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Findings of Fact, Conclusions of Law, and Decisions

on

Applications by the Chuitna Citizens Coalition, Inc. for the Reservation of Water, Under AS 46.15, the Alaska Water Use Act

Middle Creek/Stream 2003 – Main Reach Reservation of Water; LAS 27340

From the mouth of Middle Creek/Stream 2003 (river mile 0.0) at the confluence with Chuitna River, extending upstream to approximately river mile 7.7 at the confluence of Middle Creek/Stream 2003 with tributary 200305

Middle Creek/Stream 2003 – Middle Reach Reservation of Water; LAS 27437

From approximate river mile 1.4 at the confluence of Middle Creek/Stream 2003 with tributary 200301, extending upstream to approximate river mile 6.6 at the confluence of Middle Creek/Stream 2003 with tributary 200304

Middle Creek/Stream 2003 – Lower Reach Reservation of Water; LAS 27436

From the mouth of Middle Creek/Stream 2003 (river mile 0.0) at the confluence with Chuitna River, extending upstream to approximately river mile 1.4 at the confluence of Middle Creek/Stream 2003 with tributary 200301

INTRODUCTION

On June 3, 2009, the Alaska Department of Natural Resources (ADNR or Department) accepted an application from the Chuitna Citizens Coalition, Inc. (CCC or applicant) under AS 46.15.145 and 11 AAC 93.141, to reserve a specified portion of the stream flows within the main reach of Middle Creek (also known as Stream 2003) near Beluga, Alaska from the mouth of Middle Creek/Stream 2003 (river mile 0.0) at the confluence with the Chuitna River, extending upstream to approximately river mile 7.7 at the confluence of Middle Creek/Stream 2003 with tributary 200305. It was assigned case file LAS 27340.

On August 21, 2009, the Department accepted two additional applications from CCC under AS 46.15.145 and 11 AAC 93.141, to reserve specified portions of the stream flows within the middle reach and lower reach of Middle Creek (also known as Stream 2003) near Beluga, Alaska. The middle reach is from approximate river mile 1.4 at the confluence of Middle Creek/Stream 2003 with tributary 200301, extending upstream to approximate river mile 6.6 at the confluence of Middle Creek/Stream 2003 with tributary 200304; the lower reach is from the mouth of Middle Creek/Stream 2003 (river mile 0.0) at the confluence with Chuitna River, extending upstream to approximately river mile 1.4 at the confluence of Middle Creek/Stream 2003 with tributary 200301. The middle reach was assigned case file LAS 27437, and the lower reach was assigned case file LAS 27436. As these three applications are for the same stream, and must be considered as layered requests, this Decision addresses all three applications, and affects all three case files[1].

A reservation of water, sometimes referred to as a reservation in this document, is an appropriation of water the purpose of which is to reserve sufficient water to maintain a specified instream flow or level of water at a specified point on a stream or body of water, or in a specified part of a stream, throughout a year or for specified times, for one or a combination of the following purposes: (1) protection of fish and wildlife habitat, migration, and propagation; (2) recreation and park purposes; (3) navigation and transportation purposes; and (4) sanitary and water quality purposes.

The reservations of water requested here are for the purpose of protecting fish and wildlife habitat, migration, and propagation. Under 11 AAC 93.141(1), "protection of fish and wildlife habitat, migration, and propagation…means the quantity or level of water necessary to maintain suitable habitat conditions for the various life stages of fish, other aquatic organisms, and wildlife, including waterfowl and mammals, and their habitat, including water quality, depth, velocity and temperature, substrate, or streamside vegetation."

Holders of water rights junior to an established reservation of water, as well as other users, may be unable to divert or withdraw significant amounts of water when stream flows fall below

[1] A copy of this document will be placed in all three case files.

those reserved by the reservation. Senior water right holders remain unaffected by a junior reservation.

These reservation applications adequately described and quantified the requested flows. Public and agency notice of the applications were given consistent with the requirements of 11 AAC 93.145, 11 AAC 93.080, and AS 46.15.133. Below, the proposed reservations are summarized and specific findings of fact and conclusions of law are made.

DESCRIPTION OF PROPOSED RESERVATIONS

Main Reach LAS 27340

Proposed Reach Description: Middle Creek/Stream 2003, associated floodplain, side channels, spring systems and contributing wetlands between its confluence with tributary 200305 (approximately river mile 7.7) downstream to its confluence with the Chuitna River (river mile 0.0) (Map 1). Said portion of Middle Creek/Stream 2003 is located within:

Township	Range	Sections
12 North	12 West	3, 10, 11, 13, 14, 24
13 North	12 West	26, 35

All within the Seward Meridian (See Map 1).

Original Requested Reservation Flows for Main Reach Only:

Time Period	Flow Rate (cfs)
January	3.0
February	2.0
March	2.0
April	10.0
May	20.1
June	5.8
July	2.5
August	6.0
September	10.0
October	10.0
November	6.0
December	3.0

cfs = cubic feet per second

Middle Reach LAS 27437

Proposed Reach Description: Middle Creek/Stream 2003, associated floodplain, side channels, spring systems and contributing wetlands between its confluence with tributary 200304 (approximately river mile 6.6) downstream to its confluence with tributary 200301 (approximately river mile 1.4) (Map 2). Said portion of Middle Creek/Stream 2003 is located within:

Township	Range	Sections
12 North	12 West	3, 10, 11, 13, 14
13 North	12 West	35

All within the Seward Meridian (See Map 2).

Original Requested Reservation Flows for Middle Reach Only:

Time Period	Flow Rate (cfs)
January	1.1
February	0.7
March	0.7
April	3.7
May	7.2
June	2.0
July	0.9
August	2.2
September	3.7
October	3.7
November	2.2
December	1.1

cfs = cubic feet per second

Lower Reach LAS 27436

Proposed Reach Description: Middle Creek/Stream 2003, associated floodplain, side channels, spring systems and contributing wetlands between its confluence with tributary 200301 (approximately river mile 1.4) downstream to its confluence with the Chuitna River (river mile 0.0) (Map 3). Said portion of Middle Creek/Stream 2003 is located within:

Township	Range	Sections
12 North	12 West	13, 24

All within the Seward Meridian (See Map 3).

Original Requested Reservation Flows for Lower Reach Only:

Time Period	Flow Rate (cfs)
January	7.8
February	5.2
March	8.8
April	26.1
May	52.1
June	24.6
July	7.7
August	15.7
September	26.1
October	26.1
November	30.1
December	11.4

cfs = cubic feet per second

Discussion: The applicant's requested reservation flows and corresponding time periods are based on its review and analysis of data pertaining to the periodicity of fish in the area and the effects of that flow level on fish and wildlife habitat, migration, and propagation. According to the Instream Flow Council's 'Instream Flows for Riverine Resource Stewardship':[2]

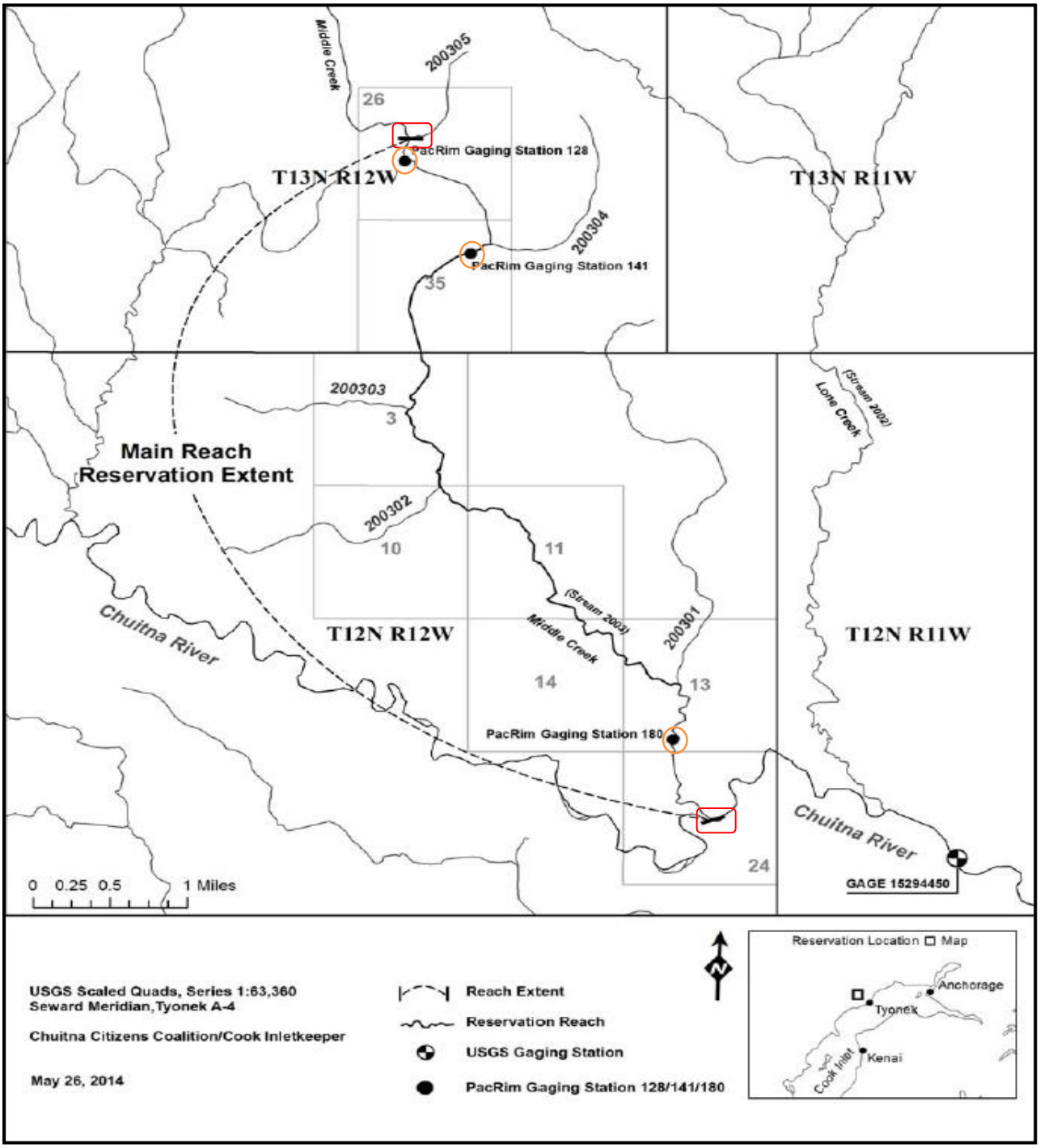
> Typically, providing a healthy aquatic community involves attention to the magnitude and duration of the natural flow regime's seasonal patterns (Poff et al. 1997). Flow conditions that vary in a manner similar to natural conditions will establish a variety of habitats and diverse fish communities. Different flow needs can be met by providing them all-separated by time. Variable conditions allow different species to flourish at different times. A temporal and spatial mosaic is a necessary component of riverine ecosystem integrity.
>
> River ecosystems are complex and require variable flows. For example, high flows form and maintain the shape and characteristics of the river channel and floodplain, flush sediment from spawning gravels, maintain riparian vegetation and stream bank stability, provide habitat critical to the life history of certain fishes, and provide cues that initiate fish migration and spawning. The life history of all aquatic organisms have adapted to naturally occurring seasonal flow regimes.

[2] Annear, T., I. Chisholm, H. Beecher, A. Locke, and 12 other authors. 2004. Instream Flows for Riverine Resource Stewardship, revised edition. Instream Flow Council, Cheyenne, WY. pp. 9, 22, 23, 101.

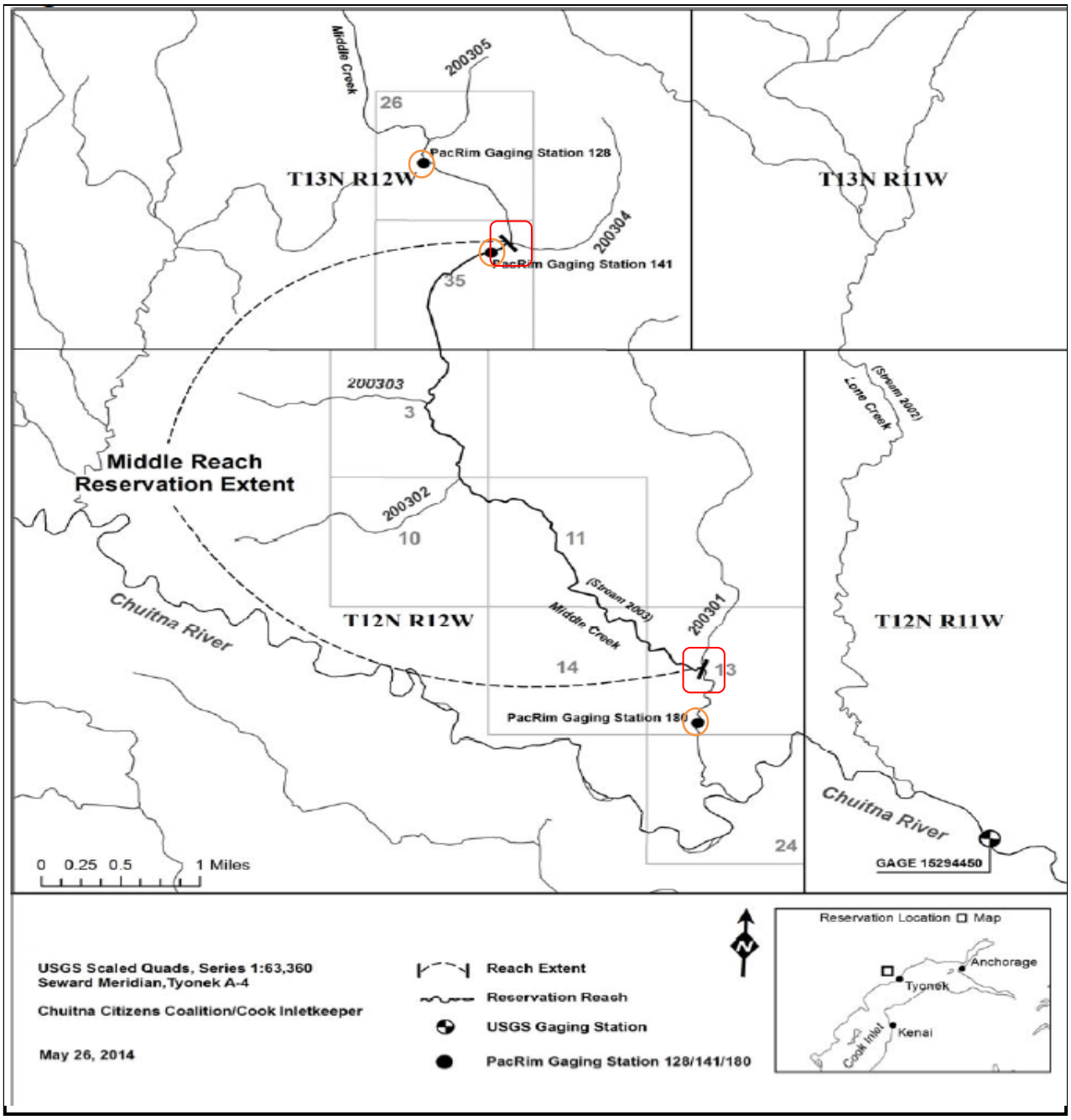
Providing suitable hydraulic habitat for aquatic organisms is a necessary part of any instream flow prescription…Habitat defined through hydraulic characteristics (such as water depth and velocity) and channel characteristics (such as substrate, cover, stream width) is sometimes referred to as hydraulic habitat. Aquatic organisms select habitat based, in part, on the physical characteristics of their surroundings. To evaluate existing hydraulic conditions as they relate to aquatic organisms, the relation of stream flow to habitat must be quantified over time.

