From: Cory Warnock <cory.warnock@mcmillen-llc.com>
Sent: Monday, October 13, 2014 11:36 AM
To: 'Lesli Schick'
Cc: 'Mike Salzetti'; Dwayne Adams; 'Michael Yarborough'; Emily Andersen
Subject: INHT Call

Hi Lesli,

As you know, the development of the Grant Lake License Application is progressing. As you also know, concurrent with this development we have been working with you (and others) to establish an appropriate process for reaching agreement on a re-routed section of the Iditarod National Historic Trail. Based on some of the feedback we've received recently, it has been communicated that a bit of an alternate approach would be preferred by some entities. As such and given your position and primary interest in this particular topic, I was hoping that Dwayne Adams, Mike Yarborough and I could have a brief chat with you to discuss the aforementioned approach. I will then follow this up with a more global email to all of the interested parties but again, in the interest of informing and discussing with you initially, I'd appreciate a few minutes. If you could please let me know a day/time that might work this week or next, I'll get something scheduled. Based on my internal polling, the best day for Dwayne, Mike and myself this week would be Thursday. If it falls into next week, that's fine.

Thanks and I'll look forward to hearing from you,

Cory

Cory Warnock
Senior Licensing and Regulatory Consultant

McMillen, LLC
www.mcmillen-llc.com
5771 Applegrove Ln.
Ferndale, Wa. 98248
O – 360-384-2662
C – 360-739-0187
F – 360-542-2264

From: John Bennett
To: Karen Morrissey
Cc: Dwayne Adams; James Kubitz
Subject: Re: Google Earth Image
Date: Monday, October 13, 2014 11:02:57 PM

That is similar to other ARRC trestles, and that is not a public walkway it's for ARRC workers and train crew, if public is on it considered trespass.

Sent from my iPhone

> On Oct 13, 2014, at 8:24 PM, Karen Morrissey <Morrisseyk@akrr.com> wrote:
>
> Dwayne,
> I am copying, John Bennett, Chief, ARRC Police and Security for his input.
> I am 99.9% sure that any public use of that trestle would be considered trespassing.
>
> There may be a walkway but that doesn't mean it is for public access -- I assume it is used for ARRC maintenance crews.
>
> Karen
> ____
> From: Dwayne Adams [wdadams@earthscape.alaska.com]
> Sent: Monday, October 13, 2014 3:01 PM
> To: James Kubitz; Karen Morrissey
> Subject: Google Earth Image
>
> Jim, Karen
>
> I'm writing a portion of an EIS for a proposed power plant at Grant Lake,
> just south of Moose Pass on the eastern side of Trail Lakes (between the two
> actually). I'm describing use of the ARRC trestle by the public at Moose
> Pass, at the location shown in the Google Earth image attached. I know
> people use it to get across the narrows at Moose Pass and I'm trying to
> describe the ARRC policy with respect to that use.
>
> Is it appropriate to say that it is "trespassing" or do you allow any use of
> it? There appears to be a walkway along it but I don' t know whether it is
> appropriate for use.
>
> Thanks
>
> Dwayne Adams
> Landscape Architect
>
>
> 1343 G Street, Suite 101
> Anchorage, AK 99501
>
> P 907.279.2688
>
>
>
>
>

Subject:	INHT Call - Grant Lake
Start:	Mon 10/20/2014 2:00 PM
End:	Mon 10/20/2014 3:00 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Organizer:	Cory Warnock
Required Attendees:	Lesli Schick (lesli.schick@alaska.gov); Dwayne Adams; Michael Yarborough; Mike Salzetti; Emily Andersen

1. Please join my meeting.
https://global.gotomeeting.com/join/428906973

2. Use your microphone and speakers (VoIP) - a headset is recommended. Or, call in using your telephone.

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Subject:	Grant Lake Hydro Update
Location:	CIRI 5th Floor Executive Conference Room
Start:	Wed 11/5/2014 3:00 PM
End:	Wed 11/5/2014 4:00 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Organizer:	Dara Glass

Emily Andersen

From: Cory Warnock
Sent: Friday, October 17, 2014 2:37 PM
To: Dara Glass
Cc: 'Mike Salzetti'; Emily Andersen
Subject: RE: Meeting with you and Ethan Shutt - Grant Lake

Thanks Dara. Looking forward to it and I'll shoot you an email a few days before the meeting just to check in and confirm any last minute details.

-----Original Message-----
From: Dara Glass [mailto:dglass@ciri.com]
Sent: Friday, October 17, 2014 2:26 PM
To: Cory Warnock
Cc: 'Mike Salzetti'; Emily Andersen
Subject: RE: Meeting with you and Ethan Shutt - Grant Lake

Great. I will send a calendar invite right now. Our office is in midtown at the CIRI Building, 2525 C Street, Suite 500, on C Street between Fireweed and Northern Lights. Sign in at the security guard desk and come on up. Pretty easy to get to from anywhere as C Street is one of the major thoroughfares. Let me know if you'd like more details than that and I am happy to provide them, just let me know where you think you'll be coming from.

Thanks Cory!

Dara Glass
CIRI Land Manager
Direct: 907.263.5140
Cell: 907.229.7052

-----Original Message-----
From: Cory Warnock [mailto:cory.warnock@mcmillen-llc.us]
Sent: Friday, October 17, 2014 1:02 PM
To: Dara Glass
Cc: 'Mike Salzetti'; Emily Andersen
Subject: RE: Meeting with you and Ethan Shutt - Grant Lake

Hi Dara,

I arrive in Anchorage around 11 so that should work perfect. If you could put that on your calendar and as you have time, shoot us some directions to your office, we can plan on meeting there and discussing the project.

Thanks and looking forward to it,

Cory

-----Original Message-----
From: Dara Glass [mailto:dglass@ciri.com]
Sent: Thursday, October 16, 2014 3:24 PM
To: Cory Warnock
Cc: 'Mike Salzetti'
Subject: RE: Meeting with you and Ethan Shutt - Grant Lake

Hi Cory - the afternoon of the 5th we are both available. We prefer 2:00 meetings, in case you are wondering.

