/25/2006	1	58	1,489	7	13	0	5	2,796	53,637	28	94	604
7/26/2006	0	38	1,129	2	0	0	5	2,834	54,766	30	94	604
7/27/2006	0	58	2,575	8	2	0	5	2,892	57,341	38	96	604
7/28/2006	0	189	1,939	41	1	0	5	3,081	59,280	79	97	604
7/29/2006	2	174	2,878	47	2	0	7	3,255	62,158	126	99	604
7/30/2006	0	102	2,640	19	0	0	7	3,357	64,798	145	99	604
7/31/2006	2	73	1,552	38	0	0	9	3,430	66,350	183	99	604
8/1/2006	0	34	1,649	3	0	0	9	3,464	67,999	186	99	604
8/2/2006	0	37	860	4	0	0	9	3,501	68,859	190	99	604
8/3/2006	0	36	665	3	1	0	9	3,537	69,524	193	100	604
8/4/2006	1	62	439	8	2	0	10	3,599	69,963	201	102	604
8/5/2006	0	46	451	21	3	0	10	3,645	70,414	222	105	604
8/6/2006	0	25	313	7	2	0	10	3,670	70,727	229	107	604
8/7/2006	0	47	566	5	0	0	10	3,717	71,293	234	107	604
8/8/2006	0	81	619	31	1	0	10	3,798	71,912	265	108	604
8/9/2006	0	67	566	54	2	0	10	3,865	72,478	319	110	604
8/10/2006	0	33	170	72	1	0	10	3,898	72,648	391	111	604

Table 1 continued.

Date	Daily						Cumulative					
2006	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Chinook	Chum	Pink	Coho	Sockeye	Dolly
8/11/2006	0	17	199	66	1	0	10	3,915	72,847	457	112	604
8/12/2006	2	18	102	18	0	0	12	3,933	72,949	475	112	604
8/13/2006	1	32	226	66	4	0	13	3,965	73,175	541	116	604
8/14/2006	1	16	71	56	8	0	14	3,981	73,246	597	124	604
8/15/2006	1	16	117	69	5	0	15	3,997	73,363	666	129	604
8/16/2006	1	10	64	71	5	1	16	4,007	73,427	737	134	605
8/17/2006	0	6	20	53	2	1	16	4,013	73,447	790	136	606
8/18/2006	2	13	29	102	3	0	18	4,026	73,476	892	139	606
8/19/2006	0	3	22	79	7	0	18	4,029	73,498	971	146	606
8/20/2006	1	18	97	123	5	0	19	4,047	73,595	1,094	151	606
8/21/2006	1	22	47	106	4	1	20	4,069	73,642	1,200	155	607
8/22/2006	2	22	56	251	22	0	22	4,091	73,698	1,451	177	607
8/23/2006	3	5	29	707	10	1	25	4,096	73,727	2,158	187	608
8/24/2006	1	1	8	251	12	0	26	4,097	73,735	2,409	199	608
8/25/2006	2	5	29	145	12	0	28	4,102	73,764	2,554	211	608
8/26/2006	0	3	7	87	1	0	28	4,105	73,771	2,641	212	608
8/27/2006	0	8	14	171	7	0	28	4,113	73,785	2,812	219	608
8/28/2006	1	5	16	287	6	0	29	4,118	73,801	3,099	225	608
8/29/2006	0	6	11	80	6	0	29	4,124	73,812	3,179	231	608
8/30/2006	0	10	25	334	7	0	29	4,134	73,837	3,513	238	608
8/31/2006	0	10	18	65	5	0	29	4,144	73,855	3,578	243	608
9/1/2006	0	1	16	70	4	0	29	4,145	73,871	3,648	247	608
9/2/2006	0	4	42	327	14	4	29	4,149	73,913	3,975	261	612
9/3/2006	0	2	23	294	3	1	29	4,151	73,936	4,269	264	613
9/4/2006	0	2	21	185	6	1	29	4,153	73,957	4,454	270	614
9/5/2006	1	0	26	61	4	0	30	4,153	73,983	4,515	274	614
9/6/2006	0	0	14	118	7	0	30	4,153	73,997	4,633	281	614
9/7/2006	1	1	17	90	10	1	31	4,154	74,014	4,723	291	615
9/8/2006	1	2	8	38	5	0	32	4,156	74,022	4,761	296	615
9/9/2006	0	2	3	10	3	0	32	4,158	74,025	4,771	299	615
9/10/2006	0	1	1	4	3	0	32	4,159	74,026	4,775	302	615
9/11/2006	0	1	2	1	0	0	32	4,160	74,028	4,776	302	615
9/12/2006	0	0	0	0	0	0	32	4,160	74,028	4,776	302	615
Total	**32**	**4,160**	**74,028**	**4,776**	**302**	**615**	**32**	**4,160**	**74,028**	**4,776**	**302**	**615**

Table 2. Historical migration of Chinook, chum, pink, coho and sockeye salmon, and Dolly Varden past the Snake River enumeration camp, 1995-2006.

Year	Operating period	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Method
1995	July 1-Aug 18	0	4,393	917	856	0	-	Tower
1996	July 3-Aug 22	5	2,772	44,558	1,638	0	-	Tower
1997	July 7-Aug 18	12	6,184	6,742	1,157	0	-	Tower
1998	July 1-Aug 11	0	11,067	219,679	178	0	-	Tower
1999	July 1-Aug 14	10	484	116	90	0	-	Tower
2000	June 29-Aug 25	28	1,911	4,723	406	0	-	Tower
2001	July 8-Sept 5	33	2,182	1,295	1,335	0	-	Tower
2002	June 28-Sept 16	9	2,776	4,103	409*	8	149	Weir
2003	June 26-Sept 11	50	2,201	2,856	489	84	111	Weir
2004	June 23-Sept 3	17	2,146	126,917	474	22	290	Weir
2005	June 27-Sept 11	31	2,967	13,813	2,948	275	28	Weir
2006	June 30-Sept 12	32	4,156	74,022	4,761	296	615	Weir

* The sum for coho (N=409) in 2002 does not account for the 442 coho estimated by aerial survey to be holding below the weir site after the weir was removed.

Table 3. Age, sex, and length of chum salmon sampled, and estimated contribution to spawning escapement, Snake River, 2006.

		Brood Year and Age Group				
		2003	2002	2001	2000	Total
		0.2	0.3	0.4	0.5	
Stratum Dates:	7/1 - 7/12					
Sample Size:	63					
Female	Percent of Sample	0.0	14.3	23.8	1.6	39.7
	Number in Escapement	0	151	251	17	418
	Average Length	-	569.2	573.5	590.0	572.6
Male	Percent of Sample	0.0	0.0	23.8	36.5	60.3
	Number in Escapement	0	0	251	385	636
	Average Length	-		587.3	598.3	594.0
Total	Percent of Sample	0.0	14.3	47.6	38.1	100.0
	Number in Escapement	0	151	502	402	1054
	Average Length	-	580.5	588.5	590.0	585.5
Stratum Dates:	7/13 - 7/26					
Sample Size:	312					
Female	Percent of Sample	1.0	45.2	8.7	0.3	55.1
	Number in Escapement	18	805	155	5	981
	Average Length	557.7	548.1	562.3	564.0	550.6
Male	Percent of Sample	0.6	34.3	9.0	1.0	44.9
	Number in Escapement	11	611	160	18	799
	Average Length	534.0	571.7	596.0	597.7	576.6
Total	Percent of Sample	1.6	79.5	17.7	1.3	100.0
	Number in Escapement	28	1415	315	23	1780
	Average Length	548.2	558.3	579.5	589.3	562.2
Stratum Dates:	7/27 - 9/11					
Sample Size:	162					
Female	Percent of Sample	1.9	50.0	11.1	0.6	63.6
	Number in Escapement	25	663	147	8	843
	Average Length	506.7	547.3	565.9	626.0	550.1
Male	Percent of Sample	0.0	30.9	5.5	0.0	36.4
	Number in Escapement	0	410	73	0	483
	Average Length	-	572.9	595.1	-	576.3
Total	Percent of Sample	1.9	80.9	16.6	0.6	100.0
	Number in Escapement	25	1073	220	8	1326
	Average Length	506.7	557.1	575.6	626.0	559.7

Table 3. Continued

		Brood Year and Age Group				
		2003	2002	2001	2000	Total
		0.2	0.3	0.4	0.5	
Stratum Dates:	Season (Weighted by Strata)					
Sample Size:	537					
Female	Percent of Sample	1.0	38.9	13.3	0.7	53.9
	Number in Escapement	43	1618	553	30	2243
	Average Length	506.7	547.3	565.9	626.0	550.1
Male	Percent of Sample	0.3	24.5	11.6	9.7	46.1
	Number in Escapement	11	1020	484	403	1917
	Average Length	-	572.9	595.1	-	576.3
Total	Percent of Sample	1.3	63.4	24.9	10.4	100.0
	Number in Escapement	54	2639	1037	433	4160
	Average Length	506.7	557.1	575.6	626.0	559.7
Stratum Dates:	Season (Un-Weighted)					
Sample Size:	537					
Female	Percent of Sample	1.1	43.0	11.2	0.6	55.9
	Number in Escapement	46	1789	466	25	2325
Male	Percent of Sample	0.4	32.0	11.2	0.6	44.1
	Number in Escapement	17	1331	466	25	1835
Total	Percent of Sample	1.5	75.0	22.4	1.2	100.0
	Number in Escapement	62	3120	932	50	4160

Table 4. Age, sex, and length of coho salmon sampled, and estimated contribution to spawning escapement, Snake River, 2006.

		Brood Year and Age Group			
		2003	2002	2001	Total
		1.1	2.1	3.1	
Sample Size:	244				
Female	Percent of Sample	2.9	46.3	1.6	50.8
	Number in Escapement	139	2211	76	2426
	Average Length	559.0	550.9	541.0	551.1
Male	Percent of Sample	3.3	44.7	1.2	49.2
	Number in Escapement	158	2135	57	2350
	Average Length	550.3	567.6	575.7	566.7
Total	Percent of Sample	6.2	91.0	2.8	100.0
	Number in Escapement	296	4346	134	4776
	Average Length	554.4	559.1	555.9	558.7

Table 5. Expanded daily and cumulative migration of all salmon past the Eldorado River enumeration camp, 2006.

