

State of Alaska

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

Stuyahok River Reservations of Water

LAS 27310 (Reach A), LAS 30073 (Reach A2), and LAS 30074 (Reach B)

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 Stuyahok River, near New Stuyahok, Alaska. This single application (known as Reach A) proposes a reservation of water for stream flows within the Stuyahok River and its floodplain from the mouth up to river mile (RM) 6.5. Additional data had been collected, and two additional updates/analysis were completed (09/10/2014 and 11/26/2014). The latest revision/update is used in the adjudication for Reach A.

On January 27, 2015, ADF&G submitted two additional Stuyahok River applications for additional flows on Reach A (known as Reach A2) and Reach B. Since there was an update of data for Reach A, ADF&G requested flow increases, creating a need for a second application (Reach A2). Reach A was submitted by SWASHP in collaboration with ADF&G, while Reaches A2 and B were submitted by only ADF&G. Reach A2 proposes the same reach description as Reach A, while Reach B proposes stream flows within the Stuyahok River and its floodplain from Reach A (and A2) upstream approximately 20 river miles to an unnamed tributary.

A reservation of water, sometimes referred to as a reservation in this document, is an appropriation of water whose purpose is reserving sufficient water to maintain a specified instream flow or level of water at a

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.

specified point on a stream or body of water, or in a specified part of a stream, throughout a year or for specified times, for one, or a combination of the following purposes; (1) protection of fish and wildlife habitat, migration, and propagation; (2) recreation and park purposes; (3) navigation and transportation purposes; and (4) sanitary and water quality purposes.

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

Holders of water rights junior to an established reservation of water as well as other users may be unable to divert or withdraw significant amounts of water when stream flows fall below 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 applications were given consistent with the requirements of 11 AAC 93.145, 11 AAC 93.080, and AS 46.15.133. Below, the proposed reservations are summarized and specific findings of fact and conclusions of law are described.

DESCRIPTION OF PROPOSED RESERVATIONS

LAS 27310 – Reach A

Proposed Reach Description: Stuyahok River – Reach A, and its floodplain from the mouth up to RM 6.5 (Map 1). Said portion of Stuyahok River – Reach A is located within*:

Township	Range	Sections
4 South	43 West	16, 17, 21, 27, 28, 34, 35
5 South	43 West	4, 5, 9, 10, 15, 22-25
5 South	42 West	19-23, 25, 26, 28-30
5 South	41 West	30-32

* Please note that the original application contained the location of all reaches (as described above).

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	130
February	100
March	80
April	120
May	750
June	450
July	250
August	300
September	425
October	475
November	300
December	200

cfs = cubic feet per second

LAS 30073 – Reach A2

Proposed Reach Description: Stuyahok River – Reach A2, and its floodplain from the mouth up to RM 6.5 (Map 1). Said portion of Stuyahok River – Reach A2 is located within:

Township	Range	Sections
4 South	43 West	16, 17, 21, 27, 28, 34, 35

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	280
February	245
March	230
April 1-15	227
April 16-23	293
April 24-30	575
May 1-7	1100

May 8-15	1055
May 16-23	835
May 24-31	714
June 1-7	740
June 8-15	561
June 16-30	468
July	434
August	573
September 1-15	641
September 16-30	548
October	613
November 1-15	460
November 16-30	370
December	300

cfs = cubic feet per second

LAS 30074 – Reach B

Proposed Reach Description: Stuyahok River – Reach B and its floodplain from Reach A (and A2) upstream approximately 20 miles to an unnamed tributary (Map 1). Said portion of Stuyahok River – Reach B is located within:

Township	Range	Sections
4 South	43 West	35
5 South	42 West	19-23, 25, 26, 28-30
5 South	43 West	4, 5, 9, 10, 15, 22-25

All within the Seward Meridian (See Map 1).

Requested Reservation Flows:

Time Period	Flow Rate (cfs)
January	280
February	245
March	230
April 1-15	227
April 16-23	293
April 24-30	575

May 1-7	1100
May 8-15	1055
May 16-23	835
May 24-31	714
June 1-7	740
June 8-15	561
June 16-30	468
July	434
August	573
September 1-15	641
September 16-30	548
October	613
November 1-15	460
November 16-30	370
December	300

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.

