Trapper Lake
Adult Sockeye Salmon
Data Report
2009

Prepared by:
CIAA Staff
2012

The Trapper Lake Project was made possible through an Alaskan Sustainable Salmon Fund grant received from the Alaska Department of Fish & Game and the National Oceanic and Atmospheric Administration and a State of Alaska Designated Legislative Grant.

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DISCLAIMER

The Cook Inlet Aquaculture Association (CIAA) conducts salmon enhancement and restoration projects in Area H, Cook Inlet and associated waters. As an integral part of these projects a variety of monitoring and evaluation studies are conducted. The following data report is a synopsis of the monitoring and evaluation studies conducted for Trapper Lake. The Trapper Lake Data Report encompasses data collected from the 2009 adult sockeye escapement as it falls under the Alaskan Sustainable Salmon Fund.

The purpose of the data report is to provide a vehicle to distribute the information produced by the monitoring and evaluation studies. Data collected each year are presented with a summary of the information previously collected for comparative purposes. These reports are intended to provide a general description of project activity and are not an exhaustive evaluation of any restoration or enhancement project. The information presented in this report has not undergone an extensive review. As reviews are completed, the information may be updated and presented in other reports.

The Trapper Lake Data Report was prepared by CIAA under award of the Alaskan Sustainable Salmon Fund 45888 from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, administered by the Alaska Department of Fish and Game (ADF&G). The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration, the U.S. Department of Commerce, or ADF&G.

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Our equal employment opportunity philosophy applies to all aspects of employment with CIAA including recruiting, hiring, training, transfer, promotion, job benefits, pay, dismissal, and educational assistance.

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ACKNOWLEDGEMENTS

Many individuals and agencies contributed to the success of the Trapper Lake Project. Appreciation is extended to Cook Inlet Aquaculture Association Interns Tom Blanton, Jeffrey Williams, Tim Miller, and seasonal employees Eric Fluette and Justin Brown, as well as all full time staff who aided in the field. Special thanks are also extended to the Alaska Department of Fish and Game for the support they provided during this project.

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ABSTRACT

As part of the continued evaluation of lakes in the Susitna River watershed to determine the sockeye salmon (*Onchorhynchus nerka*) abundance in key salmon producing lakes with and without northern pike (*Esox lucius*), Cook Inlet Aquaculture Association (CIAA) and the Alaska Department of Fish and Game (ADF&G) agreed to monitor adult sockeye salmon returns to Trapper Lake. Trapper Lake was known to have a population of northern pike.

During the 2009 adult escapement, environmental conditions were monitored from 17 July through 2 September. Water levels fluctuated ±1.31 feet during that time period. Stream temperatures averaged 17.3ºC (±0.22 SE) and ranged from 14 to 20ºC. Air temperatures averaged 19.3ºC (±0.60 SE) and ranged from 12 to 30ºC. A total of 149 mm of rain fell during that period.

The adult escapement was enumerated from 17 July through 2 September. During that time, no adult sockeye salmon returned to Trapper Lake.

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INTRODUCTION AND PURPOSE

To better understand the recent low adult sockeye salmon *(Onchorhynchus nerka)* returns to Upper Cook Inlet, the Cook Inlet Aquaculture Association (CIAA), in cooperation with the Alaska Department of Fish & Game (ADF&G), is assessing sockeye salmon populations at several key salmon producing lakes with and without northern pike *(Esox lucius)* in the Susitna River drainage. The overall objective of this effort is to enumerate the smolt and adult returns and to assess the characteristics of these populations in terms of age composition, sex and size. Additionally, for some lake systems, CIAA and/or ADF&G are recording environmental conditions and water quality measurements as well as genetic samples, mark-recapture studies and hydroacoustic surveys. The goal is to collect sound biological data to provide the foundation on which decisions for management and rehabilitation strategies can be made. Understanding the adult to juvenile relationship will allow management biologists to analyze and evaluate the production and rearing condition of each lake.

The enumeration of adult salmon returns to Trapper Lake was completed in the first year of a three year effort to enumerate salmon returns to the Susitna River drainage. Trapper Lake was chosen for enumeration because invasive northern pike were known to be present.