Date	Daily						Cumulative					
2006	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Chinook	Chum	Pink	Coho	Sockeye	Dolly
6/26/2006	0	1	0	0	0	3	0	1	0	0	0	3
6/27/2006	0	0	4	0	0	3	0	1	4	0	0	6
6/28/2006	0	0	0	0	0	0	0	1	4	0	0	6
6/29/2006	0	3	2	0	0	0	0	4	6	0	0	6
6/30/2006	0	0	0	0	0	0	0	4	6	0	0	6
7/1/2006	0	8	5	0	0	0	0	12	11	0	0	6
7/2/2006	0	123	38	0	0	3	0	135	49	0	0	9
7/3/2006	1	176	44	0	0	2	1	311	93	0	0	11
7/4/2006	5	1,367	320	0	0	7	6	1,678	413	0	0	18
7/5/2006	3	1,529	1,542	0	0	10	9	3,207	1,955	0	0	28
7/6/2006	2	1,690	4,628	0	0	6	11	4,897	6,583	0	0	34
7/7/2006	0	658	3,063	0	0	2	11	5,555	9,646	0	0	36
7/8/2006	0	635	3,051	0	0	0	11	6,190	12,697	0	0	36
7/9/2006	0	913	2,027	0	0	1	11	7,103	14,724	0	0	37
7/10/2006	5	3,560	7,539	0	0	2	16	10,663	22,263	0	0	39
7/11/2006	2	3,345	19,427	0	0	0	18	14,008	41,690	0	0	39
7/12/2006	6	2,234	25,555	0	0	2	24	16,242	67,245	0	0	41
7/13/2006	1	752	5,207	0	0	1	25	16,994	72,452	0	0	42
7/14/2006	3	3,275	12,955	0	0	1	28	20,269	85,407	0	0	43
7/15/2006	2	1,325	14,370	0	0	1	30	21,594	99,777	0	0	44
7/16/2006	0	1,592	9,918	0	0	1	30	23,186	109,695	0	0	45
7/17/2006	2	4,000	11,662	0	0	0	32	27,186	121,357	0	0	45
7/18/2006	5	4,200	15,677	0	0	2	37	31,386	137,034	0	0	47
7/19/2006	0	2,473	8,069	0	0	0	37	33,859	145,103	0	0	47
7/20/2006	0	1,342	7,853	0	0	0	37	35,201	152,956	0	0	47
7/21/2006	2	554	6,705	0	0	0	39	35,755	159,661	0	0	47
7/22/2006	0	945	10,430	0	0	3	39	36,700	170,091	0	0	50
7/23/2006	0	975	11,891	2	0	4	39	37,675	181,982	2	0	54
7/24/2006	0	980	8,865	3	0	5	39	38,655	190,847	5	0	59
7/25/2006	0	654	8,040	3	0	1	39	39,309	198,887	8	0	60
7/26/2006	0	24	2,445	3	0	2	39	39,333	201,332	11	0	62
7/27/2006	1	252	5,171	4	0	0	40	39,585	206,503	15	0	62
7/28/2006	1	699	5,814	8	0	1	41	40,284	212,317	23	0	63
7/29/2006	0	961	3,692	17	0	0	41	41,245	216,009	40	0	63
7/30/2006	0	172	2,302	3	0	0	41	41,417	218,311	43	0	63
7/31/2006	0	210	1,428	2	0	0	41	41,627	219,739	45	0	63
8/1/2006	0	123	758	0	0	0	41	41,750	220,497	45	0	63
8/2/2006	0	266	1,458	5	1	0	41	42,016	221,955	50	1	63
8/3/2006	0	89	393	5	0	2	41	42,105	222,348	55	1	65
Total	**41**	**42,105**	**222,348**	**55**	**1**	**65**	**41**	**42,105**	**222,348**	**55**	**1**	**65**

Table 6. Historical migration of Chinook, chum, pink, coho and sockeye salmon, and Dolly Varden past the Eldorado River enumeration camp, 1995-2006.

Year	Operating period	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Method
1995	July 7-Aug 9	22	39,867	4,243	35	-	-	Tower
1996	June 30-Aug 20	27	12,655	46,095	324	-	-	Tower
1997	June 29 -Aug 19	98	14,302	1,022	194	-	-	Tower
1998	June 29- Aug 12	446	13,808	137,283	21	-	-	Tower
1999	July 10 -Sep 1	28	4,218	977	510	-	-	Tower
2000	June 29-Aug 25	33	11,615	55,992	192	-	-	Tower
2001	July 8-Sept 13	50	11,635	488	1,509	-	-	Tower
2002	June 24-Sept10	26	10,215	119,098	540	10	377	Weir
2003	June 21-Sept 8	29	3,591	173	115	0	60	Weir
2004	June 22-Sept 9	25	3,273	60,858	1,151	57	-	Weir
2005	June 22-Sept 2	32	10,369	12,356	689	10	23	Weir
2006	June 26-Aug 3	41	42,105	222,348	55	1	65	Weir

Table 7. Age, sex, and length of chum salmon sampled, and estimated contribution to spawning escapement, Eldorado River, 2006.

		Brood Year and Age Group				
		2003	2002	2001	2000	Total
		0.2	0.3	0.4	0.5	
Stratum Dates:	6/26 - 7/13					
Sample Size:	268					
Female	Percent of Sample	0.0	19.8	27.2	0.8	47.8
	Number in Escapement	0	3365	4622	136	8123
	Average Length	-	564.9	580.8	594.0	574.4
Male	Percent of Sample	0.0	22.0	29.1	1.1	52.2
	Number in Escapement	0	3739	4945	187	8871
	Average Length	-	593.0	615.0	595.7	605.3
Total	Percent of Sample	0.0	41.8	56.3	1.9	100.0
	Number in Escapement	0	7103	9568	323	16994
	Average Length	-	579.7	598.5	595.0	590.6
Stratum Dates:	7/14- 8/3					
Sample Size:	191					
Female	Percent of Sample	0.5	49.2	12.0	0.0	61.8
	Number in Escapement	126	12355	3013	0	15519
	Average Length	515.0	552.8	574.3	-	556.7
Male	Percent of Sample	0.5	30.4	7.3	0.0	38.2
	Number in Escapement	126	7634	1833	0	9592
	Average Length	510	586.4	589.28	-	585.9
Total	Percent of Sample	1.0	79.6	19.3	0.0	100.0
	Number in Escapement	251	19988	4846	0	25111
	Average Length	512.5	565.6	579.97	-	567.9
Stratum Dates:	Season (Weighted by Strata)					
Sample Size:	459					
Female	Percent of Sample	0.3	37.3	18.1	0.3	56.1
	Number in Escapement	126	15719	7636	136	23642
	Average Length	515.0	557.2	579.2	594.0	565.9
Male	Percent of Sample	0.3	27.0	16.1	0.4	43.9
	Number in Escapement	126	11372	6778	187	18463
	Average Length	510.0	589.8	611.1	595.7	598.7
Total	Percent of Sample	0.6	64.3	34.2	0.8	100.0
	Number in Escapement	251	27092	14414	323	42105
	Average Length	512.5	571.6	594.8	595.0	581.1

Table 7. Continued.

		Brood Year and Age Group				
		2003	2002	2001	2000	Total
		0.2	0.3	0.4	0.5	
Stratum Dates:	Season (Un-Weighted)					
Sample Size:	650					
Female	Percent of Sample	0.2	32.0	20.9	0.4	53.6
	Number in Escapement	93	13474	8800	185	22568
Male	Percent of Sample	0.2	25.5	20.0	0.7	46.4
	Number in Escapement	93	10737	8421	274	19537
Total	Percent of Sample	0.4	57.5	40.9	1.1	100.0
	Number in Escapement	185	24210	17221	459	42105

Table 8. Expanded daily and cumulative migration of all salmon past the Pilgrim River enumeration camp, 2006.

Date	Daily						Cumulative					
2006	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Chinook	Chum	Pink	Coho	Sockeye	Dolly
6/29/06	0	0	0	0	0	0	0	0	0	0	0	0
6/30/06	0	0	0	0	0	0	0	0	0	0	0	0
7/1/06	0	0	0	0	0	0	0	0	0	0	0	0
7/2/06	0	0	0	0	0	0	0	0	0	0	0	0
7/3/06	0	0	0	0	0	0	0	0	0	0	0	0
7/4/06	0	0	0	0	0	0	0	0	0	0	0	0
7/5/06	0	0	1	0	14	9	0	0	1	0	14	9
7/6/06	0	0	0	0	53	7	0	0	1	0	67	16
7/7/06	0	3	6	0	210	2	0	3	7	0	277	18
7/8/06	0	29	26	0	763	0	0	32	33	0	1040	18
7/9/06	0	143	131	0	2440	2	0	175	164	0	3480	20
7/10/06	0	167	220	0	2535	1	0	342	384	0	6015	21
7/11/06	3	798	630	0	3974	0	3	1140	1014	0	9989	21
7/12/06	4	772	242	0	2265	4	7	1912	1256	0	12254	25
7/13/06	0	273	138	0	668	3	7	2185	1394	0	12922	28
7/14/06	12	878	579	0	3473	0	19	3063	1973	0	16395	28
7/15/06	4	552	421	0	965	0	23	3615	2394	0	17360	28
7/16/06	1	597	350	0	2362	18	24	4212	2744	0	19722	46
7/17/06	21	668	445	0	2374	8	45	4880	3189	0	22096	54
7/18/06	21	1409	852	0	3036	14	66	6289	4041	0	25132	68
7/19/06	19	1695	791	0	2587	4	85	7984	4832	0	27719	72
7/20/06	24	2574	981	0	2102	1	109	10558	5813	0	29821	73
7/21/06	16	1403	728	0	1908	0	125	11961	6541	0	31729	73
7/22/06	35	2279	1660	1	3139	0	160	14240	8201	1	34868	73
7/23/06	4	926	815	2	1555	0	164	15166	9016	3	36423	73
7/24/06	13	1040	1497	0	1982	0	177	16206	10513	3	38405	73
7/25/06	5	120	303	0	534	0	182	16326	10816	3	38939	73
7/26/06	1	230	551	0	483	0	183	16556	11367	3	39422	73
7/27/06	3	184	178	0	471	0	186	16740	11545	3	39893	73
7/28/06	7	896	681	0	1461	0	193	17636	12226	3	41354	73
7/29/06	11	1798	1267	0	1287	0	204	19434	13493	3	42641	73
7/30/06	6	708	373	0	480	2	210	20142	13866	3	43121	75
7/31/06	3	468	312	0	419	1	213	20610	14178	3	43540	76
8/1/06	4	972	480	0	700	2	217	21582	14658	3	44240	78
8/2/06	2	1945	546	1	965	2	219	23527	15204	4	45205	80
8/3/06	5	1602	428	1	776	8	224	25129	15632	5	45981	88
8/4/06	2	1307	497	2	576	2	226	26436	16129	7	46557	90
8/5/06	3	1970	602	3	1204	9	229	28406	16731	10	47761	99
8/6/06	2	267	137	3	252	7	231	28673	16868	13	48013	106
8/7/06	0	343	205	0	236	4	231	29016	17073	13	48249	110
8/8/06	3	977	222	7	324	12	234	29993	17295	20	48573	122

Table 8 continued.

Date	Daily						Cumulative					
2006	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Chinook	Chum	Pink	Coho	Sockeye	Dolly
8/9/2006	3	1,137	111	3	473	9	237	31,130	17,406	23	49,046	131
8/10/2006	1	800	73	0	375	2	238	31,930	17,479	23	49,421	133
8/11/2006	2	732	33	5	375	12	240	32,662	17,512	28	49,796	145
8/12/2006	3	909	40	4	384	36	243	33,571	17,552	32	50,180	181
8/13/2006	3	968	34	4	301	23	246	34,539	17,586	36	50,481	204
8/14/2006	1	854	27	5	264	15	247	35,393	17,613	41	50,745	219
8/15/2006	2	781	5	3	303	22	249	36,174	17,618	44	51,048	241
8/16/2006	1	571	7	3	195	14	250	36,745	17,625	47	51,243	255
8/17/2006	1	533	7	4	123	11	251	37,278	17,632	51	51,366	266
8/18/2006	1	385	1	1	81	11	252	37,663	17,633	52	51,447	277
8/19/2006	5	425	14	9	114	3	257	38,088	17,647	61	51,561	280
8/20/2006	2	811	11	4	109	13	259	38,899	17,658	65	51,670	293
8/21/2006	2	662	6	3	69	4	261	39,561	17,664	68	51,739	297
8/22/2006	2	563	4	12	103	5	263	40,124	17,668	80	51,842	302
8/23/2006	2	451	4	54	80	12	265	40,575	17,672	134	51,922	314
8/24/2006	2	549	3	69	41	9	267	41,124	17,675	203	51,963	323
8/25/2006	3	710	3	61	37	19	270	41,834	17,678	264	52,000	342
8/26/2006	1	462	4	29	40	8	271	42,296	17,682	293	52,040	350
8/27/2006	1	357	2	28	22	9	272	42,653	17,684	321	52,062	359
8/28/2006	0	217	0	3	7	5	272	42,870	17,684	324	52,069	364
8/29/2006	0	239	2	29	40	15	272	43,109	17,686	353	52,109	379
8/30/2006	1	361	4	40	32	20	273	43,470	17,690	393	52,141	399
8/31/2006	0	195	1	13	7	5	273	43,665	17,691	406	52,148	404
9/1/2006	1	162	2	24	24	9	274	43,827	17,693	430	52,172	413
9/2/2006	1	249	0	45	39	18	275	44,076	17,693	475	52,211	431
9/3/2006	0	215	2	23	20	7	275	44,291	17,695	498	52,231	438
9/4/2006	0	143	1	20	10	11	275	44,434	17,696	518	52,241	449
9/5/2006	0	117	1	15	8	13	275	44,551	17,697	533	52,249	462
9/6/2006	0	115	0	8	0	5	275	44,666	17,697	541	52,249	467
9/7/2006	0	282	0	180	20	22	275	44,948	17,697	721	52,269	489
9/8/2006	0	198	0	242	13	16	275	45,146	17,697	963	52,282	505
9/9/2006	0	78	0	10	9	13	275	45,224	17,697	973	52,291	518
9/10/2006	0	98	3	0	9	17	275	45,322	17,700	973	52,300	535
9/11/2006	0	39	1	0	23	19	275	45,361	17,701	973	52,323	554
9/12/2006	0	0	0	0	0	0	275	45,361	17,701	973	52,323	554
Total	**275**	**45,361**	**17,701**	**973**	**52,323**	**554**	**275**	**45,361**	**17,701**	**973**	**52,323**	**554**

Table 9. Historical migration of Chinook, chum, pink, coho and sockeye salmon and Dolly Varden past the Pilgrim River enumeration camp, 1997-2006.