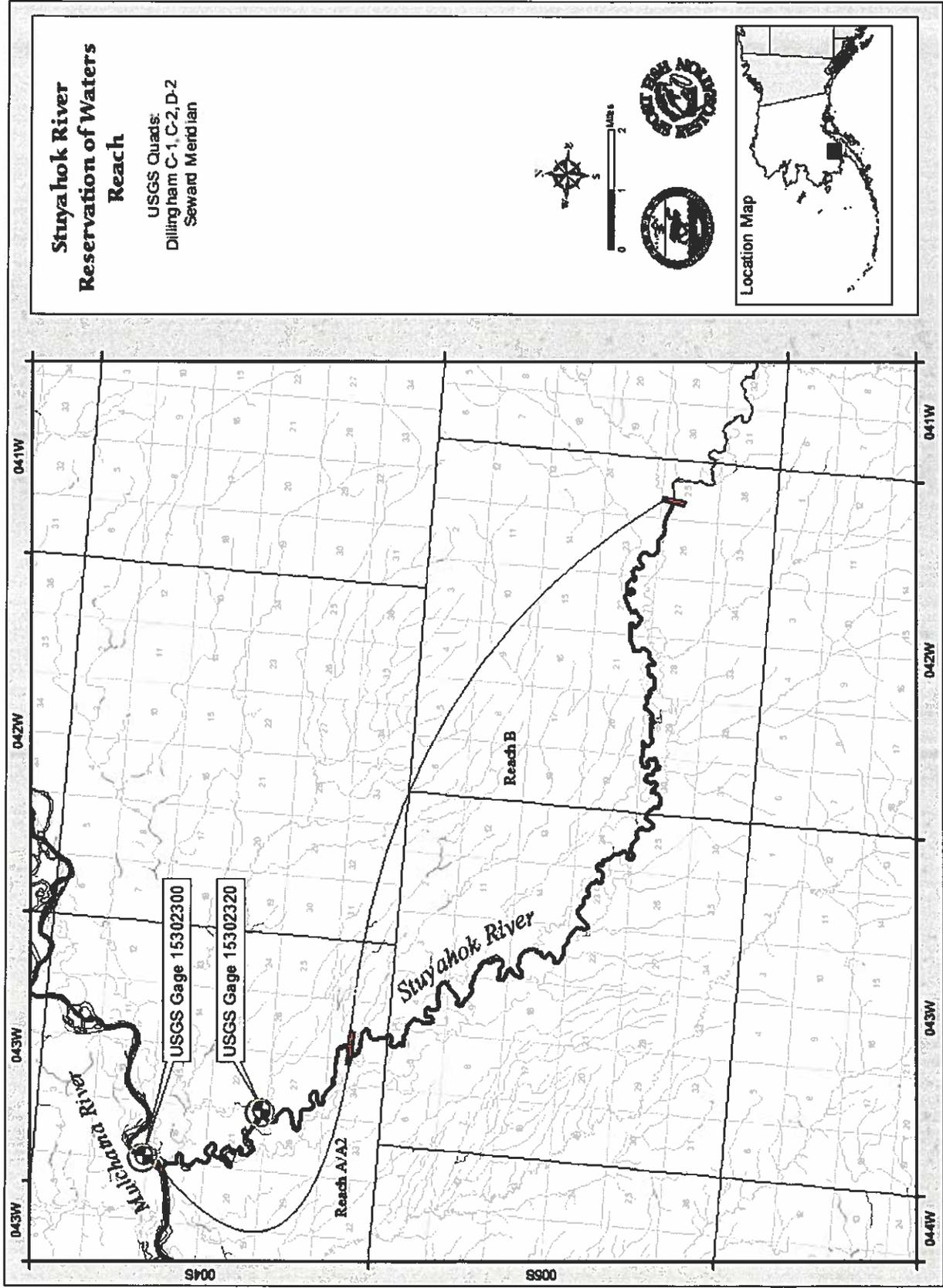
Providing suitable hydraulic habitat for aquatic organisms is a necessary part of any instream flow prescription...Habitat defined through hydraulic characteristics (such as water depth and velocity) and channel characteristics (such as substrate, cover, stream width) is sometimes referred to as hydraulic habitat. Aquatic organisms select habitat based, in part, on the physical characteristics of their

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.

surroundings. To evaluate existing hydraulic conditions as they relate to aquatic organisms, the relation of stream flow to habitat must be quantified over time.

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

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



AREA BACKGROUND

Stream: Stuyahok River (*var. Stuyahak River*)

Stream Basin Area: The Stuyahok River watershed area is 288 mi² and is a tributary of the Mulchatna River which flows into the Nushagak River before entering Bristol Bay near Dillingham (Map 2). The USGS operated a gage on Stuyahok River from June 1, 2009 to October 17, 2014 (See below).

Stuyahok River Gage location and watershed details:

Gage and Station ID	Latitude, Longitude (NAD27)	Elevation (ft NGVD 29)	Drainage Area (mi ²)	Period of operation
STUYAHOK River USGS 15302320 ³	59.80972 N -156.665 W	295	274 mi ² (2,329,600 acres) (area above USGS gaging station) 288 mi ² (2,746,240 acres) (Stuyahok R total HUC 10 watershed boundary)	June 1, 2009 to October 17, 2014

Map Coverage: USGS 1:63,360: Dillingham C-1, D-1, D-2, D-3; Iliamna C-8, D-8

General Basin Description: The Stuyahok River runs approximately 50 miles from its headwaters to the confluence with the Mulchatna River. As the final downstream tributary before the Mulchatna mouth, the Stuyahok enters approximately 27 miles upstream from the Mulchatna confluence with the Nushagak River. The Stuyahok watershed is bordered by the Kaktuli River to the east and north, Kaskanak Creek to the south, and the Mulchatna mouth to the west. Much of the watershed is low lying with broad valleys and low lying hills (<2500 ft) forming the north and south borders.

Reach Description: Stuyahok 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 Stuyahok River:

Reach A – beginning from the mouth of Stuyahok (at the confluence with the Mulchatna River) up to approximate river mile 7.0.

Reach A2 – beginning from the mouth of Stuyahok (at the confluence with the Mulchatna River) up to approximate river mile 7.0.

Reach B – beginning at approximate river mile 7.0 (end of Reach A & A2) upstream 20 river miles to approximate river mile 27.0.

³ http://waterdata.usgs.gov/ak/nwis/nwismap/?site_no=15302320&agency_cd=USGS

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 Stuyahok 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 which often have associated atmospheric instability and thunderstorm activity.

Monthly average temperature and precipitation is summarized in Table 1 for the Iliamna Airport Station (ID =503905) located approximately 30 miles east of the Stuyahok River headwaters.⁴ 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 PRISM⁵ dataset are presented in Figure 1. Estimated average annual temperature ranges from 31° to 33° F with coldest annual temperatures in the mountains between the Stuyahok and Kaktuli drainages (Figure 1). For the Stuyahok watershed, estimated annual precipitation ranges from 29 to 31 inches with highest precipitation in the western part of the drainage and slightly lower annual precipitation in the broad valley in the southeastern portion of the catchment.

