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Abundance and Run Timing of Adult Salmon in Tanada Creek in the Wrangell-St. Elias National Park and Preserve

Annual Report No. FIS 04-502

Eric R. Veach
Molly B. McCormick
David R. Sarafin

Wrangell - St. Elias National Park and Preserve
P.O. Box 439
Mile 106.8 Richardson Hwy.
Copper Center, Alaska 99573

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ANNUAL REPORT SUMMARY PAGE

Title: Abundance and Run Timing of Adult Salmon in Tanada Creek in the Wrangell-St. Elias National Park and Preserve

Study Number: FIS 04-502

Investigators/Affiliations: Eric R. Veach, Molly McCormick and David Sarafin, Wrangell - St. Elias National Park and Preserve (WRST) PO Box 439, Copper Center, Alaska, 99573.

Management Regions: Cook Inlet/Gulf of Alaska

Information Type: Fish stock status and trends

Issues Addressed: Tanada Creek salmon are highly susceptible to Federal and State subsistence users as well as commercial harvest. The Batzulnetas Area subsistence fisheries specifically target Tanada Creek salmon stocks. Monitoring Tanada Creek salmon stocks aids in assessing sockeye salmon escapement into the uppermost tributaries of the Copper River and in evaluating the harvest opportunity for subsistence fishers in the Batzulnetas Area fishery and the uppermost portion of the Glennallen Subdistrict. The dynamic nature of the flows in Tanada Creek has prevented a rigid picket weir from functioning successfully. The feasibility of a floating resistance board weir and a video counting tower as monitoring tools are tested in Tanada Creek.

Study Cost: **$**188,000

Study Duration: May 2004 to September 2006

Key Words: Batzulnetas, Copper River, Sockeye, Tanada Creek, Tanada Lake Stock/status and Trends, Use

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TABLE OF CONTENTS

LIST OF FIGURES

Figure Page

LIST OF TABLES

Table Page

LIST OF APPENDICES

Appendix Page

INTRODUCTION

The upper Copper River drainage provides spawning habitat for sockeye salmon, *Oncorhynchus nerka,* and Chinook salmon *Oncorhynchus tshawytscha*. Significant numbers of adult salmon are harvested in commercial drift gillnet operations near the mouth of the Copper River from mid-May to September. Salmon escapement into the upper Copper River system contributes to Federal and State subsistence fishing through September 30. The monitoring and evaluation of these runs is essential to ensure that Wrangell - St. Elias National Park and Preserve (WRST) maintains natural and healthy populations of fish as required by the Alaska National Interest Lands Conservation Act (ANILCA).

The Copper River system supports over 124 known stocks of sockeye salmon of which at least 12 occur above the confluence of the Copper and Slana Rivers (Roberson 1987). Two of these stocks migrate through Tanada Creek and spawn along the shores of Tanada Lake or in the lake outlet (Figure 1). Chinook salmon are present in incidental numbers in Tanada Creek (Veach and Scotton, 2001).

Tanada Creek sockeye are one of the uppermost runs of sockeye in the Copper River and support a subsistence salmon fishery both in the Copper River and in Tanada Creek. The native villages of Mentasta and Chistochina harvest salmon in the Batzulnetas Area fishery. Batzulnetas, the Ahtna name for the traditional fishing site on Tanada Creek, has been used by the Ahtna people for over 1,000 years (Kari, 1986). The Batzulnetas fishery was in litigation from 1985 –2000 as Katie John, Doris Charles and others attempted to reestablish their traditional subsistence fishery. The "Katie John Decision" resulted in the expansion of Federal management of fisheries in waters under Federal jurisdiction throughout Alaska.

The Tanada Lake sockeye salmon stocks typically compose the largest population of sockeye spawning and rearing within Wrangell-St.Elias National Park/Preserve, among those stocks which spawn upstream of the Gulkana River. Good escapement data will allow us to assess the management of these important sockeye salmon stocks.

OBJECTIVES

Specific objectives for this study were:

1. To use a weir to monitor annual variations in the abundance of adult sockeye and Chinook salmon in Tanada Creek and document the timing of the passage of these fish past the weir site between early June and late September.

2. To measure the entry pattern of sockeye and Chinook salmon to Tanada Creek and compare the entry pattern to the historic entry pattern data set to test for changes in annual run timing.
3. To estimate the age, sex and length of the sockeye population by sampling 10 percent of the sockeye salmon proportionate to their abundance with a minimum of 100 fish per week and a maximum of 100 fish per night.
4. To compare video estimates with weir counts to determine the effectiveness of a video tower to estimate salmon escapement in Tanada Creek.
5. To test the feasibility of sampling water quality and zooplankton to determine if variations in water quality and zooplankton biomass correlate with variations in adult sockeye salmon escapement to Tanada Lake.
6. To provide an educational opportunity for local students and residents to learn about the Tanada Creek salmon runs and how the weir counts help to provide information needed to manage subsistence fisheries on the Copper River.

METHODS

Study Area

Watershed Description

Tanada Creek is a third order perennial stream and a tributary to the upper Copper River in southeast interior Alaska (Figure 1). The stream flows through the Copper River Plateau and encompasses a watershed area of approximately 550 km^2. Originating at Tanada Lake (62° 27'N, 143° 23'W), Tanada Creek runs 30 km northwest to its confluence with the Copper River (62° 37'N, 143° 48'W). The terrain is nearly level to gently rolling throughout the creek basin and the stream gradient is less than 2%. The vegetation is dominated by mosses, sedges, dwarf birch and willows. Black and white spruce are the primary evergreens, with stands of cottonwoods interspersed. The soils are poorly drained and are underlain by shallow permafrost (USDA 1979). Annual precipitation in the area averages 39 cm and ambient temperature ranges from a high of 32° C to a low of - 46° C. Average annual temperature is - 2.5° C (NOAA 1995). Breakup normally occurs in May, and water bodies freeze in September or October.

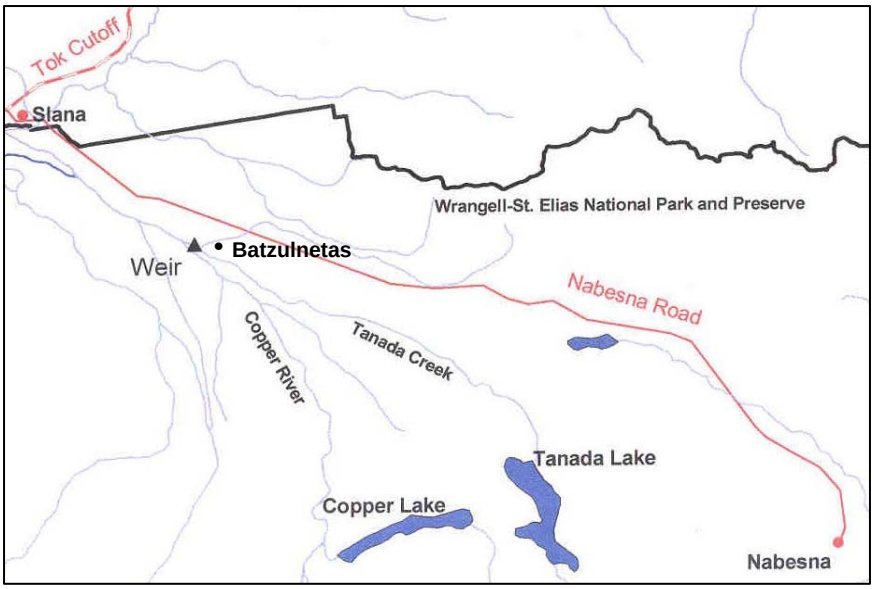

Figure 1. Tanada Creek and vicinity.

Weir Site Description

The weir site is located 920 m upstream from the Copper River and approximately 160 m downstream from the Batzulnetas village site (Figure 1). Stream width is about 9 m. The vertical banks are approximately 0.7 to 1.0 m high and bank undercutting ranges between 0 to 1 m. Maximum water depth at midstream during bank-full conditions is estimated at 1.2 m. Channel substrate is predominately cobble, with interstitial sand and gravel. The stream banks are stabilized by spruce, willow, alder and an understory of moss and horsetail ferns. Spruce and cottonwoods contribute to stream shading.

A permanent cross section was established on June 9, 1998 approximately 10 m upstream of the weir. Four brass cap reference markers were set along the transect. A staff-gage was placed in the stream near the north bank intersecting the cross section.

Weir Installation and Operation

In 2005 a floating resistance board weir was installed as described by Tobin (1994) (Figure 2). The weir, with picket spacing of 3.75 cm, was placed at the end of a straight 120 m section of stream with moderate water velocity and laminar flow. When resistance boards were in the "up" position the downstream end of the weir lay flat on the water surface. When resistance boards were in the "down" position, the downstream end of the weir was raised approximately 75 cm above the surface of the water (Figure 3). A sampling box, 1 m x 3 m, was constructed of aluminum channel, steel pipes, steel conduit, and PVC. Gates that could be raised and lowered were installed at either end to allow for holding, sampling, and releasing fish. The box was placed on the north bank side of the weir. The weir was installed during the week of May 23, and was operational beginning May 26. The weir was removed September 22. Between May 26

and September 22, high water events flooded over and around the weir for a total of eighteen days (Figure 4). During this time the weir was not operational (Table 1). A staff gauge and water temperature reading were taken at the beginning of each shift. Gates on the box were closed when the weir was not monitored. The number of salmon counted was recorded hourly.

One *HOBO® TEMP* data logger was placed in a submersible case at the base of the staff gauge to collect water temperature data throughout the summer. The data logger recorded temperatures every hour and 30 minutes. Two depth readings were recorded daily; an average was calculated when different depths were recorded in a 24-hour period.