Year	Operating period	Chinook	Chum	Pink	Coho	Sockeye	Dolly	Chum/Sockeye Combined*	Method
1997	July 12-Aug 21	356	*	5,557	452	*	-	15,619	Tower
1998	Did not operate	-	-	-	-	-	-	-	Tower
1999	July 13-Aug 6	6	2,617	35,577	104	4,650	-	-	Tower
2000	July 5-Aug 18	8	861	374	21	12,141	-	-	Tower
2001	Did not operate	-	-	-	-	-	-	-	Tower
2002	July 4-Aug 4	150	5,590	3,882	246	3,888	-	-	Tower
2003	June 21-Sept 14	1,016	15,200	14,100	677	42,729	550	-	Weir
2004	June 21-Sept 14	925	10,239	50,760	1,573	85,417	264	-	Weir
2005	June 24-Sept 5	216	9,685	13,218	304	55,951	112	-	Weir
2006	June 29-Sept 12	275	45,361	17,701	973	52,323	554	-	Weir

*Chum and sockeye salmon escapements were combined due to species identification problems during 1997.

Table 10. Age, sex and length of chum salmon sampled and estimated contribution to spawning escapement, Pilgrim River, 2006.

		Brood Year and Age Group				
		2003	2002	2001	2000	Total
		0.2	0.3	0.4	0.5	
Stratum Dates:	6/29 - 7/25					
Sample Size:	393					
Female	Percent of Sample	0.0	20.9	32.1	0.3	53.2
	Number in Escapement	0	3412	5241	49	8685
	Average Length	-	544.0	556.7	530.0	551.6
Male	Percent of Sample	0.3	19.3	27.2	0.0	46.8
	Number in Escapement	0	3151	4441	0	7641
	Average Length	516.0	572.2	584.8	-	579.2
Total	Percent of Sample	0.3	40.2	59.3	0.3	100.0
	Number in Escapement	0	6563	9681	49	16326
	Average Length	516.0	557.6	569.6	530.0	564.5
Stratum Dates:	7/26 - 8/6					
Sample Size:	69					
Female	Percent of Sample	0.0	31.9	18.8	0.0	50.7
	Number in Escapement	0	3939	2321	0	6260
	Average Length	-	559.3	553.1	-	557.0
Male	Percent of Sample	1.5	27.5	20.3	0.0	49.3
	Number in Escapement	179	3395	2506	0	6087
	Average Length	573.0	571.4	594.2	-	580.9
Total	Percent of Sample	1.5	59.4	39.1	0.0	100.0
	Number in Escapement	179	7334	4828	0	12347
	Average Length	573.0	564.9	574.4	-	568.8
Stratum Dates:	8/7 - 9/11					
Sample Size:	149					
Female	Percent of Sample	2.0	45.0	8.7	0.0	55.7
	Number in Escapement	334	7510	1452	0	9295
	Average Length	537.7	536.1	548.1	-	538.1
Male	Percent of Sample	5.4	29.5	9.4	0.0	44.3
	Number in Escapement	901	4923	1569	0	7393
	Average Length	537.3	563.9	591.3	-	566.5
Total	Percent of Sample	7.4	74.5	18.1	0.0	100.0
	Number in Escapement	1235	12433	3021	0	16688
	Average Length	537.4	547.1	570.5	-	550.6

Table 10 continued.

		Brood Year and Age Group				
		2003	2002	2001	2000	Total
		0.2	0.3	0.4	0.5	
Stratum Dates:	Season (Weighted by Strata)					
Sample Size:	611					
Female	Percent of Sample	0.7	32.8	19.9	0.1	53.4
	Number in Escapement	334	14860	9014	49	24241
	Average Length	537.7	536.1	548.1	-	538.1
Male	Percent of Sample	2.4	25.3	18.8	0.0	46.6
	Number in Escapement	1080	11469	8516	0	21120
	Average Length	537.3	563.9	591.3	-	566.5
Total	Percent of Sample	3.1	58.0	38.6	0.1	100.0
	Number in Escapement	1414	26330	17530	49	45361
	Average Length	537.4	547.1	570.5	530.0	550.6
Stratum Dates:	Season (Un-Weighted)					
Sample Size:	611					
Female	Percent of Sample	0.5	28.0	24.9	0.2	53.5
	Number in Escapement	227	12701	11295	91	24268
Male	Percent of Sample	1.6	22.7	22.1	0.0	46.5
	Number in Escapement	726	10297	10025	0	21093
Total	Percent of Sample	2.1	50.7	47.0	0.2	100.0
	Number in Escapement	953	22998	21320	91	45361

Table 11. Age, sex, and length of coho salmon sampled, and estimated contribution to spawning escapement, Pilgrim River, 2006.

		Brood Year and Age Group			
		2003	2002	2001	Total
		1.1	2.1	3.1	
Sample Size:	196				
Female	Percent of Sample	10.2	35.2	0.5	45.9
	Number in Escapement	99	342	5	447
	Average Length	526.1	535.9	573.0	534.1
Male	Percent of Sample	11.2	41.8	1.0	54.1
	Number in Escapement	109	407	10	526
	Average Length	517.7	535.3	552.0	532.0
Total	Percent of Sample	21.4	77.0	1.5	100.0
	Number in Escapement	208	749	15	973
	Average Length	521.7	535.6	559.0	532.9

Table 12. Age, sex, and length of sockeye salmon sampled, and estimated contribution to spawning escapement, Pilgrim River, 2006.

		Brood Year and Age Group					
		2002	2001	2001	2000	1999	Total
		1.2	1.3	2.2	2.3	2.4	
Stratum Dates:	6/29 - 7/25						
Sample Size:	456						
Female	Percent of Sample	6.1	16.0	6.4	21.5	0.0	50.0
	Number in Escapement	2,391	6,234	2,476	8,368	0	19,470
	Average Length	460.9	528.7	472.4	537.4	-	516.9
Male	Percent of Sample	1.8	14.9	2.9	30.3	0.2	50.0
	Number in Escapement	683	5,807	1,110	11,784	85	19,470
	Average Length	533.6	564.6	530.8	577.7	617.0	569.7
Total	Percent of Sample	7.9	30.9	9.2	51.8	0.2	100.0
	Number in Escapement	3,074	12,040	3,586	20,153	85	38,939
	Average Length	477.1	546.0	490.5	561.0	617.0	543.4
Stratum Dates:	7/26 - 8/6						
Sample Size:	143						
Female	Percent of Sample	17.5	11.2	11.2	16.1	0.0	55.9
	Number in Escapement	1,586	1,015	1,015	1,459	0	5,072
	Average Length	488.2	542.6	494.8	540.9	-	515.6
Male	Percent of Sample	7.0	13.3	4.2	19.6	0.0	44.1
	Number in Escapement	635	1,206	381	1,777	0	4,002
	Average Length	515.6	566.6	528.8	591.5	-	566.0
Total	Percent of Sample	24.5	24.5	15.4	35.7	0.0	100.0
	Number in Escapement	2,221	2,221	1,396	3,236	0	9,074
	Average Length	496.1	555.6	504.1	568.7	-	537.8
Stratum Dates:	8/7 - 9/11						
Sample Size:	109						
Female	Percent of Sample	14.7	13.8	5.5	12.8	0.0	46.8
	Number in Escapement	633	593	237	554	0	2,017
	Average Length	489.9	543.6	485.0	539.6	-	518.7
Male	Percent of Sample	14.7	11.9	4.6	22.0	0.0	53.2
	Number in Escapement	633	514	198	949	0	2,293
	Average Length	511.2	565.9	560.6	577.6	-	555.2
Total	Percent of Sample	29.4	25.7	10.1	34.9	0.0	100.0
	Number in Escapement	1,265	1,107	435	1,503	0	4,310
	Average Length	500.5	554.0	519.4	563.6	-	538.1

Table 12 continued.

		Brood Year and Age Group					
		2002	2001	2001	2000	1999	Total
		1.2	1.3	2.2	2.3	2.4	
Stratum Dates:	Season (Weighted by Strata)						
Sample Size:	708						
Female	Percent of Sample	8.8	15.0	7.1	19.9	0.0	50.8
	Number in Escapement	4610	7842	3729	10381	0	26559
	Average Length	477.5	533.0	480.9	538.2	-	516.9
Male	Percent of Sample	3.7	14.4	3.2	27.7	0.2	49.3
	Number in Escapement	1950	7526	1689	14510	85	25764
	Average Length	517.8	565.1	536.5	579.7	617.0	566.6
Total	Percent of Sample	12.5	29.4	10.4	47.6	0.2	100.1
	Number in Escapement	6560	15368	5417	24891	85	52323
	Average Length	490.8	548.7	498.7	562.5	617.0	541.4
Stratum Dates:	Season (Un-Weighted)						
Sample Size:	708						
Female	Percent of Sample	9.7	14.7	7.2	19.1	0.0	50.7
	Number in Escapement	5099	7686	3769	9977	0	26528
Male	Percent of Sample	4.8	14.1	3.4	26.8	0.1	49.3
	Number in Escapement	2513	7390	1774	14042	74	25795
Total	Percent of Sample	14.5	28.8	10.6	45.9	0.1	100.0
	Number in Escapement	7612	15076	5543	24018	74	52323

Table 13. Age, sex, and length of Chinook salmon sampled, and estimated contribution to spawning escapement, Pilgrim River, 2006.

		Brood Year and Age Group					
		2003	2002	2001	2000	2000	Total
		1.1	1.2	1.3	1.4	2.3	
Sample Size:	43						
Female	Percent of Sample	2.3	16.3	27.9	4.7	4.7	55.8
	Number in Escapement	6	45	77	13	13	153
	Average Length	375.0	597.0	731.5	800.0	748.5	684.5
Male	Percent of Sample	2.3	6.9	14.0	20.9	0.0	44.2
	Number in Escapement	6	19	39	57	0	122
	Average Length	392.0	559.3	771.8	852.6	-	756.5
Total	Percent of Sample	4.6	23.2	41.9	25.6	4.7	100.0
	Number in Escapement	13	64	115	70	13	275
	Average Length	383.5	585.7	744.9	843.0	748.5	716.3

Figure 1: Site location map of the Snake, Eldorado and Pilgrim River salmon escapement enumeration and sampling camps, 2006. Dots indicate camp locations and the City of Nome.