Table 1. Average daily climate summary for the Iliamna Airport Station (ID =503905) approximately 20 miles east of the Stuyahok 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 Stuyahok River (approximately 2 river miles from the confluence of the Stuyahok River with 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 = 950 cfs) during snowmelt as well as October (mean = 689 cfs) in response to fall rain events. Average

⁴ Alaska Climate Database <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak3905> accessed 06/29/2015.

⁵ 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.

daily flow is lowest in March (mean = 243 cfs). Minimum daily flows were highest in October (min = 410 cfs) and lowest in April (min = 1550 cfs) while maximum flows were highest in September (max = 29400 cfs) and lowest in March and April (min = 185 cfs). Overall, average daily flow remains high from May through October and recedes during the late fall months before reaching a minimum in March prior to snowmelt (Table 2).

Table 2. Monthly discharge data summary for the USGS gage located on the Stuyahok River (Station No. 15302320; Stuyahok R NR New Stuyahok AK). [Monthly mean in ft³/s]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	---	---	---	---	---	592.2	335.9	431.4	407.5	604.7	291.7	238.7
2010	218.7	231.1	198.1	249.8	1,021	421.5	476.2	743.8	562.7	518.8	383.0	287.1
2011	247.1	206.8	193.2	365.7	918.1	552.3	462.7	683.6	671.7	649.2	452.1	391.6
2012	285.0	240.6	230.0	414.7	1,514	1,018	644.1	661.9	958.8	754.4	421.5	298.1
2013	298.1	294.3	267.4	288.3	792.8	498.1	432.8	487.5	588.3	918.2	584.9	345.8
2014	413.1	351.4	325.8	487.0	504.8	630.7	457.6	526.4	611.8	---	---	---
Mean of monthly Discharge	292	265	243	361	950	619	468	589	633	689	427	312