Figure 2. Constructing floating resistance board weir in Tanada Creek 2004.

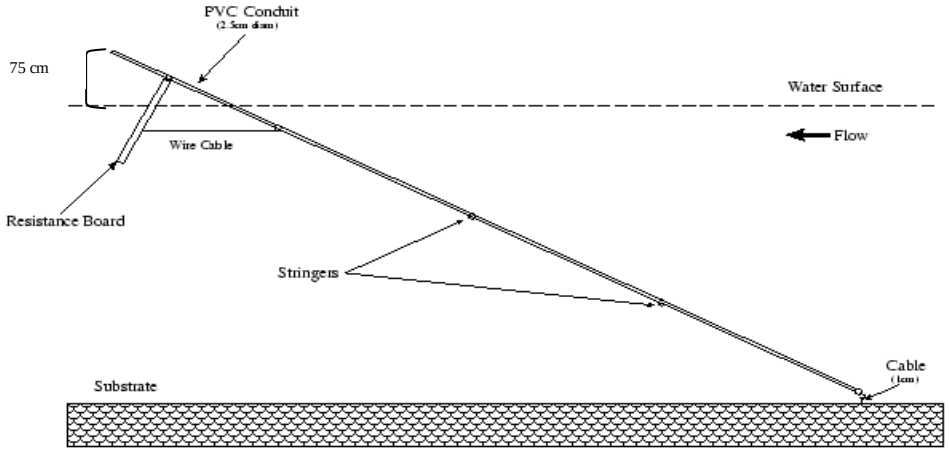

Figure 3. Placement of resistance boards in "down" position

Figure 4. High water event, July 5, 2005

Year	Start date	End date	Flood days	Days operational
2000	June 8	July 13		2
2001	June 5	August 23		60
2002	June 27	August 15		49
2003	May 31	September 19		112
2004	May 29	September 7		99
2005	May 26	September 22	18	101

Table 1. Dates of weir operation.

Biological Data

Sockeye salmon were sampled for scales and sexed using external characteristics. Two measurements were taken on each fish, from mid-eye to fork length (MEF) and mid-eye to posterior insertion of anal fin (anal) length. Lengths were recorded to the nearest millimeter. A tagging cradle was used to facilitate handling. Scales were collected from the preferred area, located on the left side of the fish and two rows above the lateral line on a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin, according to Alaska Department of Fish and Game (ADFG) sampling protocol. One scale was taken from each sockeye salmon in accordance with this protocol. One scale is typically sampled from sockeye salmon while multiple scales would typically be sampled from Chinook salmon (Steve Moffitt, personal communication). Sampled fish were marked with a round left opercle punch. Scale samples were analyzed by the ADFG Commercial Fisheries Division in Cordova. Ages were adjusted for resorbed margins based on length frequency aggregations.

Water flow was high in 2005. There were 4 major high water events during which the integrity of the weir was compromised and/or the weir was not operational (Table 1).

Video Escapement Operation

In 2005, the video escapement recorder was installed on May 26, 10 m upstream from the weir. It was removed on September 25. During the flooding events, the video camera was not operational for twenty days. A 1.5 inch in diameter pipe 15 m long was affixed horizontally between two spruce trees on either side of the creek. A 3 mm cable was attached to the trees above the pipe and was looped through guides along the pipe to provide extra support. Two remote cameras, sealed in waterproof housings were suspended from the pipe above the water surface approximately 5.5 m (Figure 5). The cameras were equipped with a 3.5 mm ultra-wide angle lens to allow for field-of-view up to five meters. Four red lights were suspended with the cameras and aimed at the water surface. The lights were evenly spaced across the wetted width of the channel. Four more red lights were installed underwater, one on each bank pointing inward and one on each side of the center panel pointing towards each bank. A waterproof case containing a time-lapse frame recording system and multiplexer unit was housed on the north bank of the creek. Six 12-volt deep cycle batteries provided power to the system. A high contrast, permeable substrate panel was fixed to the streambed below the overhead cameras. This panel was approximately 1 m wide and was constructed of white PVC pipes that ran across the width of the creek and were spaced approximately 3 cm apart. Sandbags were placed along the downstream edge of the panel to keep fish from swimming under it. A vertical row of pickets 2 m high was placed in the streambed perpendicular to the panel. The pickets, which bisected the creek at approximately 4.8 m from each bank, served two purposes: (1) to delineate the midstream field of view of the two cameras, providing a defined edge for the mid stream frame of the video; (2) to prevent salmon from moving between one camera view and the other while swimming upstream. To eliminate glare from the water surface, an opaque plastic tarp was placed over the creek above the cameras.

The time-lapse recorder was programmed to capture one image every .15 seconds allowing for up to 64 hours of video to be collected on a single T-160 tape when recorded in extended play (EP) mode. The recorder was later reprogrammed to record in standard play (SP) mode, allowing for 48 hours of viewing on each T-160 tape. Tapes were changed every 48 hours. S-VHS tapes were used throughout the summer.

Figure 5. Video counting tower in Tanada Creek.

Limnological Data

No limnological samples were taken in Tanada Lake in 2005. Weir operation expenses have increased substantially and this part of the project was costly, especially since the OAS pilot we originally contracted with was no longer insured or OAS carded in 2005. All the other OAS contractors on floats were too expensive because of their distance from Tanada Lake. The zooplankton samples collected in 2003 and 2004 showed great variability that was hard to analyze, and the lab analysis of the water samples was often imprecise. Because of this, the data collected was difficult to interpret.

RESULTS

Weir Operation

The weir was operated during the dates displayed in Table 1. There were problems with the floating resistance board weir in 2005 because of the flooding events and problems caused by the flooding events. In 2005, staff gauge readings ranged from 1.3 feet to 4.5 feet, with a mean depth of 2.1 feet (Figure 6). Flows at these staff heights range from approximately 82.49 to 1,153.59 cubic feet per second (cfs) averaging around 234.55 cfs (based on a hydrostandard developed by the WRST park geologist, Danny Rosenkrans). In 2005, the flow was consistently high throughout the summer with four major high water events: on June 22 the water crested at 3.2 feet, on July 5 at 3.7 feet, on July 20 at 2.6 feet, and on August 1 at 4.5 feet (Figure 6). Flows in 2005 were the highest flows in the past four years (Figure 6). Both *HOBO® TEMP* data loggers were lost in 2005 so no water temperatures are available for this year.

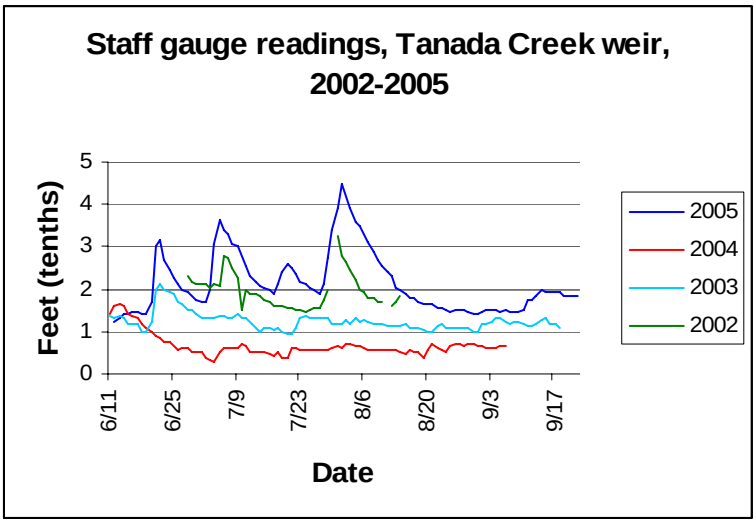

Figure 6. 2002-2005 staff gauge.

Biological Data

Total sockeye salmon, *O. nerka*, observed at the weir are displayed in Table 2. In 2005, the number of sockeye salmon observed by video camera totaled 4,659 (Table 2.) Due to the high water conditions, and damage to the integrity of the weir by increased water flow and debris, the count at the weir (739) was not considered to be accurate. One Chinook salmon, *O. tshawytscha*, was observed.

Year	Number of sockeye	Number of Chinook
1997	20,729*	5
1998	28,992	2
1999	—	—
2000	—	—
2001	1,649	16
2002	6,186**	5
2003	5,856	2
2004	17,120	0
2005	4,659***	1

Table 2. Weir counts of sockeye salmon in Tanada Creek.

*Weir compromised by flood, estimate unreliably low.

** Estimate based upon mark-recapture sampling; the actual weir estimate was 2,489

***Weir compromised by flooding, estimate from video count; the actual weir estimate was 739

A total of 602 sockeye salmon were sampled for length and sex information in 2005 (Table 4 and Table 5). Scales were also taken from these 602 sampled fish of which 473 were readable, resulting in ASL information for 10 % of the total run. Males accounted for 66% (s.e. = 2 %) of the run. The run was composed of only two age classes, age 1.2 and age 1.3, with age 1.3 salmon being the most prevalent (73%, s.e. = 2%). The overall average length of age 1.3 sockeye salmon was 605 mm (s.e. = 1 mm) and the average length of age 1.2 salmon was 564 mm (s.e. = 2 mm).

Stratum Dates: May 26 – September 22											
		Age Class									
Sex		0.2	0.3	1.1	1.2	1.3	2.1	2.2	2.3	Weir Passage	n
F	Percent	0	0	0	27	73	0	0	0		162
	Number	0	0	0	43	119	0	0	0	1,258	
	SE				3.5	3.5					
M	Percent	0	0	0	27	73	0	0	0		311
	Number	0	0	0	83	228	0	0	0	3,400	
	SE				2.5	2.5					
Total	Percent	0	0	0	27	73	0	0	0		473
	Number	0	0	0	126	347	0	0	0	4,659	
	SE				2.0	2.0					

Table 3. Tanada Creek Sockeye samples by sex and age, entire 2005 field season. Sample size is denoted by n.