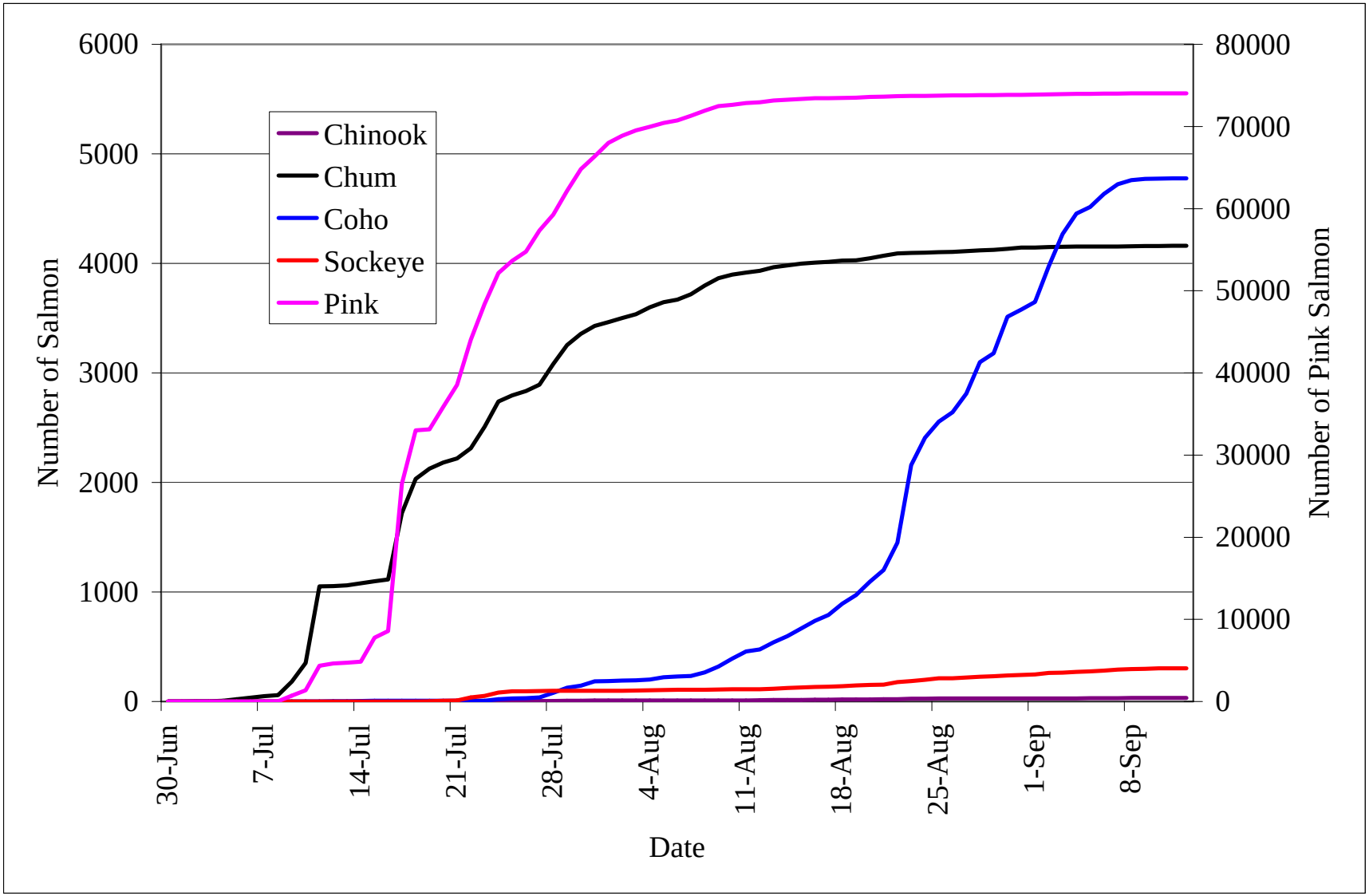

Figure 2. Cumulative escapement, Snake River, 2006.

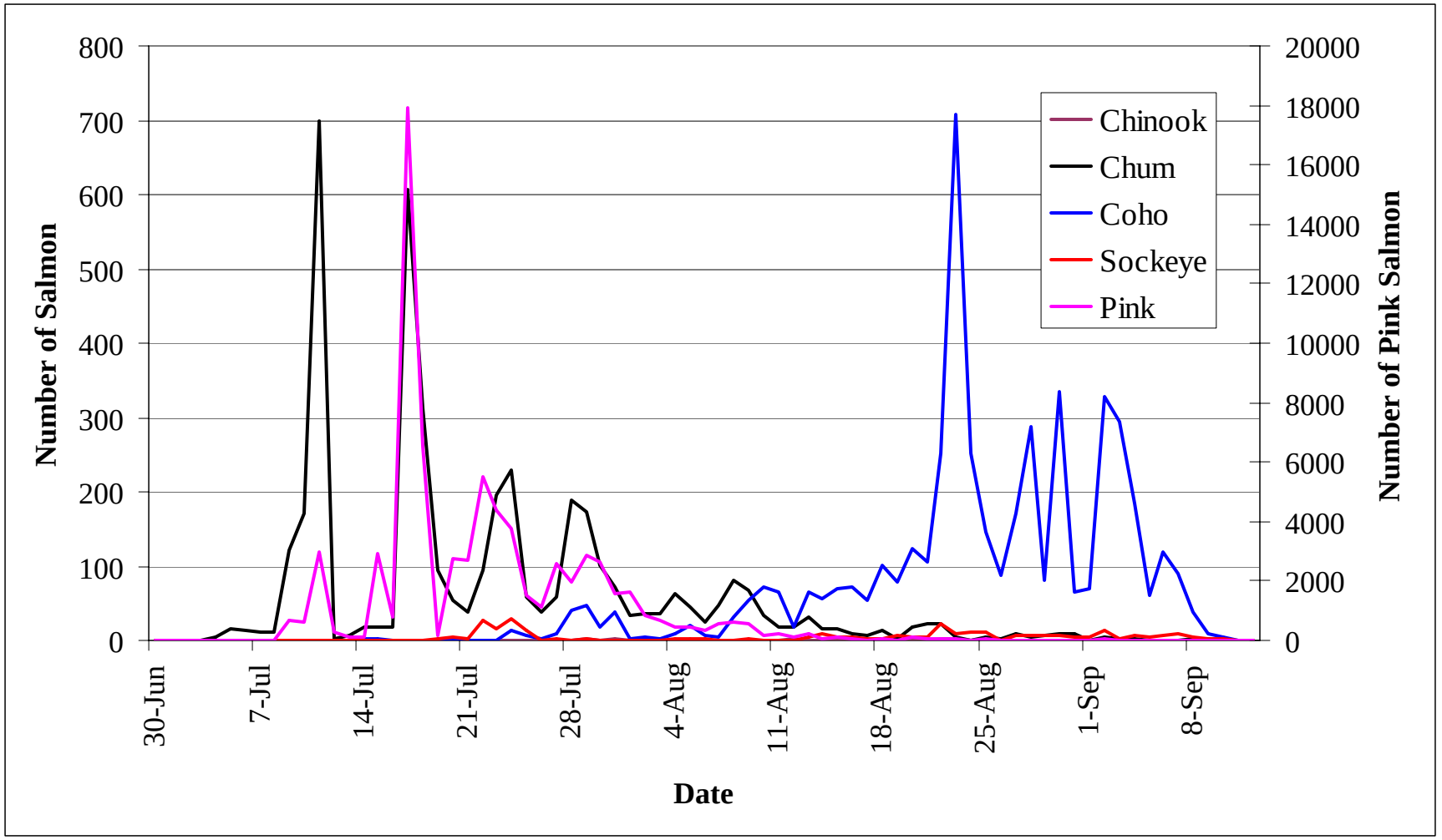

Figure 3. Daily escapement, Snake River, 2006.

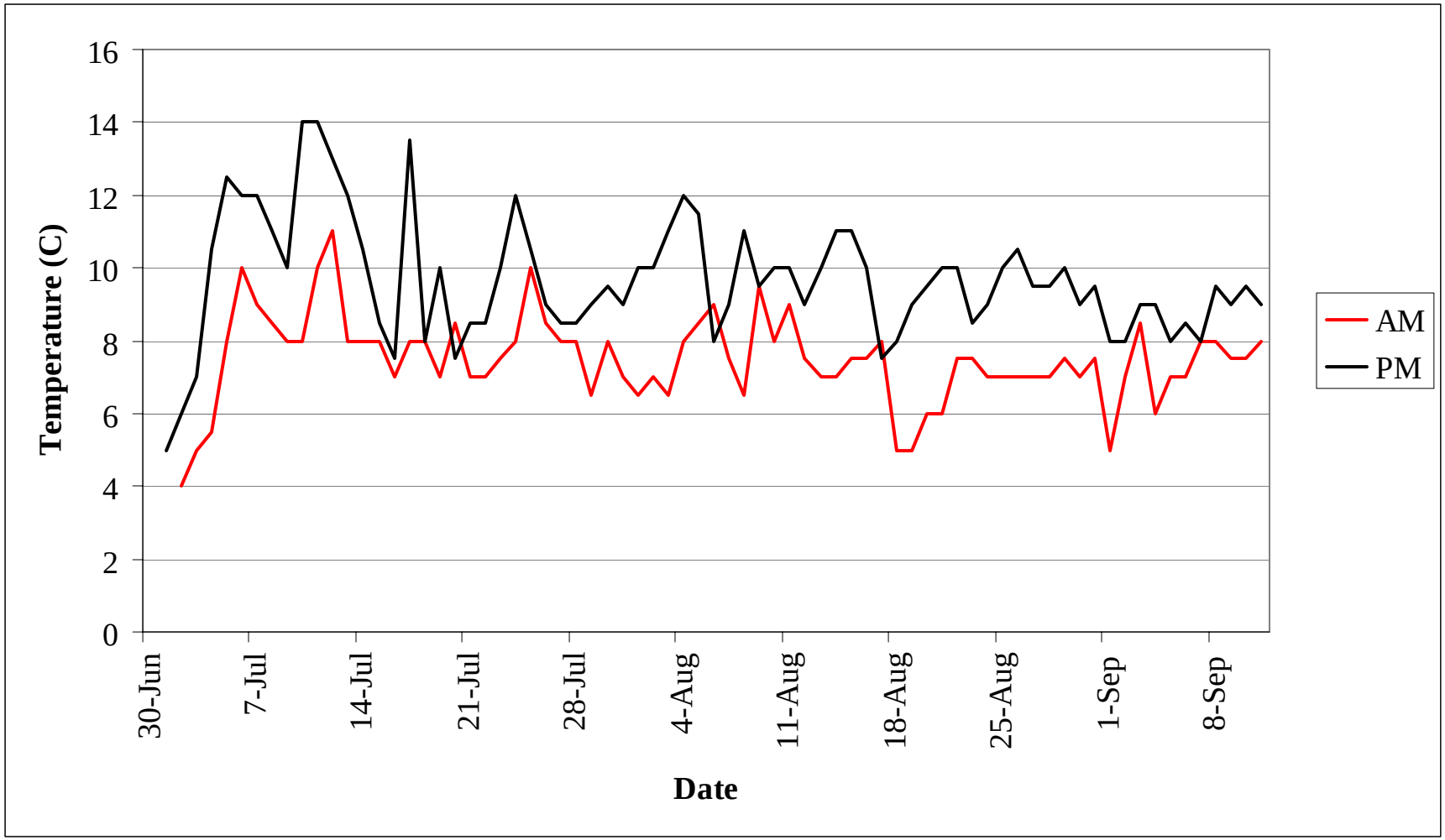

Figure 4. Snake River water temperature at 0800 and 2000 hours, 2006.