Thank you.

____

From: Cory Warnock
Sent: Thursday, October 16, 2014 2:03:43 PM
To: Dara Glass
Cc: 'Mike Salzetti'
Subject: Meeting with you and Ethan Shutt - Grant Lake

Hi Dara,

We have settled on a public meeting date of November 6th (6-9pm in Moose Pass). As such and per earlier commitment, I'm writing you to check on your (and Mr. Shutt's) availability for a meeting in Anchorage on either the afternoon of November 5th or the morning on November 6th. I'll be sending out a more formal announcement with respect to the public meeting to all of the Stakeholders shortly but in the interim, if you could give me an idea of availability for the two general timeframes discussed above, I'd appreciate it.

Thanks and looking forward to hopefully getting together,

Cory

Cory Warnock
Senior Licensing and Regulatory Consultant

McMillen, LLC
www.mcmillen-llc.com<http://www.mcmillen-llc.com/>
5771 Applegrove Ln.
Ferndale, Wa. 98248
O - 360-384-2662
C - 360-739-0187
F - 360-542-2264

____

____

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Grant Lake Hydroelectric Project (FERC No. 13212) Licensing

Consultation Record

Phone/E-mail /One on One Meeting Log

Contact Name: Lesli Schick

Agency/Organization: Alaska Department of Natural Resources

Phone No./E-mail Address: lesli.schick@alaska.gov

Date: 10/20/14

Time: 2:00pm PST

Grant Lake Licensing Team Contact: Cory Warnock

Summary of Conversation and/or E-mail Exchange: Mr. Warnock, Dwayne Adams (EarthScape) and Mike Yarborough (CRC), held a brief call with Ms. Schick to discuss the proposed deviation in process from the previously planned approach of developing a mutually agreed upon and signed Memorandum of Agreement (MOA) for the re-route of the Iditarod National Historic Trail (INHT) in advance of the FERC License Application submittal. Per the United States Forest Service (USFS) letter dated September 16, 2014, the USFS viewed it as inappropriate to sign an MOA prior to the INHT process being reviewed and commented upon as part of the more global public review process associated with the overall Draft FERC License Application (DLA). As such Mr. Warnock explained that Kenai Hydro (KHL) would now be adding to the Cultural and Recreation/Visual sections of the Exhibit E for the DLA to describe the existing status of the INHT through the Project Area and the collaborative process (meetings, calls, mapping alternative routes, site visits, etc.) that has gone on over the past 18 months in an effort to develop an appropriate approach for agreement of a mutually approved re-route.

In addition, Mr. Yarborough gave a brief update on the recent Cultural evaluation of the recently proposed re-route corridor and stated with the exception of two trees that had been modified to some minimal extent, nothing culturally significant was discovered in the re-route area.

Ms. Schick stated that she understood the proposed deviation in process and had no questions at this time. Mr. Warnock and Ms. Schick had a brief discussion related to potential attendance at the upcoming public meeting in Moose Pass and the call was adjourned.

Call Time – Approximately 10 minutes

From: Sean Skaling [mailto:sskaling@aidea.org]
Sent: Monday, October 20, 2014 2:05 PM
To: Salzetti, Mikel; Daniel J. Hertrich
Cc: Cory Warnock (cory.warnock@mcmillen-llc.com); Douglas Ott
Subject: RE: Grant Lake Public Meeting

Mike,
Thank you for the invitations. I am forwarding your email to Daniel Hertrich, who is AEA's new Hydro Program Manager (771-3045). I would be interested in participating in a project update meeting on the morning of November 6, but may not be available. I'll let Daniel work out the details with you and I'll participate if possible.
Thank you,

Sean Skaling
Programs and Evaluation Director
Alaska Energy Authority
813 W Northern Lights Blvd.
Anchorage, AK 99503-2495
(907) 771-3079 Direct phone
(907) 771-3000 Main phone
(907) 771-3044 Fax
sskaling@aidea.org
www.akenergyauthority.org

From: Salzetti, Mikel [mailto:MSalzetti@HomerElectric.com]
Sent: Monday, October 20, 2014 11:17 AM
To: Sean Skaling
Cc: Cory Warnock (cory.warnock@mcmillen-llc.com)
Subject: FW: Grant Lake Public Meeting

Sean:

As noted below, Homer Electric Association is planning a public meeting on our proposed Grant Lake Hydroelectric project in Moose Pass on the evening of November 6th and we wanted to send AEA an invite to the meeting. Since Audrey Alstrom is no longer with AEA, could you please provide us with an appropriate AEA contact to send an invitation email.

Also, since we will have some of our study team in town, I was wondering if folks at AEA would have an interest in hearing a project update sometime on the morning of November 6th? We would welcome the opportunity to fill AEA in on our progress and plans for this promising project.

Best Regards,

Mike Salzetti
Manager of Fuel Supply & Renewable Energy Development
(907) 283-2375 *work*
(907) 398-5073 *Mobile*

From: Shawn Calfa [mailto:SCalfa@aidea.org]
Sent: Monday, October 20, 2014 11:11 AM
To: Salzetti, Mikel
Subject: RE: Grant Lake Public Meeting

Mikel,

I think the best person to talk with would be Sean Skaling one that Audrey has Left us. His email is sskaling@aidea.org just in case you don't have it.

Shawn

SHAWN M. CALFA
Grant Administrator

ALASKA ENERGY AUTHORITY
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
T. 907-771-3031
F. 907-771-3044
scalfa@aidea.org

From: Salzetti, Mikel [mailto:MSalzetti@HomerElectric.com]
Sent: Monday, October 20, 2014 10:57 AM
To: Shawn Calfa
Cc: Cory Warnock (cory.warnock@mcmillen-llc.com)
Subject: Grant Lake Public Meeting

Shawn:

We are planning a public meeting on our proposed Grant Lake Hydroelectric project in Moose Pass on the evening of November 6th and we wanted to send AEA an invite to the meeting. Since Audrey Alstrom is no longer with AEA, could you please provide us with an appropriate AEA contact to send an invitation email.