Sample dates: May 26 - September 22, 2005										
		Age Class								
Sex		0.2	0.3	1.1	1.2	1.3	1.4	2.1	2.2	2.3
F	Avg Length (mm)	0	0	0	540	583	0	0	0	0
	SE	0	0	0	2	2	0	0	0	0
	Sample Size	0	0	0	43	119	0	0	0	0
M	Avg Length (mm)	0	0	0	577	617	0	0	0	0
	SE	0	0	0	2	1	0	0	0	0
	Sample Size	0	0	0	83	228	0	0	0	0
	Avg Length (mm)	0	0	0	364	605	0	0	0	0
	SE	0	0	0	2	1	0	0	0	0
Total	Sample Size	0	0	0	126	347	0	0	0	0

Table 4. Tanada Creek Sockeye samples by sex and length for the entire 2005 field season.

Run Timing

The run timing for 2005 is based on the video count. In most years, sockeye salmon are first observed at the weir between the last week of June and the middle of July (Table 5). In 2005, the first sockeye salmon was observed at the weir June 13. Only one fish was observed on this date. The first big group of 251 sockeye migrated past the video camera on July 22. (Figure7). The median point in the run occurred August 23 when the cumulative total of sockeye salmon reached 2,539 (Table 5). The last sockeye was observed on film on September 25, the day the camera was removed. Migratory run timing in 2005 appears to be the latest (1998, 2001, 2002, 2003, 2004) on record (Figure 8).

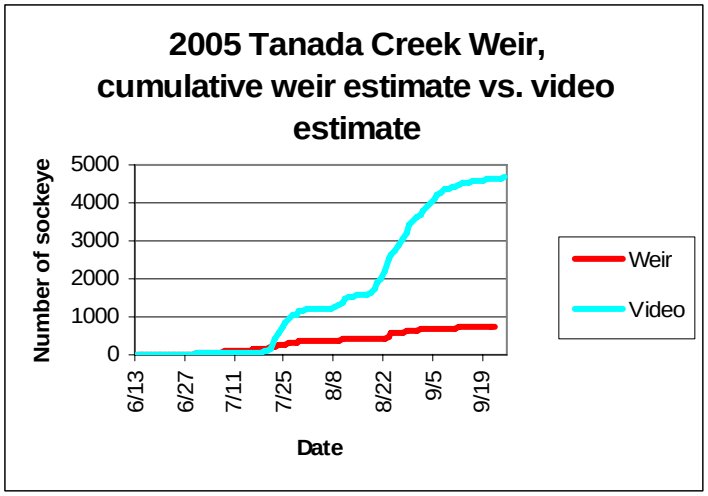

Figure 7. Cumulative and daily counts of sockeye salmon observations at the weir.

	First fish	Median date	Median Number
1998	13-Jul	19-Jul	14,496
2001	14-Jun	14-Jul	825
2002	28-Jun	12-Jul	3,094*
2003	11-Jun	5-Aug	2,929
2004	11-Jun	2-Aug	8,560
2005	13-Jun	23-Aug	2,539**

*extrapolated based upon total run size estimate
**based on video count

Table 5. Annual date of arrival of the first sockeye salmon and the median point of the sockeye migration past the weir.

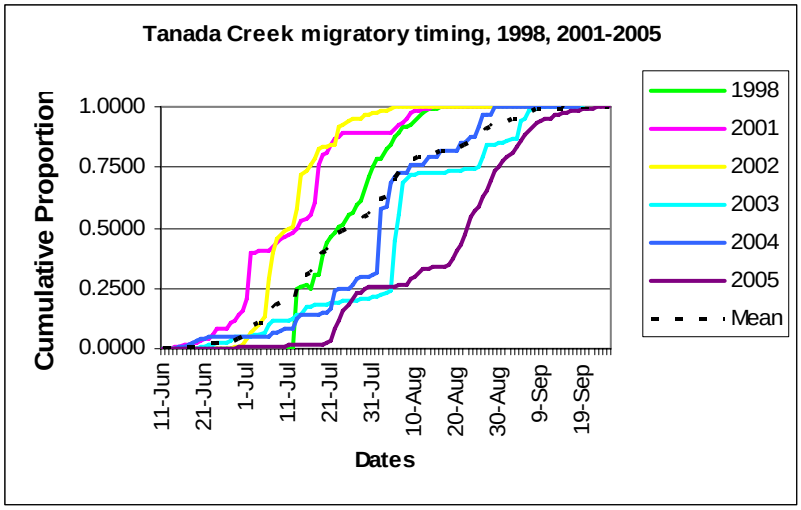

Figure 8. Migratory run timing, 1998-2005.

Capacity Building

The Batzulnetas culture camp took place from July 11-15. There were several tours of the weir given by NPS crew and staff members during the week of culture camp.

In September a PowerPoint presentation was given to the Ahtna Subsistence Committee highlighting the flooding at the weir. Reports of the weir data were given at the local SRC meetings, the SCRAC meeting and at the government-to-government meetings with Mentasta and Chistochina.

Video Escapement Estimation

In 2005, the video tower was erected and functioning while the weir was in operation. The site selected for the video recording equipment provided full coverage of the creek. Fifty tapes

recorded the creek from June 9 until the equipment was removed on September 25. The video cameras functioned well in 2005 although because of the flooding there were fourteen days or partial days when the camera was not recording or when the water was too murky and turbulent to be able to count fish passage. From July 4 to July 6, from July 31 to August 8, and from September 13 to September 14 the cameras were either disconnected or the filming was unviewable because of the turbulence. And from July 6 to July 18 there was no flash panel beneath one of the cameras (it was displaced during the July 4th high water event) providing viewing with accuracy for only half of the creek for these thirteen days. For six other days or partial days throughout the season there were technical difficulties with the recording equipment.

DISCUSSION

Weir Operation

The floating resistance board weir was installed correctly in 2005 but due to extremely high waters its integrity was compromised. High waters flowed over and/or around the weir on four occasions. Debris and high flow velocity created breaches in the weir. Due to the dangerous water conditions that continued from late June through August, these were not discovered until the water cleared up and dropped in early September. The data collected in late September during a mark/recapture effort were inconclusive since a small percentage (13% or 602 sockeye) of the fish were marked at the weir and 59% or 352 sockeye were marked before July 31. The fish that migrated through the weir during the first half of the summer, likely were dead and at the bottom of the lake by late September when the mark/recapture project took place.

Biological Data

The adult sockeye salmon population returning to Tanada Creek in 2005, estimated by video count at 4,659, was approximately 32 percent lower than the mean of 14,368 for the 6 years that salmon have been successfully enumerated at the weir's present location (Figure 9). The number estimated this year was the 2nd lowest amount counted at the weir. The majority (73%) of the returning adults was five year-old fish having spent two years in freshwater and three years in marine waters; the remaining fish were 1.2 age class (Table 3). One Chinook salmon was observed returning to Tanada Creek in 2005.

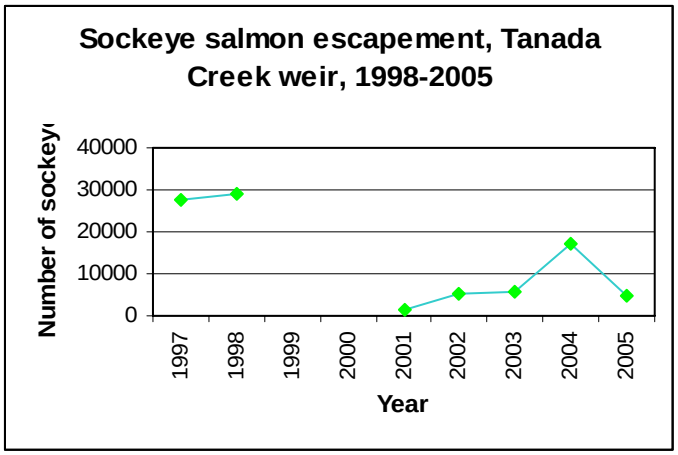

Figure 9. Estimated escapement by year.

Post-season analysis of commercial harvest and escapement at Miles Lake indicated a good return of sockeye salmon throughout the Copper River Basin (ADFG). Based on the 27-year average of 610,466 sockeye salmon, escapement in 2005 of 854,268 salmon was about 19 % higher than average (Table 6).

Year	Total Salmon	Year	Total Salmon	Year	Total Salmon	Year	Total Salmon
1978	107,011	1985	436,313	1992	601,952	1999	848,921
1979	237,173	1986	507,477	1993	833,387	2000	587,592
1980	276,538	1987	483,478	1994	715,577	2001	833,569
1981	535,263	1988	488,398	1995	599,215	2002	816,825
1982	467,306	1989	607,797	1996	906,867	2003	695,233
1983	545,724	1990	581,859	1997	1,148,079	2004	669,646
1984	536,806	1991	579,435	1998	866,957	2005	854,268

Table 6. Miles Lake Sonar Fish Counts

Sockeye escapement in Tanada Creek has fluctuated substantially during the years the weir has been in operation from a high of 28,992 in 1998 to a low of 1,660 in 2001 (Table 2). During those years the sockeye harvest in the Batzulnetas fishery has varied from a high of 582 in 1998 to a low of 62 in 2001 (the years that there was no harvest reported were years that no permits were issued) (Table 7). In 2005 one Batzulnetas permit was issued. The fishwheel was never put in the river this year and no fish were caught.

