

State of Alaska

Department of Natural Resources
Division of Mining, Land, and Water

Mulchatna River Reservations of Water

LAS 27309 (Reach A), LAS 30075 (Reach A2), LAS 27516 (Reach B),
LAS 30076 (Reach B2), and LAS 30077 (Reach C)

Applications by the Southwest Alaska Salmon Habitat Partnership¹ in
collaboration with Alaska Department of Fish and Game for the
Reservation of Water, Under AS 46.15, the Alaska Water Use Act

Findings of Fact, Conclusions of Law, and Decision

INTRODUCTION

On June 15, 2009, the Alaska Department of Natural Resources (ADNR, Department) accepted a single application from the Southwest Alaska Salmon Habitat Partnership (SWASHP, Partnership) in collaboration with Alaska Department of Fish and Game (ADF&G)(co-applicant) under AS 46.15.145 and 11 AAC 93.141, to reserve a specified portion of the stream flows within Mulchatna River, near New Stuyahok, Alaska. This application (known as Reach A and Reach B) proposes two reservations of water for stream flows within the Mulchatna River, Reach A beginning at the confluence with Nushagak River and includes all waters within the channel and floodplain upstream to river mile (RM) 26.7 to the confluence with the Stuyahok River. Reach B begins just upstream of Reach A extending upstream to RM 30 and includes all waters within the channel and floodplain. After initial review of the single application, the Department determined that each reach must be processed under separate applications. Since the initial application contained adequate data and analysis for both Reach A and B, the same priority date applies to both applications. Additional data had been collected, and two further updates/analysis were completed (09/10/2014 and 11/26/2014). The latest revision/update is used in the adjudication for both Reach A and Reach B.

On January 27, 2015, ADF&G submitted three additional Mulchatna River applications for additional flows on Reach A (known as Reach A2) and Reach B (known as Reach B2). The third application was for an additional reach above Reach B/B2 (known as Reach C). Since there was an update of data for Reach A and B, ADF&G

¹ The Southwest Alaska Salmon Habitat Partnership is an organization whose membership includes: US Fish and Wildlife Service, National Oceanic and Atmospheric Administration, Bureau of Land Management, Bristol Bay Heritage Land Trust, Bristol Bay Native Corporation, Bristol Bay Native Association, Alaska Department of Fish and Game, The Conservation Fund, and The Nature Conservancy.

requested flow increases, creating a need for a second application on each (Reach A2/B2). Reach A and B was submitted by SWASHP in collaboration with ADF&G, while Reaches A2, B2, and C were submitted by only ADF&G. Reach A2 proposes the same reach description as Reach A, Reach B2 proposes the same reach description as Reach B, and Reach C is described as stream flows from Reach B/B2 upstream approximately 12 river miles to the confluence with the Koktuli River.

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

These reservation applications adequately described and quantified the requested flows. Public and agency notice of the application was 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 described.

DESCRIPTION OF PROPOSED RESERVATIONS

LAS 27309 – Reach A

Proposed Reach Description: Mulchatna River – Reach A begins at the confluence with the Nushagak River and includes all waters within the channel and floodplain upstream to river mile (RM) 26.7 to the confluence with the Stuyahok River (Map 1). Said portion of Mulchatna River – Reach A is located within:

Township	Range	Sections
6 South	46 West	10-17, 21-24
6 South	45 West	5-7
5 South	45 West	11-15, 20-22, 28-32
5 South	45 West	25, 36
5 South	44 West	4-8
4 South	44 West	13-14, 23-24, 26-28, 33-34
4 South	43 West	16-18

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	1,500
February	1,200
March	1,000
April	1,500
May	9,500
June	6,400
July	3,300
August	4,000
September	5,800
October	6,800
November	4,000
December	3,000

cfs = cubic feet per second

LAS 30075 – Reach A2

Proposed Reach Description: Mulchatna River – Reach A2, and its off-channel habitats (includes those bodies of water adjacent to the main channel that have surface water connections, e.g. side channels, sloughs, alcoves, etc.) from the mouth upstream approximately 27 miles to the confluence with the Stuyahok River (Map 1). Said portion of Mulchatna River – Reach A2 is located within:

Township	Range	Sections
6 South	46 West	10-17, 21-22, 27-28
6 South	45 West	5-7
5 South	45 West	11-15, 20-22, 28-32
5 South	45 West	25, 36
5 South	44 West	4-8
4 South	44 West	13-14, 23-24, 26-28, 33-34
4 South	43 West	17-18

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	2,670
February	2,330
March	2,100
April 1-15	2,100
April 16-23	2,730
April 24-30	6,420
May 1-7	9,700
May 8-15	10,350
May 16-23	9,410
May 24-31	8,360
June 1-7	10,170
June 8-15	7,590
June 16-23	7,920
June 24-30	8,160
July 1-15	7,700
July 16-31	7,390
August 1-15	9,040
August 16-31	8,860
September 1-15	10,640
September 16-23	8,920
September 24-30	7,710
October 1-15	7,610
October 16-31	6,910
November 1-15	5,150
November 16-30	4,190
December 1-15	3,570
December 16-31	3,120

cfs = cubic feet per second

LAS 27516 – Reach B

Proposed Reach Description: Mulchatna River – Reach B beginning just upstream of Reach A extending upstream to RM 30.0 and includes all waters within the channel and floodplain (Map 1). Said portion of Mulchatna River – Reach B is located within:

Township	Range	Sections
4 South	43 West	1-2, 9-11
3 South	43 West	36
4 South	42 West	6
3 South	42 West	11-12, 14-15, 21-22, 28-29, 31-33

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	1,400
February	1,100
March	900
April	1,350
May	8,800
June	6,000
July	3,000
August	3,700
September	5,300
October	6,300
November	3,700
December	2,700

cfs = cubic feet per second

LAS 30076 – Reach B2

Proposed Reach Description: Mulchatna River – Reach B2 including its off-channel habitats (includes those bodies of water adjacent to the main channel that have surface water connections, e.g. side channels, sloughs, alcoves, etc.) from Reach A/A2 upstream 3.0 river miles to approximately river mile 30.0 (Map 1). Said portion of Mulchatna River – Reach B2 is located within:

Township	Range	Sections
4 South	43 West	9-11, 16-17

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	2,400
February	2,180
March	1,890
April 1-15	1,860
April 16-23	3,400
April 24-30	5,850
May 1-7	8,790
May 8-15	9,320
May 16-23	8,880
May 24-31	9,780
June 1-7	9,360
June 8-15	7,030
June 16-23	7,480
June 24-30	7,670
July 1-15	7,260
July 16-31	6,940
August 1-15	8,500
August 16-31	8,310
September 1-15	10,000
September 16-23	8,300
September 24-30	7,170
October 1-15	6,950
October 16-31	6,300
November 1-15	4,700
November 16-30	3,900
December 1-15	3,240
December 16-31	2,820

cfs = cubic feet per second

LAS 30077 – Reach C

Proposed Reach Description: Mulchatna River – Reach C including its off-channel habitats (includes those bodies of water adjacent to the main channel that have surface water connections, e.g. side channels, sloughs, alcoves, etc.) from Reach B/B2 upstream approximately 12 river miles upstream to the confluence with the Kaktuli River (Map 1). Said portion of Mulchatna River – Reach C is located within:

Township	Range	Sections
3 South	42 West	11-12, 14-15, 21-22, 28-29, 31-33
3 South	43 West	36
4 South	43 West	1-2, 11

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	2,400
February	2,180
March	1,890
April 1-15	1,860
April 16-23	3,400
April 24-30	5,850
May 1-7	8,790
May 8-15	9,320
May 16-23	8,880
May 24-31	9,780
June 1-7	9,360
June 8-15	7,030
June 16-23	7,480
June 24-30	7,670
July 1-15	7,260
July 16-31	6,940
August 1-15	8,500
August 16-31	8,310
September 1-15	10,000
September 16-23	8,300
September 24-30	7,170
October 1-15	6,950
October 16-31	6,300
November 1-15	4,700
November 16-30	3,900
December 1-15	3,240
December 16-31	2,820

cfs = cubic feet per second

Discussion: The applicants' requested reservation flows and corresponding time periods are based on their review and analysis of data pertaining to the periodicity of the many species 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 Councils '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.

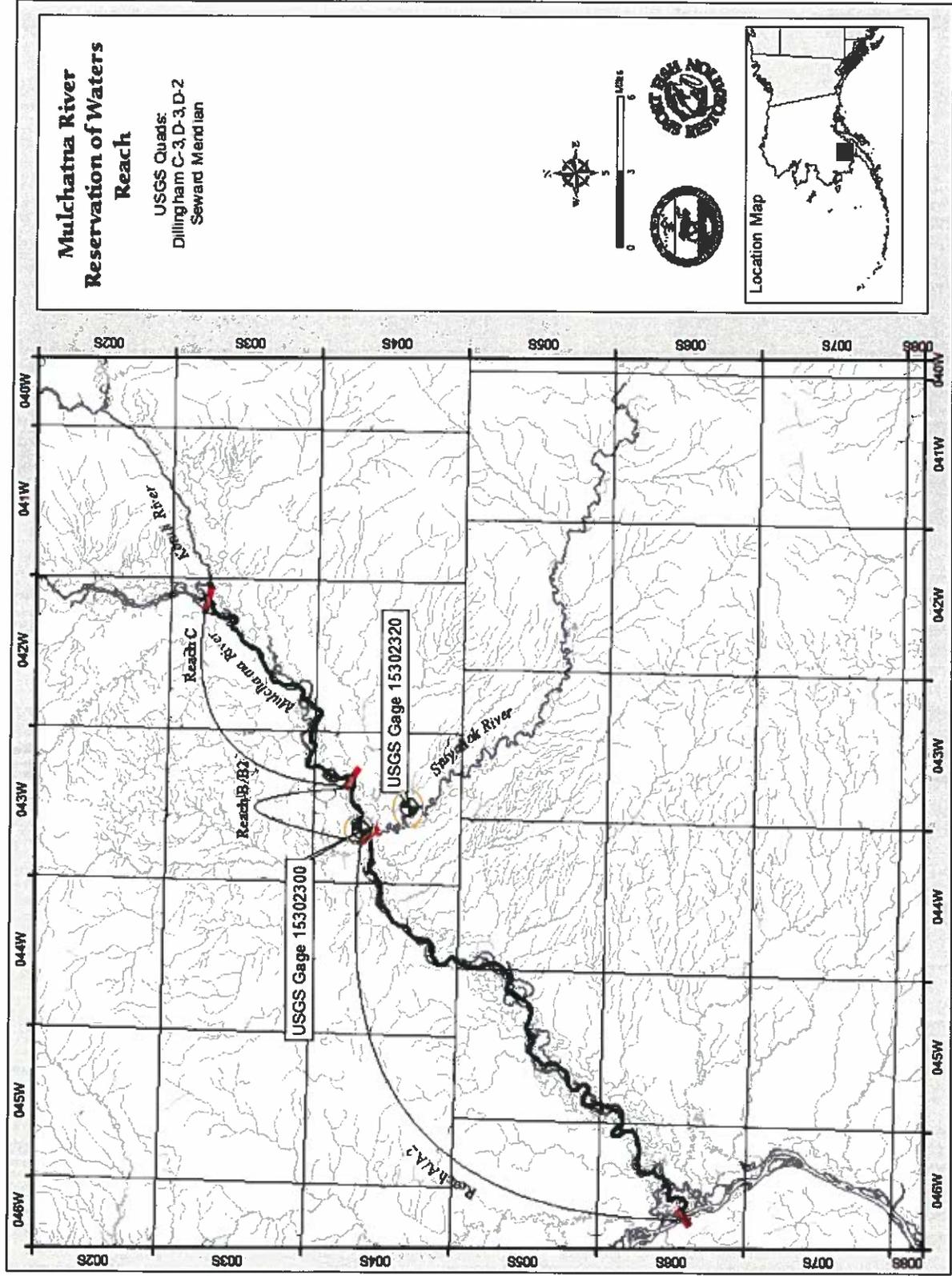
River ecosystems are complex and require variable flows. For example, high flows form and maintain the shape and characteristics of the river channel and floodplain, flush sediment from spawning gravels, maintain riparian vegetation and stream bank stability, provide habitat critical to the life history 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.

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.

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.

Map 1. Reservation of water application reach map (See 'Reach Description' for specific reach location) Reach A, A2, B, B2, & C.