The objective of an instream flow prescription should be to sustain, rehabilitate, or restore ecosystem processes through inter- and intraannual variable flow regimes to the greatest extent possible. Instream flow prescriptions should provide inter- and intraannual variable flow patterns that mimic the natural hydrograph (magnitude, frequency, duration, timing, rate of change) to maintain or restore processes that sustain natural riverine characteristics.

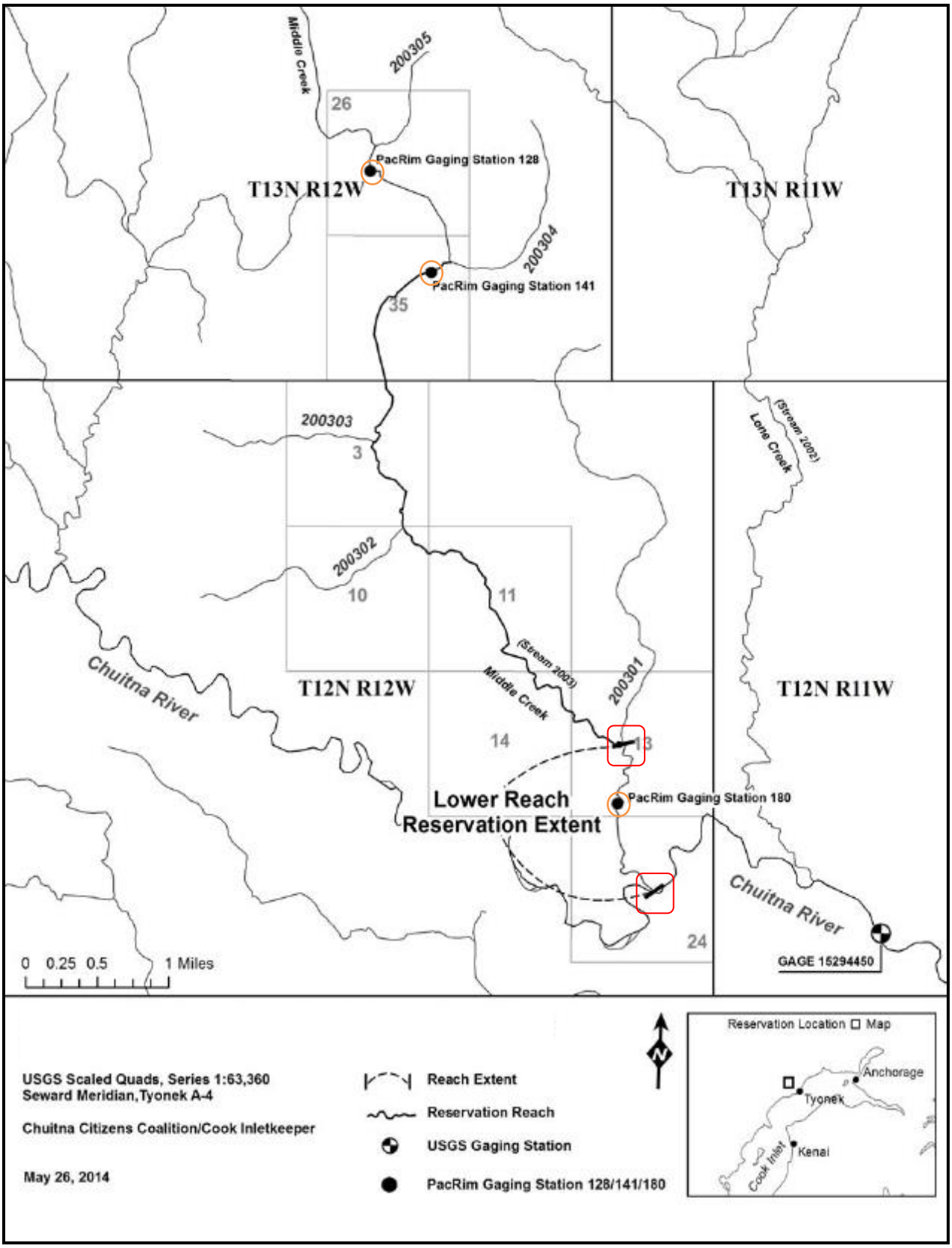
Map 1. Reservation of water application reach map: Main Reach (Extracted from the Reservation Application)



Map 2. Reservation of water application reach map: Middle Reach (Extracted from the Reservation Application)



Map 3. Reservation of water application reach map: Lower Reach (Extracted from the Reservation Application)



AREA BACKGROUND

River: Middle Creek/Stream 2003 is a tributary that enters the main stem of the Chuitna River at approximately river mile 11. The stream is located approximately 45 miles west of Anchorage, Alaska.

River Basin Area: The watershed area for Middle Creek/Stream 2003 encompasses 14.5 mi^2 of lowland area. The geologic setting is glacial deposits over sedimentary rock. Overall gradient is low and drainage is poor leading to extensive wetlands, however stream channels are incised 50 to 250 feet often revealing sedimentary and coal deposits.

Lakes: There are no named lakes within the Middle Creek/Stream 2003 watershed. Approximately 1.5% (0.2 mi^2) of the land area within the drainage consists of ponds and 30% (4.3mi^2) consists of wetlands.

Map Coverage: USGS 1:63360 Tyonek A-4

Channel Description: The average gradient of Stream 2003 is 61 ft/mile. It generally flows north to south for 9 miles from its headwaters at 845 ft on an unnamed ridge to the Chuitna River at 290 ft. It is a single channel with no lakes within the run, Cross sectional and longitudinal profiles were collected on Middle Creek/Stream 2003 to characterize bed stability, channel geometry, and stream gradient[3].

The upper section of Middle Creek/Stream 2003 is steeper and has lower sinuosity than the lower section of the stream. Bed material ranges from sand to cobble, with median grain size of bed material generally increasing as you move down channel. The stream moves little suspended sediment except during flood conditions[4].

Reach Description

> **Main Reach:** Middle Creek/Stream 2003, from the Ordinary High Water Mark (OHWM) of the outer bank (of the outside braid, where braided) of the left bank up to the OHWM of the outer bank (of the outside braid, where braided) of the right bank, including any sloughs, braids, or channels which carry water and are an integral part of the creek from the mouth (river mile 0.0) at the confluence with the Chuitna River, extending upstream to approximate river mile 7.7 at the confluence of Middle Creek/Stream 2003 with Stream 200305 (Map 1). This description does not limit the quantities of water (flow rate) reserved by this decision and any issued certificate to quantities (flow rates) within said OHWM boundaries.

[3] Riverside Technologies Inc. (2007). Chuitna Coal Project - Hydrology Component Baseline Report - Historical Data Summary.
[4] Maurer, M.A., and Toland, D.C. (1984). Water Quality Data from the Beluga Coal-Field Area, Alaska.
Alaska Division of Geological and Geophysical Surveys, Report of Investigation 84-27. Fairbanks, Alaska.

Middle Reach: Middle Creek/Stream 2003, from the OHWM of the outer bank (of the outside braid, where braided) of the left bank up to the OHWM of the outer bank (of the outside braid, where braided) of the right bank, including any sloughs, braids, or channels which carry water and are an integral part of the creek from approximate river mile 1.4 at the confluence of Middle Creek/Stream 2003 with tributary 200301, extending upstream to approximate river mile 6.6 at the confluence of Middle Creek/Stream 2003 with tributary 200304. (Map 2). This description does not limit the quantities of water (flow rate) reserved by this decision and any issued certificate to quantities (flow rates) within said OHWM boundaries.

Lower Reach: Middle Creek/Stream 2003, from the OHWM of the outer bank (of the outside braid, where braided) of the left bank up to the OHWM of the outer bank (of the outside braid, where braided) of the right bank, including any sloughs, braids, or channels which carry water and are an integral part of the creek from the mouth (river mile 0.0) at the confluence with the Chuitna River, extending upstream to approximate river mile 1.4 at the confluence of Middle Creek/Stream 2003 with Stream 200301 (Map 3). This description does not limit the quantities of water (flow rate) reserved by this decision and any issued certificate to quantities (flow rates) within said OHWM boundaries.

Climate: Middle Creek/Stream 2003 lies within the transitional zone between maritime and continental zones which is characterized by warm to hot summers and cold winter temperatures, and low precipitation. Most rainfall occurs in September and October, See Table 1 for climate summary from NWS COOP station 500685 at Beluga, AK approximately 10.5 miles west of the mouth of Middle Creek/Stream 2003[5]. PRISM[6] data indicates that the mean annual temperature for the basin is 33° F, and the average annual precipitation is 34.7 inches. Other studies indicate the average annual precipitation in the area of the Middle Creek/Stream 2003 watershed to be 40[7] to 50 inches per year[8], and the air temperature ranges from 1.5° F to 64° F[9]. Evapotranspiration was estimated at the proposed mine site within the Middle Creek/Stream 2003 watershed as 12.2 inches per year[10].

[5] Western Regional Climate Center, Historic Climate Records, Retrieved (1/4/15), http://www.wrcc.dri.edu
[6] PRISM Climate Group, Oregon State University (12/14/14) http://prism.oregonstate.edu, created 1/4/2015.
[7] United States Geological Survey (USGS) (1981). "Hydrologic Reconnaissance of the Beluga, Peters Creek, and Healy Coal Areas, Alaska." Hydrologic Resources Investigations 81-56.
[8] Environmental Research & Technology, Inc. (ERT). (1984). Diamond Chuitna Project, Groundwater Hydrology Baseline Studies Report, Volume I – Text. Prepared for Diamond Shamrock – Chuitna Coal Joint Venture, Anchorage, Alaska. Revised October 1985.
[9] Lamke, R.D. (1979). Flood Characteristics of Alaska Streams. USGS Water Resources Investigation 78-129. Anchorage, Alaska.
[10] Riverside Technologies Inc. (2007). Chuitna Coal Project - Hydrology Component Baseline Report - Historical Data Summary.

Table 1. Climate summary for Beluga, AK (Cooperative Station No. 500685; 08/01/1973 to 06/30/1992)

NWS COOP station; 500685; Beluga, AK	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Maximum Temperature (F)	25.8	28.4	36.6	44.4	56.2	64.1	67	64.6	56.6	42.6	29.7	24.3	45
Average Minimum Temperature (F)	10.6	8.8	16.4	25.2	35.9	43.1	47.9	46.3	39.7	27.9	13.6	9	27
Average Total Precipitation (in.)	1.64	1.24	1.27	0.93	1.05	1.46	2.21	3.49	5.4	4.01	1.97	2.38	27.1
Average Total Snowfall (in.)	11.6	9.7	11.7	3	0	0	0	0	0	6	13.7	23.4	79
Average Snow Depth (in.)	24	26	27	17	1	0	0	0	0	1	7	17	10