Year	Permits Issued	Sockeye Harvest	Year	Permits Issued	Sockeye Harvest
1987	8	22	**1997**	1	428
1988	0	0	**1998**	3	582
1989	0	0	**1999**	1	55
1990	0	0	**2000**	0	0
1991	0	0	**2001**	1	62
1992	0	0	**2002**	1	208
1993	1	160	**2003**	1	164
1994	4	997	**2004**	1	182
1995	4	16	**2005**	1	0
1996	0	0			

Table 7. Participation and harvest in the Batzulnetas fishery, 1987-2005.

Run Timing

Table 3 and Figure 8 demonstrate that the run timing of the Tanada Creek stocks appear to be highly variable. Determining a median run date that could be used to forecast the total run size in-season would be useful to managers. However, with the high variability in run timing during the 6 years the weir has operated since 1998, this does not yet appear to be possible. The average median run date, based on the data collected since 1998, occurs on July 26. But since other variables that might affect migratory run timing, such as water discharge or climatic warming trends, have not yet been identified or assessed, prediction of run size by simply using the average median run date is not effective.

Capacity Building

During the Batzulnetas culture camp, WRST provided a forum for community members to observe the weir project in operation and to ask questions about the abundance, timing and management of the Tanada Creek run. Four local residents of the Slana area were employed by WRST to staff the weir including one graduate from the Fisheries Biotech Training Program that was taught in Slana in 2004. Through this employment, they gained experience in monitoring, sampling, problem solving, and collecting, reporting and entering data.

Video Escapement Estimation

A wider contrasting panel installed on the substrate under the cameras in 2005 created a larger viewing area and improved the video viewers' ability to count fish. The addition of small tarps on both sides of the viewing area reduced the reflected sun glare on the water.

Video monitoring was tested in 2003 and 2004 and appeared to be a useful tool to estimate escapement in Tanada Creek A combination of the 2003 and 2004 weir daily count vs. the video count shows that approximately 88 percent of the counted fish were also observed on the video (Figure 10).

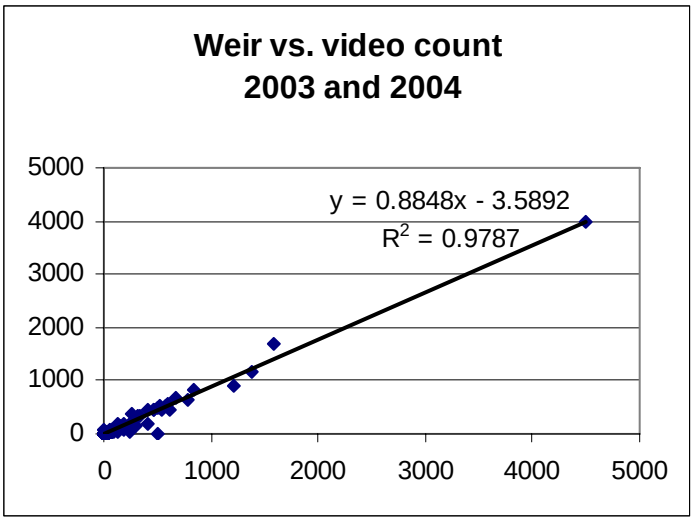

Figure 10. Relationship between daily weir fish counts and video estimates, 2003 and 2004 combined.

Limnological Data

No limnological data was collected in 2005.

CONCLUSIONS

Weir Operation

The floating resistance board weir outperformed the rigid picket weir during flooding but is subject to damage during high water. The undercut banks, deeper west side and location of the present weir site exacerbate the problems of flooding waters. A new weir and video site could alleviate major flooding issues.

Biological Data

The escapement into Tanada Creek in 2005 was the second lowest since 1997 (Table 2). Age composition of the majority of salmon migrating through the weir was similar to that in 2001-2004.

Run Timing

The first fish was seen on June 13 which is one of the earliest dates that fish have migrated through the weir and the median run date for the 2005 Tanada Creek escapement was on August 23 which is the latest. Run timing appears to be highly variable in Tanada Creek. The average median run date does not appear to be a useful tool for projecting total run size using the existing data.

Video Escapement Estimation

Enlarging the contrasting panels on the substrate increased the area that was available for counting fish when viewing. A tarp over the sides of the recording area decreased the amount of glare on the water. The video count was more accurate than the weir estimate this year, however viewing is diminished with flooding and turbulent water.

RECOMMENDATIONS

Weir Operations

1. Find a different location where flooding impacts will be reduced.

Video Escapement Operation

1. Find a different location where muddy and turbulent waters are reduced during times of high water
2. Continue operating the video escapement operation in conjunction with the weir to produce a reliable index of video estimates at a range of flow conditions.

Management

1. Continue monitoring to work towards defining what natural and healthy sockeye escapement is for Tanada Creek stocks.

2. Collect additional weir data to more accurately assess the trend in population abundance. While the aerial counts suggest a downward trend, additional weir data is likely to more accurately assess this trend.

ACKNOWLEDGEMENTS

The National Park Service would like to thank the Village of Mentasta Lake, Katie John and Doris Charles for allowing use of their land for the purpose of conducting this project. The U.S. Fish and Wildlife Service, Office of Subsistence Management, provided $60,300 in FY 03 in funding support for this project through the Fisheries Resource Monitoring Program, under agreement number FIS00-03-3.

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Appendix A. Tanada Creek daily salmon counts.

	Daily sockeye salmon count	cumulative sockeye	Daily kings	cumulative kings
5/29/04	0	0	0	0
5/30/04	0	0	0	0
5/31/04	0	0	0	0
6/1/04	0	0	0	0
6/2/04	0	0	0	0
6/3/04	0	0	0	0
6/4/04	0	0	0	0
6/5/04	0	0	0	0
6/6/04	0	0	0	0
6/7/04	0	0	0	0
6/8/04	0	0	0	0
6/9/04	0	0	0	0
6/10/04	0	0	0	0
6/11/04	1	1	0	0
6/12/04	3	4	0	0
6/13/04	18	22	0	0
6/14/04	36	58	0	0
6/15/04	66	124	0	0
6/16/04	69	193	0	0
6/17/04	125	318	0	0
6/18/04	122	440	0	0
6/19/04	144	584	0	0
6/20/04	73	657	0	0
6/21/04	2	659	0	0
6/22/04	155	814	0	0
6/23/04	23	837	0	0
6/24/04	2	839	0	0
6/25/04	3	842	0	0
6/26/04	0	842	0	0
6/27/04	0	842	0	0
6/28/04	1	843	0	0
6/29/04	0	843	0	0
6/30/04	0	843	0	0
7/1/04	0	843	0	0
7/2/04	0	843	0	0
7/3/04	7	850	0	0
7/4/04	1	851	0	0
7/5/04	1	852	0	0
7/6/04	48	900	0	0
7/7/04	191	1091	0	0
7/8/04	16	1107	0	0
7/9/04	118	1225	0	0
7/10/04	148	1373	0	0

7/11/04	7	1380	0	0
7/12/04	16	1396	0	0
7/13/04	665	2061	0	0
7/14/04	326	2387	0	0
7/15/04	1	2388	0	0
7/16/04	5	2393	0	0
7/17/04	9	2402	0	0
7/18/04	0	2402	0	0
7/19/04	110	2512	0	0
7/20/04	3	2515	0	0
7/21/04	252	2767	0	0
7/22/04	1375	4142	0	0
7/23/04	44	4186	0	0
7/24/04	36	4222	0	0
7/25/04	1	4223	0	0
7/26/04	340	4563	0	0
7/27/04	414	4977	0	0
7/28/04	51	5028	0	0
7/29/04	54	5082	0	0
7/30/04	47	5129	0	0
7/31/04	108	5237	0	0
8/1/04	104	5341	0	0
8/2/04	4501	9842	0	0
8/3/04	256	10098	0	0
8/4/04	1583	11681	0	0
8/5/04	522	12203	0	0
8/6/04	187	12390	0	0
8/7/04	0	12390	0	0
8/8/04	36	12426	0	0
8/9/04	538	12964	0	0
8/10/04	7	12971	0	0
8/11/04	5	12976	0	0
8/12/04	9	12985	0	0
8/13/04	572	13557	0	0
8/14/04	16	13573	0	0
8/15/04	16	13589	0	0
8/16/04	458	14047	0	0
8/17/04	0	14047	0	0
8/18/04	0	14047	0	0
8/19/04	0	14047	0	0
8/20/04	27	14074	0	0
8/21/04	460	14534	0	0
8/22/04	3	14537	0	0
8/23/04	500	15037	0	0
8/24/04	30	15067	0	0
8/25/04	592	15659	0	0
8/26/04	844	16503	0	0
8/27/04	81	16584	0	0

8/28/04	1	16585	0	0
8/29/04	498	17083	0	0
8/30/04	8	17091	0	0
8/31/04	22	17113	0	0
9/1/04	0	17113	0	0
9/2/04	0	17113	0	0
9/3/04	0	17113	0	0
9/4/04	7	17120	0	0
9/5/04	0	17120	0	0
9/6/04	0	17120	0	0