AREA BACKGROUND

Stream: Mulchatna River (*var. Little Mulchatna River, Malchatna, Molchatna, Pahls-chat-nok River*)

Stream Basin Area: The Mulchatna River watershed area is 4,291 mi² and includes the Kuktuli, Stoyahok, Chilchitna, and Chilikadrotna River tributaries. The Mulchatna River is a tributary of the Nushagak River which flows into Bristol Bay near Dillingham (Map 2). The USGS operated a gage on Mulchatna River from June 1, 2009 to October 17, 2014. (See below).

Mulchatna River Gage location and watershed details:

Gage and Station ID	Latitude, Longitude (NAD27)	Elevation (ft NGVD 29)	Drainage Area (mi ²)	Period of operation
MULCHATNA River USGS 15302300 http://waterdata.usgs.gov/nwis/inventory/?site_no=15302300	59.83833 N -156.692 W	250	3,640 mi ² (2,329,600 acres) (area above USGS gaging station) 4291 mi ² (2,746,240 acres) (Mulchatna R total HUC 8 watershed boundary)	June 1, 2009 to October 17, 2014

Map Coverage: USGS 1:63,360 Dillingham B-2, B-3, C-1, C-2, C-3, C-8, D-1, D-2, D-3; Iliamna C-8, D-8; Taylor Mountains A-1, A-2, B-1, B-2, C-1; Lake Clark A-7, A-8, B-6, B-7, B-8, C-3, C-4, C-5, C-6, C-7, C-8, D-3, D-4, D-5, D-6, D-7, D-8

General Basin Description: The Mulchatna River is a tributary of the Nushagak River and runs approximately 160 miles from its headwaters within the Lake Clark National Park to its confluence with the Nushagak River. To the east, the Mulchatna basin is bordered by the Alaska Range and the drainages of the Newhalen River which flows into Iliamna Lake and the Kvichak River which drains from Iliamna Lake to Bristol Bay. To the West, is the Upper Nushagak and the Hollitna and Stony Rivers which drain into the Upper Kuskokwim River. The headwaters of the Mulchatna and Chilikadrotna Rivers drain from Turquoise Lake and the Twin Lakes, respectively, within the Lake Clark National Park. The Bonanza Hills form the boundary between the Mulchatna and Chilikadrotna Rivers. From north to south, major tributaries enter the Mulchatna in the following order: Chilchitna River, Keefer Creek, Mosquito River, Ethel Creek, Beaver Creek, Dixie Creek, Kuktuli River, Old Man Creek, and the Stuyahok River.

Reach Description: Mulchatna River (all reaches) 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 Mulchatna River:

Reach A – beginning from the mouth at the confluence with Nushagak River, upstream approximately 27 river miles to the confluence with the Stuyahok River.

Reach A2 – beginning from the mouth at the confluence with Nushagak River, upstream approximately 27 river miles to the confluence with the Stuyahok River.

Reach B – beginning from the confluence of the Mulchatna River with Stuyahok River (at the end of Reach A/A2) upstream 3 river miles to approximate river mile 30.0.

Reach B2 – beginning from the confluence of the Mulchatna River with Stuyahok River (at the end of Reach A/A2) upstream 3 river miles to approximate river mile 30.0.

Reach C – beginning at approximate river mile 30.0 (at the end of Reach B/B2) upstream approximately 12 river miles to the confluence with Kaktuli River.

These descriptions do not limit the quantity of water (flow rate) reserved by this decision and certificates to quantities (flow rates) within said OHWM boundaries.

Climate: The climate of the Mulchatna Watershed and Bristol Bay region is characterized as a transitional climate zone between maritime and continental influences. Winter storm systems track from the Bering Sea to the west, the Aleutian region to the southwest, and the Gulf of Alaska to the south resulting in saturated air masses with frequent clouds, rain and snow. Occasional cool arctic air masses result in clear and cold conditions. Summer conditions are generally cool and moderated by the maritime influences of Iliamna Lake and Bristol Bay. Occasional warm air masses enter the region from interior Alaska that are often associated with atmospheric instability and thunderstorm activity.

Monthly average temperature and precipitation is summarized in Table 1 for the Iliamna Airport Station (ID =503905) located approximately 20 miles east of the Kaktuli River headwaters.³ Most precipitation occurs in late summer (max in August = 4.59) while less precipitation occurs in spring (min in April = 1.05). Annual average temperature ranges from a minimum of 16.2 F in January to a maximum of 55.4 F in July. A spatial interpolation and estimate of the average annual precipitation and temperature from the PRISM⁴ dataset are presented in Figure 1. Estimated average annual temperature ranges from 24 to 33 F with coldest annual temperatures in the mountain range between Turquoise Lake and Twin Lakes at the head of the Mulchatna and Chilikadrotna Rivers (Figure 1). For the Mulchatna watershed, estimated annual precipitation ranges from 18 to 50 inches with highest precipitation along the mountain ridges and the lowest annual precipitation along the valley bottoms along northern section of the Mulchatna River.

³ Alaska Climate Database <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak3905> accessed 06/29/2015.

⁴ Daly C et al. 2008. Physiographically sensitive mapping of climatological temperature and precipitation across the conterminous United States. International Journal of Climatology 28: 2031–2064.

Table 1. Average daily climate summary for the Iliamna Airport Station (ID =503905) approximately 20 miles east of the Mulchatna watershed (59.75 N, -154.917 W). <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak3905>

Iliamna (1920 to 2015)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg/ Total
Average Maximum Temperature (F)	22.6	25.5	29.5	39.2	50.6	59	62.5	61	54.1	40.8	29.9	23.1	41.5
Average Temperature (F)	16.2	18.6	21.9	32.1	42.9	51.1	55.4	54.6	47.9	35.1	24.2	16.8	34.7
Average Minimum Temperature (F)	9.9	11.7	14.4	24.9	35.3	43.2	48.3	48.1	41.7	29.3	18.4	10.5	28
Average Total Precipitation (in.)	1.28	1.13	1.09	1.05	1.17	1.52	2.7	4.59	4.41	3.1	2.0	1.55	25.6
Average Total Snowfall (in.)	10.8	9.5	9.8	5.3	1	0	0	0	0	2.5	8.5	11.8	59.2
Average Snow Depth (in.)	8	10	11	7	0	0	0	0	0	0	2	5	4

Available Streamflow Data: The USGS operated a gage on the Mulchatna River from June 1, 2009 to October 17, 2014. The daily discharge summary shows a bimodal flow distribution with high monthly average flows in May (mean = 9,210 cfs) during snowmelt as well as September (mean = 9,825 cfs) in response to fall rain events. Average daily flow is lowest in April (mean = 1,892 cfs). Minimum daily flows were highest in July (min = 4,920 cfs) and lowest in April (min = 1,550 cfs) while maximum flows were highest in September (max = 29,400 cfs) and lowest in March (max = 2,350 cfs). Overall, average daily flow remains high from May through September and recedes during the late fall months before reaching a minimum in April prior to snowmelt (Table 2).

Table 2. Monthly discharge data summary for the USGS gage located on the Mulchatna River (Station No. 15302300;). [Monthly mean in ft³/s]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	---	---	---	---	---	8,542	5,663	5,858	4,783	6,070	2,907	2,087
2010	1,944	1,975	1,740	2,125	8,302	5,509	7,143	13,590	9,036	6,310	3,837	2,597
2011	2,261	2,027	1,850	4,683	11,060	7,615	7,890	11,320	8,705	6,403	4,318	3,448
2012	2,510	2,079	1,918	3,138	14,230	10,730	9,405	10,400	18,120	10,850	4,710	3,487
2013	2,860	2,516	2,239	2,054	8,007	6,628	6,528	6,922	8,453	13,040	8,376	3,517
2014	3,631	2,350	1,713	4,027	4,449	8,909	7,510	7,210	9,850	---	---	---
Mean of monthly Discharge	2,640	2,190	1,890	3,210	9,210	7,990	7,360	9,220	9,820	8,530	4,830	3,030

Data Adequacy: The streamflow record of 5 years for the Mulchatna River is considered adequate to adjudicate a reservation of water application.