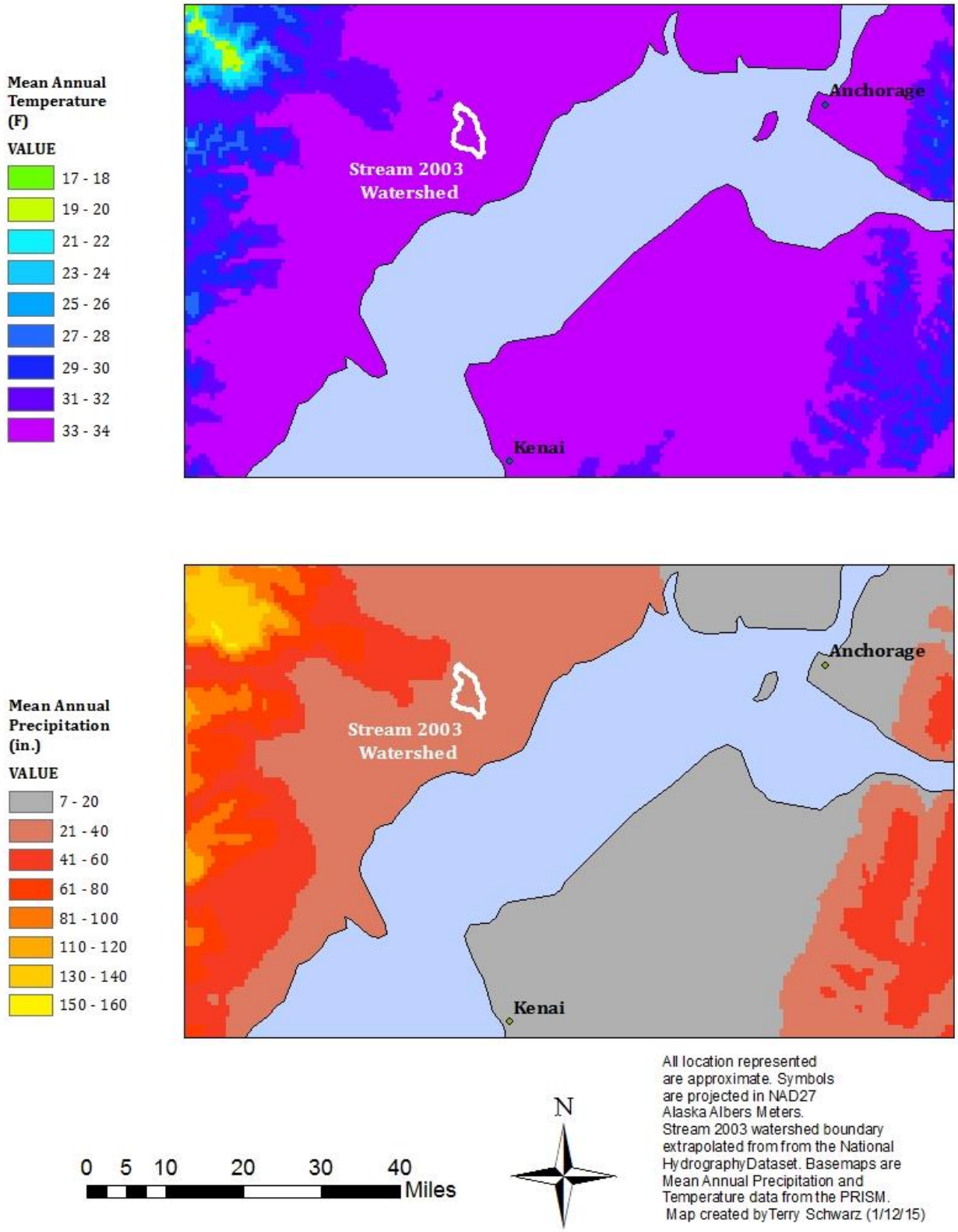


Figure 1. Mean annual temperature and precipitation derived from PRISM data in upper Cook Inlet with Stream 2003 watershed.

Available Streamflow Data: There were 5 stream gages located on Middle Creek/Stream 2003, which were operated by Riverside Technologies Inc. See Table 2 for a summary of the gages and Map 4 for gage locations and requested reservation of water reaches. Gage C180 was used for the lower reach reservation of water application (LAS 27436), gage C128 was utilized for the main reach reservation application (LAS 27340), and gages C140/C141, along with a regional streamflow regression equation[11], were used to quantify the middle reach reservation application (LAS 27437). A summary of the monthly and annual discharge from stream gages C128, C140/C141, and C180 are given in Table 2 respectively[12].

Table 2. Middle Creek/Stream 2003 gage summary/discharge summary

Stream Gage Number	Drainage Area (square miles)	Elevation (feet)	Latitude	Longitude	Period of Record
C128	3.8	563.8	61°11'17.43"	151°22'59.70"	1985-1995
C129	3.7	556	61°11'18.22"	151°22'59.57"	2006-2007
C140	6.4	511.7	61°9'49.5"	151°22'539.75"	1982-1985
C141	5.2	530	61°10’37.51”	151°22’11.19”	2006-2007
C180	14.3	285	61°7'29.88"	151°19'54.73"	1983-1995, 2000-2003, 2006

Gage C128	Mean (cfs)	Max (cfs)	Min (cfs)	# years
OCT	18	1.9	1340	11
NOV	7.3	1.3	74	11
DEC	4	1	90	10
JAN	5	0.77	317	10
FEB	2	0.73	14	10
MAR	2.4	0.48	66	10
APR	16	0.16	182	10
MAY	37	4.3	125	10
JUN	5.8	0.92	30	10
JUL	2.5	0.31	19	10
AUG	6.1	0.09	133	10
SEP	13	0.21	99	10
ANNUAL	9.9	0.09	1340	---

(cfs = cubic feet per second)

[11] Parks, B. and R. J. Madison. (1985) Estimation of selected flow and water quality characteristics of Alaskan streams, United States Geological Survey, Water-Resources Investigations Report 84-4257, Anchorage.
[12] Riverside Technologies Inc. (2007). Chuitna Coal Project - Hydrology Component Baseline Report - Historical Data Summary.

Gage C140/141	Mean (cfs)	Max (cfs)	Min (cfs)	# years
OCT	30	6	201	3
NOV	5.8	0.75	15	3
DEC	4.5	0.66	27	3
JAN	4.1	1.3	16	3
FEB	4.3	1.6	21	3
MAR	2.5	2	3.3	2
APR	17	2.4	63	2
MAY	48	12	98	2
JUN	13	3	32	2
JUL	3.6	1.6	7.4	3
AUG	10	1.9	75	4
SEP	23	4.9	159	3
ANNUAL	14	0.66	201	---

(cfs = cubic feet per second)

Gage C180	Mean (cfs)	Max (cfs)	Min (cfs)	# years
OCT	71	4	6640	19
NOV	24	4.5	204	18
DEC	15	4.1	397	17
JAN	12	4	614	18
FEB	8.6	3.1	32	18
MAR	12	1.9	285	18
APR	43	3.9	420	18
MAY	105	14	466	19
JUN	30	4	318	18
JUL	10	2.6	143	20
AUG	22	2.5	594	21
SEP	61	2.9	930	20
ANNUAL	34	1.9	6640	---

(cfs = cubic feet per second)[13]

Data Adequacy: Methods used to measure and calculate river stage and discharge for the gages utilized in the three reservation applications are outlined in "Appendix B-Stream Gauging and Data Analysis Methods". The information in each of the three appendices is taken from the 2007 Riverside Report[14], section 3.5.1 Streamflow Data Collection. This section summarizes:

[13] Stream flow values are based on USGS guidelines for daily mean discharge (http://wdr.water.usgs.gov/current/documentation.html#sqw: *Values of daily mean discharge are shown to the nearest hundredth of a cubic foot per second for discharges of less than 1 ft^3/s; to the nearest tenths between 1.0 and 10 ft^3/s; to whole numbers between 10 and 1,000 ft^3/s; and to three significant figures above 1,000 ft^3/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharge values listed for partial-record stations. (Retrieved 01/16/2015)*

[14] Riverside Technologies Inc. (2007). Chuitna Coal Project - Hydrology Component Baseline Report - Historical Data Summary

- The gage station instrumentation, installation, operation and maintenance
- The vertical and channel survey equipment and methods
- Instantaneous stream discharge measurement instrumentation and methods
- Method for developing stage-discharge rating curve and utilization of the curve to convert stream stage to discharge

Stage data was recorded with electronic pressure transducers and recorded on field data loggers. All instantaneous discharge measurements were taken monthly with a Marsh-McBirney velocity meter on wading rods based on USGS methods[15] appropriate for accurate measurement of discharge at low (1cfs) to medium flows (100's cfs). High flow discharge values were estimated using the step-backwater or slope area analysis.[16] Daily discharge was calculated from the stage record using a stage-discharge rating curve based on instantaneous discharge values and high discharge estimates. Hydrologic data for the three applications comes from the 2007 Riverside Technology report. Hydrologic data for all three reservations was compiled and analyzed by Geo-Watersheds Scientific. Geo-Watersheds Scientific also performed the analysis necessary to estimate the hydrologic data for the middle reach application. This firm has worked in Alaska on a variety of surface and groundwater projects since 1989.

The main reach employed gage C128 which is located near the top end of the reservation reach (N 61°11'17.43"; W 151°22'59.70") and has a complete ten year discharge record from 1985 to 1995. No tributaries are visible between the upper end of the main reach and the gage C128 on USGS 1:63360 Tyonek A-4 map, indicating that the gage record is conservative for the entire reach length. A ten year record is statistically robust enough to be used for the purpose of quantifying and adjudicating a reservation. The lower reach used gage C180 located approximately in the middle of the reach (N 61° 7'29.88"; W 151°19'54.73") to quantify the requested reservation flows for the reservation. No tributaries are seen between the upper end of the lower reach and the gage C180 on USGS 1:63360 Tyonek A-4 map, indicating that the gage record is conservative for the entire reach length.

To quantify the requested reservations flows for the middle reach, data from gages C140/C141 and a regional regression equation were employed. The equation used is from USGS Water Resources Investigation Report (84-4247) by Parks and Madison[17]. This report provides regional and state wide regression equations for peak flow and low flow frequencies, mean annual flow, flood flow volumes, major inorganic chemical constituents, dissolved-solids concentrations, and suspended-sediment loads. Mean annual flow was calculated for the reach at the site of gage C141 (N 61° 10' 37.51", W 151° 22' 11.19") which is located at the upper end of the middle reach above any major tributaries visible on the USGS 1:63360 Tyonek A-4 map. The two inputs to the model are drainage area and mean annual precipitation. Drainage area was calculated from the reported drainage area of gage site C141 (5.2 mi^2). Mean annual

[15] United States Geological Survey (USGS) (1976a). Discharge measurements at gaging stations. Book 3, Chapter A8. United States Government Printing Office, Washington, D.C.
[16] United States Geological Survey (USGS) (1976b). General field and office procedures for indirect discharge measurements. Book 3, Chapter A1. United States Government Printing Office. Washington, D.C.; [16] United States Geological Survey (USGS) (1976c). Measurement of peak discharge by the slope-area method. Book 3, Chapter A2. United States Government Printing Office. Washington, D.C.
[17] Parks, B. and R. J. Madison. Estimation of selected flow and water quality characteristics of Alaskan streams, United States Geological Survey, Water-Resources Investigations Report 84-4257, Anchorage. 1985.

precipitation was back calculated from the mean annual discharge from gages C128 (10.1 cfs), and C180 (36.1 cfs) divided by the drainage area of gages C128 (3.8 mi^2) and C180 (14.3 mi^2), to equal an average annual precipitation rate in the stream 2003 watershed of 40 inches. Average annual precipitation for the drainage area of gage C141 based on the PRISM[18] model is 39.5 inches based on the Zonal Statistics tool in ERSI ArcMap software. The equation used to calculate QAA was:

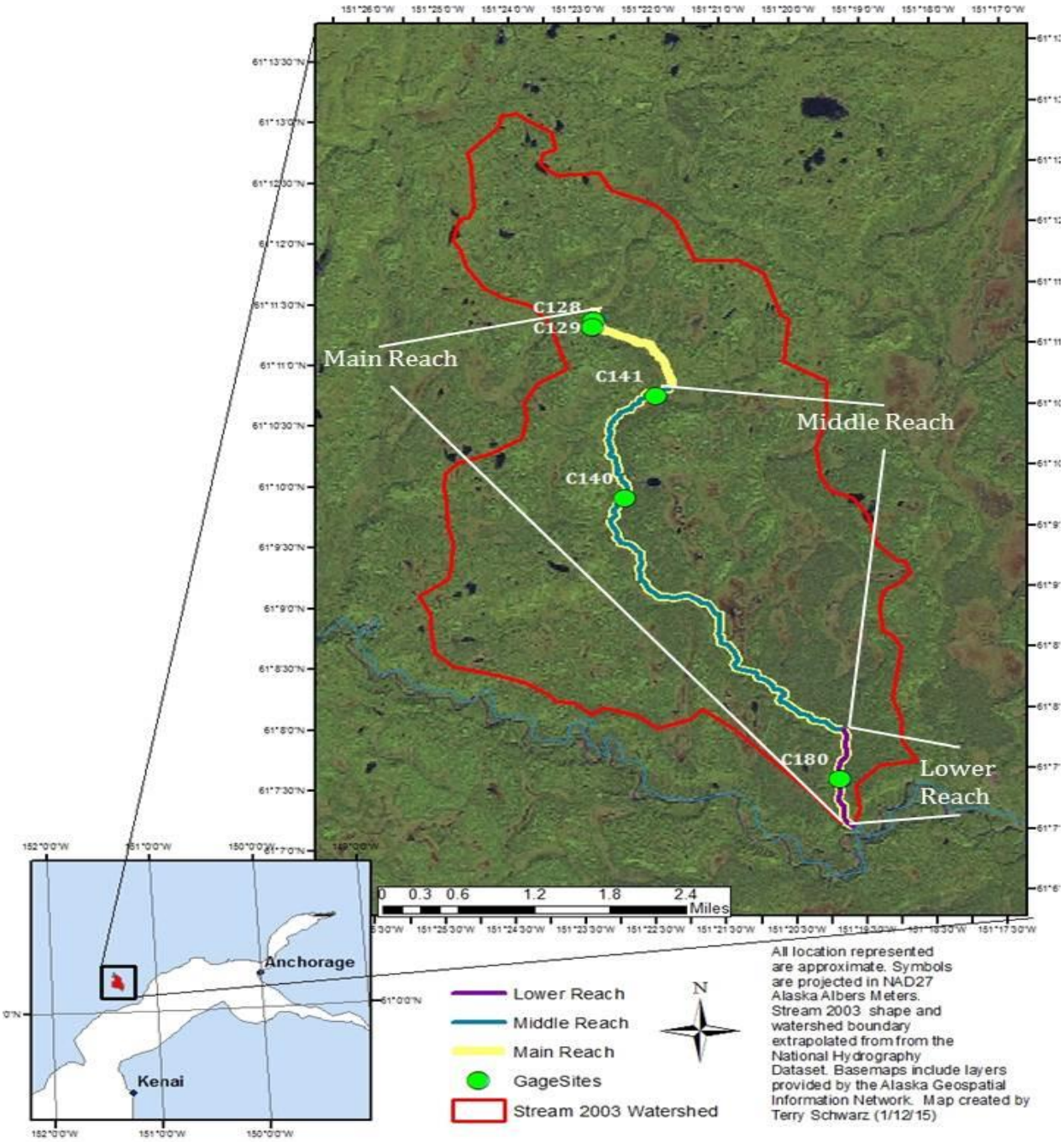
Log QAA = -1.33 + 0.96 Log (drainage area) + 1.11 Log (annual precipitation)

Using the provided equation inputs, a QAA of 13.7 cfs is calculated. Using the same drainage area and the mean annual precipitation from the PRISM model, a QAA of 13.5 cfs is calculated. The record from gages C140 and C141 spans 6 years, 1982-85 for C140 and 2006-2007 for C141. QAA for water year 1983 was calculated to be 11.7 cfs. The calculated QAA from the entire record of discharge data from both gages C140 and C141, with a population size of 1048 mean daily discharges (QAD), was 14.3 cfs. Mean monthly discharge (QAM) was estimated based on the ratio of the QAM/QAA from the gage record of C128. The estimated QAA of 13.7 cfs was then used in Tennet Method calculations to derive monthly reservation flow requests.