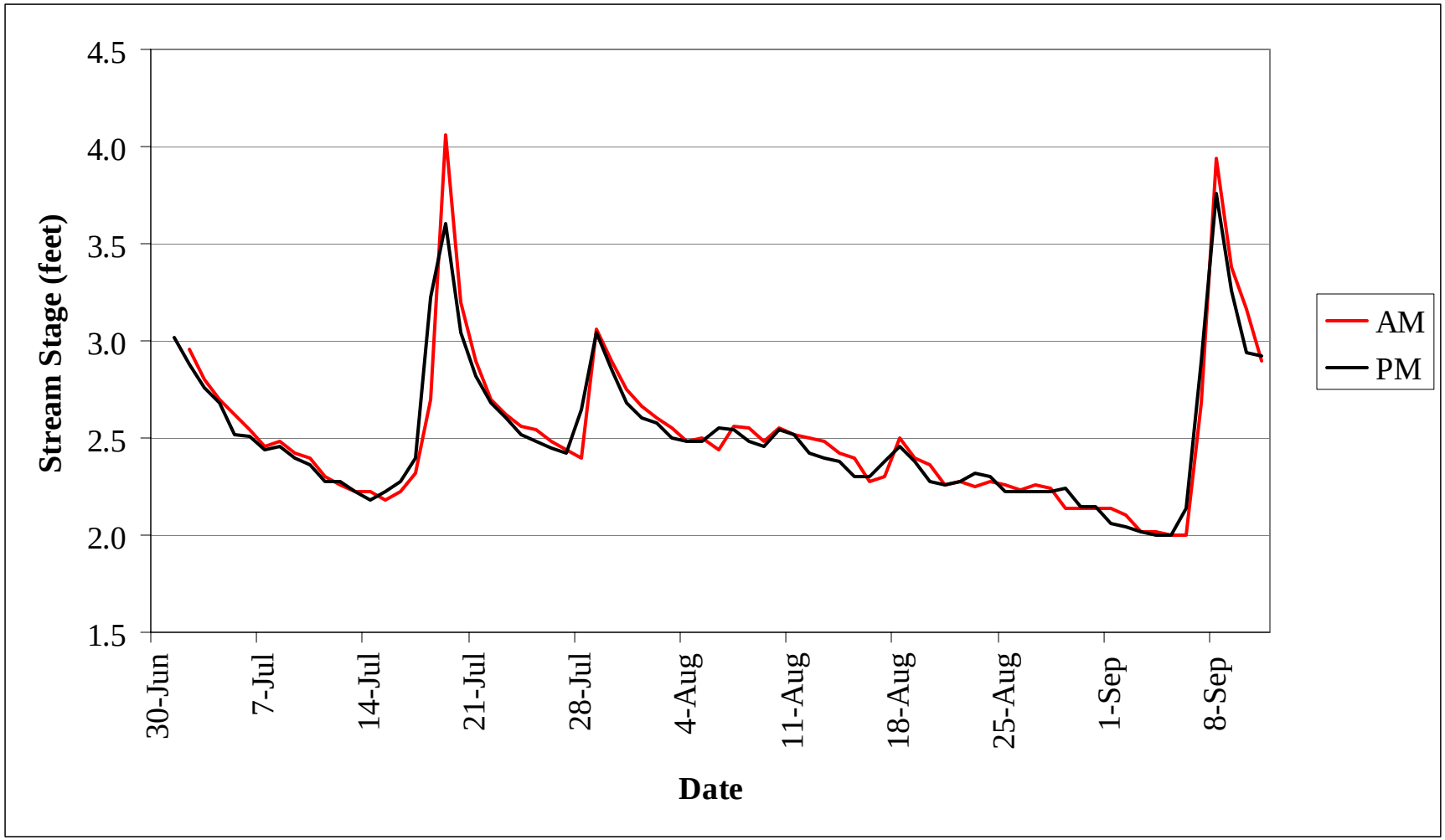

Figure 5. Snake River stream stage at 0800 and 2000 hours 2006.

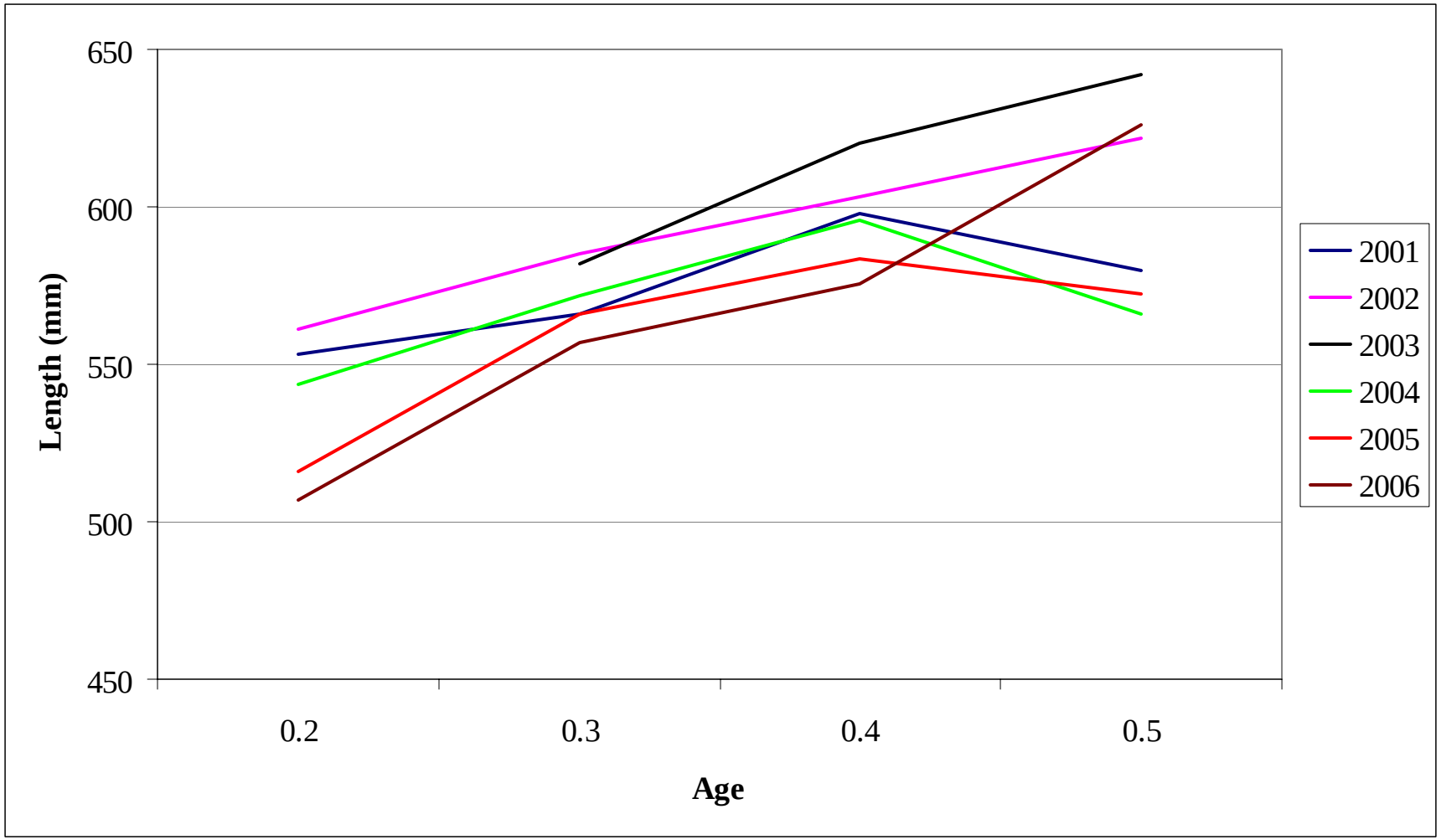

Figure 6. Chum salmon Age-Length trends, Snake River, 2001 - 2006.

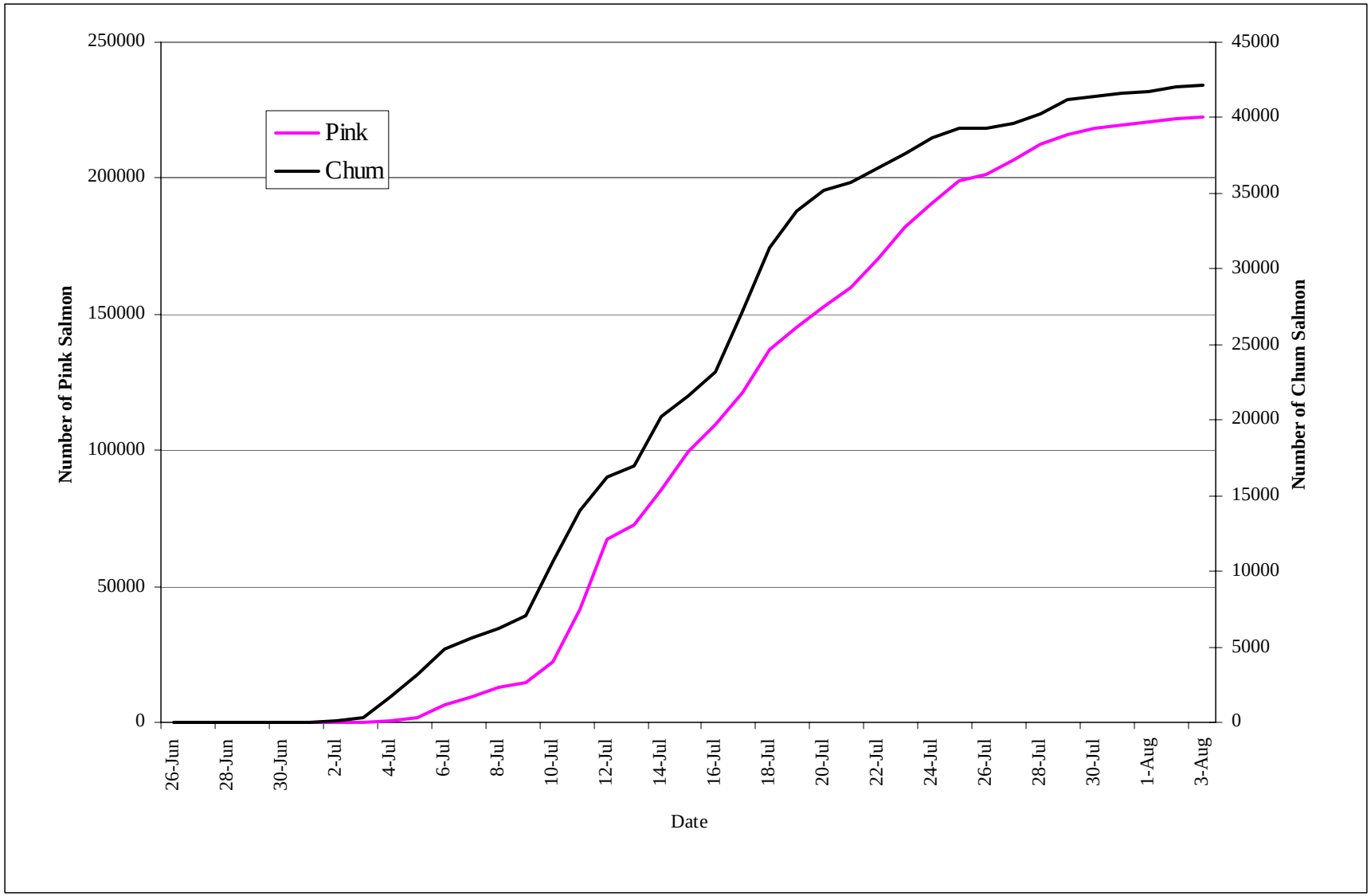

Figure 7. Cumulative escapement, Eldorado River 2006.