Also, since we will have some of our study team in town, I was wondering if folks at AEA would have an interest in hearing a project update sometime on the morning of November 6th? We would welcome the opportunity to fill AEA in on our progress and plans for this promising project.

Mike Salzetti

From: Cory Warnock <cory.warnock@mcmillen-llc.com>
Sent: Monday, October 20, 2014 3:26 PM
To: 'Judy Bittner'; 'Lesli Schick'; jeavis@fs.fed.us; 'Van Massenhove, Katherine B -FS'; rstovall@fs.fed.us; pamela.russell@alaska.gov; 'Shina Duvall'
Cc: 'Ken Hogan'; 'Mike Salzetti'; Emily Andersen; 'Michael Yarborough'; 'Dwayne Adams'
Subject: Grant Lake Project Iditarod National Historic Trail Process Update

Hello all,

I wanted to send you a brief note updating you on process and progress with respect to the proposed re-route of the Iditarod National Historic Trail (INHT) through the Grant Lake Hydroelectric Project Area. As all of you know, Kenai Hydro (KHL) has been working with you over the past couple years to develop an acceptable re-route option in conjunction with development of the Project. KHL has ramped up efforts over the past 12 months in advance of developing their Draft License Application (DLA) in hopes of reaching a fundamental agreement on the fact that a re-route (whatever the final description may be, post-license) was an acceptable approach for all parties involved. KHL held a series of meetings and site visits during the development of a proposed re-route to collaborate with Stakeholders and describe the alternative route through the Project Area that we feel creates an improved user experience while allowing for development of the requisite infrastructure associated with the hydro project. Based on that collaboration and agreed upon approach for reaching consensus, KHL drafted and distributed a Memorandum of Agreement (MOA) for review, comment and signature on August 22, 2014. Now that a good amount of time has passed since the deadline for comments, I wanted to let you know that based on the comments we've received from the Forest Service (USFS), KHL has chosen to deviate from the previously discussed (and to some extent, agreed upon) path. The USFS has expressed some concern about signing the MOA prior to allowing the description of the Project and associated discussion of the re-route of the INHT go through the public process in conjunction with the overall licensing process for the Project (specifically NEPA). As such and given our desire to collaborate on this issue, KHL will now be comprehensively describing the INHT within the Project Area and the associated collaboration that has gone on to develop a re-route, in the DLA. This will obviously give the public (and all of you) the opportunity to comprehensively review and comment prior to all of us (Stakeholders and KHL) reconvening to reach formal agreement on the remainder of the process for re-routing the trail through the Project Area.

No specific response is requested to this email but as always, if there are any questions/concerns or follow-up needed, don't hesitate to give me a call or send me an email. Additionally, being that you all have been the primary folks from your respective agencies to discuss this topic, the email is addressed to you. If there are others internal to your agencies that you'd like to keep up to date, please free to forward this email.

Thank you,

Cory

Cory Warnock
Senior Licensing and Regulatory Consultant

McMillen, LLC
www.mcmillen-llc.com
5771 Applegrove Ln.
Ferndale, Wa. 98248
O – 360-384-2662

Subject: FW: Grant Lake Project Public Meeting Announcement
Attachments: Grant Lake Project Public Meeting Announcement.pdf

From: Cory Warnock [mailto:cory.warnock@mcmillen-llc.com]
Sent: Monday, October 20, 2014 11:52 AM
To: 'jeavis@fs.fed.us'; 'Joe Klein'; 'Kevin Laves (klaves@fs.fed.us)'; 'Katherine McCafferty (katherine.a.mccafferty2@usace.army.mil)'; 'Monte Miller'; 'Jason Mouw'; 'Susan Walker'; 'Lesli Schick (lesli.schick@alaska.gov)'; 'rstovall@fs.fed.us'; 'Cassie Thomas'; 'Jeffry Anderson'; 'Patricia Berkhahn (patricia.berkhahn@alaska.gov)'; 'carl.reese@alaska.gov'; 'Kim Sager'; 'hshepherd@uci.net'; 'dglass@ciri.com'; 'David Griffin (david.griffin@alaska.gov)'; 'pamela.russell@alaska.gov'; 'Schade, David W (DNR)'; 'mcooney@arctic.net'; 'kenailake@arctic.net'; 'Ken Hogan'
Cc: 'Mike Salzetti'; 'Emily Andersen'; 'Morton Mcmillen'; 'John Stevenson'
Subject: Grant Lake Project Public Meeting Announcement

Grant Lake Hydroelectric Project (FERC No. 13212) Stakeholder Group:

As you all know, Kenai Hydro is in the process of developing our FERC Draft License Application for your review. As part of that development process and per our previous commitment, we have scheduled a public meeting in Moose Pass for the evening of November 6th. All of the specifics (time, location, etc.) are incorporated into the attached, formal announcement. As stated in the attached, the primary goal of the public meeting will be to "discuss the engineering and design plans, elaborate on the anticipated schedule for development and answer any questions that individuals may have with respect to the overall design and process associated with the Grant Lake Project". While a majority of you are well-versed to many of the intricacies of the Project through the collaborative effort that has taken place the last couple years, we obviously wanted to provide you the meeting information and give you the opportunity to attend, if interested.

If anyone has any questions with respect to the meeting or anything else Project related, don't hesitate to give me a call or send me an email.

Thanks,

Cory

Cory Warnock
Senior Licensing and Regulatory Consultant

McMillen, LLC
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O – 360-384-2662

Homer Electric Association, Inc.
A Touchstone Energy® Cooperative

3977 Lake Street, Homer, AK 99603 (907) 235-8551
280 Airport Way, Kenai, AK 99611 (907) 283-5831

Public Service Announcement

DATE: October 16th, 2014

Public Meeting on Grant Lake Hydro Project scheduled for November 6th

Kenai Hydro, LLC (KHL), a wholly owned subsidiary of Homer Electric Association (HEA), will be holding a public meeting to discuss the development of the Grant Lake Hydroelectric Project near Moose Pass.