Map 2. Map of Mulchatna watershed

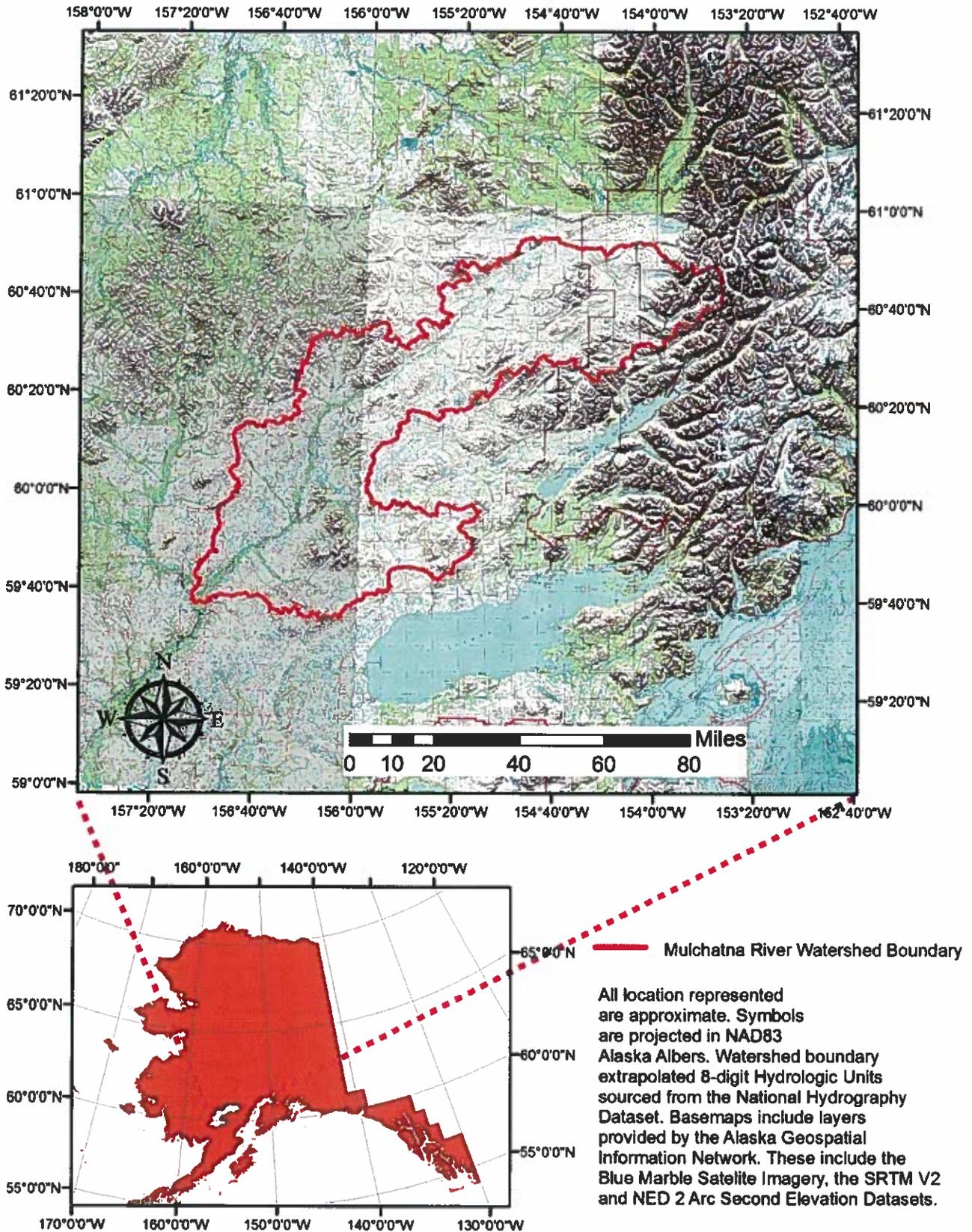
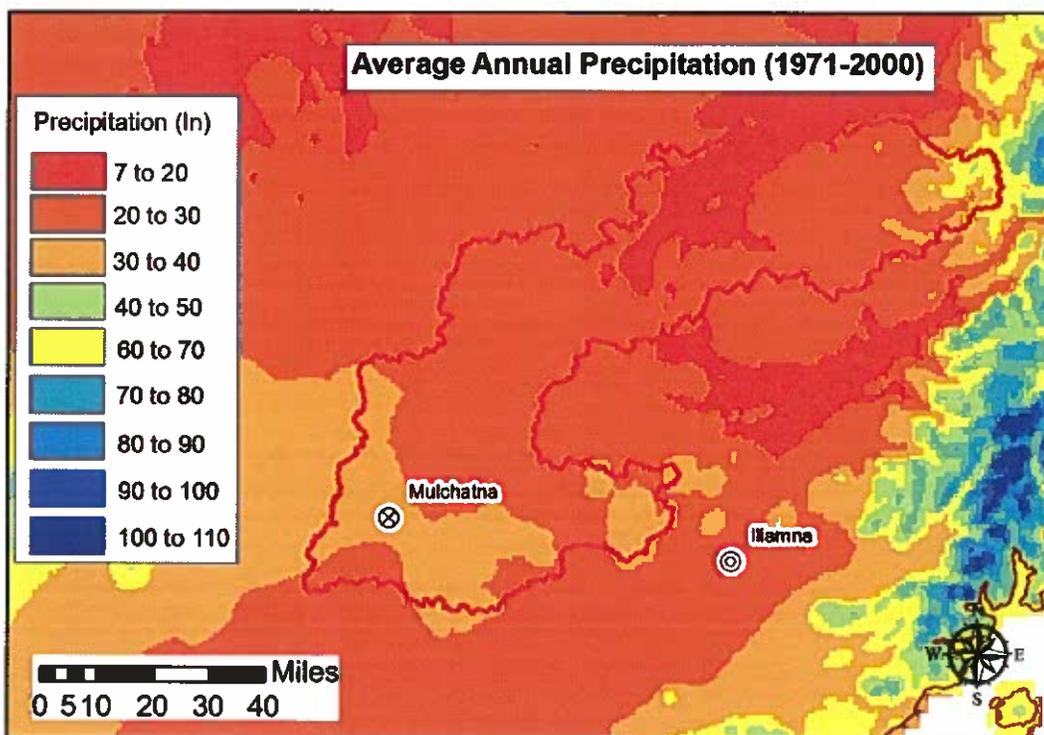
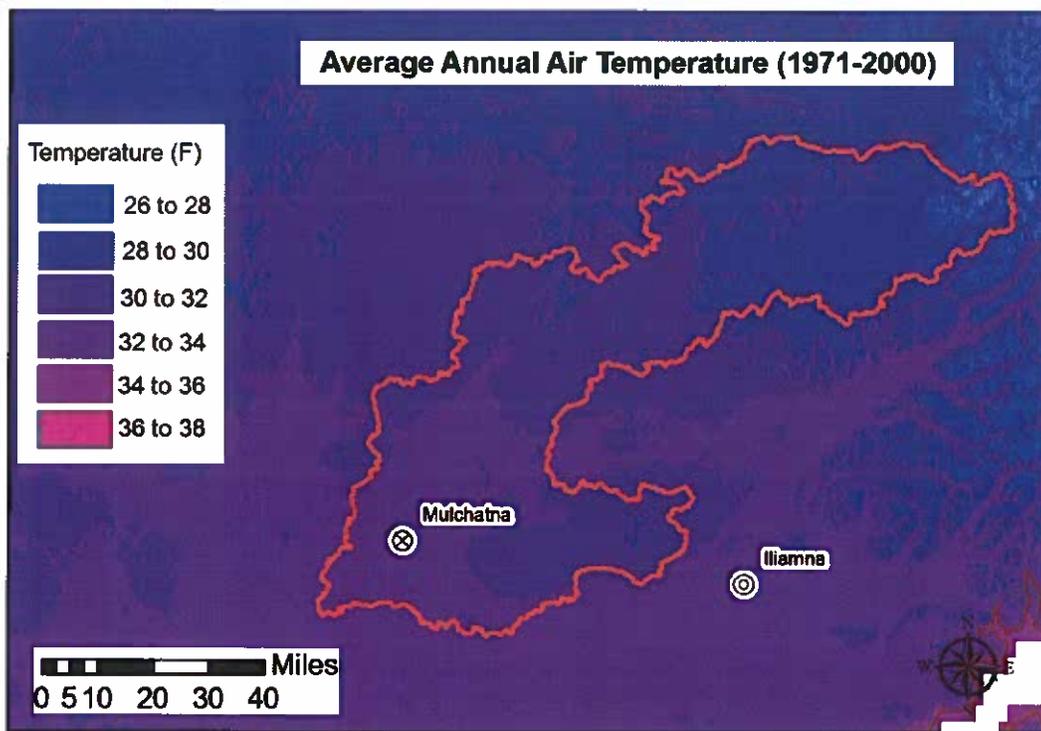
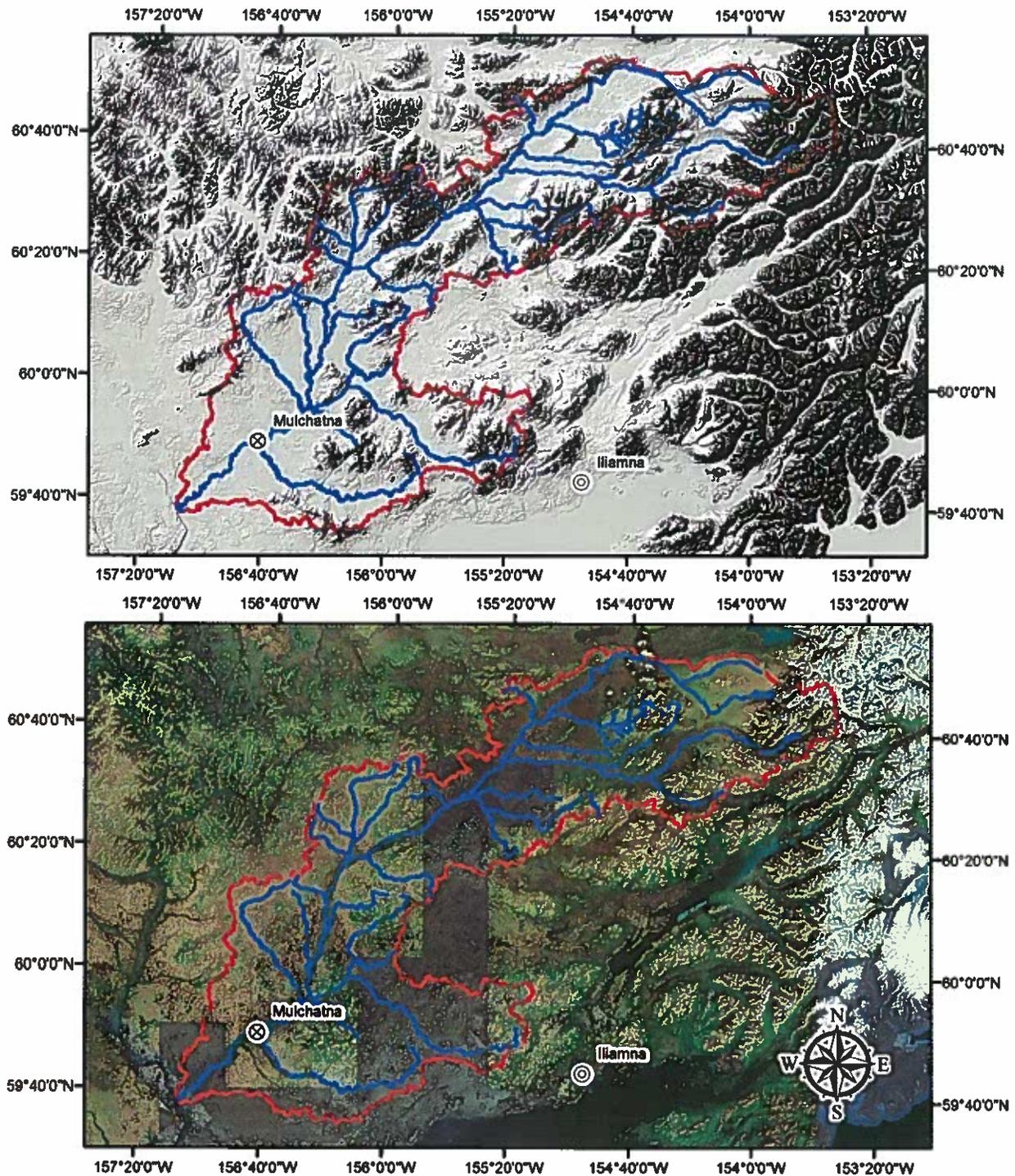


Figure 1. Estimates of average monthly and annual mean temperature (1971-2000) for the Mulchatna watershed using the PRISM model (Daly et al. 1998)



— Mulchatna River Watershed Boundary

Figure 2. Shaded relief (top panel) and hydrography (bottom panel) for the Mulchatna watershed.



All locations represented are approximate. Symbols and basemaps are projected in NAD 83 Alaska Albers. Basemaps were provided by the Alaska Geospatial Information Network, including digitized and hill-shaded USGS topographic map at 1:250k scale, Blue Marble Satellite Imagery Mosaic, and SRTM V2 Elevation Dataset. Flowlines provided by the National Hydrography Dataset.

-  USGS Mulchatna River Gage (15302300)
-  Iliamna weather station (503905)
-  Mulchatna River Watershed Boundary

Navigability: Mulchatna River is considered navigable according to the State of Alaska (for Title purposes). Please contact the Alaska Department of Natural Resources, Division of Mining, Land, and Water's Public Access, Assertion, and Defense Unit for more information.⁵

EXISTING LAND USE PLANS, VALUES, AND USES

Discussion: Staff reviewed area plans, strategies, and management plans. Recommendations provided in these documents were considered in determining if the flows and time periods for the reservation of water requested are in the public's best interest. ADNR uses the criteria in AS 46.15.080 and AS 46.15.145 to help determine the appropriate balance of the proposed reservation with those of other existing and potential users. These plans help ADNR have a better understanding of potential future water needs.

There are four documents used in the Mulchatna River watershed to better assess the needs of current and future plans. They are:

1. Bristol Bay Area Plan for State Lands – *Alaska Department of Natural Resources (Revised September 2013)*
2. Nushagak & Mulchatna Rivers Recreation Management Plan (2005 Revision), A Component of the Bristol Bay Area Plan – *Alaska Department of Natural Resources (April, 2005)*
3. Strategic Conservation Action Plan for Bristol Bay Watersheds - *Southwest Alaska Salmon Habitat Partnership (2011)*
4. *Southwest Alaska Comprehensive Economic Development Strategy 2003-2008*

The vast majority of the land surrounding the Mulchatna River belongs to and is managed by the State of Alaska. According to the Bristol Bay Area Plan for State Lands (BBAP), the entire length (within state land ownership) of the Mulchatna River is designated as 'Rp – Public Recreation and Tourism-Public Use Site' and 'Ha – Habitat'. The management intent of 'Rp' along the Mulchatna River is "...to be managed for public recreation and tourism and retained in public ownership.", and 'Ha' is a designation that "...applies to areas of various size for fish and wildlife species during a sensitive life-history stage where alteration of the habitat or human disturbance could result in the permanent loss of a population or sustained yield of species."⁶

Additionally, the BBAP continues on to directly address "Instream Flow" goals as:

*"Instream Flow. Maintain water quantity and quality sufficient to protect the human, fish, and wildlife resources and uses of the region."*⁷

These instream goals are supported by the Southwest Alaska Salmon Habitat Partnership (SWASHP) Strategic Plan. SWASHP's statement regarding fisheries management:

⁵ Alaska Department of Natural Resources, Navigable Waters Web Map. <http://navmaps.alaska.gov/navwatersmap/>

⁶ Bristol Bay Area Plan for State Lands – Alaska Department of Natural Resources (Revised September 2013); p. 3-110, 3-3

⁷ Bristol Bay Area Plan (April 2005, Revised 2013); P. 2-32

Sustained fisheries for wild salmon are only possible with a viable and intact habitat base. Historic levels of salmon production in southwest Alaska, and the fisheries that they support, have only been possible because the habitat has remained abundant and pristine...

The focus of the Partnership is conservation of fish habitat. The Partnership recognizes that the key outputs from fisheries management are protection of fish habitats, and adequate seeding of spawning salmon to these habitats. The partnership fully supports the concepts contained in the State of Alaska's Policy for the Management of Sustainable Salmon Fisheries, which explicitly recognizes that fisheries management must: protect the full range of spawning, rearing, and migratory habitats; and provide for spawning escapements necessary to both conserve potential production and maintain normal ecosystems functioning..."⁸

BBAP additionally addresses priorities from the land management perspective,

"B. Priorities. No additional in-stream reservations of water are recommended within the planning area. The need for such reservations should be reevaluated should the plan be revised in the future. Proposals for major new developments requiring substantial water use or uses of water that will negatively impact instream flows needed to produce fish, sustain water quality, provide for navigation, and/or recreation should include an evaluation of the need for an instream water reservation or other forms of instream flow protection."⁹

Area plans usually cover large areas and establish goals, management intent, and guidelines for the Department's management of the use of state land. However, even though an area plan for state lands may make general statements regarding the need for additional reservations of water, the Alaska Water Use Act and its implementing regulations authorize any person to apply for a reservation of water at any time. ADNR will review and adjudicate those applications as required by law.