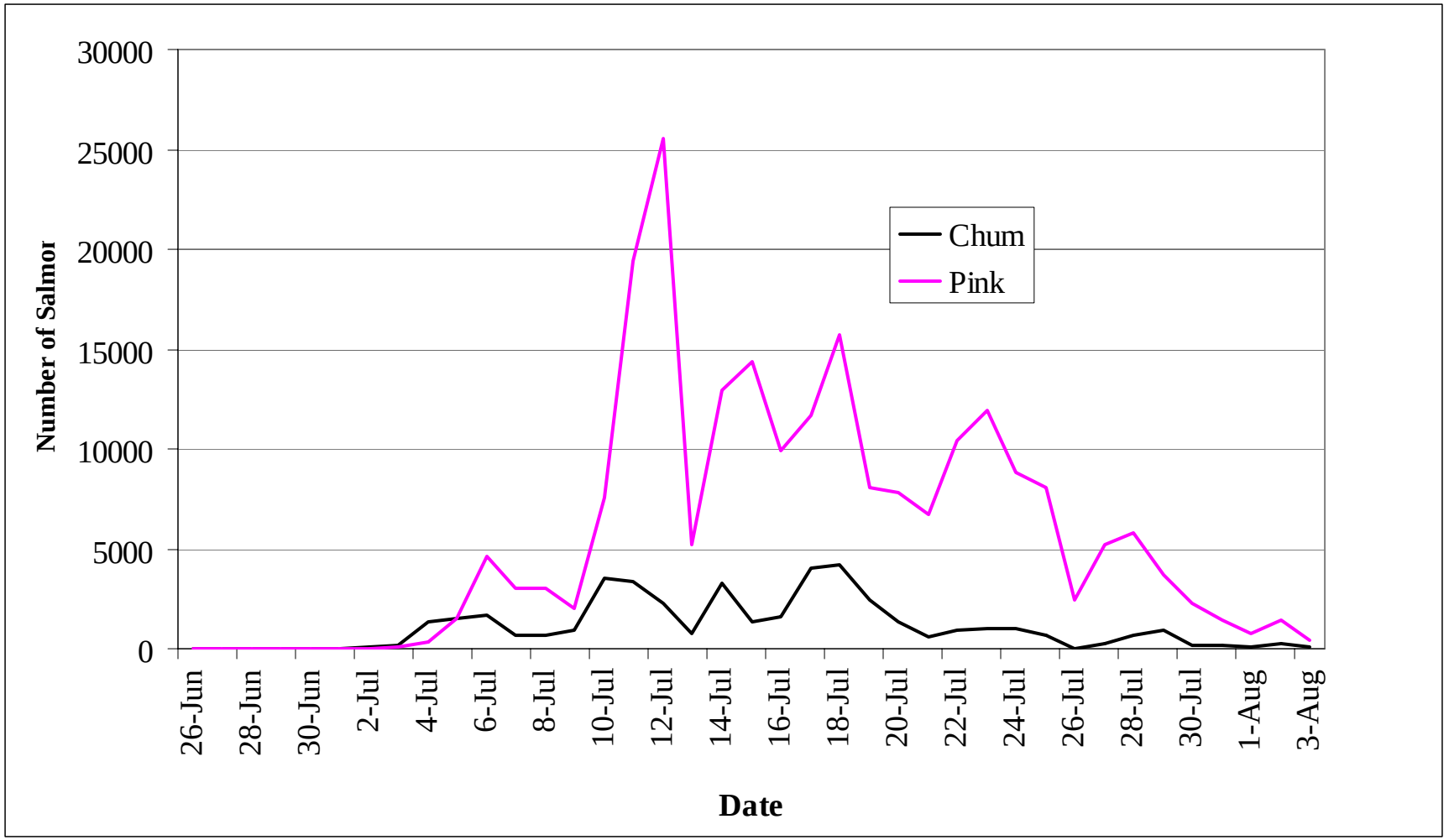

Figure 8. Daily escapement, Eldorado River 2006.

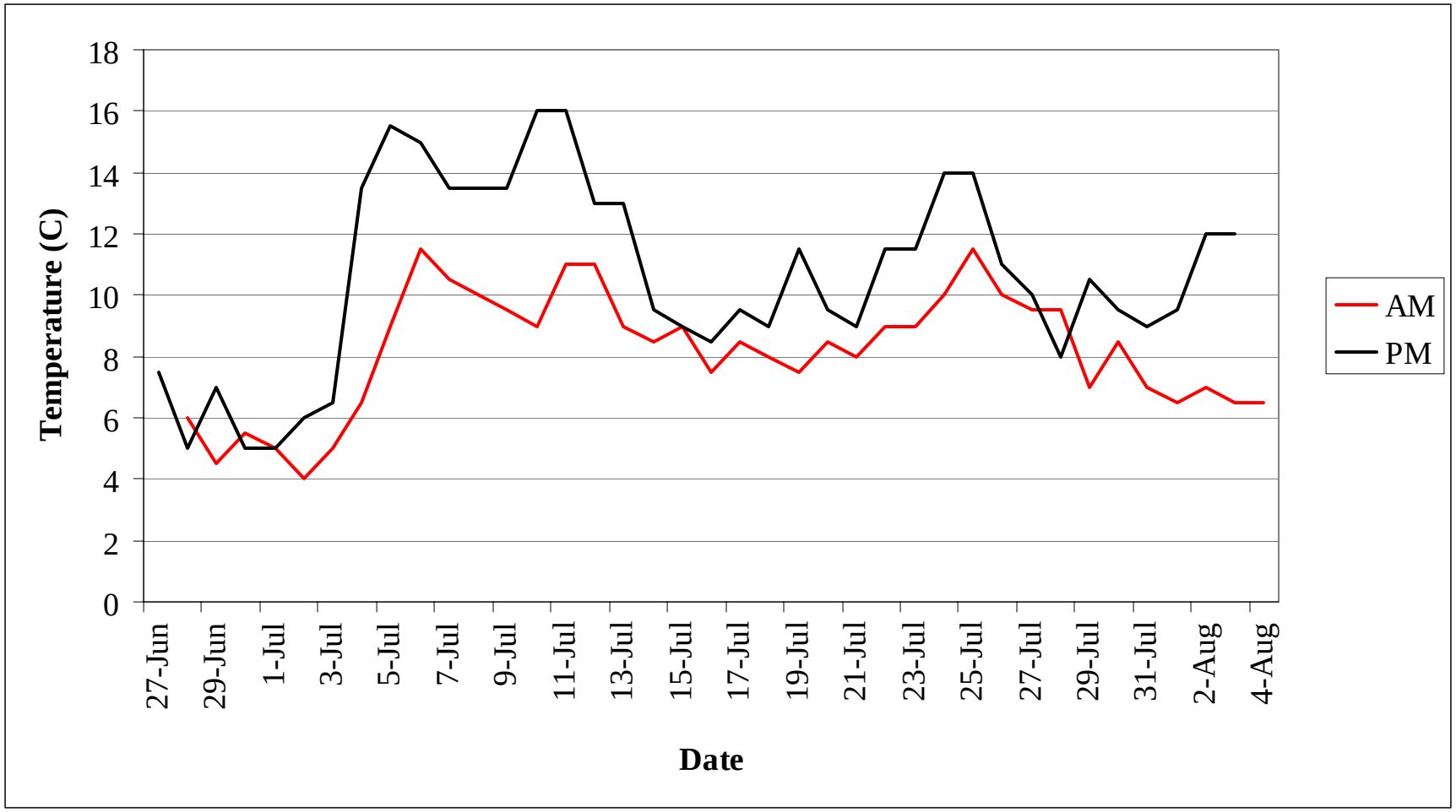

Figure 9. Eldorado River water temperature at 0800 and 2000 hours, 2006.

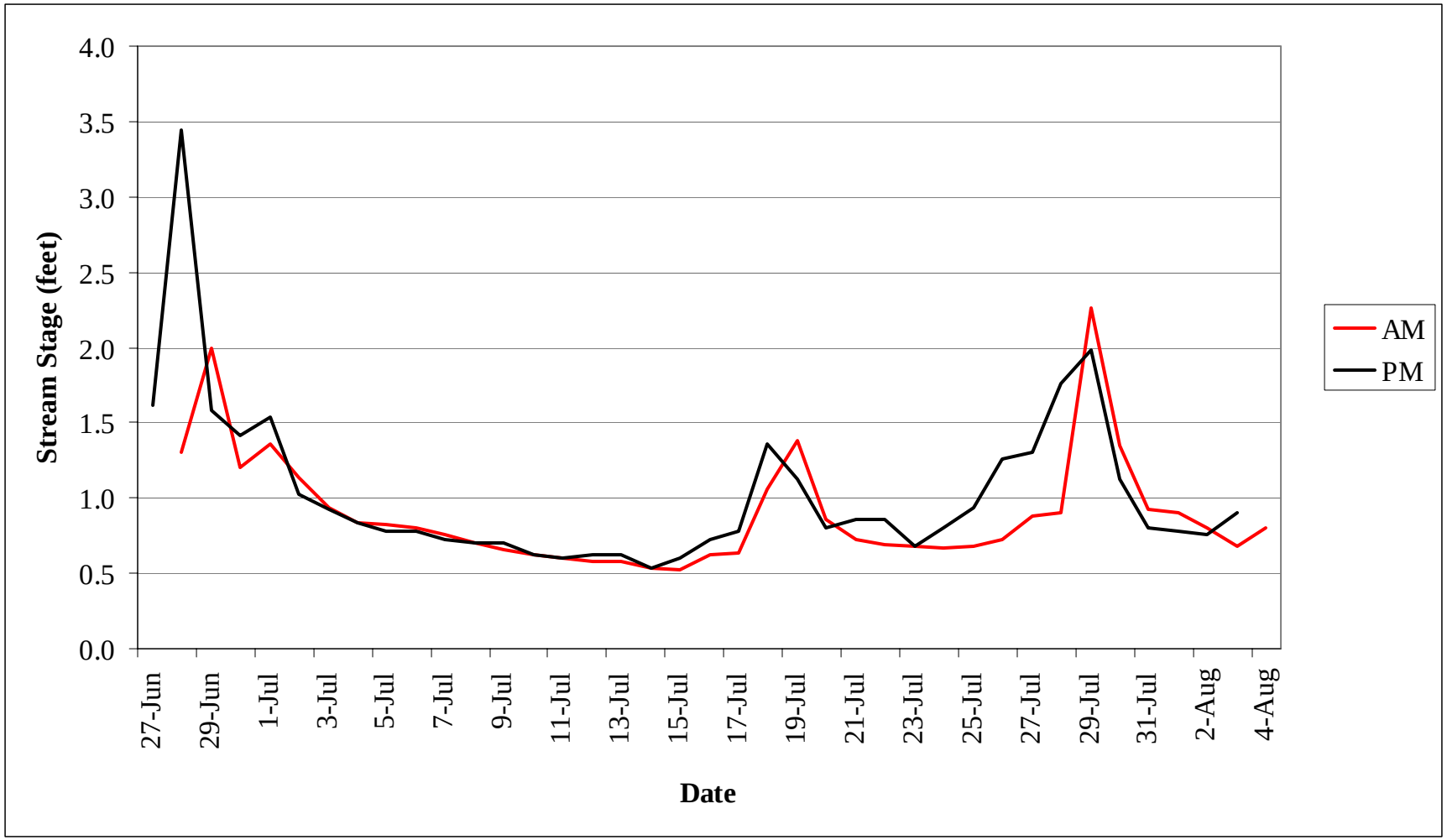

Figure 10. Eldorado River staff gage height at 0800 and 2000 hours, 2006.