The meeting will be held at the Moose Pass Community Hall on Thursday, November 6th, from 6 pm to 9 pm.

Over the past three years, KHL has had extensive collaboration with Stakeholders and the Federal Energy Regulatory Commission (FERC), conducted comprehensive natural resource studies and developed an engineering/design program. As a result of the positive findings related to these endeavors, KHL is in the process of developing its FERC License Application and plans on submitting it for public and agency comment early in 2015.

At the November 6th public meeting, project representatives will discuss the engineering and design plans, elaborate on the anticipated schedule for development and answer any questions that individuals may have with respect to the overall design and process associated with the Grant Lake Project.

Details related to the meeting are outlined below:

Grant Lake Hydroelectric Project Public Meeting
Thursday November 6, 2014 (6pm - 9pm)
Moose Pass Community Hall
33657 Depot Road, Moose Pass, AK

For additional information please contact HEA Director of Member Relations, Joe Gallagher, at 907-283-2324.

From: Stovall, Robert -FS [mailto:rstovall@fs.fed.us]
Sent: Tuesday, October 21, 2014 10:06 AM
To: Hohensee, Steve -FS; Mike Salzetti (msalzetti@HomerElectric.com); Cory Warnock (cory.warnock@mcmillen-llc.com)
Cc: Malecek, Thomas -FS; Johnson, Michael W -FS
Subject: RE: Grant Lake Project Public Meeting Announcement

Steve:

I will make sure that is pointed out to HEA. If you or Mike J could attend this meeting and explain that to Cory and Mike Salzetti It would be very helpful. The meeting is planned for Nov. 6, in Moose Pass at the Moose Pass Community Hall (6-9 pm).

Cory or Mike, if you have questions please contact Steve Hohensee – 907 288-7723 , or Mike Johnson – 907 288-7729

This should be an interesting meeting.

Robert

Deputy District Ranger
Chugach NF, Seward RD
Po Box 390, 334 Fourth Ave.
Seward, AK 99664
Seward office # 907 743-9474; KLWC # 288-7707
Gov. Cell # 907 399-3966

From: Hohensee, Steve -FS
Sent: Monday, October 20, 2014 1:19 PM
To: Stovall, Robert -FS
Cc: Hohensee, Steve -FS; Malecek, Thomas -FS
Subject: FW: Grant Lake Project Public Meeting Announcement

Robert:

Your baby, ehh?

I wanted to make sure that Homer Electric is made aware early-on that they will need to purchase rock/gravel they used in construction of their private infrastructure but not for material that is "wasted". I always remember back to a time in Juneau when I discovered that the FS neglected to let AEL&P know about this situation until the 11th hour. That added up to a cool quarter of a million on that project! We don't want (Tom) to ever have the egg on face like that Ranger did for that "gee-wiz-opps"!

Steve Hohensee
Forest Geologist
Chugach National Forest
Kenai Lake Office (Moose Pass)
(907) 288-7723

From: Eavis, John -FS
Sent: Monday, October 20, 2014 1:06 PM
To: Hohensee, Steve -FS
Subject: RE: Grant Lake Project Public Meeting Announcement

Robert I'd say.

From: Hohensee, Steve -FS
Sent: Monday, October 20, 2014 12:54 PM
To: Eavis, John -FS
Cc: Gott, Heather -FS; Clark, Paul D -FS
Subject: RE: Grant Lake Project Public Meeting Announcement

Whose baby is this one? FS primary contact, that is.

Steve Hohensee
Forest Geologist
Chugach National Forest
Kenai Lake Office (Moose Pass)
(907) 288-7723

From: Eavis, John -FS
Sent: Monday, October 20, 2014 12:03 PM
To: FS-pdl r10 chugach seward; Clark, Paul D -FS; Gott, Heather -FS
Subject: FW: Grant Lake Project Public Meeting Announcement

From: Cory Warnock [mailto:cory.warnock@mcmillen-llc.com]
Sent: Monday, October 20, 2014 10:52 AM
To: Eavis, John -FS; 'Joe Klein'; Laves, Kevin -FS; 'Katherine McCafferty'; 'Monte Miller'; 'Jason Mouw'; susan.walker@noaa.gov; 'Lesli Schick'; Stovall, Robert -FS; 'Cassie Thomas'; 'Jeffry Anderson'; 'Patricia Berkhahn'; carl.reese@alaska.gov; 'Kim Sager'; hshepherd@uci.net; dglass@ciri.com; 'David Griffin'; pamela.russell@alaska.gov; 'Schade, David W (DNR)'; mcooney@arctic.net; kenailake@arctic.net; 'Ken Hogan'
Cc: 'Mike Salzetti'; 'Emily Andersen'; 'Morton Mcmillen'; 'John Stevenson'
Subject: Grant Lake Project Public Meeting Announcement

Grant Lake Hydroelectric Project (FERC No. 13212) Stakeholder Group:

As you all know, Kenai Hydro is in the process of developing our FERC Draft License Application for your review. As part of that development process and per our previous commitment, we have scheduled a public meeting in Moose Pass for the evening of November 6th. All of the specifics (time, location, etc.) are incorporated into the attached, formal announcement. As stated in the attached, the primary goal of the public meeting will be to "discuss the engineering and design plans, elaborate on the anticipated schedule for development and answer any questions that individuals may have with respect to the overall design and process associated with the Grant Lake Project". While a majority of you are well-versed to many of the intricacies of the Project through the collaborative effort that has taken place the last couple years, we obviously wanted to provide you the meeting information and give you the opportunity to attend, if interested.

If anyone has any questions with respect to the meeting or anything else Project related, don't hesitate to give me a call or send me an email.