FINDINGS OF FACTS AND CONCLUSIONS OF LAW

Under Article VIII of the Alaska Constitution and Alaska Statute AS 46.15.030, naturally occurring water, except mineral and medicinal waters, is reserved to the people for common use and is subject to appropriation and beneficial use; AS 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, contains the statutes and regulations under which ADNR manages the State's water resources.

A reservation of water is issued pursuant to the following authorities, including but not limited to:

⁸ Southwest Alaska Salmon Habitat Partnership Strategic Plan, 2011; P. 12

⁹ Bristol Bay Area Plan (April 2005, Revised 2013); P. 2-32

Under 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.”

Under 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.”

Under 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).”

ADNR makes the following findings of fact and conclusions of law in response to the above requirements:

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

Discussion and Determination: Based on a search of ADNR’s water rights records, there are no prior appropriators within the specified reaches within Mulchatna River.

The reservations of water established by the Department’s decision and certification does not affect other valid water rights with a senior priority date including water rights with senior priority date that may be issued after the date the certificates reserving water are issued.

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

Discussion: Under Title 16 of the Alaska Statutes, ADF&G is the state agency charged with managing Alaska’s fish and wildlife. The primary purpose of these reservation applications is the protection of fish and wildlife habitat, migration, and propagation. ADF&G has staff who are dedicated to the research, development and implementation of priority applications for Reservation of Water. As part of this process, ADF&G (working with the SWASHP) identified the Mulchatna River as a priority for establishment of an instream flow reservation. Further, the applications have provided credible information that demonstrates the granting of these reservations of water is needed to help protect and maintain fish production within Mulchatna River.

The Mulchatna River serves as a fish passage corridor between the marine environment and other portions of its watershed utilized for fish production.

Mulchatna River supports Chinook salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*O. nerka*), chum salmon (*O. keta*), coho salmon (*O. kisutch*), pink salmon (*O. gorbuscha*), rainbow trout (*O. mykiss*), Dolly Varden (*Salvelinus malma*), Humpback Whitefish (*Coregonus pidschian*), Longnose Sucker (*Catostomus catostomus*), Northern Pike (*Esox lucius*), Burbot (*Lota lota*), Broad Whitefish (*C. nasus*), Round Whitefish (*Prosopium cylindraceum*), Arctic Grayling (*Thymallus arcticus*), Slimy Sculpin (*Cottus cognatus*), Threespine Stickleback (*Gasterosteus cognatus*), and Pacific Lamprey (*Entosphenus tridentatus*) for a portion of, or all of their spawning, incubation, rearing, and passage life phases.

Mulchatna River is cataloged within the Anadromous Waters Catalog as #325-30-10100-2202.

Mulchatna River, along with other area watershed rivers, is considered an important source for fish and contributes to significant commercial, subsistence, and sport fish use. In the judgment of the state's fish and wildlife management agency in collaboration with SWASHP, the proposed reservations are needed to maintain the fish production within Mulchatna River and will aid ADF&G in carrying out its duty of managing and protecting the states fish and wildlife. 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."¹⁰ It further provides that "all essential salmon habitat in marine, estuarine, and freshwater ecosystems and access of salmon to these habitats should be protected."¹¹ A reservation of water can protect fish production while still allowing for other appropriation of river flows in excess of the reservation amounts.

Additionally, the experience of other western demonstrates the importance of protecting necessary instream flows for fish production early to ensure that these flows – and the uses that depend on these flows – are fully considered later when available water may be more scarce.¹² "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."¹³

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

¹⁰ 5 AAC 39.222(c)(A)(i).

¹¹ 5 AAC 39.222(c)(a)(iv).

¹² 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.

¹³ 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

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.¹⁴

Determination: In light of the above factors, it is determined that SWASHP and ADF&G, as applicants, have demonstrated that a need exists for the proposed reservations of water and that these reservations of water will assist ADF&G in fulfilling its duties as State of Alaska's manager of the fisheries and wildlife resources, as well as contribute to the SWASHP mission.

AS 46.15.145 (c)(3): There exists unappropriated water within the stream sufficient for the reservation.

Discussion: The USGS record for Mulchatna River, gage #15302300, has been analyzed to help determine whether there is sufficient unappropriated stream flows in Mulchatna River to accommodate the proposed reservations.

The following table shows the flows available after the proposed reservation flows are met for the specified reach, during each listed period of the year, based on USGS flow data:

Table 3. Flow Table* [cfs = cubic feet per second; gpd = gallons per day]

Reach A:

Time Period	Mean Time Period Discharge (cfs)	Applicant Proposed Flow (cfs)	Reach A Reservation Flows (cfs)	Remaining Flows For Future Appropriations (cfs)	Remaining Flows For Future Appropriations (gpd)
January	2933	1500	1500	1,433	926,107,776
February	2453	1200	1200	1,253	809,778,816
March	2135	1000	1000	1,135	733,518,720
April	3566	1500	1500	2,066	1,335,197,952
May	10160	9500	6100	4,060	2,623,864,320
June	8607	6400	6400	2,207	1,426,322,304
July	7825	3300	3300	4,525	2,924,380,800
August	9807	4000	4000	5,807	3,752,901,504
September	10459	5800	5800	4,659	3,010,981,248

¹⁴ 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>.

October	9223	6800	6500	2,723	1,759,798,656
November	5256	4000	4000	1,256	811,717,632
December	3339	3000	2971	368	237,828,096

Reach A2:

Time Period	Mean Time Period Discharge (cfs)	Applicant Proposed Flow (cfs)	Reach A2 Reservation Flows (cfs)	Combined Reach A + Reach A2 Flows (cfs)	Remaining Flows For Future Appropriations after Reach A & A2 (cfs)	Remaining Flows For Future Appropriations after Reach A & A2 (gpd)
January	2933	2670	1045	2,545	388	250,753,536
February	2453	2330	1060	2,260	193	124,730,496
March	2135	2100	1050	2,050	85	54,933,120
April 1-15	2108	2100	550	2,050	58	5,170,176
April 16-23	3772	2730	873	2,373	1,399	904,134,528
April 24-30	6456	6420	3100	4,600	1,856	1,199,480,832
May 1-7	9708	9700	0	6,100	3,608	2,331,749,376
May 8-15	10358	10350	4200	10,300	58	5,170,176
May 16-23	9805	9410	2000	8,100	1,705	1,101,893,760
May 24-31	10712	8360	1550	7,650	3,062	1,978,884,864
June 1-7	10171	10170	2600	9,000	1,171	756,784,512
June 8-15	8191	7590	750	7,150	1,041	672,769,152
June 16-23	8038	7920	100	6,500	1,538	993,966,336
June 24-30	8169	8160	700	7,100	1,069	690,864,768
July 1-15	7825	7700	3800	7,100	725	468,547,200
July 16-31	7815	7390	3400	6,700	1,115	720,593,280
August 1-15	10250	9040	3800	7,800	2,450	1,583,366,400
August 16-31	9391	8860	4000	8,000	1,391	898,964,352
September 1-15	10649	10640	4550	10,350	299	193,235,328
September 16-23	10392	8920	2700	8,500	1,892	1,222,746,624
September 24-30	10128	7710	1450	7,250	2,878	1,859,970,816
October 1-15	9036	7610	450	6,950	2,086	1,348,123,392
October 16-31	9398	6910	0	6,500	2,898	1,872,896,256

November 1-15	6319	5150	983	4,983	1,336	863,419,392
November 16-30	4194	4190	125	4,125	69	44,592,768
December 1-15	3570	3570	354	3,325	245	158,336,640
December 16-31	3123	3120	0	2,971	152	98,233,344

Reach B:

Time Period	Mean Time Period Discharge (cfs)	Applicant Proposed Flow (cfs)	Reach B Reservation Flows (cfs)	Remaining Flows For Future Appropriations (cfs)	Remaining Flows For Future Appropriations (gpd)
January	2641	1400	1400	1,241	802,023,552
February	2189	1100	1100	1,089	703,790,208
March	1892	900	900	992	641,101,824
April	3205	1350	1350	1,855	1,198,834,560
May	9210	8800	5550	3,660	2,365,355,520
June	7988	6000	6000	1,988	1,284,788,736
July	7356	3000	3000	4,356	2,815,160,832
August	9218	3700	3700	5,518	3,566,128,896
September	9825	5300	5300	4,525	2,924,380,800
October	8534	6300	5900	2,634	1,702,280,448
November	4830	3700	3700	1,130	730,287,360
December	3027	2700	2600	427	275,958,144

Reach B2:

Time Period	Mean Time Period Discharge (cfs)	Applicant Proposed Flow (cfs)	Reach B2 Reservation Flows (cfs)	Combined Reach B + Reach B2 Flows (cfs)	Remaining Flows For Future Appropriations after Reach B & B2 (cfs)	Remaining Flows For Future Appropriations after Reach B & B2 (gpd)
January	2641	2400	865	2,265	376	242,998,272
February	2189	2180	920	2,020	169	109,219,968
March	1892	1890	900	1,800	92	59,457,024
April 1-15	1861	1860	510	1,860	61	39,422,592
April 16-23	3407	3400	750	2,100	1,307	844,677,504
April 24-30	5856	5850	2850	4,200	1,656	1,070,226,432
May 1-7	8791	8790	0	5,550	3,241	2,094,567,552
May 8-15	9329	9320	3729	9,279	50	5,816,448
May 16-23	8886	8880	1750	7,300	1,586	1,024,987,392
May 24-31	9781	9780	1400	6,950	2,831	1,829,596,032
June 1-7	9364	9360	2300	8,300	1,064	687,633,408
June 8-15	7568	7030	600	6,600	968	625,591,296
June 16-23	7480	7480	0	6,000	1,480	956,482,560
June 24-30	7674	7670	800	6,800	874	564,841,728
July 1-15	7349	7260	3700	6,700	649	419,430,528
July 16-31	7363	6940	3400	6,400	963	622,359,936
August 1-15	9635	8500	3550	7,250	2,385	1,541,358,720
August 16-31	8827	8310	3800	7,500	1,327	857,602,944
September 1-15	10014	10000	4450	9,750	264	170,615,808
September 16-23	9734	8300	2580	7,880	1,854	1,198,188,288
September 24-30	9524	7170	1450	6,750	2,774	1,792,758,528
October 1-15	8376	6950	500	6,400	1,976	1,277,033,472
October 16-31	8682	6300	0	5,900	2,782	1,797,928,704
November 1-15	5827	4700	800	4,500	1,327	857,602,944
November 16-30	3832	3900	25	3,725	107	69,151,104
December 1-15	3240	3240	405	3,005	235	151,873,920
December 16-31	2828	2820	60	2,660	168	108,573,696

Reach C:

Time Period	Mean Time Period Discharge (cfs)	Applicant Proposed Flows (cfs)	Reach C Reservation Flows (cfs)	Remaining Flows For Fututre Appropriations (cfs)	Remaining Flows For Fututre Appropriations (gpd)
January	2641	2400	2265	376	242,998,272
February	2189	2180	2020	169	109,219,968
March	1892	1890	1800	92	59,457,024
April 1-15	1861	1860	1800	61	39,422,592
April 16-23	3407	3400	2100	1307	844,677,504
April 24-30	5856	5850	4200	1656	1,070,226,432
May 1-7	8791	8790	5550	3241	2,094,567,552
May 8-15	9329	9320	9279	50	5,816,448
May 16-23	8886	8880	7300	1586	1,024,987,392
May 24-31	9781	9780	6950	2831	1,829,596,032
June 1-7	9364	9360	8300	1064	687,633,408
June 8-15	7568	7030	6600	968	625,591,296
June 16-23	7480	7480	6000	1480	956,482,560
June 24-30	7674	7670	6800	874	564,841,728
July 1-15	7349	7260	6700	649	419,430,528
July 16-31	7363	6940	6400	963	622,359,936
August 1-15	9635	8500	7250	2385	1,541,358,720
August 16-31	8827	8310	7500	1327	857,602,944
September 1-15	10014	10000	9750	264	170,615,808
September 16-23	9734	8300	7880	1854	1,198,188,288
September 24-30	9524	7170	6750	2774	1,792,758,528
October 1-15	8376	6950	6400	1976	1,277,033,472
October 16-31	8682	6300	5900	2782	1,797,928,704
November 1-15	5827	4700	4500	1327	857,602,944
November 16-30	3832	3900	3725	107	69,151,104
December 1-15	3240	3240	3005	235	151,873,920
December 16-31	2828	2820	2660	168	108,573,696