In summary, the lower and main reach reservation requests are based on real gage data (C128 and C180 respectively) both with records longer than 5 years. Both gages are located at the upper end of the reservation reaches above any tributaries that may contribute additional water to the river and are therefore conservative records to use for a reservation. The middle reach reservation does not have a reliable or long term discharge record from the two gages (C140 and C141) located within the reach. Therefore a QAA value was calculated from a regional regression equation that utilizes drainage area and mean annual precipitation. Drainage area and mean annual precipitation were based on the location of gage C140/C141, which is situated at the upper end of the middle reach and can be considered conservative for the reach length. The calculated QAA for the middle reach (13.7 cfs) does not violate the law of conservation and makes intuitive sense for a gaining river system based on the discharge records of C128 (upstream) and C180 (downstream).

[18] PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, created 12/5/14.

Map 4. Map of Middle Creek/Stream 2003 watershed.



Navigability: The navigability (for Title purposes) of Middle Creek/Stream 2003 has not been determined.[19] Please contact the Alaska Department of Natural Resources, Division of Mining, Land and Water, Public Access, Assertion, and Defense Unit Manager for more information.

[19] Alaska Department of Natural Resources, Division of Mining, Land, & Water, Navigable Waters Web Map. Http://www.navmaps.alaska.gov/navwatersmap/, accessed 12/17/2014

EXISTING LAND USE PLANS, VALUES, AND USES

Discussion: Staff reviewed two plans (area plan and strategy plan). Recommendations provided in these documents, along with the criteria in AS 46.15.080(b), were considered in determining if the flows and time periods for each reservation of water requested are in the public interest. These plans help ADNR have a better understanding of potential future water needs and the general land management intent for the area at issue.

The following documents, which include the Middle Creek/Stream 2003 watershed, were used to better assess the current and future plans for management and use of the area:

1. *Kenai Area Plan* – (Alaska Department of Natural Resources – 2001)
2. *Resource Management Strategy* – (The Trust Land Office; Alaska Mental Health Trust Authority (AMHTA) – 2013)

The Kenai Area Plan (KAP) and Resource Management Strategy (RMS) are the primary plans applicable to state and trust lands within this watershed, respectively. All three requested reservation reaches are completely encompassed within Mental Health Trust Authority lands, and the surrounding area is general state land. The RMS, applicable to trust land, discusses many investment and resource categories, but each category is discussed in a generalized manner and not specific to the reach location. The area is currently being managed for its coal resources. Mental health trust land must be managed consistently with the trust principles imposed on the state by the Alaska Mental Health Enabling Act, P.L. 84-830, 70 Stat. 709 (1956).

In the area of the main reach outside of trust land, the KAP classifies state land as Coal (Co). The management intent within the KAP is as such:

> Contains the Center Ridge and Lone Ridge coal deposits. Active coal leases with pending applications for roads, materials sites, a runway, and other facilities. The unit will be retained in public ownership and managed primarily for coal development. The post-mining intent for this unit is to provide high-value habitat for moose overwintering and water quality for downstream fisheries.[20]

While the management intent of this land is for mining activities, the KAP has recognized the importance of high-value habitat and water quality for wildlife and fisheries within the watershed.

[20] Kenai Area Plan (2001); p. 3-308

FINDINGS OF FACT AND CONCLUSIONS OF LAW

Under Article VIII of the Alaska Constitution and AS 46.15.030, water occurring in a natural state, except mineral and medicinal waters, is reserved to the people for common use and is subject to appropriation and beneficial use. Alaska Statute 46.15.030 and AS 46.15.145 further provide for the reservation of instream flows in rivers and water levels in lakes. The Alaska Water Use Act, AS 46.15, and Title 11, Chapter 93 of the Alaska Administrative Code, contain the statutes and regulations, respectively, under which ADNR manages the State's public water resources.

A reservation of water is issued pursuant to constitutional, statutory, and regulatory authorities, including but not limited to:

AS 46.15.145(c):

> "The commissioner shall issue a certificate reserving the water applied for under this section if the commissioner finds that,
>
> (1) The rights of prior appropriators will not be affected by this reservation;
> (2) The applicant has demonstrated that a need exists for the reservation;
> (3) There is unappropriated water in the stream or body of water sufficient for the reservation; and
> (4) The proposed reservation is in the public interest."

11 AAC 93.146(a):

> "The commissioner will issue a certificate of reservation of water if the commissioner finds that the reservation meets the requirements of AS 46.15.145."

11 AAC 93.145(d):

> "The commissioner's decision to grant, conditionally grant, or deny an application for a reservation of water will be summarized by written findings of fact and conclusions of law, including justification of any special conditions to which the reservation is subject. In determining whether the proposed appropriation is in the public interest, the commissioner will consider the criteria set out in AS 46.15.080(b)."

AS 46.15.080(b):

> "In determining the public interest, the commissioner shall consider
>
> (1) the benefit to the applicant resulting from the proposed appropriation;
> (2) the effect of the economic activity resulting from the proposed appropriation;
> (3) the effect on fish and game resources and on public recreational opportunities;

(4) the effect on public health;
(5) the effect of loss of alternate uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation;
(6) harm to other persons resulting from the proposed appropriation;
(7) the intent and ability of the applicant to complete the appropriation; and
(8) the effect upon access to navigable or public water."

AS 46.15.090

> "When there are competing applications for water from the same source, and the source is insufficient to supply all applicants, the commissioner shall give preference first to public water supply and then to the use that alone or in combination with other foreseeable uses will constitute the most beneficial use."

This decision is based on an analysis and determination of the facts as related to statutory and regulatory framework requirements, as follows:

AS 46.15.145(c)(1): Whether the rights of prior appropriators will not be affected by this reservation.

Based on a search of ADNR's water rights records, ADNR concludes that there are no prior appropriations on the specified stream reaches of Middle Creek/Stream 2003. Therefore, no prior appropriator's water rights will be affected by the establishment of any reservation of water on the specified stream reaches of Middle Creek/Stream 2003 based on the applications under adjudication.

AS 46.15.145(c)(2): Whether the applicant has demonstrated that a need exists for the reservation.

Discussion: The primary purpose of CCC's reservation applications is the protection of fish and wildlife habitat, migration, and propagation. Each application states that the reservation of water is needed to protect and maintain fish production within Middle Creek/Stream 2003. Where there is a competing use of water that is apparent or reasonably anticipated, the need for a reservation of water must be evaluated, at least in part, with respect to that competing use. If there is no apparent or reasonably anticipated competing use of water, the need for a reservation is generally more speculative.

In this case, PacRim has applied for water rights that, if granted, would directly compete with the proposed reservations at issue over portions of the Middle Reach and the Main Reach. In fact, its proposed use would completely de-water portions of those reaches. PacRim's proposed water rights would not directly compete with the proposed reservation for the Lower Reach, but the Lower Reach could be indirectly impacted by PacRim's upstream activities. At this time, PacRim's water rights applications are substantially complete, but details of its proposed water use are still being developed as part of the mine permitting review processes. Because ADNR has been ordered by the court to adjudicate CCC's applications now (*CCC v. DNR,* Case No. 3AN-11-12094CI), without waiting for additional information concerning PacRim's

proposed use of water, ADNR must make certain assumptions about the PacRim project in order to analyze the need for CCC's proposed reservation. The Department therefore will assume, for the purpose of analyzing the need for CCC's requested reservations, that PacRim's coal mine can be fully permitted for development, and that development will occur in the foreseeable future.[21] As noted, the following analysis relies on such assumption.

According to the three applications, Middle Creek/Stream 2003 supports Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), Dolly Varden (*Salvelinus malma*), rainbow trout (*O. mykiss*), threespine stickleback (*Gasterosteus arculeatus*), and Pacific lamprey (*Entosphenus tridentatus*) for a portion of, or all of their spawning, incubation, rearing, and passage life phases. Additionally, low numbers of sockeye salmon (O. nerka) and pink salmon (O. gorbuscha) were also identified during a 2008 sampling campaign (*Nemeth et al., 2009 within the Middle Creek/Stream 2003 Reservation of Water application, p. 2)*.[22]

Middle Creek/Stream 2003 is cataloged within the Anadromous Waters Catalog as #247-20-10010-2030. Streams cataloged by the Alaska Department of Fish and Game (ADF&G) are considered important habitat for fish and often contribute to significant commercial, subsistence, and sport fish use. The State of Alaska's policy for management of sustainable salmon fisheries provides that salmon spawning, rearing, and migratory habitats "should not be perturbed beyond natural boundaries of variation."[23] It further provides that "all essential salmon habitat in marine, estuarine, and freshwater ecosystems and access of salmon to these habitats should be protected."[24]

However, in response to ADNR's Agency request for comments on the applications, ADF&G's last paragraph stated: "In summary, ADF&G supports reservations of water for fish. In the case of Middle Creek/Stream 2003, ADF&G believes that an instream flow decision at this time would be premature because additional information to help inform ADNR's decision will become available through on-going Federal and State regulatory processes. These comments are provided to assist ADNR in evaluation of these applications and do not pre-judge any future Title 16 reviews by ADF&G." In other words, the state agency responsible for the management of Alaska's fish resources asserts that the need for a reservation is more appropriately analyzed when complete information concerning the proposed competing use is available. However, since the court ordered ADNR to adjudicate these applications now,[25] ADNR will continue adjudication and will make necessary assumptions to aid in its decision.

In an effort to dissuade ADNR from considering the impacts to PacRim or from assuming PacRim's project will be permitted and developed, Cook InletKeeper and others[26] who support these applications, argue that a coal mine in the area is not economically viable due to current

[21] This is an assumption only and is in no way any indication of whether or not ADNR or any other State or Federal Agency will issue necessary permits or authorizations to PacRim in the future.
[22] Please note that as of 01/06/2015 (http://extra.sf.adfg.state.ak.us/FishResourceMonitor/?mode=awc) Alaska Dept. of Fish & Game indicates coho salmon, Chinook salmon, pink salmon, Arctic lamprey, and Pacific lamprey as being the species listed within Middle Creek/Stream 2003. There is a slight difference between the species listed in the original application (see above) and the species listed within the Anadromous Waters Catalog. This does not affect the decision of the outcome of flows.
[23] 5 AAC 39.222(c)(1)(A)(i).
[24] 5 AAC 39.222(c)(1)(A)(iv).
[25] 3AN-11-12094CI
[26] See Comment Letter Cook Inlet Keeper dated August 21, 2015, Hearing testimony of Executive Director Bob Shavelson, April 6, 2015 letter to K. Sager (ADNR) from Tom Sanzillo, Director of Finance, Institute for Energy Economics and Financial Analysis.

economic conditions. They contend that the continued delay of coal mine proposals in the area supports their position that a mine "will not be developed in the reasonable future". As discussed above, given the incomplete record regarding the scope and viability of the proposed competing use, on which ADNR is adjudicating CCC's applications, ADNR must assume that PacRim's project will go forward. Nevertheless, if, as the applicant's supporters allege, no mine will be developed, there will be no competing use of the water and the need for a reservation of water becomes more speculative.

On the other hand, whether or not this coal mine is developed, the experience of other western states suggests that it is prudent to protect instream flows early, and perhaps without as much concern about whether or not there is an apparent or reasonably anticipated competing use, in order that these flows and the uses that depend upon them are fully protected at a future time when available water may be more scarce or a proposed competing use actually arises.[27] "Fish and wildlife agencies face several critical underlying challenges to effectively manage water for fish and wildlife. The primary challenge is the fact that in the majority of situations (*except Alaska* and parts of Canada) most stream and lake water has already been committed to uses other than fish and wildlife. This situation has come about because most water laws were crafted by (and for) consumptive user groups over a century ago."[28]

In the International Instream Flow Program Initiative's (IIFPI) Protecting and Restoring Rivers and Lakes in North America summary, co-author Christopher Estes states:

> Alaska is at a stage of development where the rest of America was approximately 170 years ago. When water was initially extracted from mighty rivers like the Colorado, dammed on the Columbia, and confined between levees on the Mississippi, our predecessors had little idea what was going to happen to fish and wildlife. But just as development pressures have taken and continue to take their toll on rivers and lakes in the lower 48 states, Alaska is in danger of moving along a similar path if preventative actions aren't taken.[29]

In analyzing the issues surrounding the requirement of need, ADNR considered the evidence and testimony presented in the record related to the assertion of need, and also considered the impacts, if any, of various flow alterations.