Thanks,

Cory

Cory Warnock
Senior Licensing and Regulatory Consultant

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Ferndale, Wa. 98248
O – 360-384-2662
C – 360-739-0187
F – 360-542-2264

From: John Blum <john.blum@mcmillen-llc.com>
Sent: Monday, October 27, 2014 1:17 PM
To: 'Miller, Monte D (DFG)'; 'Mouw, Jason E B (DFG)'; 'Klein, Joseph P (DFG)'; jeffry_anderson@fws.gov; dglass@ciri.com; susan.walker@noaa.gov; 'Mark Miller'; 'John Stevenson'; 'Cory Warnock'
Cc: 'Emily Andersen'; 'John Blum'
Subject: Grant Creek Instream Flow Additional Information
Attachments: Grant Lk IFIM Report Draft Addendum 10-23-14 FINAL.pdf

Good Afternoon:

As you are aware, the Instream Flow Work Group (Work Group) met a number of times between March and July to discuss outstanding issues related to the Instream Flow Study conducted for the Grant Lake Hydroelectric Project. Issues that were discussed included:

- Sockeye Salmon fry emergence timing
- Locations of salmonid spawning and rearing in Grant Creek and along transects
- Transect weighting
- Final Weighted Usable Area (WUA) for Grant Creek
- Effective Spawning Analysis
- Habitat Time Series, pre-Project and with-Project

KHL agreed to get develop this information and distribute it to the Work Group. We are getting this report to you for your information and to close the loop. The results of these investigations will be incorporated into the Draft License Application (DLA); you will have the opportunity to formally comment on these results during the DLA review period.

I want to thank you all for your participation in the process. Your insights, experience, and questions definitely made this a better product.

Thanks again, and I look forward with working with you further as we move forward.

John

John P. Blum
Senior Fisheries Scientist

McMillen, LLC
112 Ohio Street Ste 117 Bellingham, WA 98225
p 360-483-2807
f 360-734-5918
c 360-220-0694
john.blum@mcmillen-llc.com | www.mcmillen-llc.com

Grant Lake Hydroelectric Project (FERC No. 13212)

Aquatic Resources –

Grant Creek Aquatic Habitat Mapping and

Instream Flow Study Additional Information

Draft Report

Prepared for
Kenai Hydro LLC

Prepared by

MCMILLEN
DESIGN with Vision. BUILD with Integrity.

October 2014

TABLE OF CONTENTS

Appendices

List of Tables

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Aquatic Resources – Grant Creek Aquatic Habitat Mapping and Instream Flow Study Additional Information
Draft Report
Grant Lake Hydroelectric Project (FERC No. 13212)

1 INTRODUCTION

As part of the ongoing licensing of the Grant Lake Hydroelectric Project (Project; FERC No. 13212), Kenai Hydro LLC (KHL) met with the natural resource agencies and other stakeholders on March 19 – 20, 2014, in Anchorage, Alaska. During this meeting, the natural resource agencies and KHL identified areas where further data analysis would be required prior to making or evaluating a proposed instream flow and operating regime for the Project.

An Instream Flow Work Group (Work Group) was formed, consisting of staff from the National Oceanographic and Atmospheric Administration (NOAA), Alaska Department of Fish and Game (ADFG), the U.S. Fish and Wildlife Service (USFWS), Cook Inlet Region, Inc. (CIRI), BioAnalysts, and McMillen, LLC (McMillen).

A series of conference calls were held with the Work Group from March 17 – July 17, 2014, to discuss data analysis needs for providing the information requested. Outstanding issues included the following:

- Sockeye salmon fry emergence timing in Grant Creek
- Locations of salmonid spawning and rearing in Grant Creek
- Priority species and transect weighting
- Final Weighted Usable Area (WUA) for Grant Creek
- Effective spawning and incubation analysis
- Grant Creek habitat time series

This document is intended to provide supplemental information to the June 2014 Instream Flow Study report. The following sections describe the analysis conducted to address those issues raised by the Work Group. Where separate reports were generated, they are included as appendices.

2 ADDITIONAL ANALYSIS CONDUCTED FOR THE GRANT CREEK INSTREAM FLOW STUDY

2.1. Sockeye Salmon Fry Emergence Timing In Grant Creek

The Work Group requested that sockeye salmon fry emergence be added to the periodicity chart. There was uncertainty regarding the emergence timing, and it was suggested that Daily Temperature Units (DTUs) be researched in order to determine sockeye salmon fry emergence timing. Table 2.1-1 summarizes DTUs from the literature or communication with those involved in sockeye salmon aquaculture on the Kenai Peninsula.

Table 2.1-1. Review of daily temperature units (ºC) for sockeye salmon fry hatching and emergence.

Source:	Location	Hatch	Emergence	Emergence Timing
T. Prochazka (CIAA)	AK	600-650	950-1,000	early March - early May
Taylor & Heard, ADFG	AK	650	1100[1/]	
Pieper et al. (1982)	Unknown	666	1,000	
Hendry et al. (1998)	WA	615	950	

[1/] Fry fully developed.

The Work Group decided that the use of 950 – 1,000 DTUs was appropriate for sockeye salmon fry emergence. Using actual 2013 Grant Creek sockeye salmon run timing and water temperature data, emergence would have occurred from early through late May. Given yearly variances in run timing and water temperatures, the Work Group thought the majority of sockeye fry emergence would occur during May; however, emergence timing for all sockeye salmon fry could occur as early as March and as late as July.

2.2. Locations of Salmonid Spawning and Rearing in Grant Creek

The Work Group requested that KHL superimpose salmonid spawning and rearing locations onto a map of Grant Creek that included the Instream Flow transects. These data would be used, in part, to inform the decision on priority species and transects to be used to develop final WUA curves for those species and life history stages found and prioritized in Grant Creek.

Appendix 1 includes the maps for salmonid spawning and rearing in Grant Creek, including their vicinity to Instream Flow transects. Catch per unit effort (CPUE) is provided for rearing salmonids; transects were ranked from highest CPUE to lowest in order to evaluate whether certain transects were more heavily used and should be weighted accordingly.

2.3. Priority Species and Transect Weighting

After collaboration, the Work Group recommended that instead of prioritizing species and transects based upon utilization, transects be weighted by the proportion of the habitat that each transect represented. In addition, the Work Group recommended that the Habitat Suitability Criteria (HSC) curves be processed through the Instream Flow model to produce WUAs for all species and life history stages.