Appendix B. Raw Sampling Data

Date	Card#	Fish#	Sex	Length	FW age	SW age	Age	Error Code
6/13/2005	1	1	2	550	1	2	1.2	NA
6/14/2005	2	1	2	560	1	3	1.3	NA
6/17/2005	3	1	1	600	1	3	1.3	NA
6/17/2005	3	2	1	630	1	3	1.3	NA
6/18/2005	4	1	1	610	1	3	1.3	NA
6/18/2005	4	2	2	630	1	3	1.3	NA
6/20/2005	5	1	2	560	1	3	1.3	NA
6/20/2005	5	2	1	580	NA	NA	NA	3
6/20/2005	5	3	1	580	1	2	1.2	NA
6/24/2005	6	1	2	590	1	3	1.3	NA
6/24/2005	6	2	2	580	1	3	1.3	NA
6/25/2005	7	1	2	590	1	3	1.3	NA
6/26/2005	8	1	2	580	1	3	1.3	NA
6/26/2005	8	2	2	600	1	3	1.3	NA
6/27/2005	9	1	1	580	1	2	1.2	NA
6/28/2005	10	1	2	580	1	3	1.3	NA
6/28/2005	10	2	2	600	NA	NA	NA	3
6/29/2005	11	1	1	670	NA	NA	NA	4
6/29/2005	11	2	1	610	1	3	1.3	NA
6/29/2005	11	3	2	650	NA	NA	NA	3
6/29/2005	11	4	2	630	NA	NA	NA	8
6/29/2005	11	5	1	600	1	3	1.3	NA
6/29/2005	11	6	1	640	1	3	1.3	NA
6/29/2005	11	7	1	610	NA	NA	NA	3
6/30/2005	12	1	2	610	1	3	1.3	NA
6/30/2005	12	2	1	610	NA	NA	NA	3
6/30/2005	12	3	1	620	1	3	1.3	NA
6/30/2005	12	4	2	550	1	2	1.2	NA
6/30/2005	12	5	1	610	1	3	1.3	NA
6/30/2005	12	6	1	600	NA	NA	NA	3
6/30/2005	12	7	1	620	1	3	1.3	NA
6/30/2005	12	8	1	650	1	3	1.3	NA
6/30/2005	12	9	2	580	1	3	1.3	NA
6/30/2005	12	10	2	600	NA	NA	NA	8
6/30/2005	12	11	1	640	1	3	1.3	NA
6/30/2005	12	12	1	580	1	2	1.2	NA
6/30/2005	12	13	2	610	NA	NA	NA	3
6/30/2005	12	14	1	650	1	3	1.3	NA
6/30/2005	12	15	2	560	NA	NA	NA	3
6/30/2005	12	16	1	600	1	3	1.3	NA
6/30/2005	12	17	2	540	1	2	1.2	NA
7/1/2005	13	1	1	580	1	2	1.2	NA
7/1/2005	13	2	1	610	1	3	1.3	NA
7/1/2005	13	3	2	560	NA	NA	NA	3
7/1/2005	13	4	1	630	1	3	1.3	NA
7/1/2005	13	5	2	560	1	3	1.3	NA
7/1/2005	13	6	1	560	1	2	1.2	NA
7/1/2005	13	7	1	680	1	3	1.3	NA
7/2/2005	14	1	2	580	1	3	1.3	NA

7/2/2005	14	2	1	630	1	3	1.3	NA
7/3/2005	15	1	2	580	1	3	1.3	NA
7/3/2005	15	2	1	600	1	3	1.3	NA
7/3/2005	15	3	1	590	1	2	1.2	NA
7/3/2005	15	4	1	610	NA	NA	NA	3
7/3/2005	15	5	1	600	1	3	1.3	NA
7/3/2005	15	6	1	610	1	3	1.3	NA
7/3/2005	15	7	1	590	1	2	1.2	NA
7/5/2005	16	1	1	640	1	3	1.3	NA
7/5/2005	16	2	1	610	1	3	1.3	NA
7/5/2005	16	3	1	630	1	3	1.3	NA
7/5/2005	16	4	1	630	1	3	1.3	NA
7/5/2005	16	5	1	620	1	3	1.3	NA
7/5/2005	16	6	1	590	1	2	1.2	NA
7/5/2005	16	7	1	590	1	2	1.2	NA
7/5/2005	16	8	2	570	1	3	1.3	NA
7/5/2005	16	9	1	630	1	3	1.3	NA
7/5/2005	16	10	2	530	1	2	1.2	NA
7/7/2005	17	1	2	570	1	3	1.3	NA
7/7/2005	17	2	1	600	1	3	1.3	NA
7/7/2005	17	3	2	580	1	3	1.3	NA
7/8/2005	18	1	2	550	1	2	1.2	NA
7/8/2005	18	2	1	610	1	3	1.3	NA
7/8/2005	18	3	1	620	NA	NA	NA	3
7/8/2005	18	4	2	550	1	2	1.2	NA
7/8/2005	18	5	2	610	NA	NA	NA	3
7/8/2005	18	6	1	610	1	3	1.3	NA
7/8/2005	18	7	1	550	1	2	1.2	NA
7/8/2005	18	8	1	620	1	3	1.3	NA
7/8/2005	18	9	2	600	1	3	1.3	NA
7/8/2005	18	10	1	610	1	3	1.3	NA
7/8/2005	18	11	2	570	1	3	1.3	NA
7/8/2005	18	12	2	570	1	3	1.3	NA
7/8/2005	18	13	1	570	1	2	1.2	NA
7/8/2005	18	14	2	560	1	3	1.3	NA
7/9/2005	19	1	2	600	1	3	1.3	NA
7/9/2005	19	2	2	610	1	3	1.3	NA
7/9/2005	19	3	1	620	NA	NA	NA	3
7/9/2005	19	4	1	600	1	3	1.3	NA
7/9/2005	19	5	2	550	1	2	1.2	NA
7/9/2005	19	6	1	600	1	3	1.3	NA
7/9/2005	19	7	1	610	1	3	1.3	NA
7/9/2005	19	8	1	600	1	3	1.3	NA
7/9/2005	19	9	2	540	NA	NA	NA	3
7/9/2005	19	10	1	590	1	2	1.2	NA
7/9/2005	19	11	1	580	1	2	1.2	NA
7/9/2005	19	12	2	590	1	3	1.3	NA
7/9/2005	19	13	2	580	NA	NA	NA	3
7/9/2005	19	14	2	580	1	3	1.3	NA
7/9/2005	19	15	2	580	1	3	1.3	NA
7/9/2005	19	16	1	610	1	3	1.3	NA
7/9/2005	19	17	1	590	NA	NA	NA	3

7/9/2005	19	18	2	570	1	3	1.3	NA
7/10/2005	20	1	2	570	NA	NA	NA	4
7/10/2005	20	2	1	600	NA	NA	NA	3
7/10/2005	20	3	1	600	1	3	1.3	NA
7/10/2005	20	4	2	580	1	3	1.3	NA
7/10/2005	20	5	2	590	1	3	1.3	NA
7/10/2005	20	6	1	630	NA	NA	NA	3
7/11/2005	21	1	2	570	1	3	1.3	NA
7/11/2005	21	2	2	600	NA	NA	NA	3
7/11/2005	21	3	2	590	1	3	1.3	NA
7/11/2005	21	4	1	570	1	2	1.2	NA
7/11/2005	21	5	1	620	NA	NA	NA	3
7/11/2005	21	6	2	550	1	2	1.2	NA
7/12/2005	22	1	1	540	1	2	1.2	NA
7/13/2005	23	1	2	590	1	3	1.3	NA
7/13/2005	23	2	1	590	1	2	1.2	NA
7/14/2005	24	1	2	570	1	3	1.3	NA
7/14/2005	24	2	2	570	NA	NA	NA	3
7/14/2005	24	3	1	580	1	2	1.2	NA
7/14/2005	24	4	2	570	1	3	1.3	NA
7/14/2005	24	5	1	600	NA	NA	NA	3
7/14/2005	24	6	2	560	NA	NA	NA	3
7/14/2005	24	7	2	560	1	3	1.3	NA
7/15/2005	25	1	1	620	1	3	1.3	NA
7/16/2005	26	1	1	640	1	3	1.3	NA
7/16/2005	26	2	1	610	1	3	1.3	NA
7/16/2005	26	3	1	590	1	2	1.2	NA
7/16/2005	26	4	1	610	1	3	1.3	NA
7/16/2005	26	5	1	630	1	3	1.3	NA
7/16/2005	26	6	2	510	NA	NA	NA	3
7/16/2005	26	7	1	620	1	3	1.3	NA
7/17/2005	27	1	1	600	1	3	1.3	NA
7/17/2005	27	2	1	590	NA	NA	NA	3
7/17/2005	27	3	2	540	1	2	1.2	NA
7/17/2005	27	4	1	590	1	2	1.2	NA
7/17/2005	27	5	2	580	1	3	1.3	NA
7/17/2005	27	6	1	620	1	3	1.3	NA
7/18/2005	28	1	1	610	1	3	1.3	NA
7/18/2005	28	2	2	560	1	3	1.3	NA
7/19/2005	29	1	2	660	1	3	1.3	NA
7/19/2005	29	2	1	630	NA	NA	NA	3
7/19/2005	29	3	1	620	1	3	1.3	NA
7/19/2005	29	4	1	640	NA	NA	NA	4
7/19/2005	29	5	1	630	1	3	1.3	NA
7/19/2005	29	6	1	660	1	3	1.3	NA
7/19/2005	29	7	1	650	1	3	1.3	NA
7/19/2005	29	8	1	620	NA	NA	NA	3
7/19/2005	29	9	1	620	1	3	1.3	NA
7/19/2005	29	10	1	670	1	3	1.3	NA
7/19/2005	29	11	1	650	NA	NA	NA	3
7/20/2005	30	1	1	590	1	2	1.2	NA
7/20/2005	30	2	1	600	NA	NA	NA	3