According to the United States Geological Survey Biological Resources Division, stream segments can be differentiated when the base flow changes by 10% or more[30]. In other words, it takes a 10% change in flow (for a period of time) to change a stream's character. Looking from the perspective of protection from changes, in A Presumptive Standard For Environmental Flow Protection the authors offer the following: "We suggest that a high level of ecological

[27] Annear, T., I. Chisholm, H. Beecher, A. Locke, and 12 other authors. 2004. Instream Flows for Riverine Resource Stewardship, revised edition. Instream Flow Council, Cheyenne, WY.
[28] Annear, T., D. Lobb, C. Coomer, M Woythal, C. Hendry, C. Estes, and K. Williams. 2009. International Instream Flow Program Initiative, A status Report of State and Provincial Fish and Wildlife Agency Instream Flow Activities and Strategies for the Future, Final Report for Multi-State Conservation Grant Project WY M-7-T. Instream Flow Council, Cheyenne, WY.
[29] Madson, C., T. Annear, and D. Lobb. Protecting and Restoring Rivers and Lakes in North America: Trends, challenges, and opportunities for doing a better job. http://www.instreamflowcouncil.org/node/65. Retrieved 04/25/2013.
[30] Bovee,K.,Lamb,B.,Bartholow,J.,Stalnaker, C.,Taylor,J.,and Henrikson,J. Stream Habitat Analyses Using the Instream Flow Incremental Method. U.S.Geological Survey Biological Resources Division, pp. 36-37.

protection will be provided when daily flow alterations are no greater than 10%; a high level of protection means that the natural structure and function of the riverine ecosystem will be maintained with minimal changes [low impact]. A moderate level of protection is provided when flows are altered by 11-20%; a moderate level of protection means that there may be measurable changes in structure and minimal changes in ecosystem functions [moderate impact]. Alterations greater than 20% will likely result in moderate to major changes in natural structure and ecosystem function, with greater risk associated with greater levels of alteration in daily flows [high impact].[31] The Department uses these standards as a factor in analyzing need brought about by potential impacts of water use (removal) in a stream. In this case, these standards are analyzed as to the potential impacts of PacRim's proposed competing use, which are considered in deciding the need for a reservation.

The Department considered potential impacts to Middle Creek/Stream 2003 as well as to the Chuitna River, downstream of the proposed reservation and proposed competing use. If the full flow of Middle Creek/Stream 2003 is diverted, then there is a high impact to the Middle Creek/Stream 2003 system. Although this may be enough in itself to support a need for a reservation, the Department also considered whether, if the full flow of Middle Creek/Stream 2003 is prevented from entering the Chuitna River, there would be impact on the Chuitna River system. According to the Alaska Hydrologic Survey staff analyses,[32] assuming the full flow of Middle Creek/Stream 2003 is diverted[33], total loss of the contribution of this creek to the Chuitna River would cause a loss of flows ranging from 4.8 % to 14.6 % on a monthly basis (low to moderate impact), and from 6.1% to 19.9% on a yearly basis (low to moderate impact), with a mean (average) contribution loss level of 9.4% (low impact). Complete loss of the Middle Creek/Stream 2003 flow contribution to the Chuitna River is expected to cause only low to moderate impacts to that system.

Reserving flows in Middle Creek/Stream 2003 at the highest proposed reservation levels, as determined by adding the proposed reservations for the main and lower reaches[34] (if granted), would lower that impact analysis range on a monthly basis to [35] a flow loss of 2.5% to 10.7%. According to Richter, this reduces the expected impacts to the Chuitna River to low impact and results in a higher level of ecological protection.

<u>Determination:</u> Arguments presented that it is highly unlikely that the mine will ever be developed, and low potential impacts to the Chuitna River, weigh against a finding of a need for a reservation. However, ADNR has concluded that under the circumstances of these applications and proposed competing uses, with the assumption that the PacRim project will go forward, that there is impact to the Middle Creek/Stream 2003 system. This conclusion, along with the appropriateness of being pro-active to protect water flows in an area classified and managed for coal development, weigh in favor of finding a need for the proposed reservations.

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[31] Richter, B.D.; Davis, M.M.;Apse, C.; and Konrad,C.,Short Communication A Presumptive Standard for Environmental Flow Protection, River Research and Applications (2011), p.2.

[32] Kevin Petrone, Ph.D. and Terry Schwarz, M.P.S.. Alaska Hydrologic Survey Memorandum "Stream 2003 contribution to the Chuitna River", 4/20/2015.

[33] It must be noted that this assumption is not true for the lower reach where PacRim's application for competing water right application shows water flow diverted from Middle Creek/Stream 2003 returned to the channel above this reach.

[34] Kim Sager, Memo to David W. Schade, Section Chief, Recommendations for Stream 2003 Reservation of Water Flow Quantities (3 Reaches) 12/31/2014, Page 7, Figure 5

[35] For example: June mean flow (C180) 33cfs – proposed reservation flow 13.5 cfs = 19.5 cfs allowed to be withdrawn divided by (C220) 765.9 = 2.5% contribution reduction.

Accordingly, it is determined that CCC, as applicant, has demonstrated that a need exists for the proposed reservations of water for the Lower Reach of Middle Creek/Stream 2003 (LAS 27436); for the Main Reach of Middle Creek/Stream 2003 (LAS 27340); and for the Middle Reach of Middle Creek/Stream 2003 (LAS 27437).

AS 46.15.145(c)(3): Whether there exists unappropriated water in the stream sufficient for the reservation.

Discussion: Gages C180/140/141/128 records for Middle Creek/Stream 2003 have been analyzed to help determine whether there are sufficient unappropriated stream flows in Middle Creek/Stream 2003 to accommodate the proposed reservations.

Table 3 (a-e) shows the analysis of flows under individual reaches as well as layered reaches, based on gage flow data. Each reach has been reviewed independently of each other, in Table 3a – 3c, without consideration of the cumulative effect. Table 3d – 3e are reviews of the cumulative effect of all three applications:

Table 3. Flow Table* [cfs = cubic feet per second]

Table 3a. Main Reach of Stream 2003 (covers all of Stream 2003)

Time Period	Mean Monthly Flow (C128) (cfs)	Original Main Requests (cfs)	% Duration	ADNR Main Proposed (cfs)	% Duration
January	5.0	3.0	10-15%	1.8	65%
February	2.0	2.0	35-40%	1.5	65%
March	2.4	2.0	25-30%	1.4	65%
April	16.5	10.0	30-35%	3.0	65%
May	37.4	20.1	65-70%	20.1	65-70
June	5.8	5.8	25-30%	2.9	65%
July	2.5	2.5	25-30%	1.5	65%
August	6.1	6.0	25-30%	2.0	65%
September	13.1	10.0	45%	7.5	60-65%
October	17.9	10.0	40-45%	7.0	60-65%
November	7.4	6.0	35-40%	3.5	60%
December	4.0	3.0	30%	2.3	60%

Table 3b. Middle Reach of Stream 2003 (covers the middle portion of Stream 2003)

Time Period	Mean Monthly Flow C140/C141 (cfs)*	Original Middle Requests (cfs)	% Duration	ADNR Middle Proposed (cfs)	% Duration
January	6.7	1.1	95-100%	1.1	95-100%
February	2.7	0.7	100%	0.7	100%
March	3.2	0.7	95%	0.7	95%
April	22.3	3.7	55-60%	3.7	55-60%
May	50.7	7.2	95-100%	7.2	95-100%
June	7.8	2.0	85-90%	2.0	85-90%
July	3.4	0.9	90%	0.9	90%
August	8.2	2.2	60-65%	2.2	60-65%
September	17.7	3.7	85-90%	3.7	85-90%
October	24.2	3.7	90-95%	3.7	90-95%
November	10.0	2.2	75%	2.2	75%
December	5.4	1.1	95-100%	1.1	95-100%

*including the regression analyses

Table 3c. Lower Reach of Stream 2003 (covers the lower portion of Stream 2003)

Time Period	Mean Monthly Flow (C180) (cfs)	Original Lower Requests (cfs)	% Duration	ADNR Lower Proposed (cfs)	% Duration
January	12.7	7.8	60-65%	7.8	60-65%
February	8.8	5.2	80-85%	5.2	80-85%
March	12.3	8.8	50-55%	6.8	60-65%
April	43.2	26.1	35-40%	12	60-65%
May	108.8	52.1	65-70%	52.1	65-70%
June	33	24.6	25-30%	13.5	60-65%
July	10.8	7.7	45-50%	6.4	60-65%
August	26.5	15.7	30-35%	8.5	60-65%
September	60.6	26.1	50-55%	20	60-65%
October	74.3	26.1	55-60%	24	60-65%
November	23.7	30.1	20-25%	13	60%
December	16	11.4	40-45%	9.6	60%

Because the applicant chose to layer the applications[36] (i.e. Main Reach covers both Middle/Lower reaches in addition to two separate applications for the Middle/Lower reaches), ADNR also considered the effects of overlapping reaches and flows. The Main Reach application has an earlier priority date than the applications for the Middle and Lower Reaches.

Table 3d. Middle Reach Stream 2003 overlaying the Main Reach Stream 2003

Time Period	Mean Monthly Flow ((C140/141*) (cfs)	ADNR Main Reach Proposed Flows (cfs)	ADNR Middle Reach Proposed Flows (cfs)	Total Combined Proposed Flows (cfs)	% Duration
January	6.7	1.8	0	1.8	65%
February	2.7	1.5	0	1.5	65%
March	3.2	1.4	0	1.4	65%
April	22.3	3.0	0.7	3.7	55-60%
May	50.7	20.1	1.1	21.2	65%
June	7.8	2.9	0	2.9	65%
July	3.4	1.5	0	1.5	65%
August	8.2	2.0	0.2	2.2	60-65%
September	17.7	7.5	0.0	7.5	60-65%
October	24.2	7.0	0.1	7.1	60-65%
November	10.0	3.5	0	3.5	60%
December	5.4	2.3	0	2.3	60%

*including the regression analysis.

[36] Due to the unusual circumstances of these applications and the way they are layered, if all three proposed reaches were to be certificated, the flows from Table 3d – 3e should be used to establish flows. However, if only one or two reaches were to be certificated, then Tables 3a – 3c should be used to establish flows.

Table 3e. Lower Reach Stream 2003 overlaying the Main Reach Stream 2003

Time Period	Mean Monthly Flow (C180) (cfs)	ADNR Main Reach Proposed Flows (cfs)	ADNR Lower Reach Proposed Flows (cfs)	Total Combined Proposed Flows (cfs)	% Duration
January	12.7	1.8	6.0	7.8	60-65%
February	8.8	1.5	4.8	6.3	65%
March	12.3	1.4	5.4	6.8	60-65%
April	43.2	3.0	9.0	12	60-65%
May	108.8	20.1	41.9	62	65%
June	33	2.9	10.6	13.5	60-65%
July	10.8	1.5	4.9	6.4	60-65%
August	26.5	2.0	6.5	8.5	60-65%
September	60.6	7.5	12.5	20	60-65%
October	74.3	7.0	17	24	60-65%
November	23.7	3.5	9.5	13	60%
December	16	2.3	7.3	9.6	60%

* For perspective, 1 cubic foot per second is equal to 646,272 gallons per day. An average family of four (for domestic use) is allotted 500 gallons per day.

Table 4. Duration chart showing the percent of time streamflows are equaled or exceeded and the mean monthly flow for all reaches of Middle Creek/Stream 2003

Lower Reach of Middle Creek/Stream 2003

Duration chart showing the percent of time streamflows are equaled or exceeded and the mean monthly flow in cfs for the Lower Reach of Middle Creek/Stream 2003 (Gage C180).

% Time exceeded	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
100	4.0	3.1	1.9	3.9	15.0	4.7	2.6	2.7	3.5	4.0	4.5	4.7
95	5.0	4.5	2.9	4.5	22.0	7.0	3.9	4.0	7.0	10.0	6.3	6.3
90	5.5	5.0	4.4	5.6	28.0	7.9	4.5	4.8	9.3	13.0	8.5	7.1
85	6.2	5.2	4.7	6.5	33.0	9.5	4.8	5.4	11.0	15.0	9.4	7.3
80	6.4	5.4	4.8	8.3	42.0	10.0	5.1	5.9	13.0	17.0	10.0	7.9
75	6.7	5.7	5.0	9.9	50.0	11.0	5.4	6.4	15.0	19.0	10.5	8.5
70	7.2	6.0	5.7	10.0	56.0	12.0	5.8	7.2	16.0	21.0	11.0	8.7
65	7.3	6.3	6.4	11.0	62.0	13.0	6.2	8.1	18.0	23.0	12.0	9.1
60	7.9	6.5	7.2	13.0	69.0	14.0	6.5	8.9	21.0	25.0	13.0	9.6
55	8.2	7.1	7.9	16.0	73.0	16.0	7.0	9.9	24.0	27.0	15.0	9.9
50	8.6	7.3	8.5	21.0	78.0	17.0	7.9	11.0	28.0	31.0	16.5	10.0
45	8.7	8.0	8.9	24.0	90.0	19.0	8.1	13.0	32.0	34.0	17.5	11.0
40	9.2	8.7	9.3	27.0	103.0	20.0	8.8	14.0	37.0	39.0	19.0	12.0
35	9.9	9.3	10.0	30.0	115.0	22.0	9.4	15.0	43.0	47.0	21.0	12.5
30	10.5	9.8	10.5	38.0	137.0	26.0	10.0	17.0	51.0	55.0	23.0	13.0
25	11.0	10.0	11.5	48.0	155.0	35.0	12.0	21.0	66.0	63.0	26.0	15.0
20	11.5	11.0	13.5	58.0	178.0	45.0	14.0	29.0	85.0	71.0	29.5	20.0
15	13.5	12.0	16.0	85.0	198.0	52.0	16.0	38.0	110.0	88.0	34.0	23.5
10	16.5	14.0	18.0	123.0	222.0	61.0	18.0	61.0	142.0	128.0	48.0	30.0
5	19.0	17.0	27.0	172.0	263.0	93.0	29.0	110.0	207.0	187.0	68.0	37.0
Mean	12.7	8.8	12.3	43.2	108.8	33.0	10.8	26.5	60.5	74.3	23.7	16.0

Middle Reach of Middle Creek/Stream 2003

Duration chart showing the percent of time streamflows are equaled or exceeded and the mean monthly flow in cfs for the Middle Reach of Middle Creek/Stream 2003 (Gage C140/C141 using Gage C128).