Appendix 2 includes the Final Transect Weighting report. Table 2.3-1 shows the species and life history stages that were modeled for Grant Creek. Table 2.3-2 summarizes final transect and reach weighting.

Table 2.3-1. Target species and life history stages modeled in the Grant Creek Instream Flow Study.

Species	Spawning	Fry Rearing	Juvenile Rearing	Adult Rearing
Sockeye Salmon	✓			
Coho Salmon	✓	✓	✓	
Chinook Salmon	✓	✓	✓	
Rainbow Trout	✓	✓	✓	✓
Dolly Varden Char	✓	✓	✓	✓

Table 2.3-2. Summary of reach and transect weighting (ft).

Reach	Transect	Length (ft)
1 - Distributary	100	169
	110	227
	Total	***396***
1 - Main Channel	120	256
	130	167
	140	102
	150	118
	160	49
	Total	***692***
2 - Main Channel	200	51
	210	22
	220	405
	230-M[1/]	283
	230-BW[2/]	58
	Total	***820***
3 - Main Channel	300	90
	310	718
	Total	***808***
2/3 Side Channels	320	669
	330	810
	Total	***1,479***
4 - Main Channel	400	146
	410	297
	430	25
	Total	468
Total		
Distributary		396
Main Channel		2,788
Side Channel		1,479
Total		***4,663***

[1/] Main Channel; [2/] Backwater

2.4. Final Weighted Usable Area for Grant Creek

Using the final transect weighting, and HSC curves for the species and life history stages shown in Table 2.3-1, KHL produced WUA curves for Grant Creek. Appendix 3 presents WUA for Grant Creek salmonid spawning, fry, and juvenile/adult rearing, respectively.

2.5. Effective Spawning and Incubation Analysis for Grant Creek

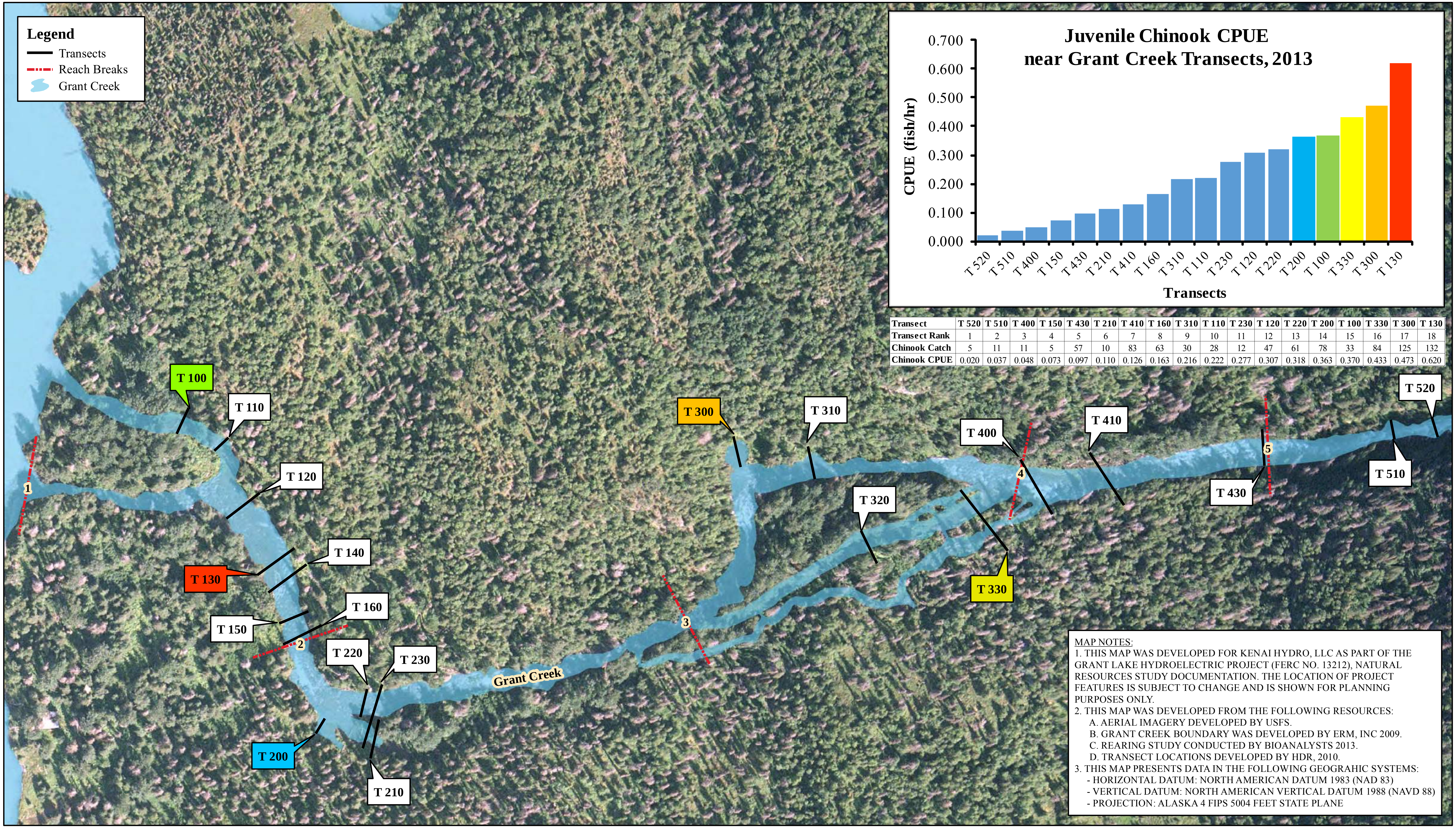
This report was produced to address issues and concerns regarding spawning flows and potential effects of Project flows on incubating salmonid eggs. KHL analyzed spawning flows of 450 cubic feet per second (cfs), as well as the median flows for the time periods when Grant Creek salmonids were spawning. The effective spawning analysis report is included as Appendix 4.