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

Map 2. Map of Stuyahok watershed

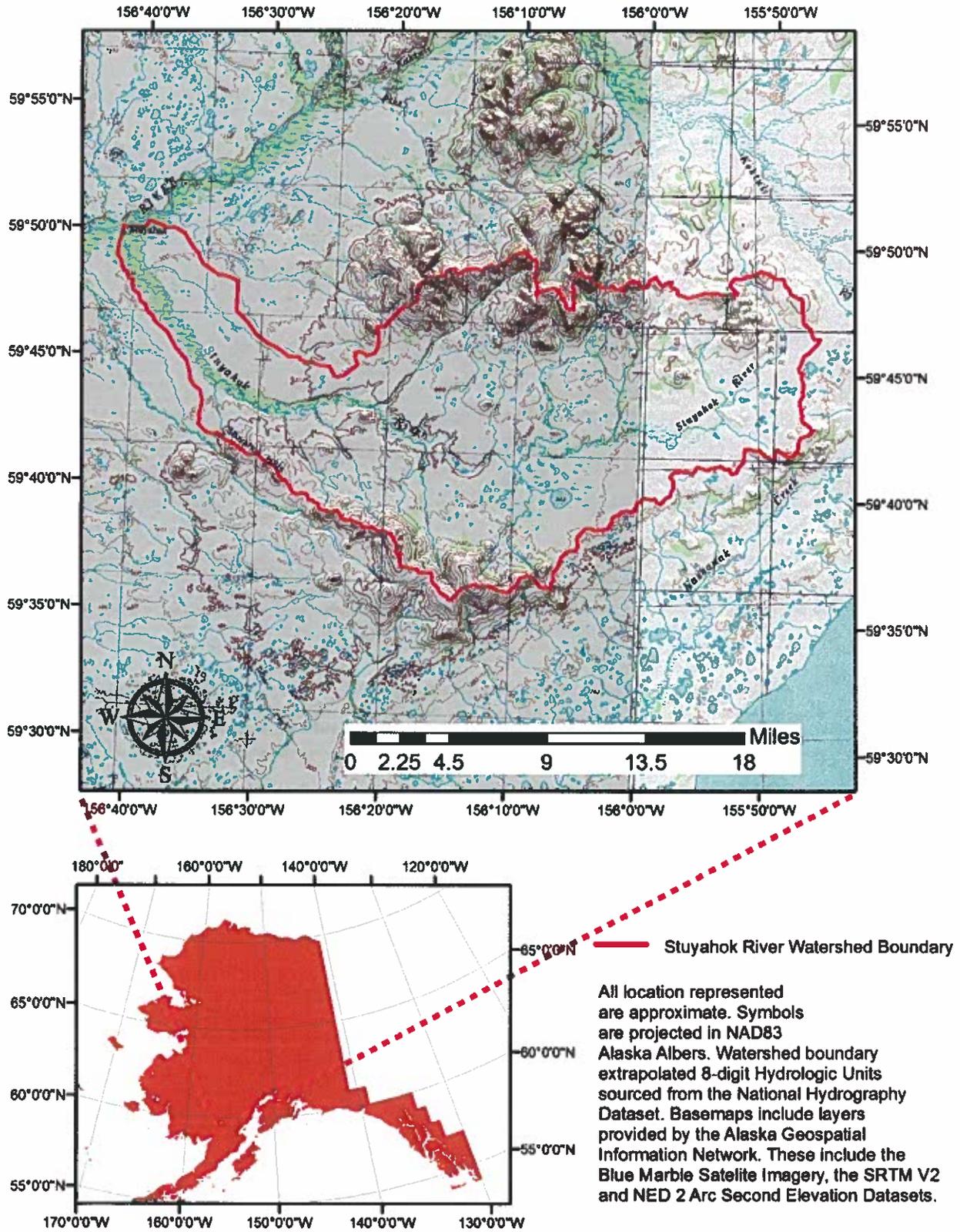
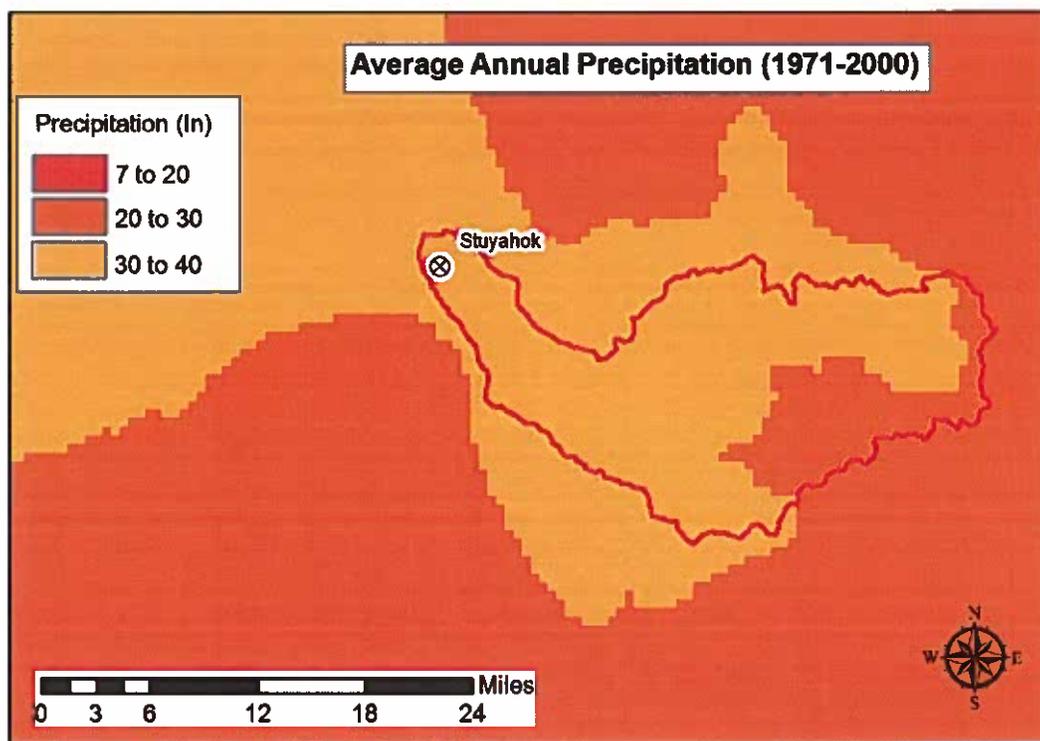
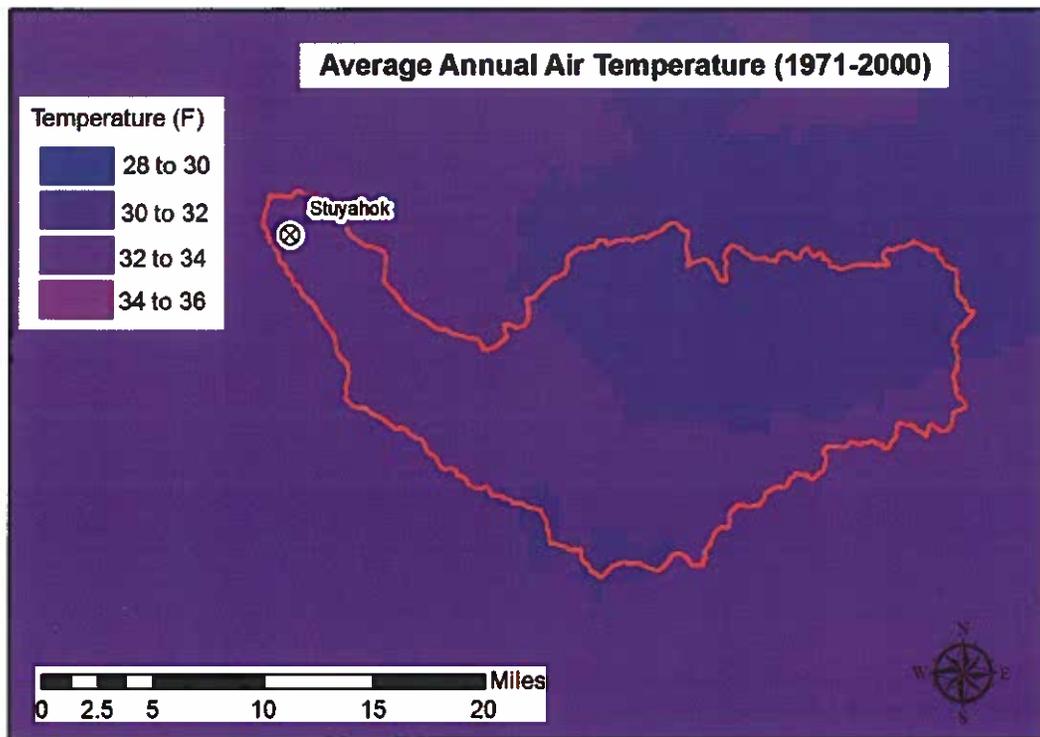
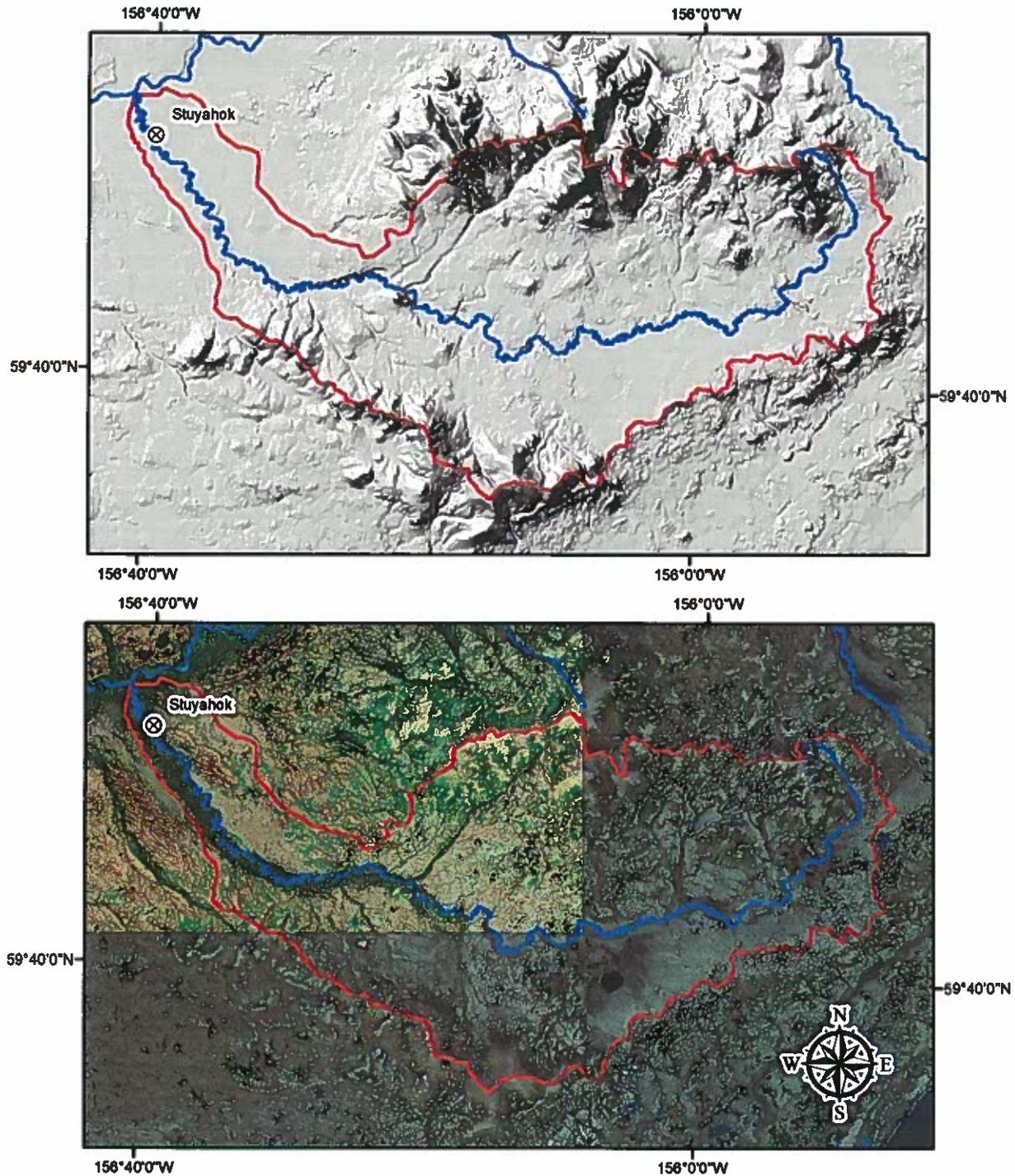