* 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 in cfs.*

Reach A:

% Time exceeded	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10,645	5,900	2,640	20,200	20,020	13,830	15,723	19,471	30,650	26,750	14,388	5,080
5	3,770	2,970	2,580	8,700	18,270	13,015	10,696	16,420	20,360	17,620	12,478	4,420
10	3,240	2,860	2,460	7,595	17,160	12,035	10,381	14,956	16,905	16,230	9,160	4,168
15	3,150	2,780	2,450	6,419	16,090	11,589	9,916	13,471	13,601	15,173	6,100	4,090
20	3,110	2,730	2,310	4,775	15,525	11,302	9,390	12,653	12,569	12,483	5,590	4,000
25	3,060	2,640	2,171	3,880	14,866	10,776	9,039	12,201	11,743	9,650	5,320	3,910
30	3,036	2,460	2,150	3,050	13,780	10,033	8,617	11,460	11,466	8,762	5,155	3,800
35	2,960	2,431	2,129	2,470	12,150	9,271	8,281	10,910	11,176	8,256	5,020	3,688
40	2,878	2,374	2,128	2,410	10,996	9,009	8,144	10,381	10,637	7,808	4,860	3,585
45	2,760	2,360	2,120	2,370	10,600	8,583	7,766	9,572	10,180	7,518	4,730	3,530
50	2,668	2,325	2,100	2,330	9,804	8,315	7,594	8,916	9,384	7,208	4,593	3,417
55	2,582	2,293	2,090	2,310	8,820	7,992	7,384	8,442	8,910	6,938	4,470	3,300
60	2,545	2,260	2,050	2,275	8,108	7,676	7,036	8,094	8,545	6,830	4,395	3,210
65	2,473	2,250	2,050	2,205	7,465	7,164	6,769	7,733	8,231	6,670	4,290	3,061
70	2,440	2,220	2,020	2,163	7,095	6,665	6,537	7,264	7,787	6,503	4,180	2,880
75	2,330	2,220	2,000	2,136	5,859	6,301	6,303	7,023	7,410	6,391	3,990	2,670
80	2,250	2,200	1,990	2,080	4,955	6,064	6,072	6,781	7,023	6,283	3,740	2,505
85	2,170	2,173	1,950	1,950	4,259	5,975	5,982	6,489	5,972	6,140	3,510	2,340
90	2,170	2,110	1,895	1,880	3,681	5,722	5,840	6,176	5,227	6,013	2,930	2,340
95	2,110	2,100	1,840	1,790	2,765	5,297	5,527	5,671	4,830	5,866	2,560	2,230
100	2,110	2,000	1,785	1,735	2,430	5,039	5,243	4,707	4,623	4,962	2,450	2,230
Mean	2,933	2,453	2,135	3,566	10,160	8,607	7,825	9,807	10,459	9,223	5,256	3,339

Reach A2:

% Time exceeded	Jan	Feb	Mar	Apr 1-15	Apr 16-23	Apr 24-30	May 1-7	May 8-15	May 16-23	May 24-31	Jun 1-7	Jun 8-15	Jun 16-23	Jun 24-30
0	10,645	5,900	2,640	2,620	8,750	20,200	19,520	17,640	18,320	20,020	13,830	13,570	11,990	13,207
5	3,770	2,970	2,580	2,410	8,675	15,960	18,940	16,830	18,030	18,360	13,310	12,400	11,687	11,473
10	3,240	2,860	2,460	2,380	8,415	11,150	17,790	16,030	17,435	17,355	13,080	11,690	11,470	11,109
15	3,150	2,780	2,450	2,330	5,870	9,580	16,150	15,510	16,850	16,355	12,880	11,420	10,929	10,856
20	3,110	2,730	2,310	2,315	5,180	8,325	14,725	14,980	15,265	15,675	12,600	9,636	10,787	10,535
25	3,060	2,640	2,171	2,310	4,315	8,020	14,300	14,160	10,757	15,560	12,380	9,009	9,598	10,451
30	3,036	2,460	2,150	2,270	4,035	7,540	13,770	13,760	10,430	15,275	12,080	8,835	9,153	10,037
35	2,960	2,431	2,129	2,205	3,670	7,006	13,210	12,830	10,207	14,933	11,840	8,718	8,545	9,444
40	2,878	2,374	2,128	2,200	3,335	6,838	11,695	11,963	9,789	13,995	11,538	7,991	8,392	9,086
45	2,760	2,360	2,120	2,160	3,115	6,680	10,830	11,815	9,645	8,925	11,304	7,747	8,147	8,379
50	2,668	2,325	2,100	2,136	2,725	6,419	10,010	11,140	9,411	8,364	10,535	7,590	7,917	8,228
55	2,582	2,293	2,090	2,127	2,525	5,290	7,160	10,859	8,980	8,071	9,350	7,349	7,160	7,855
60	2,545	2,260	2,050	2,109	2,373	4,795	6,139	10,717	8,325	7,712	9,207	7,294	6,655	7,507
65	2,473	2,250	2,050	1,950	2,345	4,460	6,051	10,230	7,885	7,558	8,841	7,026	6,311	6,833
70	2,440	2,220	2,020	1,950	2,340	3,670	5,730	5,141	7,403	7,403	8,705	6,758	6,188	5,568
75	2,330	2,220	2,000	1,880	2,290	3,020	5,381	4,955	7,000	7,299	8,272	6,603	6,016	5,397
80	2,250	2,200	1,990	1,880	2,280	2,615	3,977	4,633	5,568	6,925	7,995	6,289	5,912	5,273
85	2,170	2,173	1,950	1,790	2,260	2,420	2,580	4,464	4,103	5,400	7,081	6,130	5,866	5,191
90	2,170	2,110	1,895	1,790	2,213	2,420	2,500	3,943	3,979	3,700	6,575	6,006	5,672	5,149
95	2,110	2,100	1,840	1,735	2,100	2,400	2,440	3,003	3,783	3,589	6,017	5,976	5,589	5,110
100	2,110	2,000	1,785	1,735	2,010	2,350	2,430	2,765	3,681	3,562	5,974	5,857	5,362	5,039
Mean	2,933	2,453	2,135	2,108	3,772	6,456	9,708	10,358	9,805	10,712	10,171	8,191	8,038	8,169

Reach A2 continued:

% Time exceeded	Jul 1-15	Jul 16-31	Aug 1-15	Aug 16-31	Sep 1-15	Sep 16-23	Sep 24-30	Oct 1-15	Oct 16-31	Nov 1-15	Nov 16-30	Dec 1-15	Dec 16-31
0	11,552	15,723	18,059	19,471	18,841	27,250	30,650	17,510	26,750	14,388	8,620	5,080	3,960
5	10,500	11,265	16,820	15,443	16,950	22,950	28,550	16,441	23,230	13,400	6,400	4,760	3,894
10	10,277	10,502	15,629	13,155	14,902	17,986	22,886	15,779	17,370	12,478	5,200	4,420	3,780
15	9,920	9,868	14,842	11,965	13,243	13,500	18,269	14,281	15,841	10,800	4,870	4,202	3,730
20	9,434	9,390	13,677	11,460	12,532	13,172	8,969	12,504	11,643	8,105	4,795	4,169	3,655
25	9,165	8,996	13,167	11,097	12,010	12,069	8,538	10,225	9,493	6,100	4,700	4,145	3,585
30	8,723	8,339	12,631	10,734	11,656	10,214	8,313	9,126	8,376	5,680	4,610	4,100	3,565
35	8,359	8,245	12,220	10,563	11,553	9,690	8,219	8,613	7,829	5,480	4,520	4,050	3,530
40	8,168	8,079	11,489	9,699	11,403	9,476	7,968	8,224	7,435	5,345	4,423	4,005	3,466
45	7,895	7,583	9,923	9,394	11,253	9,183	7,846	7,830	7,175	5,270	4,360	3,960	3,386
50	7,701	7,389	9,040	8,863	11,071	8,921	7,708	7,608	6,905	5,150	4,270	3,910	3,300
55	7,604	7,223	8,366	8,601	10,986	8,699	7,503	7,208	6,694	5,110	4,195	3,620	3,204
60	7,425	6,909	7,889	8,315	10,551	8,552	7,301	7,010	6,557	4,983	4,125	3,325	2,971
65	6,850	6,573	7,733	7,628	10,193	8,417	7,192	6,894	6,425	4,790	3,970	3,210	2,780
70	6,585	6,480	7,318	7,167	9,486	8,099	7,112	6,801	6,358	4,570	3,760	3,100	2,675
75	6,362	6,298	6,968	7,060	8,790	7,765	7,078	6,527	6,283	4,455	3,560	2,990	2,670
80	6,058	6,105	6,717	6,786	7,550	7,069	6,558	6,466	6,207	4,320	3,155	2,670	2,450
85	5,983	5,975	6,511	6,489	6,491	5,241	4,833	6,333	6,107	4,180	2,660	2,450	2,340
90	5,896	5,745	6,298	5,916	5,424	5,053	4,668	6,046	5,969	3,720	2,560	2,340	2,230
95	5,405	5,527	5,738	5,274	5,266	4,829	4,633	5,880	5,863	3,300	2,450	2,340	2,230
100	5,243	5,408	5,474	4,707	4,830	4,677	4,623	4,962	5,120	2,980	2,450	2,340	2,230
Mean	7,835	7,815	10,250	9,391	10,649	10,392	10,128	9,036	9,398	6,319	4,194	3,570	3,123

Reach B

% Time exceeded	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10,000	5,100	2,350	19,000	18,600	12,700	14,900	18,500	29,400	25,200	13,500	4,600
5	3,450	2,600	2,300	8,000	16,500	11,850	10,000	15,400	19,300	16,500	11,600	4,000
10	2,950	2,550	2,200	6,950	15,500	11,100	9,760	14,200	15,950	15,200	8,725	3,800
15	2,850	2,500	2,200	5,850	14,700	10,700	9,240	12,800	12,850	14,200	5,600	3,720
20	2,800	2,400	2,050	4,350	14,000	10,450	8,800	12,000	11,850	11,650	5,100	3,645
25	2,750	2,300	1,940	3,500	13,500	9,920	8,550	11,300	11,100	9,000	4,850	3,550
30	2,700	2,200	1,920	2,700	12,500	9,430	8,090	10,900	10,800	8,160	4,700	3,500
35	2,650	2,200	1,900	2,200	11,000	8,660	7,840	10,300	10,500	7,660	4,550	3,400
40	2,600	2,140	1,900	2,100	10,000	8,420	7,650	9,630	10,050	7,130	4,425	3,275
45	2,500	2,100	1,900	2,100	9,600	7,985	7,330	8,950	9,545	6,820	4,300	3,250
50	2,400	2,100	1,900	2,050	8,910	7,750	7,150	8,385	8,700	6,570	4,200	3,100
55	2,300	2,050	1,850	2,050	8,100	7,400	6,930	7,910	8,280	6,400	4,100	3,000
60	2,265	2,020	1,800	2,000	7,335	7,125	6,610	7,500	7,915	6,245	4,000	2,900
65	2,200	2,000	1,800	2,000	6,760	6,685	6,270	7,200	7,650	6,100	3,900	2,720
70	2,200	2,000	1,800	1,925	6,420	6,175	6,140	6,740	7,255	5,910	3,800	2,600
75	2,100	2,000	1,800	1,900	5,300	5,890	5,930	6,580	6,890	5,830	3,600	2,400
80	2,025	1,950	1,700	1,875	4,325	5,675	5,760	6,340	6,540	5,750	3,400	2,250
85	1,950	1,900	1,700	1,600	3,800	5,510	5,680	6,100	5,485	5,680	3,200	2,100
90	1,950	1,900	1,600	1,600	3,320	5,310	5,540	5,780	4,840	5,510	2,650	2,100
95	1,900	1,900	1,600	1,550	2,350	4,960	5,240	5,320	4,435	5,360	2,300	2,000
100	1,900	1,800	1,600	1,550	2,100	4,700	4,920	4,400	4,270	4,550	2,200	2,000
Mean	2,641	2,189	1,892	3,205	9,210	7,988	7,356	9,218	9,825	8,534	4,830	3,027

Reach B2:

% Time exceeded	Jan	Feb	Mar	Apr 1-15	Apr 16-23	Apr 24-30	May 1-7	May 8-15	May 16-23	May 24-31	Jun 1-7	Jun 8-15	Jun 16-23	Jun 24-30
0	10,000	5,100	2,350	2,400	8,000	19,000	18,000	16,000	17,000	18,600	12,700	12,400	11,400	12,500
5	3,450	2,600	2,300	2,200	7,875	15,000	17,500	15,250	16,250	17,100	12,200	11,300	10,800	10,900
10	2,950	2,550	2,200	2,100	7,675	10,000	16,500	14,500	15,750	16,150	12,000	10,600	10,500	10,300
15	2,850	2,500	2,200	2,100	5,450	8,500	15,000	14,000	15,250	14,850	11,600	10,400	9,960	10,100
20	2,800	2,400	2,050	2,075	4,800	7,600	13,500	13,750	13,900	14,500	11,500	8,990	9,890	9,920
25	2,750	2,300	1,940	2,050	4,000	7,000	13,000	13,000	9,900	14,000	11,300	8,460	8,955	9,710
30	2,700	2,200	1,920	2,000	3,650	6,900	12,500	12,450	9,600	13,950	11,000	8,250	8,560	9,560
35	2,650	2,200	1,900	2,000	3,350	6,400	12,000	11,550	9,400	13,500	10,900	8,000	7,970	8,950
40	2,600	2,140	1,900	1,950	3,000	6,200	10,305	10,800	8,920	12,550	10,700	7,390	7,930	8,640
45	2,500	2,100	1,900	1,920	2,750	6,000	9,320	10,350	8,745	8,200	10,500	7,140	7,700	7,920
50	2,400	2,100	1,900	1,910	2,400	5,850	8,910	10,000	8,435	7,700	9,795	7,030	7,430	7,740
55	2,300	2,050	1,850	1,900	2,250	4,600	6,500	10,000	8,095	7,350	8,680	6,790	6,580	7,360
60	2,265	2,020	1,800	1,900	2,100	4,250	5,575	9,590	7,495	7,000	8,500	6,790	6,150	7,070
65	2,200	2,000	1,800	1,700	2,050	4,000	5,500	9,125	7,060	6,900	8,180	6,500	5,890	6,430
70	2,200	2,000	1,800	1,600	2,050	3,300	5,150	4,600	6,590	6,720	8,000	6,260	5,760	5,210
75	2,100	2,000	1,800	1,600	2,000	2,700	4,850	4,325	6,390	6,605	7,600	6,110	5,650	5,060
80	2,025	1,950	1,700	1,600	2,000	2,305	3,500	4,085	5,075	6,270	7,300	5,800	5,540	4,940
85	1,950	1,900	1,700	1,600	2,000	2,100	2,200	4,000	3,695	4,820	6,600	5,690	5,480	4,860
90	1,950	1,900	1,600	1,550	1,965	2,100	2,150	3,475	3,590	3,320	6,050	5,630	5,270	4,810
95	1,900	1,900	1,600	1,550	1,875	2,100	2,100	2,550	3,415	3,230	5,500	5,570	5,200	4,760
100	1,900	1,800	1,600	1,550	1,800	2,050	2,100	2,350	3,320	3,210	5,460	5,450	4,990	4,700
Mean	2,641	2,189	1,892	1,861	3,407	5,856	8,791	9,329	8,886	9,781	9,364	7,568	7,480	7,674

Reach B2 continued:

% Time exceeded	Jul 1-15	Jul 16-31	Aug 1-15	Aug 16-31	Sep 1-15	Sep 16-23	Sep 24-30	Oct 1-15	Oct 16-31	Nov 1-15	Nov 16-30	Dec 1-15	Dec 16-31
0	10,800	14,900	17,100	18,500	17,900	25,800	29,400	16,400	25,200	13,500	8,200	4,600	3,560
5	9,860	10,700	16,000	14,600	16,100	21,800	27,400	15,500	21,800	12,800	6,000	4,300	3,500
10	9,565	9,870	14,650	12,400	14,100	17,000	21,900	14,800	16,300	11,600	4,750	4,000	3,490
15	9,240	9,200	14,000	11,300	12,600	12,700	17,400	13,500	14,800	10,300	4,450	3,800	3,410
20	8,745	8,890	12,900	10,900	11,850	12,400	8,410	11,650	10,900	7,625	4,375	3,800	3,350
25	8,610	8,495	12,500	10,500	11,300	11,350	7,940	9,420	8,850	5,600	4,300	3,760	3,275
30	8,155	7,910	11,900	10,100	11,000	9,600	7,690	8,440	7,680	5,200	4,200	3,740	3,250
35	7,880	7,820	11,600	9,980	10,800	9,010	7,610	7,880	7,100	5,000	4,150	3,700	3,225
40	7,695	7,540	10,950	9,110	10,700	8,660	7,450	7,600	6,780	4,875	4,050	3,650	3,150
45	7,470	7,100	9,360	8,770	10,600	8,420	7,270	7,180	6,500	4,800	4,000	3,600	3,025
50	7,260	6,940	8,505	8,315	10,500	8,295	7,170	6,950	6,300	4,700	3,900	3,550	3,000
55	7,170	6,790	7,780	8,060	10,300	7,990	7,040	6,660	6,150	4,600	3,800	3,300	2,850
60	6,980	6,530	7,330	7,820	9,920	7,900	6,850	6,430	5,965	4,500	3,725	3,005	2,660
65	6,350	6,200	7,120	7,210	9,570	7,840	6,640	6,380	5,845	4,400	3,600	2,900	2,500
70	6,180	6,090	6,800	6,730	8,870	7,610	6,620	6,180	5,780	4,200	3,400	2,800	2,400
75	5,930	5,925	6,480	6,585	8,200	7,285	6,550	6,080	5,745	4,000	3,200	2,700	2,400
80	5,750	5,770	6,270	6,390	7,070	6,610	6,130	5,895	5,680	3,950	2,850	2,400	2,200
85	5,680	5,640	6,130	6,060	5,980	4,860	4,400	5,840	5,600	3,800	2,400	2,200	2,100
90	5,580	5,420	5,850	5,540	5,000	4,670	4,290	5,600	5,460	3,400	2,300	2,100	2,000
95	5,040	5,240	5,420	4,930	4,870	4,470	4,290	5,300	5,365	3,000	2,200	2,100	2,000
100	4,920	5,080	5,100	4,400	4,500	4,330	4,270	4,550	4,700	2,700	2,200	2,100	2,000
Mean	7,349	7,363	9,635	8,827	10,014	9,734	9,524	8,376	8,682	5,827	3,832	3,240	2,828

Reach C:

% Time exceeded	Jan	Feb	Mar	Apr 1-15	Apr 16-23	Apr 24-30	May 1-7	May 8-15	May 16-23	May 24-31	Jun 1-7	Jun 8-15	Jun 16-23	Jun 24-30
0	10,000	5,100	2,350	2,400	8,000	19,000	18,000	16,000	17,000	18,600	12,700	12,400	11,400	12,500
5	3,450	2,600	2,300	2,200	7,875	15,000	17,500	15,250	16,250	17,100	12,200	11,300	10,800	10,900
10	2,950	2,550	2,200	2,100	7,675	10,000	16,500	14,500	15,750	16,150	12,000	10,600	10,500	10,300
15	2,850	2,500	2,200	2,100	5,450	8,500	15,000	14,000	15,250	14,850	11,600	10,400	9,960	10,100
20	2,800	2,400	2,050	2,075	4,800	7,600	13,500	13,750	13,900	14,500	11,500	8,990	9,890	9,920
25	2,750	2,300	1,940	2,050	4,000	7,000	13,000	13,000	9,900	14,000	11,300	8,460	8,955	9,710
30	2,700	2,200	1,920	2,000	3,650	6,900	12,500	12,450	9,600	13,950	11,000	8,250	8,560	9,560
35	2,650	2,200	1,900	2,000	3,350	6,400	12,000	11,550	9,400	13,500	10,900	8,000	7,970	8,950
40	2,600	2,140	1,900	1,950	3,000	6,200	10,305	10,800	8,920	12,550	10,700	7,390	7,930	8,640
45	2,500	2,100	1,900	1,920	2,750	6,000	9,320	10,350	8,745	8,200	10,500	7,140	7,700	7,920
50	2,400	2,100	1,900	1,910	2,400	5,850	8,910	10,000	8,435	7,700	9,795	7,030	7,430	7,740
55	2,300	2,050	1,850	1,900	2,250	4,600	6,500	10,000	8,095	7,350	8,680	6,790	6,580	7,360
60	2,265	2,020	1,800	1,900	2,100	4,250	5,575	9,590	7,495	7,000	8,500	6,730	6,150	7,070
65	2,200	2,000	1,800	1,700	2,050	4,000	5,500	9,125	7,060	6,900	8,180	6,500	5,890	6,430
70	2,200	2,000	1,800	1,600	2,050	3,300	5,150	4,600	6,590	6,720	8,000	6,260	5,760	5,210
75	2,100	2,000	1,800	1,600	2,000	2,700	4,850	4,325	6,390	6,605	7,600	6,110	5,650	5,060
80	2,025	1,950	1,700	1,600	2,000	2,305	3,500	4,085	5,075	6,270	7,300	5,800	5,540	4,940
85	1,950	1,900	1,700	1,600	2,000	2,100	2,200	4,000	3,695	4,820	6,600	5,690	5,480	4,860
90	1,950	1,900	1,600	1,550	1,965	2,100	2,150	3,475	3,590	3,320	6,050	5,630	5,270	4,810
95	1,900	1,900	1,600	1,550	1,875	2,100	2,100	2,550	3,415	3,230	5,500	5,570	5,200	4,760
100	1,900	1,800	1,600	1,550	1,800	2,050	2,100	2,350	3,320	3,210	5,460	5,450	4,990	4,700
Mean	2,641	2,189	1,892	1,861	3,407	5,856	8,791	9,329	8,886	9,781	9,364	7,568	7,480	7,674

Reach C continued:

% Time exceeded	Jul 1-15	Jul 16-31	Aug 1-15	Aug 16-31	Sep 1-15	Sep 16-23	Sep 24-30	Oct 1-15	Oct 16-31	Nov 1-15	Nov 16-30	Dec 1-15	Dec 16-31
0	10,800	14,900	17,100	18,500	17,900	25,800	29,400	16,400	25,200	13,500	8,200	4,600	3,560
5	9,860	10,700	16,000	14,600	16,100	21,800	27,400	15,500	21,800	12,800	6,000	4,300	3,500
10	9,565	9,870	14,650	12,400	14,100	17,000	21,900	14,800	16,300	11,600	4,750	4,000	3,490
15	9,240	9,200	14,000	11,300	12,600	12,700	17,400	13,500	14,800	10,300	4,450	3,800	3,410
20	8,745	8,890	12,900	10,900	11,850	12,400	8,410	11,650	10,900	7,625	4,375	3,800	3,350
25	8,610	8,495	12,500	10,500	11,300	11,350	7,940	9,420	8,850	5,600	4,300	3,760	3,275
30	8,155	7,910	11,900	10,100	11,000	9,600	7,690	8,440	7,680	5,200	4,200	3,740	3,250
35	7,880	7,820	11,600	9,980	10,800	9,010	7,610	7,880	7,100	5,000	4,150	3,700	3,225
40	7,695	7,540	10,950	9,110	10,700	8,660	7,450	7,600	6,780	4,875	4,050	3,650	3,150
45	7,470	7,100	9,360	8,770	10,600	8,420	7,270	7,180	6,500	4,800	4,000	3,600	3,025
50	7,260	6,940	8,505	8,315	10,500	8,295	7,170	6,950	6,300	4,700	3,900	3,550	3,000
55	7,170	6,790	7,780	8,060	10,300	7,990	7,040	6,660	6,150	4,600	3,800	3,300	2,850
60	6,980	6,530	7,330	7,820	9,920	7,900	6,850	6,430	5,965	4,500	3,725	3,005	2,660
65	6,350	6,200	7,120	7,210	9,570	7,840	6,640	6,380	5,845	4,400	3,600	2,900	2,500
70	6,180	6,090	6,800	6,730	8,870	7,610	6,620	6,180	5,780	4,200	3,400	2,800	2,400
75	5,930	5,925	6,480	6,585	8,200	7,285	6,550	6,080	5,745	4,000	3,200	2,700	2,400
80	5,750	5,770	6,270	6,390	7,070	6,610	6,130	5,895	5,680	3,950	2,850	2,400	2,200
85	5,680	5,640	6,130	6,060	5,980	4,860	4,400	5,840	5,600	3,800	2,400	2,200	2,100
90	5,580	5,420	5,850	5,540	5,000	4,670	4,290	5,600	5,460	3,400	2,300	2,100	2,000
95	5,040	5,240	5,420	4,930	4,870	4,470	4,290	5,300	5,365	3,000	2,200	2,100	2,000
100	4,920	5,080	5,100	4,400	4,500	4,330	4,270	4,550	4,700	2,700	2,200	2,100	2,000
Mean	7,349	7,363	9,635	8,827	10,014	9,734	9,524	8,376	8,682	5,827	3,832	3,240	2,828

*"The hydrographic-and-climatic-comparison method generally is used by the U.S. Geological Survey to estimate discharge during ice-affected periods (Rantz and others, 1982). Discharge measurements, the indicated open-water discharges, meteorological information, and notes or observations on ice conditions are plotted on semilogarithmic hydrograph paper. Values of daily mean discharge are estimated and plotted on this hydrograph on the basis of discharges for periods without ice effect, the normal trend of the winter hydrograph recession, daily discharge estimates for other nearby streamflow-gaging stations, and local climatological records.¹⁵

The hydrographic-and-climatic-comparison method produced more reliable results compared with the other subjective methods, and the results were also comparable to those of the best analytical methods.¹⁶ Ice affects the stage-discharge relation for some portion of the winter at more than one-half of the streamflow-gaging stations operated by the U.S. Geological Survey. Ice affected discharge usually is estimated using a method that is dependent on the judgment of the hydrographer...To improve the reliability of estimates of ice-affected streamflow and the efficiency of processing streamflow records, proposed and existing methods for estimating ice-affected discharge records were evaluated for possible use by the U.S. Geological Survey...Based on the results of the evaluation... the discharge-ratio and hydrographic-and-climatic-comparison methods were more accurate than the other subjective methods and about as accurate as the best analytical method."