2.6. Grant Creek Habitat Time Series

This report was produced to address a request from the Work Group to conduct a habitat time series analysis for the salmonid life history stages present in Grant Creek for the Project. This report used 66 years of daily flows, both pre-Project and with-Project. The Grant Creek habitat time series report is included as Appendix 5.

Appendix 1: Grant Creek Salmonid Spawning and Rearing Locations

This appendix contains the following figures:



Transect	T 520	T 510	T 400	T 150	T 430	T 210	T 410	T 160	T 310	T 110	T 230	T 120	T 220	T 200	T 100	T 330	T 300	T 130
Transect Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Chinook Catch	5	11	11	5	57	10	83	63	30	28	12	47	61	78	33	84	125	132
Chinook CPUE	0.020	0.037	0.048	0.073	0.097	0.110	0.126	0.163	0.216	0.222	0.277	0.307	0.318	0.363	0.370	0.433	0.473	0.620

MAP NOTES:
1. THIS MAP WAS DEVELOPED FOR KENAI HYDRO, LLC AS PART OF THE GRANT LAKE HYDROELECTRIC PROJECT (FERC NO. 13212), NATURAL RESOURCES STUDY DOCUMENTATION. THE LOCATION OF PROJECT FEATURES IS SUBJECT TO CHANGE AND IS SHOWN FOR PLANNING PURPOSES ONLY.
2. THIS MAP WAS DEVELOPED FROM THE FOLLOWING RESOURCES:
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   B. GRANT CREEK BOUNDARY WAS DEVELOPED BY ERM, INC 2009.
   C. REARING STUDY CONDUCTED BY BIOANALYSTS 2013.
   D. TRANSECT LOCATIONS DEVELOPED BY HDR, 2010.
3. THIS MAP PRESENTS DATA IN THE FOLLOWING GEOGRAHIC SYSTEMS:
   - HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 (NAD 83)
   - VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88)
   - PROJECTION: ALASKA 4 FIPS 5004 FEET STATE PLANE

REV DATE BY DESCRIPTION

N

Drawing Scale:
0 95 190 380 Feet

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OFFICE: 208.342.4214 FAX: 208.342.4216

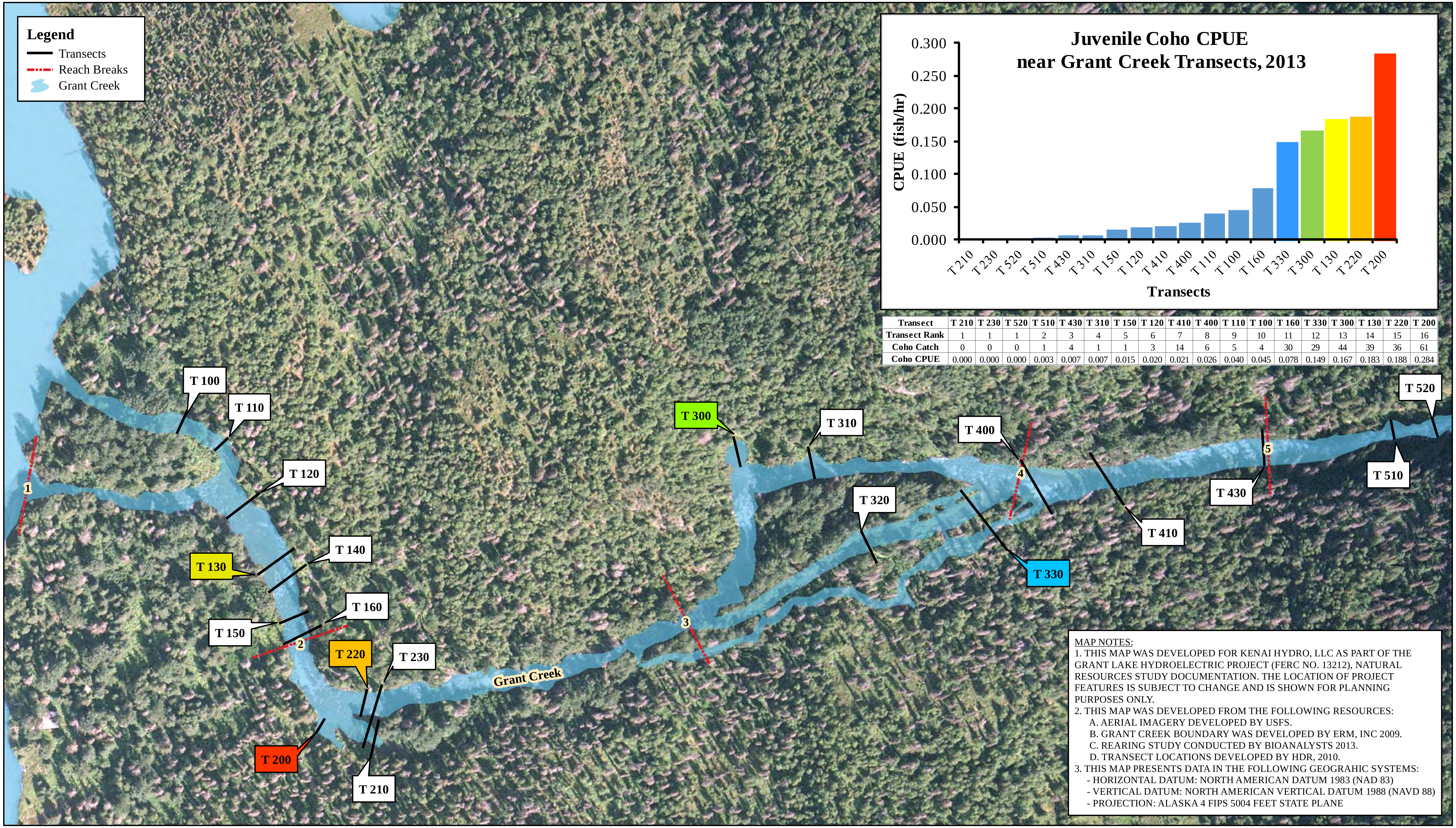
Developed For:
Homer Electric Association, Inc.
A Touchstone Energy Cooperative