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PROJECT AREA

Trapper Lake is located approximately 35 km Southwest of Talkeetna, Alaska (Figure 1). The Lake is located in T22N, R5W, Section 28. The lake lies in the heart of the Susitna River Valley, and has a surface elevation of 58 m. Trapper Lake has a surface area of 461 ha, and total volume of 6.46 x 10^6 m^3. Trapper Lake has a maximum depth of 6.4 m, and a mean depth of 1.4 m (Figure 2). Tributaries to Trapper Lake include two unnamed creeks, one which is on the north side of the lake, with the other lying on the southeast side. The lake's discharge forms Trapper Creek, which flows approximately 32 km to the Susitna River.

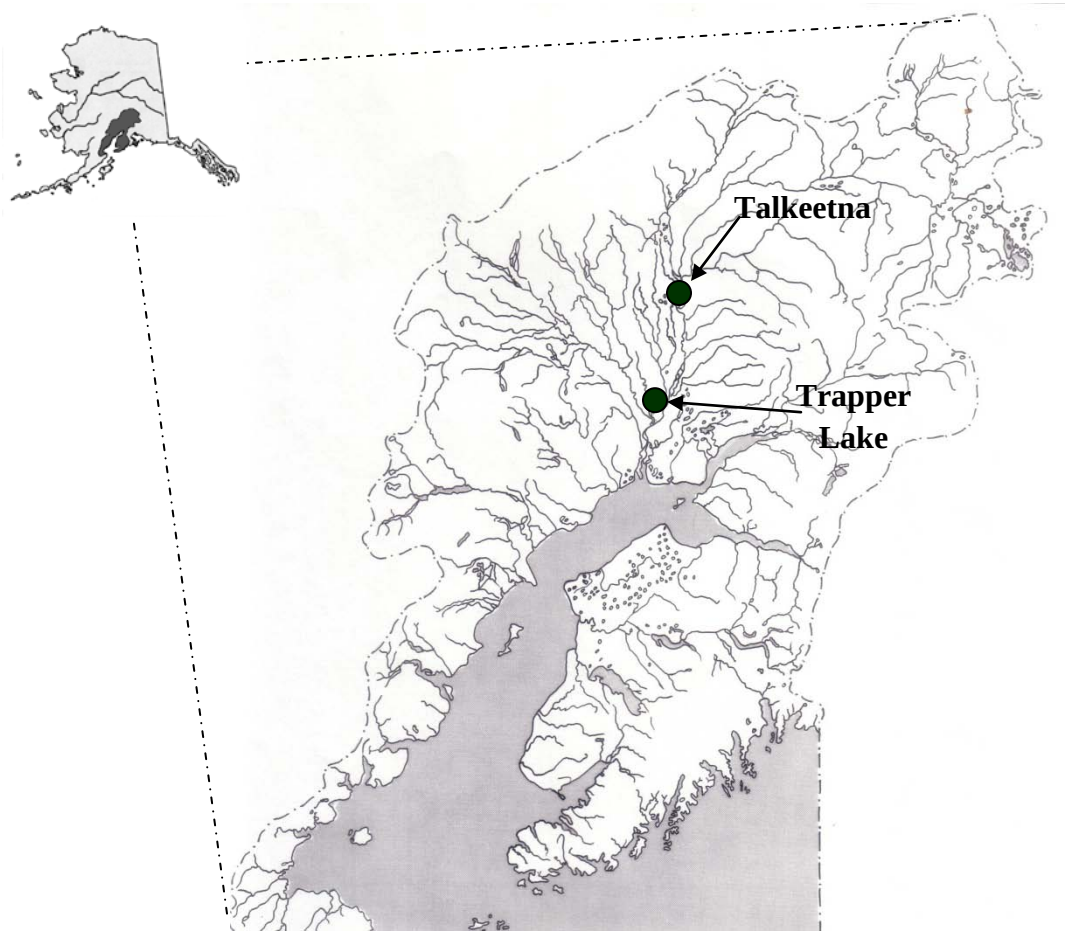

Figure 1: Trapper Lake in relation to Cook Inlet and Alaska

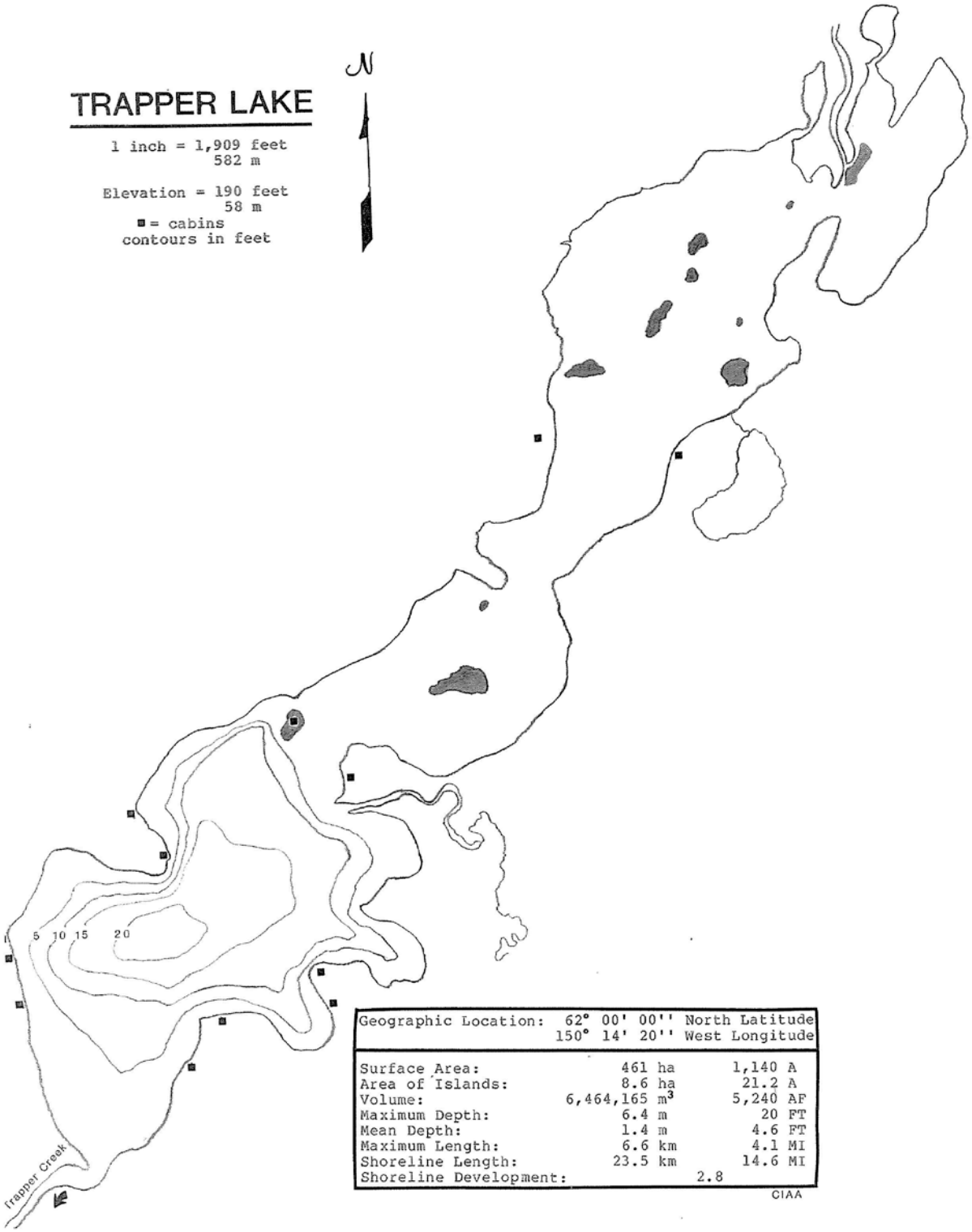

Figure 2: Bathymetric map of Trapper Lake

METHODS

Environmental Conditions

To assess the environmental conditions during the adult sockeye salmon migration to Trapper Lake, percent cloud cover was visually estimated, stream stage measured to the nearest tenth of a foot, and precipitation measured to the nearest millimeter and water and air temperatures to the nearest 1ºC were recorded at 5:00 PM daily. Standard CIAA procedures were followed for collecting these observations (CIAA 2009).

Weir

To enumerate returning adult salmon and facilitate data collection, a fixed picket weir approximately 12 meters wide was temporarily installed across Trapper Creek, approximately 70 meters downstream from the outlet of Trapper Lake. The weir was constructed of 1.9 cm galvanized pipe and 7.6 cm aluminum channel. The galvanized pipe was picketed through 1.9 cm holes in the aluminum channel spaced 2.54 cm apart.