7/20/2005	30	3	2	570	1	3	1.3	NA
7/20/2005	30	4	1	640	1	3	1.3	NA
7/20/2005	30	5	1	570	1	2	1.2	NA
7/20/2005	30	6	1	580	1	2	1.2	NA
7/20/2005	30	7	1	610	1	3	1.3	NA
7/20/2005	30	8	1	610	1	3	1.3	NA
7/20/2005	30	9	1	590	1	2	1.2	NA
7/20/2005	30	10	1	600	1	3	1.3	NA
7/21/2005	31	1	1	600	1	3	1.3	NA
7/21/2005	31	2	1	610	NA	NA	NA	3
7/21/2005	31	3	1	610	1	3	1.3	NA
7/21/2005	31	4	1	630	1	3	1.3	NA
7/21/2005	31	5	1	600	NA	NA	NA	3
7/21/2005	31	6	1	610	NA	NA	NA	3
7/21/2005	31	7	2	550	1	2	1.2	NA
7/21/2005	31	8	1	600	1	3	1.3	NA
7/21/2005	31	9	1	610	NA	NA	NA	3
7/21/2005	31	10	1	610	1	3	1.3	NA
7/21/2005	31	11	1	550	1	2	1.2	NA
7/21/2005	31	12	1	600	1	3	1.3	NA
7/21/2005	31	13	1	600	NA	NA	NA	3
7/21/2005	31	14	2	590	1	3	1.3	NA
7/21/2005	31	15	1	610	1	3	1.3	NA
7/21/2005	31	16	2	590	NA	NA	NA	3
7/21/2005	31	17	2	600	1	3	1.3	NA
7/21/2005	31	18	1	600	1	3	1.3	NA
7/21/2005	31	19	1	580	1	2	1.2	NA
7/21/2005	31	20	2	560	NA	NA	NA	3
7/21/2005	31	21	2	570	NA	NA	NA	3
7/21/2005	31	22	2	560	1	3	1.3	NA
7/21/2005	31	23	2	550	1	2	1.2	NA
7/21/2005	31	24	2	540	1	2	1.2	NA
7/21/2005	31	25	1	600	1	3	1.3	NA
7/21/2005	31	26	1	570	1	2	1.2	NA
7/21/2005	31	27	1	600	1	3	1.3	NA
7/21/2005	31	28	2	510	1	2	1.2	NA
7/21/2005	31	29	2	600	NA	NA	NA	5
7/21/2005	31	30	1	590	1	2	1.2	NA
7/22/2005	32	1	2	570	1	3	1.3	NA
7/22/2005	32	2	2	550	1	2	1.2	NA
7/22/2005	32	3	1	560	1	2	1.2	NA
7/22/2005	32	4	1	570	1	2	1.2	NA
7/22/2005	32	5	1	620	1	3	1.3	NA
7/22/2005	32	6	1	590	1	2	1.2	NA
7/22/2005	32	7	1	600	NA	NA	NA	3
7/22/2005	32	8	1	600	1	3	1.3	NA
7/22/2005	32	9	1	570	1	2	1.2	NA
7/22/2005	32	10	1	580	NA	NA	NA	3
7/22/2005	32	11	1	590	1	2	1.2	NA
7/22/2005	32	12	1	580	1	2	1.2	NA
7/22/2005	32	13	1	590	1	2	1.2	NA
7/22/2005	32	14	2	580	1	3	1.3	NA

7/22/2005	32	15	1	610	NA	NA	NA	3
7/22/2005	32	16	1	620	1	3	1.3	NA
7/22/2005	32	17	1	630	1	3	1.3	NA
7/22/2005	32	18	2	620	1	3	1.3	NA
7/22/2005	32	19	1	600	1	3	1.3	NA
7/22/2005	32	20	1	600	1	3	1.3	NA
7/22/2005	32	21	2	570	1	3	1.3	NA
7/22/2005	32	22	2	570	1	3	1.3	NA
7/22/2005	32	23	1	620	1	3	1.3	NA
7/22/2005	32	24	1	610	1	3	1.3	NA
7/22/2005	32	25	1	600	NA	NA	NA	5
7/22/2005	32	26	2	590	1	3	1.3	NA
7/22/2005	32	27	2	570	1	3	1.3	NA
7/22/2005	32	28	1	600	1	3	1.3	NA
7/22/2005	32	29	2	540	1	2	1.2	NA
7/22/2005	32	30	1	600	1	3	1.3	NA
7/23/2005	33	1	1	630	1	3	1.3	NA
7/23/2005	33	2	1	640	1	3	1.3	NA
7/23/2005	33	3	1	610	1	3	1.3	NA
7/23/2005	33	4	1	650	1	3	1.3	NA
7/23/2005	33	5	2	560	1	3	1.3	NA
7/23/2005	33	6	1	580	1	2	1.2	NA
7/23/2005	33	7	1	590	1	2	1.2	NA
7/23/2005	33	8	1	610	1	3	1.3	NA
7/23/2005	33	9	1	640	1	3	1.3	NA
7/23/2005	33	10	1	630	1	3	1.3	NA
7/23/2005	33	11	1	600	1	3	1.3	NA
7/23/2005	33	12	2	510	1	2	1.2	NA
7/23/2005	33	13	1	590	1	2	1.2	NA
7/23/2005	33	14	1	610	1	3	1.3	NA
7/23/2005	33	15	1	610	1	3	1.3	NA
7/23/2005	33	16	1	610	1	3	1.3	NA
7/23/2005	33	17	1	580	1	2	1.2	NA
7/23/2005	33	18	1	620	NA	NA	NA	3
7/23/2005	33	19	1	580	1	2	1.2	NA
7/23/2005	33	20	2	620	1	3	1.3	NA
7/23/2005	33	21	1	610	1	3	1.3	NA
7/23/2005	33	22	1	580	1	2	1.2	NA
7/23/2005	33	23	1	600	1	3	1.3	NA
7/23/2005	33	24	1	580	1	2	1.2	NA
7/23/2005	33	25	1	600	1	3	1.3	NA
7/23/2005	33	26	1	530	1	2	1.2	NA
7/23/2005	33	27	1	630	1	3	1.3	NA
7/23/2005	33	28	2	560	1	3	1.3	NA
7/23/2005	33	29	2	580	1	3	1.3	NA
7/23/2005	33	30	1	600	NA	NA	NA	3
7/23/2005	33	31	1	580	NA	NA	NA	3
7/23/2005	33	32	1	610	1	3	1.3	NA
7/23/2005	33	33	2	580	1	3	1.3	NA
7/23/2005	33	34	1	640	1	3	1.3	NA
7/23/2005	33	35	1	620	NA	NA	NA	3
7/23/2005	33	36	2	620	1	3	1.3	NA

7/23/2005	33	37	1	600	1	3	1.3	NA
7/23/2005	33	38	1	630	1	3	1.3	NA
7/23/2005	33	39	2	570	1	3	1.3	NA
7/24/2005	34	1	1	640	1	3	1.3	NA
7/24/2005	34	2	1	600	1	3	1.3	NA
7/24/2005	34	3	1	600	1	3	1.3	NA
7/24/2005	34	4	1	600	1	3	1.3	NA
7/25/2005	35	1	2	570	1	3	1.3	NA
7/25/2005	35	2	1	590	1	2	1.2	NA
7/25/2005	35	3	2	550	1	2	1.2	NA
7/25/2005	35	4	1	630	NA	NA	NA	3
7/25/2005	35	5	1	600	NA	NA	NA	3
7/25/2005	35	6	1	640	NA	NA	NA	3
7/25/2005	35	7	1	610	1	3	1.3	NA
7/25/2005	35	8	1	590	NA	NA	NA	3
7/25/2005	35	9	1	610	1	3	1.3	NA
7/25/2005	35	10	2	560	1	3	1.3	NA
7/25/2005	35	11	1	590	1	2	1.2	NA
7/25/2005	35	12	1	590	NA	NA	NA	3
7/25/2005	35	13	1	610	NA	NA	NA	3
7/25/2005	35	14	1	620	1	3	1.3	NA
7/25/2005	35	15	2	560	1	3	1.3	NA
7/25/2005	35	16	1	610	NA	NA	NA	4
7/25/2005	35	17	1	660	1	3	1.3	NA
7/25/2005	35	18	2	580	NA	NA	NA	3
7/26/2005	36	1	1	600	NA	NA	NA	3
7/26/2005	36	2	1	590	1	2	1.2	NA
7/26/2005	36	3	1	610	1	3	1.3	NA
7/26/2005	36	4	1	640	NA	NA	NA	3
7/26/2005	36	5	1	610	1	3	1.3	NA
7/26/2005	36	6	1	620	1	3	1.3	NA
7/26/2005	36	7	1	585	NA	NA	NA	3
7/26/2005	36	8	2	570	1	3	1.3	NA
7/26/2005	36	9	1	610	1	3	1.3	NA
7/26/2005	36	10	1	600	1	3	1.3	NA
7/26/2005	36	11	2	600	1	3	1.3	NA
7/26/2005	36	12	1	520	NA	NA	NA	5
7/26/2005	36	13	1	610	1	3	1.3	NA
7/26/2005	36	14	1	620	NA	NA	NA	3
7/26/2005	36	15	1	610	1	3	1.3	NA
7/27/2005	37	1	1	610	1	3	1.3	NA
7/27/2005	37	2	1	630	1	3	1.3	NA
7/27/2005	37	3	1	600	1	3	1.3	NA
7/27/2005	37	4	1	650	1	3	1.3	NA
7/27/2005	37	5	1	600	1	3	1.3	NA
7/27/2005	37	6	1	620	1	3	1.3	NA
7/27/2005	37	7	1	600	NA	NA	NA	3
7/27/2005	37	8	1	610	1	3	1.3	NA
7/27/2005	37	9	1	630	1	3	1.3	NA
7/27/2005	37	10	1	600	NA	NA	NA	4
7/27/2005	37	11	1	650	NA	NA	NA	3
7/27/2005	37	12	1	610	NA	NA	NA	3