% Time exceeded	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
100	0.8	0.7	0.5	0.2	4.3	0.9	0.3	0.1	0.2	1.9	1.3	1.0
95	1.2	0.9	0.7	1.2	7.4	1.5	0.7	0.4	2.5	3.1	1.5	1.2
90	1.3	0.9	0.8	1.6	9.9	1.7	0.9	0.9	3.1	4.4	1.6	1.3
85	1.5	1.0	0.9	1.9	12.0	2.1	1.0	1.3	3.9	5.0	1.9	1.4
80	1.5	1.1	0.9	2.2	14.0	2.3	1.1	1.5	4.7	5.3	2.0	1.5
75	1.6	1.2	1.0	2.3	16.0	2.4	1.3	1.6	5.3	5.8	2.2	1.7
70	1.7	1.4	1.1	2.5	19.0	2.6	1.4	1.7	6.1	6.2	2.5	2.0
65	1.8	1.5	1.4	3.0	21.2	2.9	1.5	2.0	7.2	6.5	3.0	2.2
60	1.9	1.6	1.5	3.4	25.0	3.0	1.6	2.4	7.8	7.2	3.5	2.3
55	1.9	1.6	1.6	4.4	29.0	3.2	1.7	2.9	8.7	7.7	4.0	2.4
50	2.0	1.7	1.6	6.1	32.0	3.5	1.9	3.3	9.5	8.2	4.2	2.5
45	2.1	1.7	1.7	7.2	34.0	4.0	2.0	3.5	10.0	8.9	4.7	2.6
40	2.2	1.9	1.8	7.9	36.0	4.3	2.1	4.0	11.0	11.0	5.2	2.7
35	2.4	2.1	1.8	9.4	41.9	4.7	2.2	4.1	12.0	12.0	6.2	2.9
30	2.5	2.1	1.9	11.3	46.3	5.1	2.4	4.6	13.0	14.0	6.9	3.0
25	2.5	2.2	2.1	14.3	53.8	6.0	2.6	6.4	15.0	15.0	7.9	3.2
20	2.6	2.3	2.2	20.0	60.2	7.5	3.3	7.3	17.0	17.0	9.4	4.6
15	2.9	2.4	2.5	31.2	67.0	11.0	4.0	8.6	20.2	19.0	13.0	6.8
10	3.8	2.8	2.7	47.2	75.0	14.0	4.4	12.1	26.0	25.0	15.0	7.9
5	5.6	3.5	3.2	77.1	88.6	20.0	6.8	23.1	36.3	37.0	22.0	9.0
Mean	6.7	2.7	3.2	22.3	50.7	7.8	3.4	8.2	17.7	24.2	10.0	5.4

Main Reach of Middle Creek/Stream 2003

Duration chart showing the percent of time streamflows are equaled or exceeded and the mean monthly flow in cfs for the Main Reach of Middle Creek/Stream 2003 (Gage C128).

% Time exceeded	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
100	0.8	0.7	0.5	0.2	4.3	0.9	0.3	0.1	0.2	1.9	1.3	1.0
95	1.2	0.9	0.7	1.2	7.4	1.5	0.7	0.4	2.5	3.1	1.5	1.2
90	1.3	0.9	0.8	1.6	9.9	1.7	0.9	0.9	3.1	4.4	1.6	1.3
85	1.5	1.0	0.9	1.9	12.0	2.1	1.0	1.3	3.9	5.0	1.9	1.4
80	1.5	1.1	0.9	2.2	14.0	2.3	1.1	1.5	4.7	5.3	2.0	1.5
75	1.6	1.2	1.0	2.3	16.0	2.4	1.3	1.6	5.3	5.8	2.2	1.7
70	1.7	1.4	1.1	2.5	19.0	2.6	1.4	1.7	6.1	6.2	2.5	2.0
65	1.8	1.5	1.4	3.0	21.2	2.9	1.5	2.0	7.2	6.5	3.0	2.2
60	1.9	1.6	1.5	3.4	25.0	3.0	1.6	2.4	7.8	7.2	3.5	2.3
55	1.9	1.6	1.6	4.4	29.0	3.2	1.7	2.9	8.7	7.7	4.0	2.4
50	2.0	1.7	1.6	6.1	32.0	3.5	1.9	3.3	9.5	8.2	4.2	2.5
45	2.1	1.7	1.7	7.2	34.0	4.0	2.0	3.5	10.0	8.9	4.7	2.6
40	2.2	1.9	1.8	7.9	36.0	4.3	2.1	4.0	11.0	11.0	5.2	2.7
35	2.4	2.1	1.8	9.4	41.9	4.7	2.2	4.1	12.0	12.0	6.2	2.9
30	2.5	2.1	1.9	11.3	46.3	5.1	2.4	4.6	13.0	14.0	6.9	3.0
25	2.5	2.2	2.1	14.3	53.8	6.0	2.6	6.4	15.0	15.0	7.9	3.2
20	2.6	.3	2.2	20.0	60.2	7.5	3.3	7.3	17.0	17.0	9.4	4.6
15	2.9	2.4	2.5	31.2	67.0	11.0	4.0	8.6	20.2	19.0	13.0	6.8
10	3.8	2.8	2.7	47.2	75.0	14.0	4.4	12.1	26.0	25.0	15.0	7.9
5	5.6	3.5	3.2	77.1	88.3	20.0	6.8	23.1	36.3	37.0	22.0	9.0
Mean	5.0	2.0	2.4	16.4	37.4	5.8	2.5	6.1	13.1	17.9	7.4	4.0

The data described in each chart of Table 4 shows flows that support the amounts of water that the applicant and its experts agreed with ADNR were appropriate to be reserved, as outlined in Kim Sager's 12/31/14 memo. While almost any appropriation of water may experience periods of time during which the natural variability in flow will result in unavailability of water, there will be a reasonable proportion of time when Middle Creek/Stream 2003 flows will be sufficient for the proposed reservations.

Determination: It is determined that there exists unappropriated water within Middle Creek/Stream 2003 sufficient for the agreed proposed reservation flows as stated in Table 3 a – e.

Further, the agreed proposed flows leave water available for ADNR to allocate to new applicants, and are set at an amount that will adequately and reasonably protect the fish and wildlife habitat, migration, and propagation, based on currently available information.

AS 46.15.145(c)(4) and 11 AAC 93.145(d): Whether the proposed reservation is in the public interest, considering the criteria set out in AS 46.15.080(b).

Under 11 AAC 93.145, in determining the public interest in connection with a proposed reservation of water, ADNR must consider, at a minimum, the eight factors found in AS 46.15.080(b). Analysis of each of those factors follows:

AS 46.15.080(b)(1): The benefit to the applicant resulting from the proposed reservation.

Discussion: CCC has applied for these reservations for the primary purpose[37] of protecting fish habitat, migration, and propagation in Middle Creek/Stream 2003. Middle Creek/Stream 2003 produces a low number of fish relative to the area's fishery, but which nevertheless contribute to the area's subsistence, sport, and commercial fishing harvest.[38]

There is no evidence that CCC members directly use Middle Creek/Stream 2003. The applicant did not claim that its members directly use this stream, and the Mental Health Trust Land Office reported that no permits for area use of trust land have been requested or issued to the applicant, its members, or other persons. The applicants did submit evidence that members of CCC fish in the Chuitna River for sport and subsistence purposes. While CCC has not quantified an impact to its use of the Chuitna River fishery that might be protected by these applications, the limited information provided indicates generally that the fish resources of the Chuitna River system would experience some impact if it is assumed that the flows from Stream2003/Middle Creek are completely eliminated and the fish from Middle Creek/Stream 2003 no longer contribute to the Chuitna River run. However, because it is not possible to attribute specific fish in the Chuitna River to Middle Creek/Stream 2003, the applicant cannot show that its use of the Chuitna River fishery means that it directly benefits from the resource in Stream 2003/Middle Creek.

In the long run, the proposed reservations of water would ensure that there is limited impact (attributable to human caused development activity in the area) to the Chuitna River system, which might contribute indirectly to the lifestyle of the applicant's members. However, when viewed in the short term (the time period in which it will take PacRim's proposed coal mine to receive all necessary governmental permits and approvals), issuance of a reservation of water now would not serve to protect either Middle Creek/Stream 2003 or the Chuitna River from any immediate development pressure because there is no other currently known development proposal for the area. In its comments on its own pending water reservation applications, CCC recognizes the lack of short term benefit when it acknowledges that PacRim is still years away from being able to begin work at the proposed mine site.

Determination: In the long term, the proposed reservations may contribute to the maintenance of Chuitna River fish populations by reserving the quantities of water needed for fish habitat in Middle Creek/Stream 2003 and by maintaining the level of flows contributed to

[37] The applicant has made mention of Middle Creek/Stream 2003 being habitat for bear, moose and other wildlife, but the majority of the supporting documentation refers to the fishery.
[38] See the discussion in the next section, regarding economics.

the Chuitna River. Although minimal, it is determined that a reservation(s) may be of limited benefit to the applicant.

AS 46.15.080(b)(2): The effect of the economic activities resulting from the proposed reservation.

Discussion: Middle Creek/Stream 2003 is classified as an anadromous stream which supports the life cycle of salmon and other resident fish.

According to the 'Economic Value of the Alaska Seafood Industry' (McDowell Group, 2013),

> The seafood industry directly employs approximately 63,100 people in the state of Alaska. Roughly 1-in-8 workers in Alaska earned at least part of their annual income directly from the seafood industry in 2011. These direct jobs produced $4.6 billion worth of wild, sustainable seafood (in wholesale terms) and resulted in an estimated $1.7 billion in labor income.[39]
>
> The seafood industry directly employed an estimated 27,230 Alaska residents in 2011… Including multiplier effects[40], the Alaska seafood industry was responsible for an estimated 41,530 Alaska resident workers in 2011 and $1.28 billion in labor income earned by Alaska residents.

In 2011, the direct employment of Alaska residents in the seafood industry in southcentral Alaska (which includes the Municipality of Anchorage, Matanuska-Susitna Borough, Kenai Peninsula Borough, and Valdez-Cordova areas) was 7,530 workers which included commercial fishing, seafood processing, and the support sector.[41] The estimated income of Alaska residents in southcentral related to the seafood industry totaled $159 million.[42]

Sport fishing also provides significant economic benefits to Alaska. The American Sport Fishing Association estimated that the expenditures for sport fishing in Alaska in 2007 generated 15,879 jobs, and $545 million in wages and salaries. Anglers in Alaska spent nearly $1.4 billion on fishing trips, fishing equipment, and development and maintenance of land used primarily for the pursuit of sport fishing in Alaska. Anglers in the southcentral region, which includes Prince William Sound, Cook Inlet, Anchorage area, Kodiak Island, and the Bristol Bay area to the west of Cook Inlet, spent $989 million in 2007, supported 11,535 jobs, and created $91 million in state and local taxes.[43]

A review of the relevant biological reports indicates that the main production of this stream is for coho salmon. Although specifically requested by ADNR, the applicant failed to provide a detailed analysis of the Middle Creek/Stream 2003 fish valuation. Instead, the applicant argued

[39] Economic Value of the Alaska Seafood Industry (prepared for Alaska Seafood Marketing Institute), (McDowell Group, July 2013); p. 3
[40] Multiplier effects equate to things such as jobs and income created as a result of business and personal spending connected to the seafood industry.
[41] Economic Value of the Alaska Seafood Industry (prepared for Alaska Seafood Marketing Institute), (McDowell Group, July 2013); p. 3, p.18
[42] Ibid); p. 18
[43] Economic Impacts and Contributions of Sportfishing in Alaska (ADF&G, 2007)

that Middle Creek/Stream 2003 is an integral part of the Chuitna watershed, and that the value of the entire Chuitna watershed must be considered rather than just this stream. Since the applications currently before the Department are only for reaches of Middle Creek/Stream 2003, that is the value that the Department must consider, not the larger watershed.

Even though the applicant did not provide the requested economic valuation data related to this stream, ADNR Water Resources staff nevertheless did a simple economic analysis of the reports and baseline data submitted by the applicant. Staff determined what significant resources (fish) would be impacted or lost by the destruction of Middle Creek/Stream 2003. It should be noted that only a portion of the stream channel will be impacted by the (draft) proposed mine plan, since the Lower Reach is not within the mine plan boundaries. Because staff was unable to ascertain which reaches of the stream channel had the most biological value, for this analysis it was assumed that all of the biological value would be lost.[44]

ADNR staff concluded that while there were a number of species of fish present, the significant resource (fish) were coho salmon, and the major value of the area appears to be rearing habitat. Therefore, an analysis of the number of coho salmon returning to the area was developed so that ADNR could estimate the number of fish utilizing Middle Creek/Stream 2003.[45]

Reese (2014) estimated the harvest and spawning populations for adult coho salmon within Middle Creek/Stream 2003 using smolt data (Middle Creek/Stream 2003 data collection), hatchery data, and catch monitoring data from Alaska hatcheries. Reese estimated that the maximum number of surviving adult coho salmon is 1,789, while the minimum is 246.[46] According to McDowell Group (2013), the 2012 price per pound for salmon was $0.91. According to the Kenai Peninsula Borough Commercial Fishing Industry, the average weight of a coho salmon in 2006 for Cook Inlet was 6.52 pounds. This makes the average price for a coho salmon $5.93. Based on Reese's (2014) findings a maximum return rate would equate to $10,608.77 per year, while the minimum return rate would equate to $1,458.78 per year. Over 25 years (life expectance of PacRim Coal, LP mine), the return rate would be $36,469.50 (min) - $265,219.25 (max).[47]

In relationship to the overall Southcentral Alaska or even the Cook Inlet fisheries, Middle Creek/Stream 2003 is an extremely small portion of the overall southcentral fishing industry. Further, as noted above, there is no assertion that any members of CCC actually fish in Middle Creek/Stream 2003, and there is also no assertion that the proposed reservations will change that fact. The applicant has not presented any information about new economic activity that might result from the proposed reservations.