Adult Enumeration

Passage counts were conducted several times daily. CIAA adult salmon enumeration normally includes assessment of the sex, age (scales), and mideye fork length (MEF)[1] of up to 40 randomly selected adult sockeye daily (CIAA 2009). Due to no returns, no sampling occurred.

[1] MEF length is defined as the measurement to the nearest millimeter from the middle of the eye to the fork of the tail.

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RESULTS

Environmental Conditions

During the 2009 adult escapement, environmental conditions were monitored from 17 July through 2 September. Water levels fluctuated 1.31 feet during that time period. The fluctuation in water level includes an unusually low staff gauge reading that was reported on 29 July (Appendix 2). The cause, whether personnel error or otherwise, is unknown. Stream temperatures averaged 17.3ºC (±0.22 SE) and ranged from 14 to 20ºC. Air temperatures averaged 19.3ºC (±0.60 SE) and ranged from 12 to 30ºC. Ten percent of the days were clear, 46% were partly cloudy, and 44% were completely overcast. Measurable rain was recorded on 30 days of the escapement. A total of 149 mm of rain fell during that period.

Adult Enumeration

The adult escapement was enumerated from 17 July through 2 September. During that time, zero adult sockeye salmon returned to Trapper Lake. No other fish species were recorded during that time.

On 6 August, CIAA personnel conducted beaver dam surveys below the weir by foot. Field crews noted 11 beaver dams relatively close to the weir downstream. Of those, 8 were completely blocking upstream fish passage and were then notched to facilitate potential upstream movement. No fish were observed below the dams.

On 11 August, CIAA personnel flew a beaver dam survey of Trapper Creek. There were >20 beaver dams on the creek. Four dams were notched to facilitate upstream fish movement. Just upstream from the confluence with the main river, one unidentified salmon was seen below a dam after modification. Dams ranged in size from 20 to 80 feet wide, and up to 8 feet tall.

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RECOMMENDATIONS

No adult sockeye returned to Trapper Lake in 2009 and additional salmon monitoring is not warranted. However, Trapper Lake should be evaluated for control and/or removal of northern pike and habitat conditions (limnology) evaluated to assess the potential for reintroducing salmon to the lake.

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LITERATURE CITED

CIAA 2009. Trapper Lake Adult Procedures Manual. Cook Inlet Aquaculture Association.

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APPENDICES

Appendix 1: Trapper Lake 2009 environmental conditions

Adult Migration

Date	Sky	Precip. (mm)	Stage* (ft)	Water Temp. (°C)	Air Temp. (°C)
17-Jul	4	0.0	0.00	19	23
18-Jul	3	0.0	0.00	20	25
19-Jul	3	8.9	0.02	20	29
20-Jul	4	6.4	0.02	20	23
21-Jul	5	0.3	0.00	20	19
22-Jul	4	1.5	0.00	14	18
23-Jul	2	0.5	0.00	19	20
24-Jul	3	0.0	0.00	19	20
25-Jul	4	0.5	0.00	16	16
26-Jul	5	7.6	0.00	16	17
27-Jul	5	2.5	0.00	17	17
28-Jul	3	7.6	0.00	18	21
29-Jul	4	2.0	-0.92	17	22
30-Jul	3	1.8	0.00	18	22
31-Jul	3	1.3	0.00	18	19
1-Aug	2	0.0	0.00	17	18
2-Aug	2	0.0	-0.20	18	24
3-Aug	1	0.0	-0.20	19	30
4-Aug	4	0.0	-0.20	19	18
5-Aug	4	12.7	-0.20	18	16
6-Aug	4	6.4	-0.20	16	17
7-Aug	3	0.0	-0.25	16	15
8-Aug	3	0.3	-0.25	16	18
9-Aug	2	0.0	-0.27	17	20
10-Aug	3	0.0	-0.25	17	26
11-Aug	1	0.0	ND	18	23
12-Aug	4	0.0	-0.30	16	18
13-Aug	5	3.1	ND	14	14
14-Aug	5	19.3	-0.25	15	17
15-Aug	5	9.7	ND	15	14
16-Aug	1	0.5	-0.10	18	23
17-Aug	2	1.5	-0.08	18	23
18-Aug	5	1.5	-0.08	18	15
19-Aug	2	22.4	0.00	17	24
20-Aug	1	0.0	0.02	17	24
21-Aug	1	0.0	0.05	18	21
22-Aug	2	0.0	0.01	18	18
23-Aug	5	8.1	0.06	17	12
24-Aug	2	1.5	0.10	17	15
25-Aug	2	0.0	0.11	17	20
26-Aug	5	5.1	0.15	17	13
27-Aug	3	2.3	0.18	17	21
28-Aug	5	1.0	0.20	17	15
29-Aug	2	3.1	0.25	17	21
30-Aug	2	0.0	0.25	16	17
31-Aug	2	0.0	0.23	17	18
1-Sep	5	3.1	0.28	15	12
2-Sep	4	6.4	0.39	15	14
Total		149			
Avg.		3.1	-0.03	17	19
Min.		0.0	-0.92	14	12
Max.		22.4	0.39	20	30