Figure 1. Estimates of average monthly and annual mean temperature (1971-2000) for the Stuyahok watershed using the PRISM model (Daly et al. 1998)



⊗ USGS Stuyahok River Gage (15302320) — Stuyahok River Watershed Boundary

Figure 2. Shaded relief (top panel) and hydrography (bottom panel) for the Stuyahok 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 Stuyahok River Gage (15302320)
-  Stuyahok River Watershed Boundary

Navigability: Stuyahok River is considered navigable-in-fact according to the State of Alaska (for Title purposes).⁶ Please contact the Alaska Department of Natural Resources, Division of Mining, Land and Water's Public Access, Assertion, and Defense Unit for more information.

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 three documents used in the Stuyahok 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. Strategic Conservation Action Plan for Bristol Bay Watersheds - *Southwest Alaska Salmon Habitat Partnership (2011)*
3. *Southwest Alaska Comprehensive Economic Development Strategy 2003-2008*

The vast majority of the land surrounding the Stuyahok 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 of the Stuyahok is designated as 'Rp – Public Recreation and Tourism-Public Use Site'. The management intent of 'Rp' along the Stuyahok River is "...to be managed for public recreation and tourism and retained in public ownership."⁷

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."*⁸

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

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...

⁶ Alaska Department of Natural Resources, Navigable Waters Web Map. <http://navmaps.alaska.gov/navwatersmap/>

⁷ Bristol Bay Area Plan for State Lands – Alaska Department of Natural Resources (Revised September 2013); p. 3-110

⁸ Bristol Bay Area Plan (April 2005, Revised 2013); P. 2-32

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...⁹

BBAP additionally address 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."¹⁰

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 a general statement 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 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. Alaska Statute 46.15.030 and AS 46.15.145 further provide for the reservation of instream flows in rivers and water levels in lakes. The Alaska Water Use Act, AS 46.15, and Title 11, Chapter 93 of the Alaska Administrative Code, 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:

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,

⁹ Southwest Alaska Salmon Habitat Partnership Strategic Plan, 2011; P. 12

¹⁰ Bristol Bay Area Plan (April 2005, Revised 2013); P. 2-32

- (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 Stuyahok 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 this certificate reserving water is 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 Stuyahok 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 Stuyahok River. The Stuyahok River serves as a fish passage corridor between the marine environment and other portions of its watershed utilized for fish production.