Since the gages used for the Mulchatna River reservation applications measure extremely stable stage discharges, the hydrographic-and-climatic-comparison method applied here is appropriate and its stable flows are evident in the winter portions of the Duration Table (Table 4). After having discussions with internal DNR hydrologists and the Acting U.S. Geological Survey Hydrologic Data Program Chief J. Conaway on 08/27/2014, it was determined this method is standard practice around the state (with a few exceptions).

The data described in Table 4 shows flows which support the amount of water in these reservation applications. While almost any allocation 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 Mulchatna River flows will be sufficient for the proposed reservations.

Determination: It is determined that there exists unappropriated water within Mulchatna River sufficient for these reservation requests. Further, the granted reservation flows stated in Table 3 are reasonable amounts for these reservations. Based on the applications and ADF&G's professional judgment,

'Sufficient flows are needed to support riverine habitats used by fish and to provide fluvial processes that maintain these habitats. To maintain seasonal uses of habitats by each life history state,' the applicants recommend 'maintaining a flow regime that mimics the magnitude and timing of the natural flow regime. This approach is necessary to meet the needs of species life history stages that have coevolved and exhibited biological adaptations to the rivers flow regime.'

Reserved flows leave water available for ADNR to allocate to new applicants, and are set at an amount that will contribute to maintenance of the fish and wildlife habitat based on available information, as described by SWASHP and ADF&G in their applications.

For the adjudication process, the applicants submitted flow recommendations that as stated previously, mimic the natural hydrologic variability to meet the needs of species life history stages. ADNR reviewed these flows and took into consideration the requested flows along with current and future impacts. This includes any senior water appropriations and potential near future uses that may benefit the people of the State. ADNR then adjusts flows that account for prior appropriators and maintains necessary flow for habitat maintenance and passage. If a future water use is of a significant quantity and competes with an existing reservation, then a review of the purpose and finding for the reservation of water can be performed. Lower flows, (which

¹⁵ Melcher, N. B. and J.F. Walker. 1992. *Evaluation of selected methods for determining streamflow during periods of ice effect*. U.S. Geological Survey water-supply paper; 2378; p. 10

¹⁶ *Ibid* p. 32

would be available a greater percent of the time [see Table 4]), are considered by the applicants and ADNR to be inadequate, but would be subject for review upon challenge of a competing applicant.

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

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

Discussion: The SWASHP Vision Statements is for “continuation of the world’s largest populations of salmon that perpetually sustain the culturally and ecologically important, economically valuable, and unique landscape of Southwest Alaska”, while ADF&G has the statutory responsibility of managing the fish and wildlife resources of the State of Alaska. The applicants applied for these reservations for the primary purpose of protecting fish habitat, migration, and propagation in Mulchatna River. ADF&G indicates that these reservations will also assist in the management of fish resources in Mulchatna River. The proposed reservations of water would contribute significantly to ensuring the continued viability of this resource.

Determination: The proposed reservations will benefit ADF&G in the fulfillment of its statutory responsibility to protect and manage Mulchatna River fish populations, a resource reserved to the people under the Alaska Constitution, as well as the mission of SWASHP. The proposed reservations will contribute to the maintenance of Mulchatna River fish populations by providing the appropriate quantities of water needed for fish habitat, migration, and propagation.

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

Discussion: Mulchatna River supports commercial, sport fishing, and subsistence uses. Sport fishing 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.¹⁷

Mulchatna River provides the basis for subsistence, sport, and commercial fishing harvest in the watershed area. As reported by the plans and studies, this enables area residents to sustain their subsistence activities as well as stimulate elements of the local and regional economy.

Determination: While no detailed breakdown of the economic impacts of the Mulchatna River fishery has been submitted by the applicants, the protection of this fishery is of economic importance to the region. The proposed reservations will help protect this resource.

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

Discussion: As previously described, Mulchatna River supports five Pacific salmon species as well as other resident fishes. The primary purpose of these reservations is to protect the habitat, migration, and propagation of these fish. Reservation flows were allocated specifically to provide for the needs of fish

¹⁷ Economic Impacts and Contributions of Sportfishing in Alaska (ADF&G, 2007)

populations at the times those populations utilize the river for their various life stage activities of spawning, incubating, rearing, and passage (See Table 5).

Table 5. Mulchatna River Fish Periodicity Chart¹⁸

Chinook Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				??	XXXX	XXXX	XXXX	XXXX	??			
Adult Passage					??	XXXX	XXXX	XX??				
Spawning ?							X	XXXX	?			
Incubation ?	XXXX	XXXX	XXXX	????	????		?	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX											

Coho Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage				??	XXXX	XXXX	XXXX	XXXX	??			
Adult Passage							??XX	XXXX	XXXX	X???		
Spawning ?									?XXX	XX??		
Incubation ?	XXXX	XXXX	XXXX	????	????				?XXX	XXXX	XXXX	XXXX
Rearing	XXXX											

Sockeye Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage					??XX	XXXX	XXXX	XXXX	X???			
Adult Passage					????	XXXX	XXXX	XXXX	??			
Spawning ?							X	XXXX	X			
Incubation ?	XXXX	XXXX	XXXX	????	????		?	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing ?	XXXX											

Chum Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			??	XXXX	XXXX	XXXX	XXXX	XXXX	??			
Adult Passage						XXXX	XXXX	XXXX	??			
Spawning ?							XX	XXXX				
Incubation ?	XXXX	XXXX	XXXX	XX??	????		?X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XXXX	????	????	????						

Pink Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage			????	XXXX	XXXX	XXXX	XXXX	XXXX	????			
Adult Passage						??XX	XXXX	XXXX	XXXX			
Spawning							XXXX	XXXX	XXXX			
Incubation	XXXX	XXXX	XXXX	XXXX	????		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XXXX	XXXX	XXXX							

¹⁸ Reservation of Water Application

Rainbow Trout	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX											
Spawning ?			?	?XXX	XX??							
Incubation ?				??XX	XXXX	XXXX	XXXX					
Rearing	XXXX											

Arctic Grayling	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX											
Spawning ?				?XXX	X???							
Incubation ?				XXX	XXXX	XXXX						
Rearing	XXXX											

Dolly Varden	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage	XXXX											
Adult Passage	XXXX											
Spawning ?									?XXX	XX??		
Incubation ?	????	????	????	????					????	????	????	????
Rearing	XXXX											

Longnose Sucker	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	XXXX	XXXX	XXXX	XXXX	XXXX				XXXX	XXXX	XXXX	XXXX
Spawning			????	????	XXX?	????						
Incubation			????	????	????	????	????					
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Northern Pike	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	XXXX	XXXX	XXXX	XXXX	????	????	????	????
Spawning				?	XXXX	????						
Incubation					????	????	????					
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Burbot	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Smolt Passage	XXXX											
Adult Passage	XXXX											
Spawning ?	????	????								????	????	????
Incubation ?	????	????	????	????					????	????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Round Whitefish

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning									????	????	??	
Incubation	????	????	????	????					????	????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Broad Whitefish

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning									????	????	??	
Incubation	????	????	????	????	????				????	????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Humpback Whitefish

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning									????	????	??	
Incubation	????	????	????	????	????				????	????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Slimy Sculpin

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning	????	????	????	????	????	????	????	????	????	????	????	????
Incubation	????	????	????	????	????	????	????	????	????	????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Threespine Stickleback

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning	????	????	????	????	????	????	????	????	????	????	????	????
Incubation	????	????	????	????	????	????	????	????	????	????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Pacific Lamprey

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Passage	????	????	????	????	????	????	????	????	????	????	????	????
Spawning									????	????	????	
Incubation	????	????	????	????					????	????	????	????
Rearing	????	????	????	????	????	????	????	????	????	????	????	????

Based upon professional judgment of ADF&G biologists

Smolt passage is for juvenile emigration to estuarine/marine environment

Adult passage: for salmon is immigration: for trout, char, and other species, immigration and emigration.

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 SWASHP and ADF&G. They were subsequently adjusted to better mimic the natural hydrologic and biologic requirements for Mulchatna River by combining statistical analyses of hydrologic variability and fish species periodicity (See Table 4, Table 5).

Adjustments were made based on these analyses and were reviewed and discussed by both the applicants and ADNR. ADNR's decision to grant the specific water quantities and time periods provided for in this decision is based on and consistent with the current level of hydrologic and biologic knowledge, as well as consideration of current water right appropriations and potential near future uses. Reservation flows granted will contribute to fish habitat, migration, and propagation within each reservation reach.

While the primary purpose of the proposed reservations is to protect fish habitat, migration, and propagation, reservations of these flows will help preserve quantities necessary for boating, sport fishing, hunting, and other recreational opportunities as well.

Determination: These proposed reservations will benefit the protection of fish resources and will enhance public recreational activities.

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

Discussion: Maintaining flow quantities will help retain high water quality and has a positive health impact. There are no permitted surface water withdrawals from Mulchatna River for drinking water purposes, but significant use of the water and waterway of Mulchatna River occurs by residents who live in and around the requested reservation areas.

These reservations of water will help the quality of water in Mulchatna River, and may provide positive public health impacts in the future. Maintaining these flows will also regulate water temperature and dilute contaminants in the system.¹⁹

Determination: The proposed reservations will generally contribute to the maintenance and protection of water quality by helping to ensure the instream flows of a volume of water that can buffer extreme temperature changes and dilute concentrations and thus reduce impacts of any pollutants or contaminants that may enter the river. Therefore, there should be a positive impact on public health attributable to granting these reservations.

¹⁹ 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.

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: At this time, research by ADNR has not identified any imminent proposed alternative uses of water or alternative uses which may be made within a reasonable amount of time. By establishing these reservations of water, the amounts described will be withdrawn from the amount available for appropriation or for temporary water use authorizations. Further, while the reservations allow for economic and recreational development activities compatible with the primary uses, any future development that depends upon water withdrawals may be limited if the amount of water available is not sufficient to meet reservation flows and any other senior water right holders during specified time periods. Future water right applicants may need to consider other options such as off-river storage and/or development of alternative water sources, in order to bridge the periods of flow equal to or less than reservation flows.

Nevertheless, if a project applies for a new, competing, water right for waters from Mulchatna River, the law provides for a review of the water system usage, and allows an applicant to present additional information for a review of the reservations.²⁰ The intent of a reservation is not to prevent future developments requiring a water right, but rather to give the necessary quantities of water for protection of the purpose given, in this case, habitat, migration, and propagation of fish. Once a reservation is certificated, it is subject to AS 46.15.145 (f) and 11 AAC 93.147 (a) and (b), which provide for review and “a finding that the purpose, or part or all of the findings no longer apply to the reservation.” ADNR may issue a revocation or amendment of a certificate of reservation in appropriate circumstances, after public notice and a hearing if appropriate, and a written determination that the revocation or amendment is in the best interest of the state.

Determination: Based on reservation amounts and remaining amounts of water for appropriation, the reservation quantities granted here leave a quantity of unappropriated Mulchatna River flows throughout the year, shown in Table 3, that ADNR believes is adequate for other uses that currently can be anticipated. Further, if the amounts of unappropriated water were to be found inadequate for any future uses of water, statutory provisions for review of these reservation could be implemented per 11 AAC 93.147. Therefore, it is determined that, at this time there are no existing or planned alternative uses of water that might be precluded or hindered by the proposed reservations.