* - Does not reflect actual depth, only water level fluctuation.

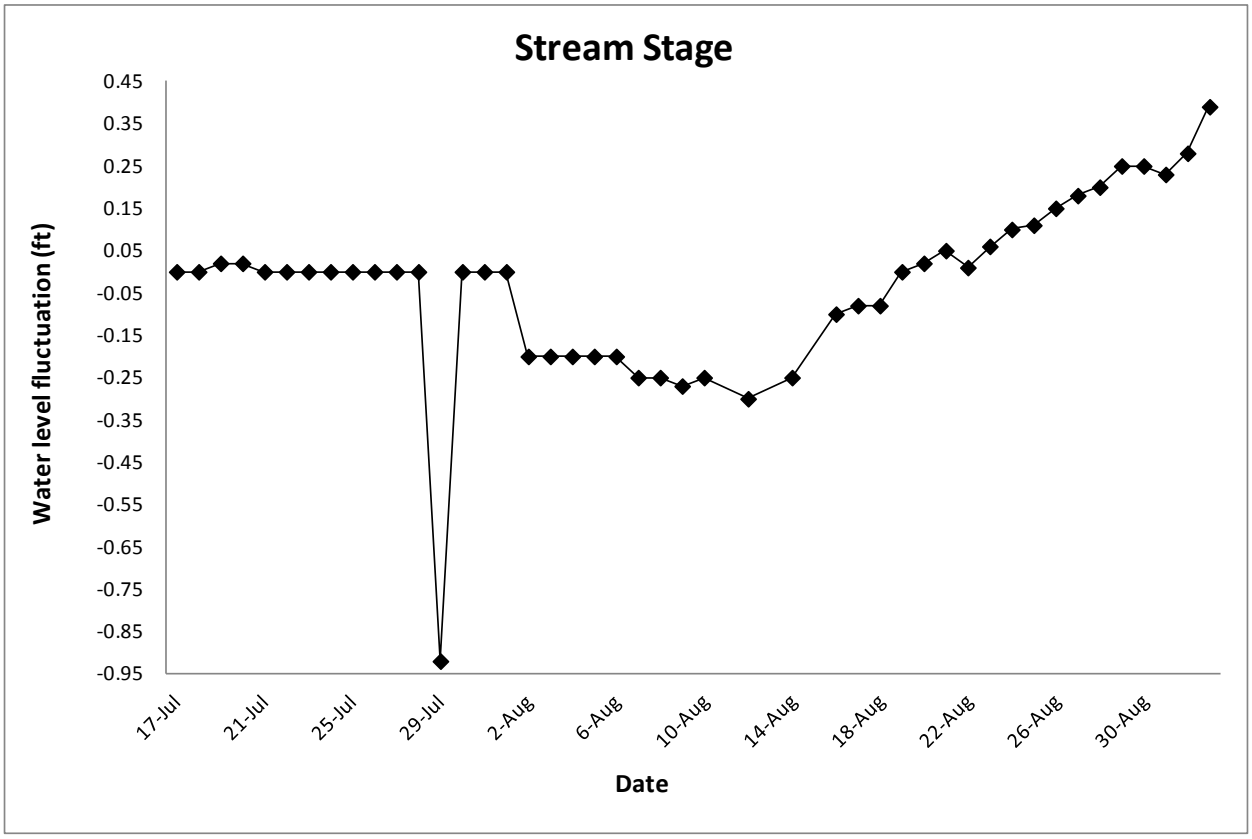
Summary of Cloud Cover - Percent of Days

	No. Days	Overcast	Partly Cloudy	Clear
Adults	48	44%	46%	10%

ND = No Data

1.0 = Clear
2.0 = Cloud Cover <50%
3.0 = Cloud Cover>50%
4.0 = Overcast
5.0 = Rain