The applicant and its supporters have argued that ADNR staff are significantly undervaluing the value of the Middle Creek/Stream 2003 as part of the Chuitna River watershed. At the hearing

[44] This assumption is in applicant's favor, despite the fact that it failed to provide any economic analysis when requested.
[45] See Run Size And Harvest Estimates For Adult Coho Salmon In Stream 2003 Based On Smolt Production dated February 4, 2015 by Carl Reese.
[46] Run Size and Harvest Estimates for Adult Coho Salmon in Stream 2003 Based on Smolt Production (ADNR – Carl Reese, December 2014)
[47] Kenai Peninsula Borough Commercial Fishing Industry website (retrieved 1/7/2015) http://www2.borough.kenai.ak.us/Econ/1S_P%20data/Commercial%20Fishing%20Industry/Salmon%20weight%20history.htm; Economic Value of the Alaska Seafood Industry (prepared for Alaska Seafood Marketing Institute), (McDowell Group, July 2013); p. 81
Run Size and Harvest Estimates for Adult Coho Salmon in Stream 2003 Based on Smolt Production (ADNR – Carl Reese, December 2014)

held on August 21, 2015, the applicant and other objectors continued to make that argument. However, under the AS 46.15.080(b)(2) criterion, ADNR is required to look at the effect of the economic activities resulting from the proposed reservations on the stream under consideration, not on the larger watershed. While there may come a point in time where the effect of the economic activities and impacts to the larger watershed are at issue, it is not in connection with ADNR's decision solely on these reservation applications.[48]

Determination: The above discussion presents information about the existing fishery status, and it is clear that the Middle Creek/Stream 2003 fishery exists, but is extremely limited. Further, there is no evidence that any increased economic activity (resulting from increased fishing, hunting or recreational activity) would occur as a consequence of (resulting from) a reservation of water on Middle Creek/Stream 2003.

The applicant did not submit any significant economic analysis. On the record and ADNR's own analysis, ADNR concludes that the proposed reservation(s) would have limited economic importance or effect.

AS 46.15.080(b)(3): The effect on fish and game resources and on public recreational opportunities.

Discussion: As previously described, Middle Creek/Stream 2003 supports four Pacific salmon species as well as other resident species. The primary purpose of these reservations is to protect the habitat, migration, and propagation of these fish. Reservation flows were requested specifically to provide for the needs of fish populations at the times those populations utilize the stream for their various life stage activities of spawning, incubating, rearing, and passage (See Table 5).

[48] It also should be noted that, even though the Department is not required to review the economics of the entire watershed, the applicant did not submit information from which a reasonable economic analysis could be made concerning the entire watershed. Further, while a complete loss of the Middle Creek/Stream 2003 flows would impact the Chuitna watershed by removing its flow contribution, CCC and its supporters have not provided any evidence that this loss of flow would result in some larger impact to that watershed.

Table 5. Middle Creek/Stream 2003 Fish Periodicity Chart[49]

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage [a]					XXX	XXXX	XXX					
Adult Passage [b]							XX	XXXX	XXXX	??		
Spawning [c]								XXXX	XXXX	XXXX		
Incubation [d]	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX	XXXX	XXXX	XXXX	XXXX
Rearing [e]	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Chinook Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage [f]					XX	XXXX	XXXX					
Adult Passage [g]						XX	XXXX	XX				
Spawning [g]							XXXX	XXXX				
Incubation [g]	XXXX	XXXX	XXXX	XXXX	XXXX		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing [h]	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage [i]				XXXX	XXXX	XXXX						
Adult Passage [j]							XXX	XXXX				
Spawning [j]								XXXX	XX			
Incubation [j]	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX	XXXX	XXXX	XXXX	XXXX
Sockeye Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage ?												
Adult Passage [l]							XX	XX				
Spawning ?												
Incubation ?												
Rearing ?												
Dolly Varden	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spawning [m]									XXXX	XXXX	XXXX	
Incubation [m]	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX	XXXX	XXXX	XXXX
Rearing [n]	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rainbow Trout	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spawning [o]				XXXX	XXXX	XX						
Incubation [p]				XXXX	XXXX	XXXX	XXXX					
Rearing [n]	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgment by Dr. C.A. Woody

Smolt passage is for juvenile emigration to estuarine/marine environment

Adult passage: for salmon is immigration to and emigration from spawning grounds.

Incubation life phase includes time of egg deposition to fry emergence

? = Data not available or timing is incomplete

Specific reservation quantities were requested and recommended by CCC in their applications, and subsequently by retained experts. After discussion with the applicant's experts, ADF&G staff, and ADNR staff, flows requested were later adjusted to better mimic the natural hydrologic and biologic requirements for Middle Creek/Stream 2003 by combining statistical analyses of hydrologic variability, the Tennant Method (also known as the Montana Method), and fish species periodicity (See Table 4 and Table 5). The specific water quantities and time periods proposed for decision are based on and consistent with the current level of hydrologic and biologic knowledge, as well as consideration of potential near future uses. The agreed

[49] CCC Middle Creek/Stream 2003 Reservation of Water Application, 2014

proposed reservation flows, if granted, will adequately and reasonably protect fish habitat, migration, and propagation within the reservation reaches. However, it is important to note, as described elsewhere, that the Middle Creek/Stream 2003 fishery is relatively small in relation to the surrounding areas, and so the effect is limited.

While the primary purpose of the proposed reservation(s) is to protect fish habitat, migration, and propagation, reservation of these flows will also help preserve quantities necessary for any boating and fishing on the Chuitna River, as well as for other recreational opportunities in the area, to the extent available. However, the record does not show any significant recreational uses of the area at this time, or in the foreseeable future.

Determination: CCC submitted flow requests that mimic the natural hydrologic variability to meet the needs of species' life history stages. ADNR then adjusted requested flows to an amount that would adequately and reasonably protect the fish and wildlife habitat, migration, and propagation, based on currently available information.

It is determined that the proposed reservations would have some positive effect on the fish and game resources and could help protect public recreational activities.

AS 46.15.080(b)(4): The effect on public health.

Discussion: Anytime that flow quantities are reserved, that will help retain the existing water quality and associated health factors. Maintaining flows will also help to regulate water temperature and dilute contaminates in the system. [50] While there currently are no permitted surface water withdrawals from Middle Creek/Stream 2003 for drinking water purposes, if such uses are actually occurring or occur in the future, a reservation will have a positive effect for those uses.

Determination: The proposed reservation(s) will generally contribute to the maintenance and protection of water quality by helping to protect the instream flows that can buffer extreme temperature changes and dilute concentrations and thus reduce impacts of any pollutants or contaminants that may enter the creek. Therefore, while limited at this time, a positive impact on public health attributable to granting the reservation(s) could result.

AS 46.15.080(b)(5): The effect of loss of alternate uses of water that might be made within a reasonable time if not precluded or hindered by the proposed reservation.

Discussion: By establishing the reservations of water, the amounts described will be withdrawn from the amount available for other appropriations or for temporary water use authorizations. While a reservation of water allows for use of the reserved water for compatible purposes, in this case, the alternative (competing) use of the water is for coal mine development. As described in the competing water right application, the proposed alternate use would result in

[50] Annear, T., I. Chisholm, H. Beecher, A. Locke, and 12 other authors. 2004. Instream Flows for Riverine Resource Stewardship, revised edition. Instream Flow Council, Cheyenne, WY

portions of the Main and Middle Reaches of Middle Creek/Stream 2003 being completely de-watered. Both the applicant and PacRim have stated that this use is not compatible with the proposed reservations of water.

PacRim is currently working to permit a coal mine in the area through which portions of the Main Reach and the Middle Reach applications extend. Current (draft) plans for development of the mine include redirecting a portion of Middle Creek/Stream 2003 water from the proposed mine site, out of the natural channel, and then back into Middle Creek/Stream 2003 at a point above the Lower Reach. PacRim and other industry representatives have asserted that a reservation of water granted in the mine site area will stop the project from moving forward, as the elimination of portions of Middle Creek/Stream 2003 will be required during the life of the mine. The applicant has asserted that granting the reservations of water at this time will not stop the project, because ADNR can review the reservation if and when the PacRim water right applications are adjudicated.

PacRim and other industry representatives who objected to the reservation applications argue that granting the reservations could be perceived as pre-judging the project, and it would be difficult, if not impossible, to convince potential investors that ADNR will agree to review and possibly revoke the reservations in the future, upon adjudication of PacRim's water rights applications. They allege that granting the reservations at this time will cause loss of funding, and will cause other agencies reviewing the project to close, or at least shelve, the permitting review process. Further, the AMHTA, as the land owner, stated that it will consider granting these reservations a loss of its property rights (including future royalty payments for coal extraction) and a regulatory taking. It also argues that ADNR would appear to pre-judge the coal mine project by granting a reservation. Industry representatives and the landowner all assert that PacRim should be allowed to complete the permitting process on the merits, which will include obtaining a USACOE Section 404 Dredge and Fill Permit, an Alaska Department of Fish and Game Title 16 Habitat Permit, an Alaska Surface Mining Coal Regulatory Act (ASMCRA) Permit, and a number of water right permits. Further, other objectors asserted that the ramifications of this decision could affect all industries in the State of Alaska, not just this project or the mining industry, because development projects needing water could be negatively impacted by the filing of an application for a reservation of water.

The Department must consider the effect of a reservation on PacRim's competing traditional water right applications, and the potential loss of that alternate use of the water. However, as noted by ADF&G, the applicant, and many other interested parties, much of the pertinent information concerning costs and benefits, permit requirements and mitigation for the proposed PacRim project are not currently known. In fact, ADNR informed the applicant that it would be difficult to adjudicate the reservation applications prior to the above noted permitting process being completed because the effect of the loss of the alternate use of water could not be fully analyzed without complete information. It further explained that proceeding now, before the permitting process is complete, would require it to make certain assumptions to adjudicate these applications.

ADNR must analyze the effect of the proposed reservations on the proposed PacRim project in order to determine whether the public interest supports granting the reservation. ADNR

cannot completely ignore the proposed competing use of water now, as the applicant asserts it can, and then simply review the reservations in the future, when additional information about the coal project is available. The alternate use of water is known and is on track to occur in a reasonable time frame. It therefore cannot be ignored in the adjudication of these applications. While the applicant's assertions that the mine will not be permitted, or that it may become economically infeasible and never be developed, may become reality, that information is not currently known to the Department. Therefore, ADNR assumes that the mine would be permitted and developed, but that such development may be prohibited if these reservations are granted. ADNR also finds that it is reasonably likely that PacRim's and AMHTA's assertions that the granting of the reservations may contribute to the financial demise of the project are true.

Determination: Based on the information submitted by the applicant, and a review of the objections of PacRim and other objectors, it is hereby determined that granting the reservations within the mine site boundaries likely would preclude the mine project from moving forward. At the least, there is a perception by industry that granting a reservation of water within the mine site will be seen as pre-judging the competing project, which may result in financial consequences that are fatal to the project. While there is some amount of speculation in these conclusions, this is a consequence of performing the analysis without full or more complete information because the permitting review process has not been completed.

However, it is also determined that granting the lower reach application would not present the same concerns. The mine boundary does not overlap the lower reach application, and PacRim has proposed putting the water back into Middle Creek/Stream 2003 prior to the upstream endpoint of this reach.

AS 46.15.080(b)(6): Harm to other persons resulting from the proposed reservation.

Discussion: As discussed earlier, for the purposes of this review, ADNR must assume that the mine would be permitted and developed, but that such development may be prohibited if these reservations are granted. ADNR also finds that it is reasonably likely that PacRim's and AMHTA's assertions that the granting of the reservations may contribute to the financial demise of the project are true. Therefore, assuming that the granting of the reservations will preclude the mine project from moving forward, significant harm to others would occur.

The landowner, AMHTA, has stated that granting a reservation which precludes the mine (the main reach and the middle reach), will cause a loss of revenue to the trust up to $300,000,000. This significant loss of revenue would affect its ability to provide for the 72,000 beneficiaries around the state. Further, there would be loss of income attributable to foregone (lost) construction and mining jobs, including the loss of millions in state and local taxes, and the lost value of other support services. PacRim would lose its investment in the mine project to date.

As discussed in more detail above, objectors also discussed the potential harm to other natural resource industries as a result of an unpredictable permitting process that could result if ADNR

cannot adjudicate water right applications and reservation applications in a time and way that allows for full or at least the best information to be developed and considered.[51]

Determination: While the amount of alleged loss to the AMHTA is varied ($100,000,000 to $300,000,000), there is no doubt that there will be substantial revenue paid to the AMHTA if PacRim is able to permit and operate a successful mine, which will be lost if the mine is not developed. Further, there may be significant harm to many people if other development industries are damaged by even a perception that a pre-emption of the permitting process can be gained by the use of a reservation of water.

It is hereby determined that granting reservations at this time for the main and middle reaches will likely cause significant harm to PacRim and the AMHTA, and may cause significant harm to other people working in all resource development industries. On the other hand, it is also determined that granting the lower reach application will not present the same concerns. The mine boundary does not overlap the Lower Reach application, and PacRim has proposed putting the water back into Middle Creak/Stream 2003 prior to the upstream endpoint of this reach.

AS 46.15.080(b)(7): The intent and ability of the applicant to complete the reservation.

Discussion and Determination: The applicant has adequately described (albeit with overlapping reservation reaches, instead of distinct reaches) and quantified the proposed reservations. While some information requested by the Department was not provided, at this time no further action on the part of the applicant is required in order for the Department to complete a decision on the reservation case files.

AS 46.15.080(b)(8): The effect upon access to navigation or public water.

Discussion and Determination: The proposed reservations, if granted, are not expected to impact access to navigable or public water. Access across uplands would still be subject to AMHTA land access and usage permit requirements.

AS 46.15.145(c)(4) and 11 AAC 93.145(d): Public interest determination.

It is the policy of the State to encourage the development of its resources by making them available for maximum use consistent with the public interest. Alaska Constitution, art. VIII, sec. 1. To implement that policy, the legislature provides for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people. Alaska Constitution, art. VIII, sec. 2.