7/27/2005	37	13	1	580	NA	NA	NA	3
7/27/2005	37	14	1	600	1	3	1.3	NA
7/27/2005	37	15	1	580	1	2	1.2	NA
7/27/2005	37	16	1	620	1	3	1.3	NA
7/27/2005	37	17	1	670	1	3	1.3	NA
7/27/2005	37	18	1	620	1	3	1.3	NA
7/27/2005	37	19	1	600	1	3	1.3	NA
7/27/2005	37	20	1	600	1	3	1.3	NA
7/28/2005	38	1	1	630	1	3	1.3	NA
7/28/2005	38	2	1	630	1	3	1.3	NA
7/28/2005	38	3	1	610	1	3	1.3	NA
7/28/2005	38	4	1	630	1	3	1.3	NA
7/28/2005	38	5	1	600	1	3	1.3	NA
7/28/2005	38	6	1	600	1	3	1.3	NA
7/28/2005	38	7	2	580	1	3	1.3	NA
7/28/2005	38	8	1	600	1	3	1.3	NA
7/28/2005	38	9	1	610	1	3	1.3	NA
7/28/2005	38	10	1	640	1	3	1.3	NA
7/28/2005	38	11	2	530	1	2	1.2	NA
7/28/2005	38	12	1	600	1	3	1.3	NA
7/29/2005	39	1	1	620	1	3	1.3	NA
7/29/2005	39	2	1	610	1	3	1.3	NA
7/29/2005	39	3	2	620	1	3	1.3	NA
7/29/2005	39	4	1	600	1	3	1.3	NA
7/29/2005	39	5	1	630	1	3	1.3	NA
7/29/2005	39	6	2	600	1	3	1.3	NA
7/29/2005	39	7	1	620	NA	NA	NA	5
7/29/2005	39	8	1	600	1	3	1.3	NA
7/29/2005	39	9	1	600	1	3	1.3	NA
7/29/2005	39	10	1	620	NA	NA	NA	3
7/29/2005	39	11	1	580	1	2	1.2	NA
7/29/2005	39	12	1	610	1	3	1.3	NA
7/29/2005	39	13	1	610	1	3	1.3	NA
7/29/2005	39	14	2	540	1	2	1.2	NA
7/29/2005	39	15	1	630	1	3	1.3	NA
7/29/2005	39	16	1	630	NA	NA	NA	3
7/29/2005	39	17	1	600	NA	NA	NA	5
7/29/2005	39	18	1	630	1	3	1.3	NA
7/29/2005	39	19	2	630	1	3	1.3	NA
7/29/2005	39	20	2	600	1	3	1.3	NA
7/29/2005	39	21	1	620	1	3	1.3	NA
7/30/2005	40	1	1	610	1	3	1.3	NA
8/8/2005	41	1	2	560	1	3	1.3	NA
8/8/2005	41	2	1	580	1	2	1.2	NA
8/8/2005	41	3	1	620	1	3	1.3	NA
8/8/2005	41	4	1	570	1	2	1.2	NA
8/8/2005	41	5	2	570	NA	NA	NA	3
8/8/2005	41	6	1	580	1	2	1.2	NA
8/8/2005	41	7	1	600	1	3	1.3	NA
8/8/2005	41	8	1	570	1	2	1.2	NA
8/8/2005	41	9	2	590	NA	NA	NA	5
8/8/2005	41	10	1	590	1	2	1.2	NA

8/8/2005	41	11	1	620	1	3	1.3	NA
8/8/2005	41	12	2	580	1	3	1.3	NA
8/8/2005	41	13	1	630	1	3	1.3	NA
8/9/2005	42	1	1	640	1	3	1.3	NA
8/9/2005	42	2	1	610	1	3	1.3	NA
8/9/2005	42	3	1	550	1	2	1.2	NA
8/9/2005	42	4	1	610	1	3	1.3	NA
8/9/2005	42	5	1	650	1	3	1.3	NA
8/9/2005	42	6	2	580	1	3	1.3	NA
8/9/2005	42	7	2	560	NA	NA	NA	3
8/9/2005	42	8	1	600	1	3	1.3	NA
8/9/2005	42	9	1	600	1	3	1.3	NA
8/9/2005	42	10	2	570	1	3	1.3	NA
8/9/2005	42	11	2	550	1	2	1.2	NA
8/9/2005	42	12	1	600	1	3	1.3	NA
8/9/2005	42	13	2	570	1	3	1.3	NA
8/9/2005	42	14	2	540	1	2	1.2	NA
8/9/2005	42	15	2	560	1	3	1.3	NA
8/9/2005	42	16	2	580	1	3	1.3	NA
8/10/2005	43	1	1	610	1	3	1.3	NA
8/10/2005	43	2	2	560	1	3	1.3	NA
8/10/2005	43	3	2	560	1	3	1.3	NA
8/10/2005	43	4	1	560	1	2	1.2	NA
8/10/2005	43	5	1	600	1	3	1.3	NA
8/10/2005	43	6	1	630	NA	NA	NA	3
8/10/2005	43	7	2	690	1	3	1.3	NA
8/10/2005	43	8	2	600	1	3	1.3	NA
8/10/2005	43	9	1	650	1	3	1.3	NA
8/10/2005	43	10	2	600	1	3	1.3	NA
8/10/2005	43	11	1	630	1	3	1.3	NA
8/10/2005	43	12	1	530	1	2	1.2	NA
8/10/2005	43	13	2	590	1	3	1.3	NA
8/10/2005	43	14	1	550	1	2	1.2	NA
8/10/2005	43	15	2	580	NA	NA	NA	3
8/10/2005	43	16	2	580	1	3	1.3	NA
8/10/2005	43	17	1	610	1	3	1.3	NA
8/10/2005	43	18	1	580	1	2	1.2	NA
8/11/2005	44	1	2	580	1	3	1.3	NA
8/12/2005	45	1	1	610	1	3	1.3	NA
8/15/2005	46	1	1	620	1	3	1.3	NA
8/16/2005	47	1	1	640	1	3	1.3	NA
8/21/2005	48	1	1	600	1	3	1.3	NA
8/21/2005	48	2	2	580	1	3	1.3	NA
8/21/2005	48	3	1	610	NA	NA	NA	3
8/21/2005	48	4	2	590	1	3	1.3	NA
8/21/2005	48	5	2	560	NA	NA	NA	4
8/22/2005	49	1	2	570	NA	NA	NA	3
8/22/2005	49	2	2	550	1	2	1.2	NA
8/22/2005	49	3	1	590	1	2	1.2	NA
8/22/2005	49	4	1	620	1	3	1.3	NA
8/22/2005	49	5	1	510	1	2	1.2	NA
8/22/2005	49	6	1	580	1	2	1.2	NA

8/22/2005	49	7	1	610	NA	NA	NA	4
8/22/2005	49	8	2	550	1	2	1.2	NA
8/22/2005	49	9	1	590	1	2	1.2	NA
8/23/2005	50	1	2	570	1	3	1.3	NA
8/23/2005	50	2	1	540	NA	NA	NA	3
8/23/2005	50	3	2	510	1	2	1.2	NA
8/23/2005	50	4	2	560	NA	NA	NA	3
8/24/2005	51	1	1	620	1	3	1.3	NA
8/24/2005	51	2	2	570	1	3	1.3	NA
8/24/2005	51	3	1	650	1	3	1.3	NA
8/24/2005	51	4	1	660	1	3	1.3	NA
8/24/2005	51	5	2	560	1	3	1.3	NA
8/24/2005	51	6	1	590	NA	NA	NA	5
8/24/2005	51	7	1	630	1	3	1.3	NA
8/25/2005	52	1	1	610	NA	NA	NA	4
8/25/2005	52	2	2	530	1	2	1.2	NA
8/25/2005	52	3	1	600	NA	NA	NA	3
8/25/2005	52	4	2	560	NA	NA	NA	3
8/25/2005	52	5	1	620	1	3	1.3	NA
8/25/2005	52	6	1	590	1	2	1.2	NA
8/25/2005	52	7	1	630	NA	NA	NA	3
8/25/2005	52	8	1	640	NA	NA	NA	3
8/25/2005	52	9	2	560	1	3	1.3	NA
8/25/2005	52	10	1	560	NA	NA	NA	3
8/25/2005	52	11	1	610	1	3	1.3	NA
8/25/2005	52	12	1	640	NA	NA	NA	2
8/26/2005	53	1	1	620	1	3	1.3	NA
8/26/2005	53	2	2	570	1	3	1.3	NA
8/26/2005	53	3	1	590	1	2	1.2	NA
8/27/2005	54	1	1	580	1	2	1.2	NA
8/27/2005	54	2	2	570	NA	NA	NA	2
8/27/2005	54	3	1	600	1	3	1.3	NA
8/27/2005	54	4	1	540	NA	NA	NA	2
8/27/2005	54	5	1	640	1	3	1.3	NA
8/27/2005	54	6	2	570	1	3	1.3	NA
8/27/2005	54	7	2	580	1	3	1.3	NA
8/27/2005	54	8	1	630	NA	NA	NA	3
8/27/2005	54	9	1	630	1	3	1.3	NA
8/28/2005	55	1	2	570	1	3	1.3	NA
8/28/2005	55	2	1	610	1	3	1.3	NA
8/28/2005	55	3	1	640	1	3	1.3	NA
8/28/2005	55	4	1	600	NA	NA	NA	4
8/28/2005	55	5	1	580	1	2	1.2	NA
8/28/2005	55	6	2	550	1	2	1.2	NA
8/28/2005	55	7	1	620	1	3	1.3	NA
8/28/2005	55	8	1	590	1	2	1.2	NA
8/28/2005	55	9	1	610	1	3	1.3	NA
8/28/2005	55	10	1	590	NA	NA	NA	3
8/28/2005	55	11	1	600	1	3	1.3	NA
8/28/2005	55	12	2	600	1	3	1.3	NA
8/28/2005	55	13	2	620	1	3	1.3	NA
8/28/2005	55	14	2	550	1	2	1.2	NA