Stuyahok 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.

Stuyahok River is cataloged within the Anadromous Waters Catalog as #325-30-10100-2202-3044.

Stuyahok River, along with other area watershed rivers, is considered important habitat 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 Stuyahok River, and will aid ADF&G in carrying out its duty of managing and protecting the State's 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."¹¹ It further provides that "all essential salmon habitat in marine, estuarine, and freshwater ecosystems and access of salmon to these habitats should be protected."¹² A reservation of water can protect fish production while still allowing for other appropriations 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.¹³ "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."¹⁴

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 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.¹⁵

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

¹¹ 5 AAC 39.222(c)(A)(i).

¹² 5 AAC 39.222(c)(a)(iv).

¹³ 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.

¹⁴ 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

¹⁵ 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>.

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 Stuyahok River, gage #15302320, has been analyzed to help determine whether there is sufficient unappropriated stream flow in Stuyahok 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	292	130	130	162	104,696,064
February	265	100	100	165	106,634,880
March	243	80	80	163	105,342,336
April	361	120	120	241	155,751,552
May	950	750	559	391	252,692,352
June	619	450	428	191	123,437,952
July	468	250	250	218	140,887,296
August	589	300	300	289	186,772,608
September	633	425	425	208	134,424,576
October	689	475	475	214	138,302,208
November	427	300	300	127	82,076,544
December	312	200	200	112	72,382,464

Reach A2

Time Period	Mean Time Period Discharge (cfs)	Applicant Proposed Flow (cfs)	Reach A2 Reservation Flows (cfs)	Combined Reach A + Reach A2 Reservation Flows (cfs)	Remaining Flows For Future Appropriations after Reach A & A2 (cfs)	Remaining Flows For Future Appropriations after Reach A & A2 (gpd)
January	292	280	128	258	34	21,973,248
February	265	245	140	240	25	16,156,800
March	243	230	144	224	19	12,279,168
April 1-15	247	227	103	223	24	15,510,528
April 16-23	365	293	168	288	77	49,762,944
April 24-30	600	575	355	475	125	80,784,000
May 1-7	917	1100	11	570	347	224,256,384
May 8-15	1029	1055	251	810	219	141,533,568
May 16-23	919	835	236	795	124	80,137,728
May 24-31	931	714	121	680	251	162,214,272
June 1-7	807	740	211	639	168	108,573,696
June 8-15	623	561	102	530	93	60,103,296
June 16-30	529	468	5	433	96	62,042,112
July	468	434	159	409	60	38,776,320
August	589	573	220	520	69	44,592,768
September 1-15	634	641	175	600	34	21,973,248
September 16-30	633	548	85	510	123	79,491,456
October	689	613	94	569	120	77,552,640
November 1-15	492	460	148	448	44	28,435,968
November 16-30	362	370	50	350	12	7,755,264
December	312	300	80	280	32	20,680,704

Reach B

Time Period	Mean Time Period Discharge (cfs)	Applicant Proposed Flows (cfs)	Reach B Reservation Flows (cfs)	Remaining Flows For Future Appropriations (cfs)	Remaining Flows For Future Appropriations (gpd)
January	292	280	258	34	21,973,248
February	265	245	240	25	16,156,800
March	243	230	224	19	12,279,168
April 1-15	247	227	223	24	15,510,528
April 16-23	365	293	288	77	49,762,944
April 24-30	600	575	475	125	80,784,000
May 1-7	917	1100	570	347	224,256,384
May 8-15	1029	1055	910	119	76,906,368
May 16-23	919	835	795	124	80,137,728
May 24-31	931	714	680	251	162,214,272
June 1-7	807	740	694	113	73,028,736
June 8-15	623	561	532	91	58,810,752
June 16-30	529	468	433	96	62,042,112
July	468	434	410	58	37,483,776
August	589	573	520	69	44,592,768
September 1-15	634	641	500	134	86,600,448
September 16-30	633	548	512	121	78,198,912
October	689	613	570	119	76,906,368
November 1-15	492	460	448	44	28,435,968
November 16-30	362	370	350	12	7,755,264
December	312	300	280	32	20,680,704

* 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 stream flows 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	1,100	800	350	1,200	1,820	1,330	852	1,120	1,450	1,670	1,040	480
5	336	340	350	900	1,630	1,175	700	942	1,075	1,140	800	420
10	320	320	320	685	1,570	987	671	820	889	1,020	540	406
15	318	310	300	569	1,520	860	639	771	794	912	500	402
20	310	300	295	435	1,455	812	601	715	733	844	480	396
25	300	280	280	360	1,370	714	559	665	715	781	460	356
30	300	280	260	340	1,210	686	518	644	696	718	450	320
35	300	260	260	330	1,150	637	486	624	678	691	440	310
40	295	250	242	320	1,075	593	466	611	646	662	423	310
45	290	250	231	300	966	578	449	599	629	635	410	300
50	280	245	230	283	861	560	434	573	603	613	400	300
55	270	242	229	280	825	530	426	550	584	596	390	290
60	258	240	224	270	757	515	414	530	562	575	380	280
65	250	236	200	260	680	486	404	510	546	563	370	280
70	240	220	200	233	602	463	393	491	516	542	360	280
75	230	220	195	226	577	439	379	467	491	530	350	270
80	230	210	190	215	523	419	357	437	471	519	330	255
85	220	210	190	210	436	399	333	415	435	494	310	240
90	220	200	190	195	396	373	310	381	393	461	280	240
95	210	200	190	190	361	345	281	358	372	440	260	230
100	210	200	185	185	330	330	256	254	330	410	250	230
Mean	292	265	243	361	950	619	468	589	633	689	427	312