Appendix 2: Trapper Lake 2009 water level fluctuation



Appendix 3: 2009 Trapper Lake daily adult escapement

	Sockeye		Coho	King	Pink	Chum	Rainbow	D.V.
Date	Daily Escapement	Total Return	Daily Escapement	Daily Escapement	Daily Escapement	Daily Escapement	Daily Escapement	Daily Escapement
17-Jul	0	0	0	0	0	0	0	0
18-Jul	0	0	0	0	0	0	0	0
19-Jul	0	0	0	0	0	0	0	0
20-Jul	0	0	0	0	0	0	0	0
21-Jul	0	0	0	0	0	0	0	0
22-Jul	0	0	0	0	0	0	0	0
23-Jul	0	0	0	0	0	0	0	0
24-Jul	0	0	0	0	0	0	0	0
25-Jul	0	0	0	0	0	0	0	0
26-Jul	0	0	0	0	0	0	0	0
27-Jul	0	0	0	0	0	0	0	0
28-Jul	0	0	0	0	0	0	0	0
29-Jul	0	0	0	0	0	0	0	0
30-Jul	0	0	0	0	0	0	0	0
31-Jul	0	0	0	0	0	0	0	0
1-Aug	0	0	0	0	0	0	0	0
2-Aug	0	0	0	0	0	0	0	0
3-Aug	0	0	0	0	0	0	0	0
4-Aug	0	0	0	0	0	0	0	0
5-Aug	0	0	0	0	0	0	0	0
6-Aug	0	0	0	0	0	0	0	0
7-Aug	0	0	0	0	0	0	0	0
8-Aug	0	0	0	0	0	0	0	0
9-Aug	0	0	0	0	0	0	0	0
10-Aug	0	0	0	0	0	0	0	0
11-Aug	0	0	0	0	0	0	0	0
12-Aug	0	0	0	0	0	0	0	0
13-Aug	0	0	0	0	0	0	0	0
14-Aug	0	0	0	0	0	0	0	0
15-Aug	0	0	0	0	0	0	0	0
16-Aug	0	0	0	0	0	0	0	0
17-Aug	0	0	0	0	0	0	0	0
18-Aug	0	0	0	0	0	0	0	0
19-Aug	0	0	0	0	0	0	0	0
20-Aug	0	0	0	0	0	0	0	0
21-Aug	0	0	0	0	0	0	0	0
22-Aug	0	0	0	0	0	0	0	0
23-Aug	0	0	0	0	0	0	0	0
24-Aug	0	0	0	0	0	0	0	0
25-Aug	0	0	0	0	0	0	0	0
26-Aug	0	0	0	0	0	0	0	0
27-Aug	0	0	0	0	0	0	0	0
28-Aug	0	0	0	0	0	0	0	0
29-Aug	0	0	0	0	0	0	0	0
30-Aug	0	0	0	0	0	0	0	0
31-Aug	0	0	0	0	0	0	0	0
1-Sep	0	0	0	0	0	0	0	0
2-Sep	0	0	0	0	0	0	0	0
Total	0		0	0	0	0	0	0

Appendix 4: Trapper Lake 2009 hourly escapement

	AM						PM												AM					
	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00	1:00	2:00	3:00	4:00	5:00
17-Jul						0					0			0				0						
18-Jul					0				0			0												
19-Jul					0				0			0				0		0						
20-Jul					0				0			0						0						
21-Jul					0					0		0					0							
22-Jul	0		0			0																		
23-Jul							0					0				0								
24-Jul						0			0				0				0							
25-Jul					0				0				0				0							
26-Jul					0				0				0				0							
27-Jul					0					0		0					0							
28-Jul					0					0		0					0							
29-Jul					0				0			0					0							
30-Jul					0					0		0					0							
31-Jul			0						0			0					0							
1-Aug					0					0				0			0							
2-Aug					0				0			0					0							
3-Aug					0				0			0					0							
4-Aug					0				0			0					0							
5-Aug					0							0					0							
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27-Aug						0		0				0				0								
28-Aug							0				0	0		0										
29-Aug							0		0			0			0		0							
30-Aug							0					0		0										
31-Aug				0			0					0			0		0							
1-Sep					0			0				0				0								
2-Sep					0			0			0													

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