8/28/2005	55	15	1	590	1	2	1.2	NA
8/28/2005	55	16	1	610	1	3	1.3	NA
8/28/2005	55	17	1	640	1	3	1.3	NA
8/28/2005	55	18	1	610	1	3	1.3	NA
8/28/2005	55	19	1	630	NA	NA	NA	3
8/28/2005	55	20	2	540	1	2	1.2	NA
8/28/2005	55	21	2	570	1	3	1.3	NA
8/28/2005	55	22	1	630	1	3	1.3	NA
8/29/2005	56	1	1	640	NA	NA	NA	4
8/29/2005	56	2	2	600	1	3	1.3	NA
8/29/2005	56	3	1	600	1	3	1.3	NA
8/29/2005	56	4	1	610	NA	NA	NA	4
8/29/2005	56	5	1	580	1	2	1.2	NA
8/29/2005	56	6	2	580	1	3	1.3	NA
8/29/2005	56	7	1	580	1	2	1.2	NA
8/29/2005	56	8	2	560	1	3	1.3	NA
8/29/2005	56	9	2	540	1	2	1.2	NA
8/29/2005	56	10	1	640	1	3	1.3	NA
8/29/2005	56	11	1	620	1	3	1.3	NA
8/29/2005	56	12	2	550	1	2	1.2	NA
8/30/2005	57	1	1	560	1	2	1.2	NA
8/30/2005	57	2	1	590	NA	NA	NA	3
8/30/2005	57	3	2	590	1	3	1.3	NA
8/30/2005	57	4	1	580	NA	NA	NA	2
8/30/2005	57	5	3	NA	1	NA	NA	NA
8/30/2005	57	6	3	NA	1	NA	NA	NA
8/30/2005	57	7	3	NA	1	NA	NA	NA
8/30/2005	57	8	3	NA	NA	NA	NA	4
8/30/2005	57	9	3	NA	NA	NA	NA	5
8/30/2005	57	10	3	NA	NA	NA	NA	4
8/30/2005	57	11	3	NA	1	NA	NA	NA
8/30/2005	57	12	3	NA	1	NA	NA	NA
8/30/2005	57	13	3	NA	1	NA	NA	NA
8/30/2005	57	14	3	NA	1	NA	NA	NA
8/30/2005	57	15	3	NA	1	NA	NA	NA
8/31/2005	58	1	1	595	1	3	1.3	NA
8/31/2005	58	2	1	580	1	2	1.2	NA
8/31/2005	58	3	2	550	1	2	1.2	NA
8/31/2005	58	4	1	620	1	3	1.3	NA
8/31/2005	58	5	1	610	1	3	1.3	NA
9/1/2005	59	1	2	580	1	3	1.3	NA
9/1/2005	59	2	1	600	1	3	1.3	NA
9/1/2005	59	3	2	540	1	2	1.2	NA
9/1/2005	59	4	2	540	1	2	1.2	NA
9/1/2005	59	5	2	550	1	2	1.2	NA
9/1/2005	59	6	1	600	1	3	1.3	NA
9/1/2005	59	7	2	550	1	2	1.2	NA
9/1/2005	59	8	1	620	1	3	1.3	NA
9/1/2005	59	9	1	590	NA	NA	NA	3
9/1/2005	59	10	2	560	1	3	1.3	NA
9/1/2005	59	11	1	600	1	3	1.3	NA
9/1/2005	59	12	1	600	1	3	1.3	NA

9/1/2005	59	13	2	610	1	3	1.3	NA
9/1/2005	59	14	1	660	1	3	1.3	NA
9/1/2005	59	15	1	610	NA	NA	NA	2
9/1/2005	59	16	2	500	1	2	1.2	NA
9/1/2005	59	17	1	580	1	2	1.2	NA
9/2/2005	60	1	1	620	1	3	1.3	NA
9/2/2005	60	2	1	580	1	2	1.2	NA
9/2/2005	60	3	1	620	1	3	1.3	NA
9/2/2005	60	4	1	610	NA	NA	NA	3
9/2/2005	60	5	1	600	1	3	1.3	NA
9/3/2005	61	1	2	500	NA	NA	NA	3
9/4/2005	62	1	1	630	1	3	1.3	NA
9/4/2005	62	2	2	570	NA	NA	NA	3
9/4/2005	62	3	1	630	1	3	1.3	NA
9/4/2005	62	4	1	610	1	3	1.3	NA
9/4/2005	62	5	1	610	NA	NA	NA	4
9/4/2005	62	6	1	620	1	3	1.3	NA
9/5/2005	63	1	2	570	NA	NA	NA	4
9/5/2005	63	2	1	650	1	3	1.3	NA
9/5/2005	63	3	1	620	NA	NA	NA	3
9/5/2005	63	4	2	540	1	2	1.2	NA
9/5/2005	63	5	2	530	1	2	1.2	NA
9/5/2005	63	6	1	600	1	3	1.3	NA
9/5/2005	63	7	1	590	1	2	1.2	NA
9/5/2005	63	8	1	630	1	3	1.3	NA
9/5/2005	63	9	1	620	1	3	1.3	NA
9/5/2005	63	10	2	590	1	3	1.3	NA
9/6/2005	64	1	2	540	1	2	1.2	NA
9/6/2005	64	2	2	530	1	2	1.2	NA
9/6/2005	64	3	2	540	1	2	1.2	NA
9/6/2005	64	4	1	540	1	2	1.2	NA
9/6/2005	64	5	1	570	1	2	1.2	NA
9/6/2005	64	6	2	570	1	3	1.3	NA
9/6/2005	64	7	1	600	1	3	1.3	NA
9/6/2005	64	8	1	600	NA	NA	NA	3
9/6/2005	64	9	1	600	1	3	1.3	NA
9/6/2005	64	10	2	570	1	3	1.3	NA
9/7/2005	65	1	2	560	1	3	1.3	NA
9/7/2005	65	2	1	610	1	3	1.3	NA
9/7/2005	65	3	1	580	1	2	1.2	NA
9/7/2005	65	4	1	600	1	3	1.3	NA
9/7/2005	65	5	1	610	1	3	1.3	NA
9/7/2005	65	6	2	590	1	3	1.3	NA
9/7/2005	65	7	2	600	NA	NA	NA	3
9/8/2005	66	1	1	630	1	3	1.3	NA
9/8/2005	66	2	1	600	1	3	1.3	NA
9/8/2005	66	3	1	590	1	2	1.2	NA
9/8/2005	66	4	2	570	NA	NA	NA	4
9/9/2005	67	1	1	600	1	3	1.3	NA
9/9/2005	67	2	2	570	1	3	1.3	NA
9/10/2005	68	1	2	570	1	3	1.3	NA
9/10/2005	68	2	2	570	1	3	1.3	NA

9/10/2005	68	3	2	580	NA	NA	NA	5
9/11/2005	69	1	2	600	1	3	1.3	NA
9/11/2005	69	2	1	610	1	3	1.3	NA
9/11/2005	69	3	2	560	NA	NA	NA	3
9/11/2005	69	4	2	560	1	3	1.3	NA
9/12/2005	70	1	1	650	1	3	1.3	NA
9/12/2005	70	2	2	530	NA	NA	NA	8
9/13/2005	71	1	1	640	1	3	1.3	NA
9/13/2005	71	2	1	650	1	3	1.3	NA
9/13/2005	71	3	1	610	1	3	1.3	NA
9/13/2005	71	4	1	600	1	3	1.3	NA
9/13/2005	71	5	1	630	1	3	1.3	NA
9/13/2005	71	6	1	590	1	2	1.2	NA
9/13/2005	71	7	1	620	1	3	1.3	NA
9/13/2005	71	8	2	590	1	3	1.3	NA
9/14/2005	72	1	1	570	1	2	1.2	NA
9/14/2005	72	2	1	630	NA	NA	NA	2
9/14/2005	72	3	1	580	1	2	1.2	NA
9/14/2005	72	4	2	580	1	3	1.3	NA
9/15/2005	73	1	1	580	1	2	1.2	NA
9/15/2005	73	2	2	580	1	3	1.3	NA
9/16/2005	74	1	2	580	1	3	1.3	NA
9/16/2005	74	2	2	580	1	3	1.3	NA
9/16/2005	74	3	2	530	1	2	1.2	NA
9/18/2005	75	1	1	620	1	3	1.3	NA
9/18/2005	75	2	1	610	1	3	1.3	NA
9/20/2005	76	1	2	600	1	3	1.3	NA
9/20/2005	76	2	2	550	1	2	1.2	NA
9/20/2005	76	3	1	610	1	3	1.3	NA
9/20/2005	76	4	1	610	NA	NA	NA	4
9/21/2005	77	1	1	590	1	2	1.2	NA
9/22/2005	78	1	2	600	1	3	1.3	NA
9/22/2005	78	2	2	590	1	3	1.3	NA