After reviewing the factors above and the complete record in this matter, two of the most significant factors related to the public interest as it concerns these proposed reservations are

[51] It should be noted that in response to the US Environmental Protection Agencies action to preempt permitting of the "Pebble Mine", the State of Alaska made a similar argument where they opposed EPA's action because they acted without information which would be obtained during the permitting process.

1) the effect of loss of alternate uses of the water (AS 46.15.080(b)(5)) and 2) the potential harm to other persons (AS 46.15.080(b)(6)). These factors make it clear that, at least as to the Middle and Main Reaches, only one of the proposed uses of the water can be granted, and granting the reservations at this time could result in significant harm to the proposed alternate use of water and other persons. The reservations applied for on the Middle and Main Reaches and PacRim's proposed use are not compatible.

Having reviewed the case file and record, and in consideration of the testimony at the August 21, 2015 hearing, the Department finds two arguments concerning the public interest particularly compelling. First, the applicant has made a compelling argument that ADNR should not allow PacRim to develop a coal mine that would significantly and negatively impact the Chuitna River watershed. However, the only applications currently requiring a decision are the Middle Creek/Stream 2003 reservation of water applications. The PacRim water right applications and the ADF&G's reservation of water application for the Chuitna River (LAS 20335) currently do not require a decision and do not have complete case file records upon which the decisions could be made. Although the Department normally would have adjudicated all of the applications (CCC's, PacRim's, and the ADF&G's) at the same time in order to have the best, most complete information available to determine the most beneficial use(s) of the water and what is in the public interest, the Department must nevertheless consider what action to take in the public interest right now on these reservation applications because of a court order. ADNR cannot consider the entire Chuitna River watershed in the context of these reservation applications alone as it does not have complete information on the potential impacts of the mine or the mitigation measures that will be taken by PacRim to reduce any impacts on the watershed. An analysis of the entire Chuitna watershed and the consequences and protections of the different proposed uses must be conducted when all the applications are ready for review.

However, ADNR's and other agencies'application requirements and permitting processes can adequately protect the water resources in Middle Creek/Stream 2003, without a reservation. Right now there is no impending threat to those resources as there is no authorization to use all or even most of the water in the stream. In the future, as part of the adjudication process of PacRim's water right applications, the Department can impose any conditions it considers necessary to protect the public interest if it were to approve those applications. Those conditions can include things such as bypass flow requirements or even instream flow requirements. In fact, the competing water right applications [52] from PacRim explicitly state that water removed from Middle Creek/Stream 2003 would be put back in the stream channel outside the mine permit boundary[53]. That means that there is no conflict with the lower reach application in terms of actual mining.

The other compelling argument was from the land owner, AMHTA, PacRim and the industry representatives who contend that, while the State and Federal permitting processes must be stringent, they must also allow for a predictable and complete process. This means allowing

[52] See PacRim Coal LP ADNR application case files LAS 00000 to LAS 00000.
[53] See PacRim Coal LP ADNR application case files LAS 29318, LAS 29371 - LAS 29377, LAS 29737 – LAS 29738, LAS 29340 – LAS 29760, LAS 29762 -29765, LAS 29767 – LAS 29768, LAS 29770 – LAS 29777 and LAS 30407.

the entire process to proceed in an orderly and consistent manner to the final conclusion, rather than effectively being cut short or stopped before all available information can be compiled and presented by all participants in each permitting process. At the conclusion of such a process, there will be sufficient information to allow a full analysis of the effects of the project on state resources, including water, fish, and game, and which use of water may be most beneficial and in the public interest.

The Department finds that it is in the public interest to allow the PacRim permitting review process to be completed, and therefore that it would not be in the public interest to issue a reservation of water on the Main or Middle Reaches of Middle Creek/Stream 2003 at this time. Such an action could prematurely prevent the mine project from receiving fair consideration during a full and complete permitting review process. On the other hand, not issuing reservations on these reaches will not place the water and fish resources of Middle Creek/Stream 2003 in immediate danger of being negatively affected; those resources will not be affected or at issue until such time as the mine project is fully permitted for development. In turn, the mine cannot be developed without water permits from ADNR. In the event PacRim receives the other necessary permits, ADNR will be able to conduct a full and complete analysis of all water rights applications and the public interest with respect to them. ADNR has the ability to impose stipulations and conditions on any water right that may be issued in order to protect water and fish resources.

The Department finds that the public interest would not be served if ADNR grants the reservation applications on the Main and Middle Reaches, which may completely preclude a significant alternative use of the water and harm other persons, before all the competing application case files are complete with all available information included. Only then will the Department be in a position to make a fully informed decision that determines and serves the public interest. In the meantime, the purposes for which the reservation applications were submitted can be fully protected without issuing a reservation.

Further, it is not in the public interest to grant a reservation on the assumption that the decision can be reviewed and possibly amended later. The applicant's assertion that no harm will accrue from issuing a reservation now, subject to being reviewed later, does not account for the immediate and potentially permanent harm that may accrue to PacRim and the AMHTA, as described above, by the perception that the state has pre-judged the coal project, or by the concern that the project will never overcome the issuance of the reservations upon later review. It is not in the public interest to issue a reservation with the knowledge that it does not adequately address or analyze competing applications for the same water. Further, ADNR anticipates that, despite its current willingness to acknowledge ADNR's right to manage and review instream flow certificates, the applicant would strenuously object to such review and any changes, and likely would assert that such review or amendment violated its rights in its certificates.

It is also the Department's position that the public interest is served when reservation of water certificates are considered a perpetual appropriation for the requested purpose, subject to amendment or revocation under the standards of AS 46.15.145(e) for reasons that are not foreseeable at the time the certificate was issued. It is not in the public interest to issue a

reservation certificate on less than complete information, and with the knowledge that it may only be temporary. There are other management tools that can be used protect state resources on a temporary, or even long term, basis.

Because the application for the Lower Reach is outside the mine site and issuance of a reservation on that reach would not preclude the potential development of a mine (if development is otherwise appropriate), this same public interest analysis does not apply to it. Without the concern that the Lower Reach reservation would completely prohibit a competing, alternate use of the water or cause harm to others, the public interest factors weigh in favor of granting the reservation. Further, a reservation on that reach would be a tool to ensure the least impact on the downstream, Chuitna River system.

AS 46.15.090: Most beneficial use

Even where applications for appropriation of water meet all the statutory requirements for the type of appropriation applied for, including the public interest, competing applications for appropriations of water are subject to preferences among beneficial uses. When there are applications for competing uses from the same source of water and there is not enough water to supply all applicants, ADNR is required to balance the interests involved and give preference to "the use that alone or in combination with other foreseeable uses will constitute the most beneficial use." Alaska Constitution, art. VIII, sec. 13; AS 46.15.090. Accordingly, even if ADNR could determine that the proposed reservations for the Main and Middle Reaches were in the public interest and otherwise met the statutory criteria to be granted, it would then have to determine whether or not PacRim's proposed appropriations were in the public interest and otherwise met the statutory criteria to be granted, and finally ADNR would have to determine if the reservations or PacRim's proposed use was "the most beneficial use."

Since, among other reasons, the Department has found that it is necessary to consider any proposed projects in relationship to their effects upon the entire Chuitna watershed, ADNR cannot yet determine, on this incomplete record, which of the competing applications for the same water would be given a preference as the most beneficial use. For the same reasons as stated in the discussion concerning the public interest, including the fact that much of the pertinent information concerning costs and benefits, permit requirements and mitigation for the proposed PacRim project are not currently known, it is not possible, on an incomplete record concerning the proposed alternate use, for ADNR to make a “most beneficial use” determination.

Because there are no competing applications for use of water from the Lower Reach, there is no beneficial use determination.

RESPONSE TO AGENCY AND PUBLIC NOTICE

Public and agency notice was provided as required by 11 AAC 93.145, 11 AAC 93.080, and AS 46.15.133. Notice was published in the Alaska Dispatch News on February 23, 2015 as well as ADNR's public online website. CCC additionally requested an extension of time for comments, in response to which ADNR granted a 15 day extension which was also noticed on February 26, 2015. Notice was also sent to Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, Mental Health Land Trust, U.S. Fish and Wildlife Service, U.S. Forest Service, Kenai Peninsula Borough, Tyonek Post Office, and all interested parties that requested notification.

The Department received more than 8,500 comments regarding the proposed Middle Creek/Stream 2003 Reservation of Water applications. All of the comments were reviewed and categorized. Further, the Department received 23 objections.[54] Three objectors requested a hearing. ADNR granted the hearing request as to addressing the objections raised by commenters and the hearing was held on August 21, 2015. The information presented at the hearing and a recording of the proceeding has been placed in the case files. The entirety of the case file(s) records were, including information provided in response to ADNR's request for comments, used in making this decision.

[54] Also see Notice of August 21, 2015 Objection Hearing.

DECISION

CCC's reservation application case files have been found to be complete and the application requirements of all applicable statutes and regulations have been satisfied. ADNR hereby briefly summarizes the AS 46.15.145(c) findings described in more detail in the Findings of Fact and Conclusions of Law section in this document, but without in any way (by this summary) nullifying or minimizing the qualifying or limiting factors discussed in each finding section, as follows:

> **AS 46.15.145(c)(1):** As to all three reservation applications (LAS 27340 – Main Reach, LAS 27437 – Middle Reach, and LAS 27436 – Lower Reach), ADNR finds that the rights of prior appropriators will not be affected by a reservation of water for the respective ADNR Proposed Flows described above in the Table 3 tables.
>
> **AS 46.15.145(c)(2):** As to all three reservation applications (LAS 27340 – Main Reach, LAS 27437 – Middle Reach, and LAS 27436 – Lower Reach), ADNR finds that CCC has demonstrated that a need exists for a reservation of the respective ADNR Proposed Flows described above in the Table 3 tables.
>
> **AS 46.15.145(c)(3):** As to all three reservation applications (LAS 27340 – Main Reach, LAS 27437 – Middle Reach, and LAS 27436 – Lower Reach), ADNR finds there is unappropriated water in the stream sufficient for a reservation of water for the respective ADNR Proposed Flows described above in the Table 3 tables.
>
> **AS 46.15.145(c)(4):** As to reservation application LAS 27340 - Main Reach and as to reservation application LAS 27437 – Middle Reach, ADNR finds that it is not in the public interest to grant a reservation of water. As to reservation application LAS 27436 – Lower Reach, ADNR finds that it is in the public interest to grant a reservation of water in the manner described below.

Under AS 46.15.145(c), ADNR must find that all four of the criteria have been satisfied for each reservation application before a certificate reserving water can be issued. Therefore, based on the above analysis, by authority delegated from the Commissioner of the Alaska Department of Natural Resources, I hereby find that Chuitna Citizens Coalition Inc. <u>has not</u> satisfied the requirements of AS 46.15.145 with respect to the application for reservation of water within Middle Creek/Stream 2003 – Main Reach (LAS 27340) and Middle Reach (LAS 27437). ADNR denies these Reservation of Water applications and the case files are hereby closed.

ADNR does note that this is not, in any way, a decision to grant or renew any permit, water right, or authorization to PacRim. Rather, it is the Department's decision, based on the requirements of AS 46.15.145, on the reservation of water applications only. It is the Department's intent to allow gathering of all of the information during the remainder of the permitting review processes and, upon completion of all of those processes, the Water

Resources Section will adjudicate all remaining water right and reservation of water applications within the Chuitna River watershed area.

Further, I hereby find that Chuitna Citizens Coalition Inc. has satisfied the requirements of AS 46.15.145 with respect to the application for reservation of water within Middle Creek/Stream 2003 – Lower Reach (LAS 27436). Therefore, pursuant to 11 AAC 93.146(a), ADNR will issue one **Certificate of Reservation** to **Chuitna Citizens Coalition Inc.** in the amount, for the time periods, and for the reach description as described below:

LAS 27436 – Lower Reach, Middle Creek/Stream 2003

Granted Reservation of Water Flows:

Time Period	Granted Reservation Flows (cfs)
JANUARY	7.8
FEBRUARY	5.2
MARCH	6.8
APRIL	12
MAY	52.1
JUNE	13.5
JULY	6.4
AUGUST	8.5
SEPTEMBER	20
OCTOBER	24
NOVEMBER	13
DECEMBER	9.6

cfs = cubic feet per second

Priority Date: August 21, 2009

Reservation of Water Reach Description: Middle Creek/Stream 2003, from the Ordinary High Water Mark (OHWM) of the outer bank (of the outside braid, where braided) of the left bank up to the OHWM of the outer bank (of the outside braid, where braided) of the right bank, including any sloughs, braids, or channels which carry water and are an integral part of the creek from the mouth (river mile 0.0) at the confluence with Chuitna River, extending upstream to approximate river mile 1.4 at the confluence of Middle Creek/Stream 2003 with Stream 200301. This description does not limit the quantities of water (flow rate) reserved by this decision and certificate to quantities (flow rates) within said OHWM boundaries. Said portion of Middle Creek/Stream 2003 is located within:

Township	Range	Sections
12 North	12 West	13, 24

All within the Seward Meridian.

Application Approved for Middle Creek/Stream 2003 Lower Reach - Case File LAS 27436. Certificate to be issued on the 31st day after the decision; or, if any, after completion of all appeals:

David W. Schade, MPA
Chief, Water Resources Section
Division of Mining, Land, and Water
Alaska Department of Natural Resources

10/6/2015
Date

A person affected by this decision may appeal it, in accordance with 11 AAC 02. Any appeal must be received within 20 calendar days after the date of issuance of this decision, as defined in 11 AAC 02.040 (c) and (d), and may be mailed or delivered to the Commissioner, Alaska Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska, 99501; faxed to 907-269-8918, or sent by electronic mail to dnr.appeals@alaska.gov. If no appeal is filed by the appeal deadline, this decision becomes a final administrative order and decision of the department on the 31st day after issuance. An eligible person must first appeal this decision in accordance with 11 AAC 02 before appealing this decision to superior court. A copy of 11 AAC 02 may be obtained from any regional information office of the Alaska Department of Natural Resources.