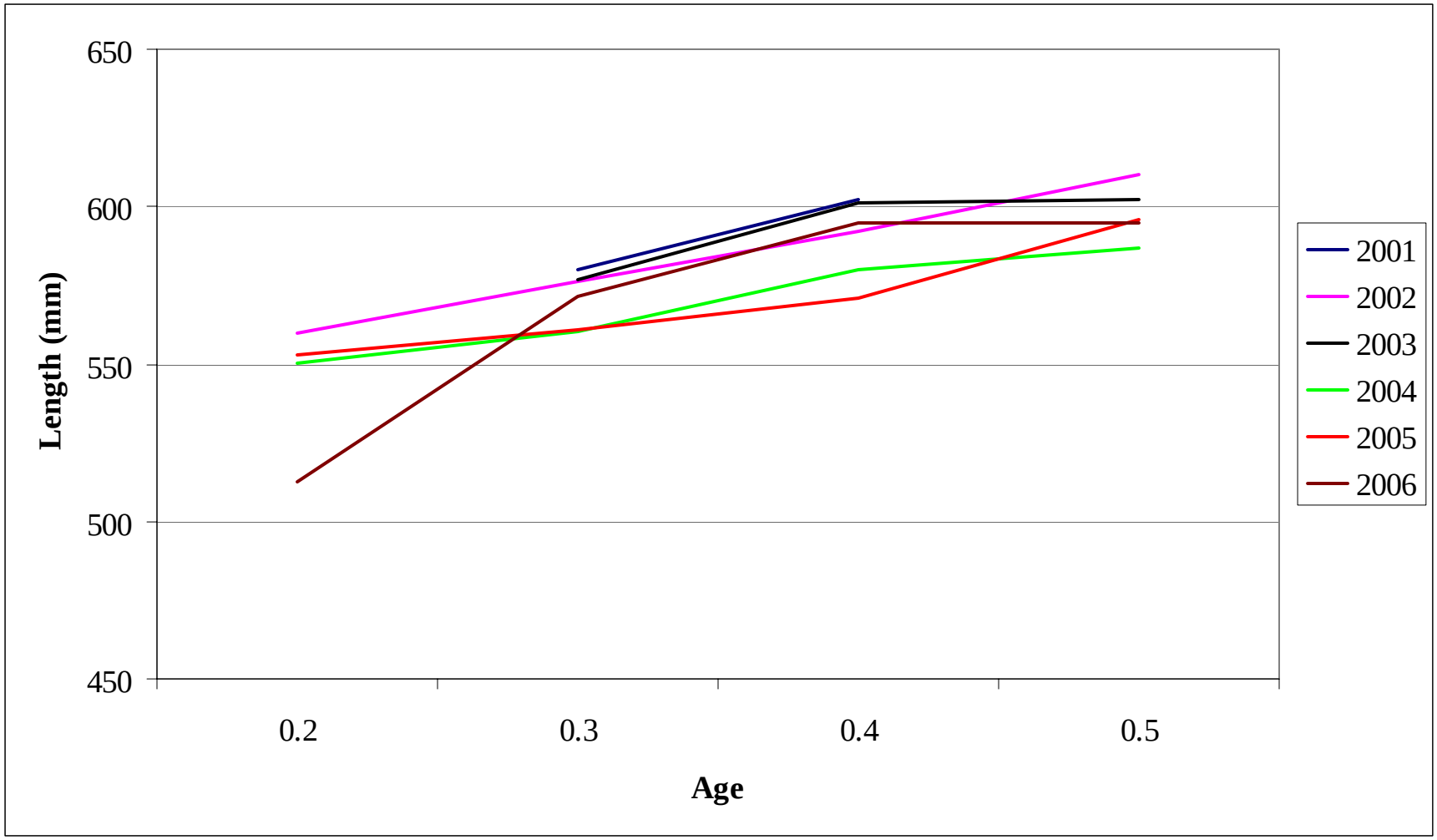

Figure 11. Chum salmon Age-Length trends, Eldorado River, 2001 - 2006.

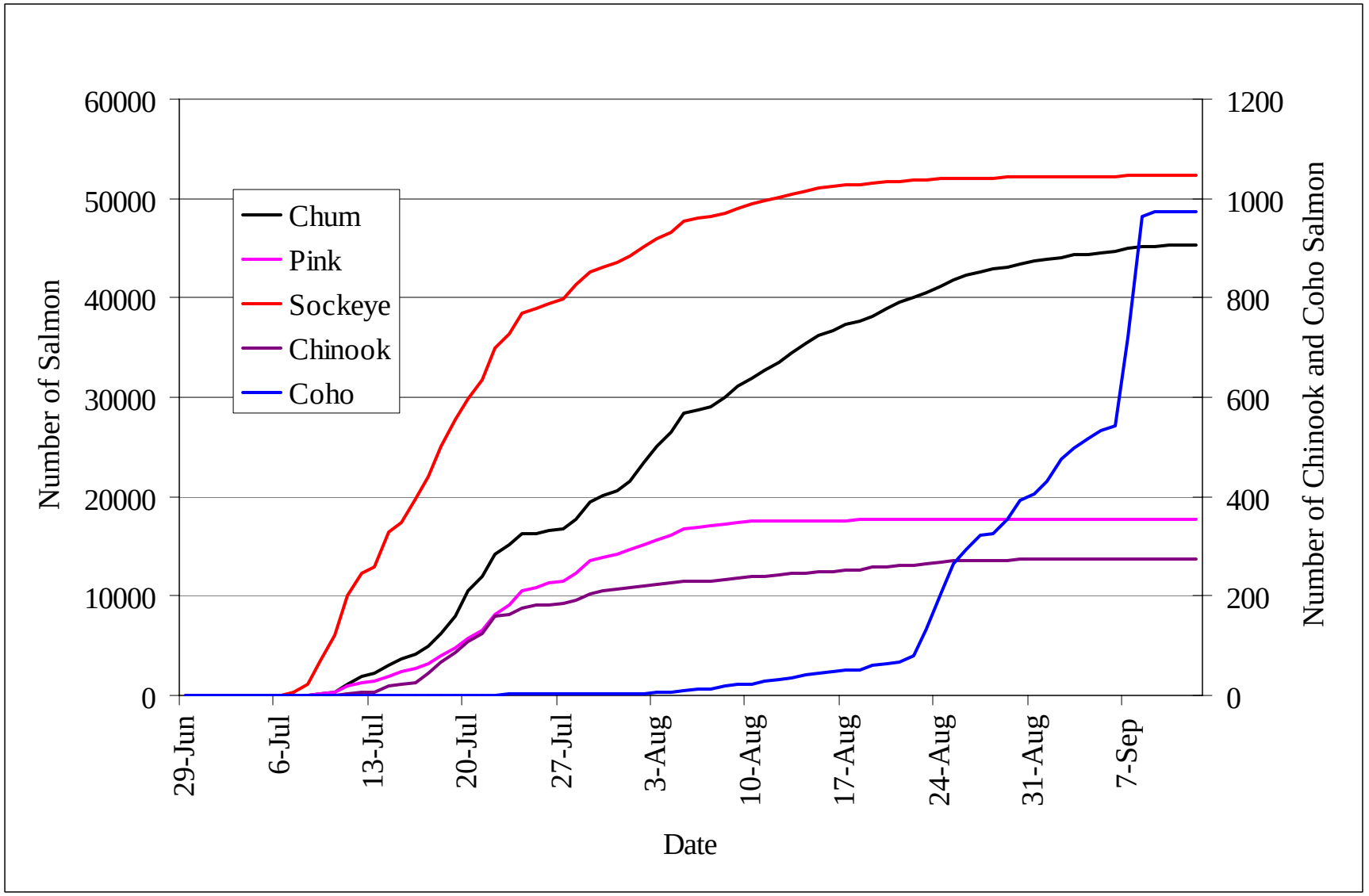

Figure 12. Cumulative escapement, Pilgrim River 2006.

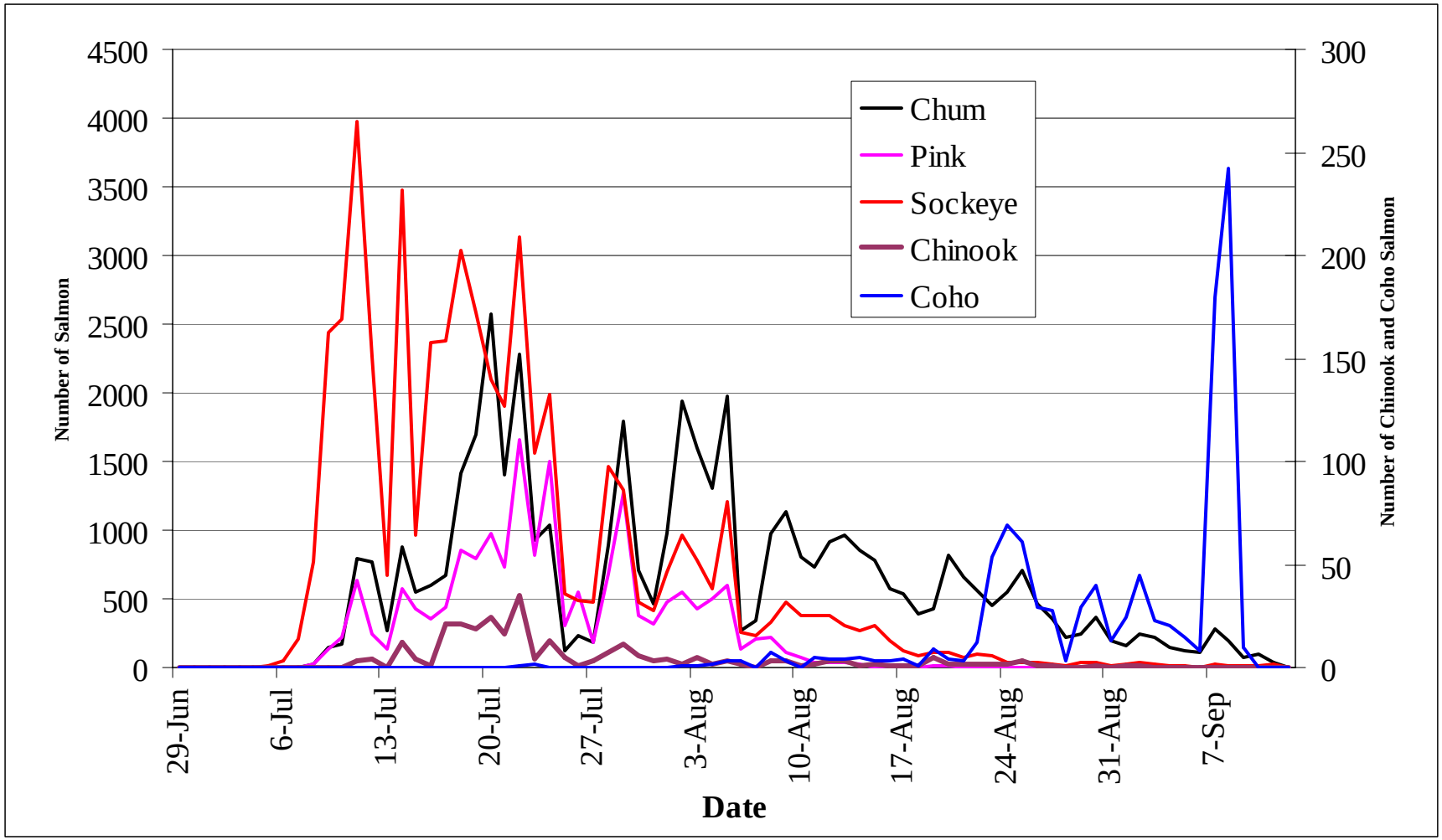

Figure 13. Daily escapement, Pilgrim River 2006.