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 16-30	Jul	Aug	Sep 1-15	Sep 16-30	Oct	Nov 1-15	Nov 16-30	Dec
0	1,100	800	350	350	1,000	1,200	1,630	1,640	1,820	1,640	1,330	1,240	994	852	1,120	1,150	1,450	1,670	1,040	450	480
5	336	340	350	350	850	1,150	1,590	1,605	1,780	1,605	1,280	1,100	918	700	942	869	1,200	1,140	888	450	420
10	320	320	320	330	575	1,020	1,510	1,545	1,685	1,555	1,270	1,080	836	671	820	757	998	1,020	800	440	406
15	318	310	300	330	460	900	1,370	1,530	1,600	1,515	1,200	1,020	721	639	771	731	895	912	620	425	402
20	310	300	295	305	415	825	1,315	1,515	1,365	1,450	1,000	679	649	601	715	726	807	844	540	420	396
25	300	280	280	280	390	800	1,290	1,480	1,047	1,390	880	628	594	559	665	705	754	781	510	415	356
30	300	280	260	280	365	700	1,270	1,405	939	1,205	858	601	578	518	644	699	675	718	500	400	320
35	300	260	260	270	345	680	1,210	1,335	903	1,120	838	592	557	486	624	684	623	691	490	400	310
40	295	250	242	258	320	603	1,175	1,160	858	1,020	814	582	520	466	611	678	589	662	480	398	310
45	290	250	231	230	298	590	1,150	1,100	846	848	802	564	488	449	599	655	572	635	480	380	300
50	280	245	230	227	293	575	1,100	1,055	835	714	740	561	468	434	573	641	548	613	460	370	300
55	270	242	229	226	290	540	660	1,040	820	698	705	537	449	426	550	631	535	596	450	360	290
60	258	240	224	223	288	490	580	963	807	682	695	535	438	414	530	606	518	575	448	360	280
65	250	236	200	210	280	460	559	859	779	676	692	526	428	404	510	595	502	563	400	350	280
70	240	220	200	210	280	370	559	682	757	640	670	508	413	393	491	578	486	542	390	340	280
75	230	220	195	200	270	330	548	504	610	612	624	485	389	379	467	557	468	530	380	320	270
80	230	210	190	195	260	320	463	466	493	581	577	460	376	357	437	503	442	519	375	295	255
85	220	210	190	190	253	320	390	453	408	579	534	430	359	333	415	476	392	494	350	260	240
90	220	200	190	190	240	310	350	438	389	383	517	406	345	310	381	417	378	461	320	260	240
95	210	200	190	185	225	300	340	426	368	356	501	387	337	281	358	393	358	440	300	250	230
100	210	200	185	185	210	300	330	415	361	352	454	371	330	256	254	330	343	410	280	250	230
Mean	292	265	243	247	365	600	917	1,029	919	931	807	623	529	468	589	634	633	689	492	362	312

Reach B

% 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 16-30	Jul	Aug	Sep 1-15	Sep 16-30	Oct	Nov 1-15	Nov 16-30	Dec
0	1,100	800	350	350	1,000	1,200	1,630	1,640	1,820	1,640	1,330	1,240	994	852	1,120	1,150	1,450	1,670	1,040	450	480
5	336	340	350	350	850	1,150	1,590	1,605	1,780	1,605	1,280	1,100	918	700	942	869	1,200	1,140	888	450	420
10	320	320	320	330	575	1,020	1,510	1,545	1,685	1,555	1,270	1,080	836	671	820	757	998	1,020	800	440	406
15	318	310	300	330	460	900	1,370	1,530	1,600	1,515	1,200	1,020	721	639	771	731	895	912	620	425	402
20	310	300	295	305	415	825	1,315	1,515	1,365	1,450	1,000	679	649	601	715	726	807	844	540	420	396
25	300	280	280	280	390	800	1,290	1,480	1,047	1,390	880	628	594	559	665	705	754	781	510	415	356
30	300	280	260	280	365	700	1,270	1,405	939	1,205	858	601	578	518	644	699	675	718	500	400	320
35	300	260	260	270	345	680	1,210	1,335	903	1,120	838	592	557	486	624	684	623	691	490	400	310
40	295	250	242	258	320	603	1,175	1,160	858	1,020	814	582	520	466	611	678	589	662	480	398	310
45	290	250	231	230	298	590	1,150	1,100	846	848	802	564	488	449	599	655	572	635	480	380	300
50	280	245	230	227	293	575	1,100	1,055	835	714	740	561	468	434	573	641	548	613	460	370	300
55	270	242	229	226	290	540	660	1,040	820	698	705	537	449	426	550	631	535	596	450	360	290
60	258	240	224	223	288	490	580	963	807	682	695	535	438	414	530	606	518	575	448	360	280
65	250	236	200	210	280	460	559	859	779	676	692	526	428	404	510	595	502	563	400	350	280
70	240	220	200	210	280	370	559	682	757	640	670	508	413	393	491	578	486	542	390	340	280
75	230	220	195	200	270	330	548	504	610	612	624	485	389	379	467	557	468	530	380	320	270
80	230	210	190	195	260	320	463	466	493	581	577	460	376	357	437	503	442	519	375	295	255
85	220	210	190	190	253	320	380	453	408	579	534	430	359	333	415	476	392	494	350	260	240
90	220	200	190	190	240	310	350	438	389	383	517	406	345	310	381	417	378	461	320	260	240
95	210	200	190	185	225	300	340	426	368	356	501	387	337	281	358	393	358	440	300	250	230
100	210	200	185	185	210	300	330	415	361	352	454	371	330	256	254	330	343	410	280	250	230
Mean	292	265	243	247	365	600	917	1,029	919	931	807	623	529	468	589	634	633	689	492	362	312