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

Discussion: ADNR received 16 comments within the commenting period during public and agency notice. There were no comments received which alleged harm related to water use and from the review of the water records, it was determined that there should not be any potential harm as a result of the proposed reservations.

Reservations of water for instream flow purposes do not preclude the simultaneous use of that water for other purposes compatible with the reservations, and the proposed reservations are likely to reinforce the current uses of Mulchatna River. Under 11 AAC 93.920 (b), reserved water may be used in an emergency for the protection of life and property.

²⁰ Should such a development alternative arise, 11 AAC 93.147 provides authority for review of a reservation of water if circumstances warrant.

Determination: The proposed reservations are not expected to harm other persons.

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

Discussion and Determination: The applicants adequately described, justified, and quantified the proposed reservations and no further action on the part of the applicants is required to complete these reservations.

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

Discussion and Determination: The proposed reservations are not expected to have any negative effect on access to navigable or public water. However, the granted reservations can be expected to have some beneficial effects of assuring that sufficient water flow remains for navigation and access to the boating and rafting opportunities available on Mulchatna River.

AS 46.15.080: Public interest determination.

Water rights are subject to preferences among beneficial uses, and where there are applications for competing uses of water and there is not enough water for all uses, ADNR is required to balance the interests involved and give preference to the most beneficial use under AS 46.15.090. Here, as shown by the discussion and record described herein, there is a preponderance of evidence of public benefits, and at the time of application, there was unappropriated water available.

The applicant will also be required to defend and indemnify the State against and hold it harmless from any and all claims, demands, legal actions, loss, liability and expense from injury to or death of persons and damages to or loss of property arising out of or connected with the exercise of any water right granted.

Therefore, in light of the entire record, the proposed Stuyahok River reservations of water are determined to be in the overall public interest of the state.

11 AAC 93.146 Issuance of a certificate of reservation of water (Standard Conditions)

In accordance with 11 AAC 93.146 (c) and (d), the following standard conditions are applied to all certificates of reservation as of September 11, 1983 and any additional special conditions will be addressed:

1. This certificate may not be voluntarily abandoned, conveyed, transferred, assigned, or converted to another use, in whole or in part, unless required as a result of review under 11 AAC 93.147.
2. This certificate does not authorize the Certificate Holder or any other person to prevent access to, on, or through the water reserved by the certificate, or to prohibit the use of the reserved water for other compatible purposes set out in AS 46.15.145(a).
3. This certificate does not grant any inherent water management duties or authorities held by the Alaska Department of Natural Resources, through the Division of Mining, Land and Water, Water Resources Section (ADNR) to the Certificate Holder. To request ADNR to pursue curtailment, or take other administrative action, the Certificate Holder must formally request ADNR to curtail or otherwise

impose limits on potentially conflicting uses and must provide ADNR with data or other proof that the reservation of water is not being met, and that the proximate cause is from conflicting uses. Whether ADNR will pursue any administrative or judicial proceedings against users of water is within the sole discretion of ADNR.

4. ADNR may require the Certificate Holder to install and maintain measuring devices of a type and at a location approved by ADNR to monitor and report on the reserved instream flow or level of water. ADNR is not responsible for monitoring the reserved instream flow or level of water.
5. The Certificate Holder may participate in any administrative or judicial proceedings pursued by ADNR that may impact this certificate.
6. This certificate shall be subject to review as required under AS 46.15.145(f) and 11 AAC 93.147.
7. Pursuant to AS 46.15.145(f) and 11 AAC 93.147, this certificate may be amended to reduce the flows and/or water level reserved under this reservation of water but this certificate cannot be amended to increase the reserved flows and/or water level.
8. The Certificate Holder shall comply with all the applicable requirements of AS 46.15.010 – 46.15.270 and 11 AAC 93.010 – 11 AAC 93.970, now effective or as they might in the future be amended.
9. The Certificate Holder shall notify ADNR of any change of address.
10. Except for claims or losses arising from the sole negligence of the State, the Certificate Holder shall defend and indemnify the State against and hold it harmless from any and all claims, demands, legal actions, loss, liability and expense from injury to or death of persons and damages to or loss of property arising out of or connected with the exercise of the water right granted by this certificate.

Special Conditions: No special conditions are required.

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 June 16, 2015 as well as ADNR's public notice online website. A comment period deadline extension was requested and granted, publishing notice again in the Alaska Dispatch News on July 3, 2015. Both notices were also sent to Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, New Stuyahok Post Office, and all interested parties that requested notification.

Sixteen comments were received on the proposed Mulchatna River Reservations of Water. The Department acknowledges the comments and further states that the comments do not change the basis of this decision.

DECISION

The case files have been found to be complete and the requirements of all applicable statutes have been satisfied. Further, upon recommendation of the Natural Resource Specialist who has adjudicated these files, and after consideration of the above analysis, by authority delegated from the Commissioner of the Alaska Department of Natural Resources, I hereby find that the Southwest Alaska Salmon Habitat Partnership (LAS 27309 - Reach A; LAS 27516 – Reach B) and Alaska Department of Fish and Game (LAS 27309 – Reach A; LAS 27516 – Reach B; LAS 30075 – Reach A2; LAS 30076 – Reach B2; LAS 30077 – Reach C) have satisfied the requirements of AS 46.15.145 with respect to the applications for reservation of water within Mulchatna River. Therefore, pursuant to 11 AAC 93.145 (a), ADNDR will issue five Certificates of Reservation in the amounts, for the time periods, and for the reach descriptions as described below:

LAS 27309: Mulchatna River – Reach A

Applicants: Southwest Alaska Salmon Habitat Partnership, Alaska Department of Fish and Game

Granted Reservation of Water Flows with a priority date of June 15, 2009:

Time Period	Granted Reservation Flows (cfs)
JANUARY	1,500
FEBRUARY	1,200
MARCH	1,000
APRIL	1,500
MAY	6,100
JUNE	6,400
JULY	3,300
AUGUST	4,000
SEPTEMBER	5,800
OCTOBER	6,500
NOVEMBER	4,000
DECEMBER	2,971

cfs = cubic feet per second

Reservation of Water Reach Description: Mulchatna River – Reach A, 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 river beginning from the mouth at the confluence with Nushagak River, upstream approximately 27 river miles to the confluence with the Stuyahok River. 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 Mulchatna River is located within:

Township	Range	Sections
6 South	46 West	1, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 27
6 South	45 West	6, 7
5 South	45 West	1, 11, 12, 13, 14, 15, 16, 20, 21, 22, 23, 24, 28, 29, 30, 31, 32
5 South	44 West	6, 7
4 South	44 West	13, 14, 23, 24, 26, 27, 28, 33, 34
4 South	43 West	7, 8, 17, 18

All within the Seward Meridian.

LAS 30075: Mulchatna River – Reach A2

Applicant: Alaska Department of Fish and Game

Granted Reservation of Water Flows with a priority date of January 27, 2015:

Time Period	Granted Reservation Flows (cfs)
January	1,045
February	1,060
March	1,050
April 1-15	550
April 16-23	873
April 24-30	3,100
May 1-7	0
May 8-15	4,200
May 16-23	2,000
May 24-31	1,550
June 1-7	2,600
June 8-15	750
June 16-23	100
June 24-30	700
July 1-15	3,800
July 16-31	3,400
August 1-15	3,800
August 16-31	4,000
September 1-15	4,550
September 16-23	2,700
September 24-30	1,450
October 1-15	450
October 16-31	0
November 1-15	983
November 16-30	125
December 1-15	354
December 16-31	0

cfs = cubic feet per second

Reservation of Water Reach Description: Mulchatna River – Reach A2, 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 river beginning from the mouth at the confluence with Nushagak River, upstream approximately 27 river miles to the confluence with the Stuyahok River. 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 Mulchatna River is located within:

Township	Range	Sections
6 South	46 West	1, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 27
6 South	45 West	6, 7
5 South	45 West	1, 11, 12, 13, 14, 15, 16, 20, 21, 22, 23, 24, 28, 29, 30, 31, 32
5 South	44 West	6, 7
4 South	44 West	13, 14, 23, 24, 26, 27, 28, 33, 34
4 South	43 West	7, 8, 17, 18

All within the Seward Meridian.

LAS 27516: Mulchatna River – Reach B

Applicant: Southwest Alaska Salmon Habitat Partnership, Alaska Department of Fish and Game

Granted Reservation of Water Flows with a priority date of June 15, 2009:

Time Period	Granted Reservation Flows (cfs)
January	1,400
February	1,100
March	900
April	1,350
May	5,550
June	6,000
July	3,000
August	3,700
September	5,300
October	5,900
November	3,700
December	2,600

cfs = cubic feet per second

Reservation of Water Reach Description: Mulchatna River – Reach B, 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 river beginning from the confluence of the Mulchatna River with Stuyahok River (at the end of Reach A/A2) upstream 3 river miles to approximate river mile 30.0. 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 Mulchatna River is located within:

Township	Range	Sections
4 South	43 West	8, 9, 10, 11, 16, 17

All within the Seward Meridian.

LAS 30076: Mulchatna River – Reach B2

Applicant: Alaska Department of Fish and Game

Granted Reservation of Water Flows with a priority date of January 27, 2015:

Time Period	Granted Reservation Flows (cfs)
January	865
February	920
March	900
April 1-15	510
April 16-23	750
April 24-30	2,850
May 1-7	0
May 8-15	3,729
May 16-23	1,750
May 24-31	1,400
June 1-7	2,300
June 8-15	600
June 16-23	0
June 24-30	800
July 1-15	3,700
July 16-31	3,400
August 1-15	3,550
August 16-31	3,800
September 1-15	4,450
September 16-23	2,580
September 24-30	1,450
October 1-15	500
October 16-31	0
November 1-15	800

November 16-30	25
December 1-15	405
December 16-31	60

cfs = cubic feet per second

Reservation of Water Reach Description: Mulchatna River – Reach B2, 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 river beginning from the confluence of the Mulchatna River with Stuyahok River (at the end of Reach A/A2) upstream 3 river miles to approximate river mile 30.0. 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 Mulchatna River is located within:

Township	Range	Sections
4 South	43 West	8, 9, 10, 11, 16, 17

All within the Seward Meridian.

LAS 30077: Mulchatna River – Reach C

Applicant: Alaska Department of Fish and Game

Granted Reservation of Water Flows with a priority date of January 27th, 2015:

Time Period	Granted Reservation Flows (cfs)
January	2,265
February	2,020
March	1,800
April 1-15	1,800
April 16-23	2,100
April 24-30	4,200
May 1-7	5,550
May 8-15	9,279
May 16-23	7,300
May 24-31	6,950
June 1-7	8,300
June 8-15	6,600
June 16-23	6,000
June 24-30	6,800
July 1-15	6,700
July 16-31	6,400
August 1-15	7,250
August 16-31	7,500
September 1-15	9,750

September 16-23	7,880
September 24-30	6,750
October 1-15	6,400
October 16-31	5,900
November 1-15	4,500
November 16-30	3,725
December 1-15	3,005
December 16-31	2,660

cfs = cubic feet per second

Reservation of Water Reach Description: Mulchatna River – Reach C, 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 river beginning at approximate river mile 30.0 (at the end of Reach B/B2) upstream approximately 12 river miles to the confluence with Koktuli River. 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 Mulchatna River is located within:

Township	Range	Sections
4 South	43 West	1, 2, 3, 11
3 South	43 West	35, 36
4 South	42 West	5, 6
3 South	42 West	11, 12, 14, 15, 21, 22, 28, 29, 31, 32, 33

All within the Seward Meridian.

These applications are recommended for approval as described in the decision:

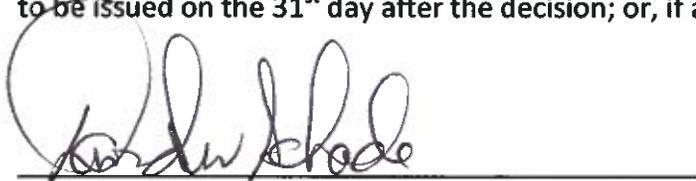


Kimberly Sager
Natural Resource Specialist, Water Resource Section
Reservation of Water Program
Division of Mining, Land, and Water
Alaska Department of Natural Resources

December 15, 2015

Date

Applications Approved for Mulchatna River – Case File LAS 27309, 27516, 30075, 30076, & 30077. Certificates 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

12-15-2015

Date

A person affected by this decision may appeal it, in accordance with 11 AAC 01. 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 Commissioner, 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 Department of Natural Resources.