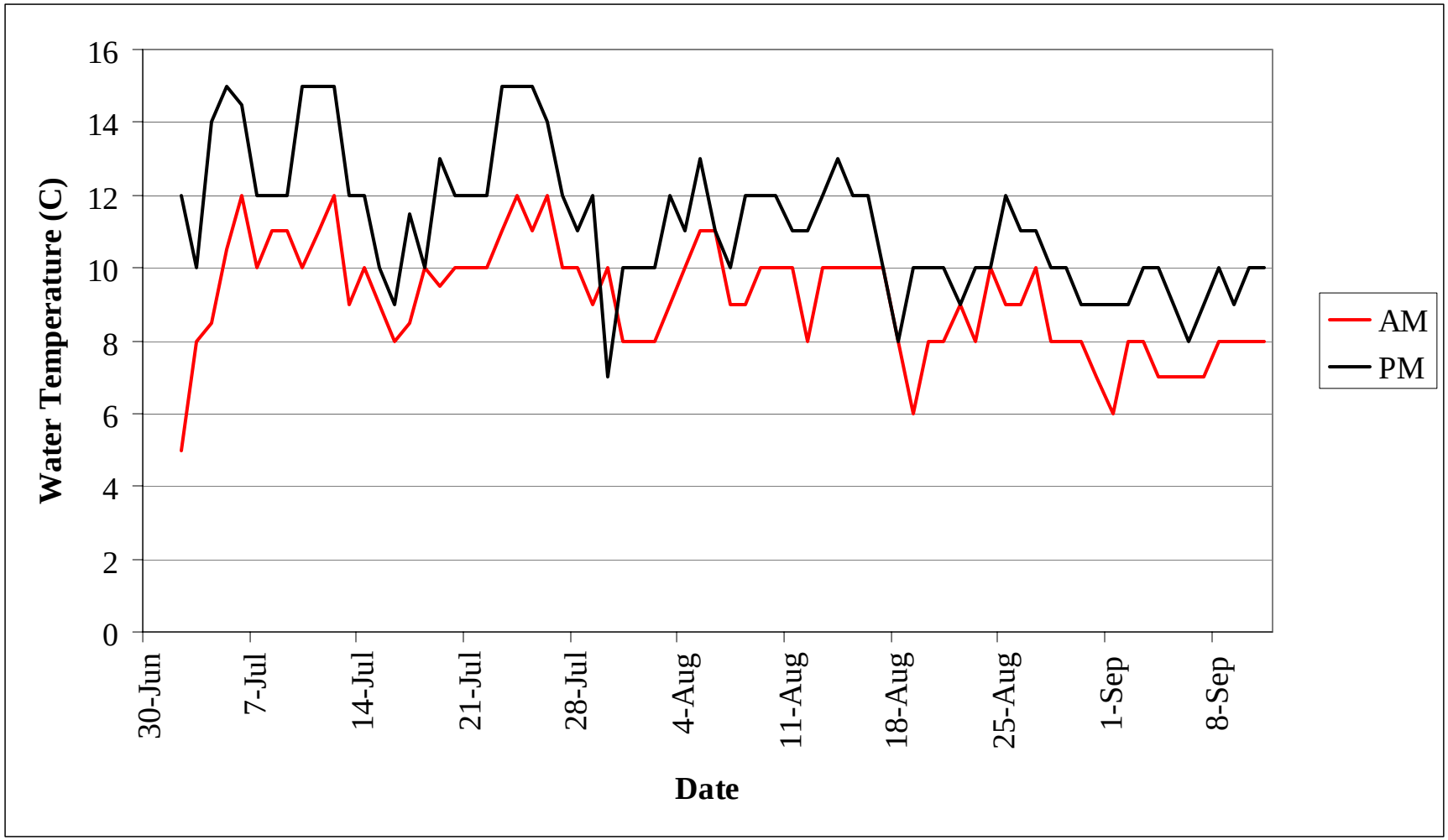

Figure 14. Pilgrim River water temperature at 0800 and 2000 hours, 2006.

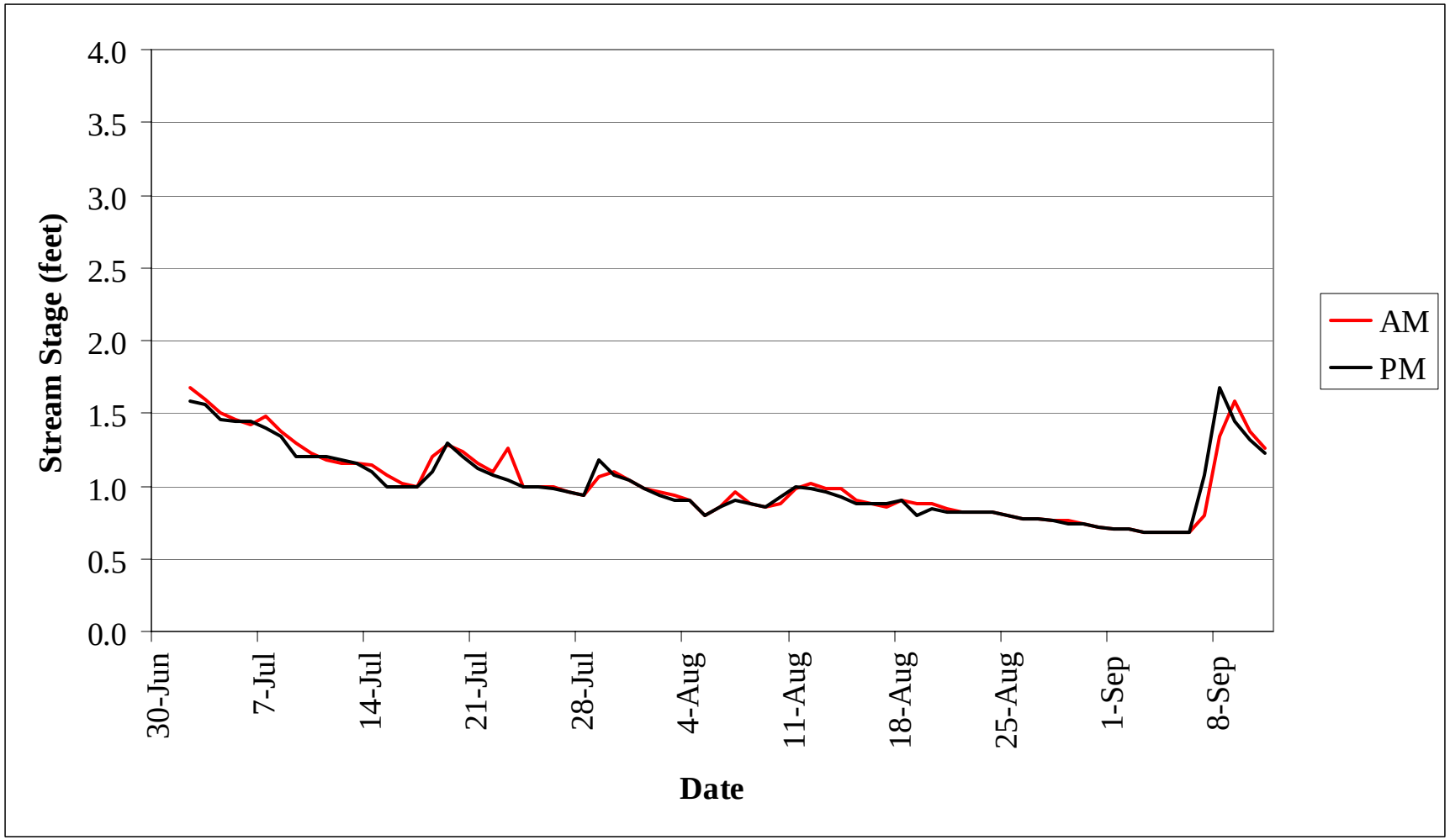

Figure 15. Pilgrim River staff gage height at 0800 and 2000 hours, 2006.

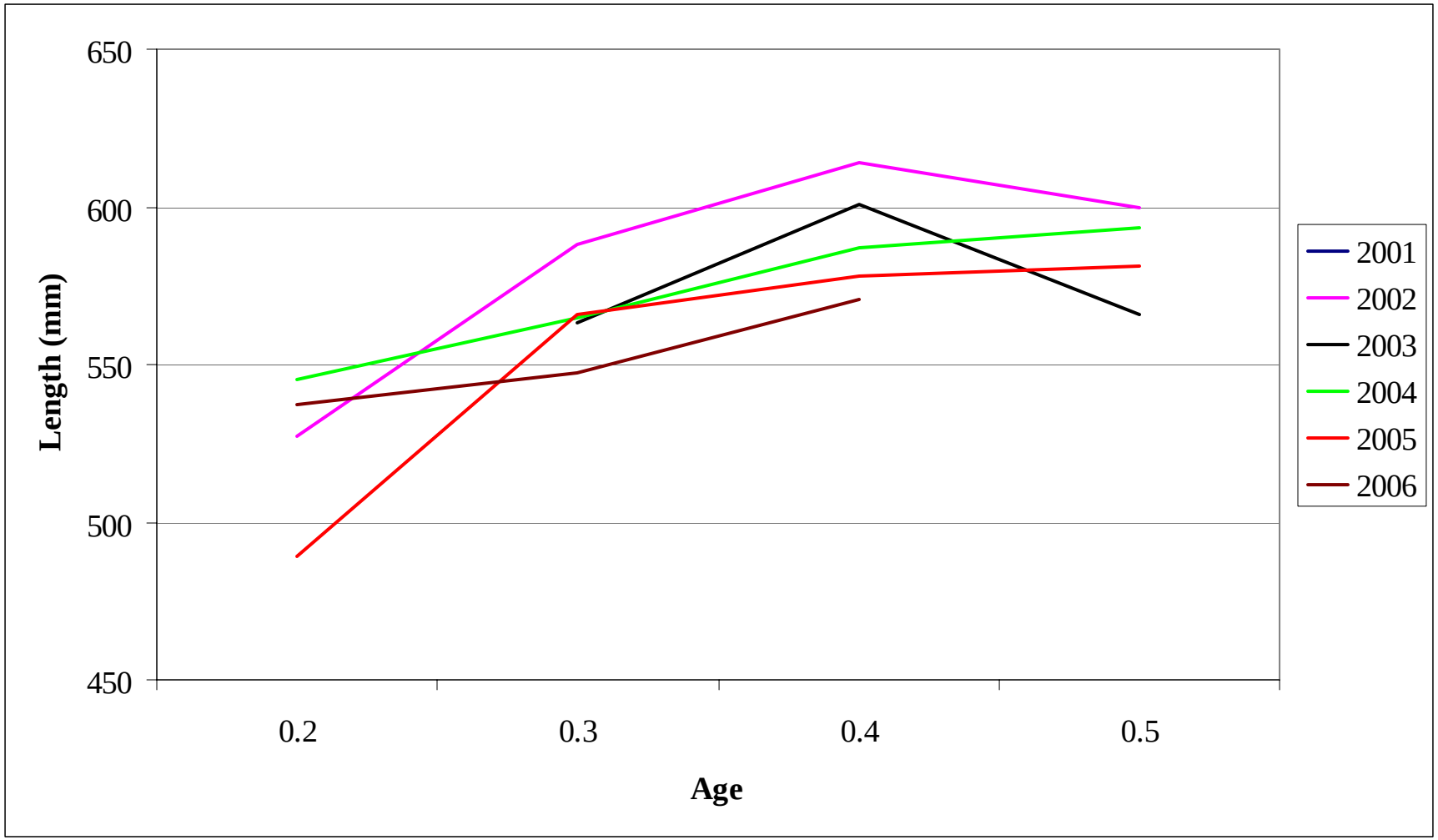

Figure 16. Chum salmon Age-Length trends, Pilgrim River, 2002 - 2006.