*"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.¹⁶

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.¹⁷ 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.¹⁸"

Since the gage used for the Stuyahok 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 Jeff 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 Stuyahok River flows will be sufficient for the proposed reservations.

Determination: It is determined that there exists unappropriated water within Stuyahok 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 maintain necessary flow for habitat

¹⁶ 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

¹⁷ *Ibid* p. 32

¹⁸ *Ibid* p. 37-38

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 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 Statement 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 Stuyahok River. ADF&G indicates that these reservations will also assist in the management of fish resources in Stuyahok 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 Stuyahok 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 Stuyahok 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: Stuyahok 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.¹⁹

Stuyahok 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 Stuyahok 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.

¹⁹ Economic Impacts and Contributions of Sportfishing in Alaska (ADF&G, 2007)

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

Discussion: As previously described, Stuyahok 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 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. Stuyahok River Fish Periodicity Chart²⁰

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	????	????	????						

²⁰ Reservation of Water Application

Pink Salmon

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

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 Stuyahok 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 Stuyahok River for drinking water purposes, but significant use of the water and waterway of Stuyahok River occurs by residents who live in and around the requested reservation areas.

These reservations of water will help the quality of water in Stuyahok 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.²¹

²¹ 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.

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.

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 Stuyahok 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.²² 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 Stuyahok 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 reservations 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

²² Should such a development alternative arise, 11 AAC 93.147 provides authority for review of a reservation of water if circumstances warrant.

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 Stuyahok River. Under 11 AAC 93.920(b), reserved water may be used in an emergency for the protection of life and property.

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 Stuyahok 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 Stuyahok 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 and the Alaska Department of Fish and Game (LAS 27310 - Reach A) and Alaska Department of Fish and Game (LAS 30073 – Reach A2; LAS 30074 – Reach B) have satisfied the requirements of AS 46.15.145 with respect to the applications for reservation of water within Stuyahok River. Therefore, pursuant to 11 AAC 93.145 (a), ADNR will issue three Certificates of Reservation in the amounts, for the time periods, and for the reach descriptions as described below:

LAS 27310: Stuyahok 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	130
FEBRUARY	100
MARCH	80
APRIL	120
MAY	559
JUNE	428
JULY	250
AUGUST	300
SEPTEMBER	425
OCTOBER	475
NOVEMBER	300
DECEMBER	200

cfs = cubic feet per second

Reservation of Water Reach Description: Stuyahok 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 of Stuyahok (at the confluence with the Mulchatna River) up to approximate river mile 7.0. 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 Stuyahok River is located within:

Township	Range	Sections
4 South	43 West	16, 17, 21, 27, 28, 34, 35

All within the Seward Meridian.

LAS 30073: Stuyahok 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	128
February	140
March	144
April 1-15	103
April 16-23	168
April 24-30	355
May 1-7	11
May 8-15	251
May 16-23	236
May 24-31	121
June 1-7	211
June 8-15	102
June 16-30	5
July	159
August	220
September 1-15	175
September 16-30	85
October	94
November 1-15	148
November 16-30	50
December	80

cfs = cubic feet per second

Reservation of Water Reach Description: Stuyahok 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 of Stuyahok (at the confluence with the Mulchatna River) up to approximate river mile 7.0. 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 Stuyahok River is located within:

Township	Range	Sections
4 South	43 West	16, 17, 21, 27, 28, 34, 35

All within the Seward Meridian.

LAS 30074: Stuyahok River – Reach B

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	258
February	240
March	224
April 1-15	223
April 16-23	288
April 24-30	475
May 1-7	570
May 8-15	910
May 16-23	795
May 24-31	680
June 1-7	694
June 8-15	532
June 16-30	433
July	410
August	520
September 1-15	500
September 16-30	512
October	570
November 1-15	448
November 16-30	350
December	280

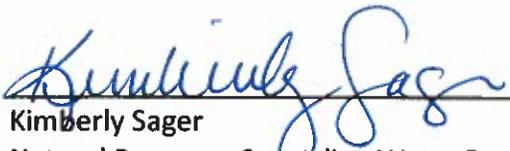
cfs = cubic feet per second

Reservation of Water Reach Description: Stuyahok 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 river mile 7.0 (at the end of Reach A/A2) upstream 20 river miles (ending at river mile 27.0). 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 Stuyahok River is located within:

Township	Range	Sections
4 South	43 West	35
5 South	42 West	19, 20, 21, 22, 23, 25, 26, 28, 29, 30
5 South	43 West	4, 5, 9, 10, 22, 23, 24, 25

All within the Seward Meridian.

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



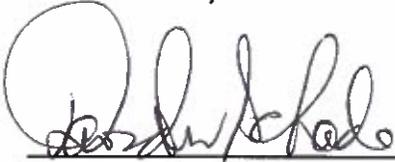
Kimberly Sager

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

December 15, 2015

Date

Applications Approved for Stuyahok River – Case File LAS 27310, 30073, and 30074. 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.