GRANT LAKE HYDROELECTRIC PROJECT - FERC PROJECT NO. 13212

GRANT LAKE NATURAL RESOURCES STUDY

Chinook Salmon
Rearing Habitat By Transect

DESIGNED J. Woodbury
DRAWN J. Woodbury
CHECKED J. Blum
ISSUED DATE 7/18/2014
DRAWING
SCALE: 1:2,000



Transect	T 210	T 230	T 520	T 510	T 430	T 310	T 150	T 120	T 410	T 400	T 110	T 100	T 160	T 330	T 300	T 130	T 220	T 200
Transect Rank	1	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coho Catch	0	0	0	1	4	1	1	3	14	6	5	4	30	29	44	39	36	61
Coho CPUE	0.000	0.000	0.000	0.003	0.007	0.007	0.015	0.020	0.021	0.026	0.040	0.045	0.078	0.149	0.167	0.183	0.188	0.284

MAP NOTES:
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   - PROJECTION: ALASKA 4 FIPS 5004 FEET STATE PLANE

REV DATE BY DESCRIPTION

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GRANT LAKE NATURAL RESOURCES STUDY

Coho Salmon
Rearing Habitat By Transect

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CHECKED J. Blum
ISSUED DATE 7/18/2014
SCALE: 1:2,000
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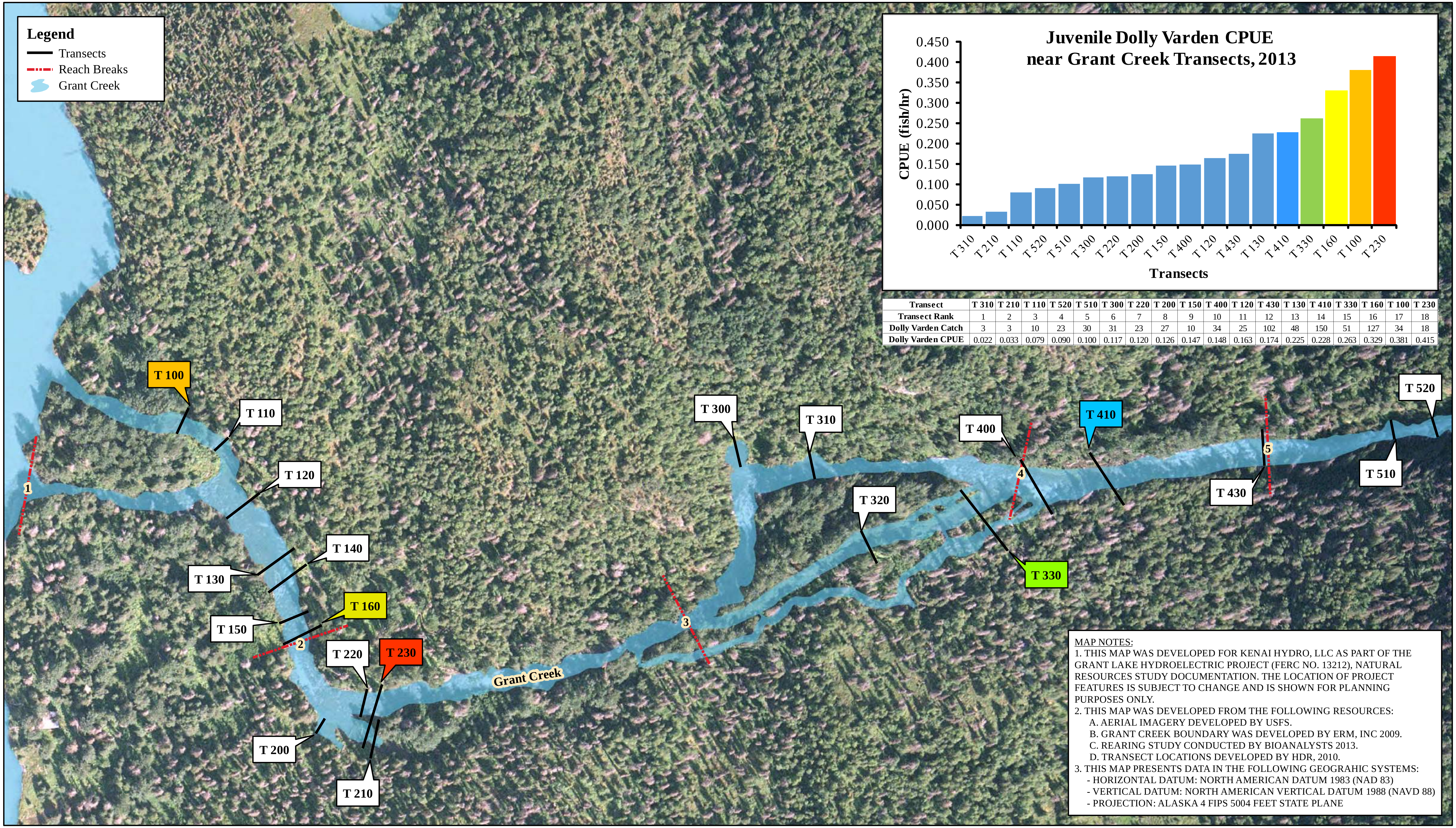

Transect	T 310	T 210	T 110	T 520	T 510	T 300	T 220	T 200	T 150	T 400	T 120	T 430	T 130	T 410	T 330	T 160	T 100	T 230
Transect Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Dolly Varden Catch	3	3	10	23	30	31	23	27	10	34	25	102	48	150	51	127	34	18
Dolly Varden CPUE	0.022	0.033	0.079	0.090	0.100	0.117	0.120	0.126	0.147	0.148	0.163	0.174	0.225	0.228	0.263	0.329	0.381	0.415

MAP NOTES:

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GRANT LAKE NATURAL RESOURCES STUDY

Juvenile Dolly Varden Rearing Habitat By Transect

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CHECKED J. Blum
ISSUED DATE 7/18/2014
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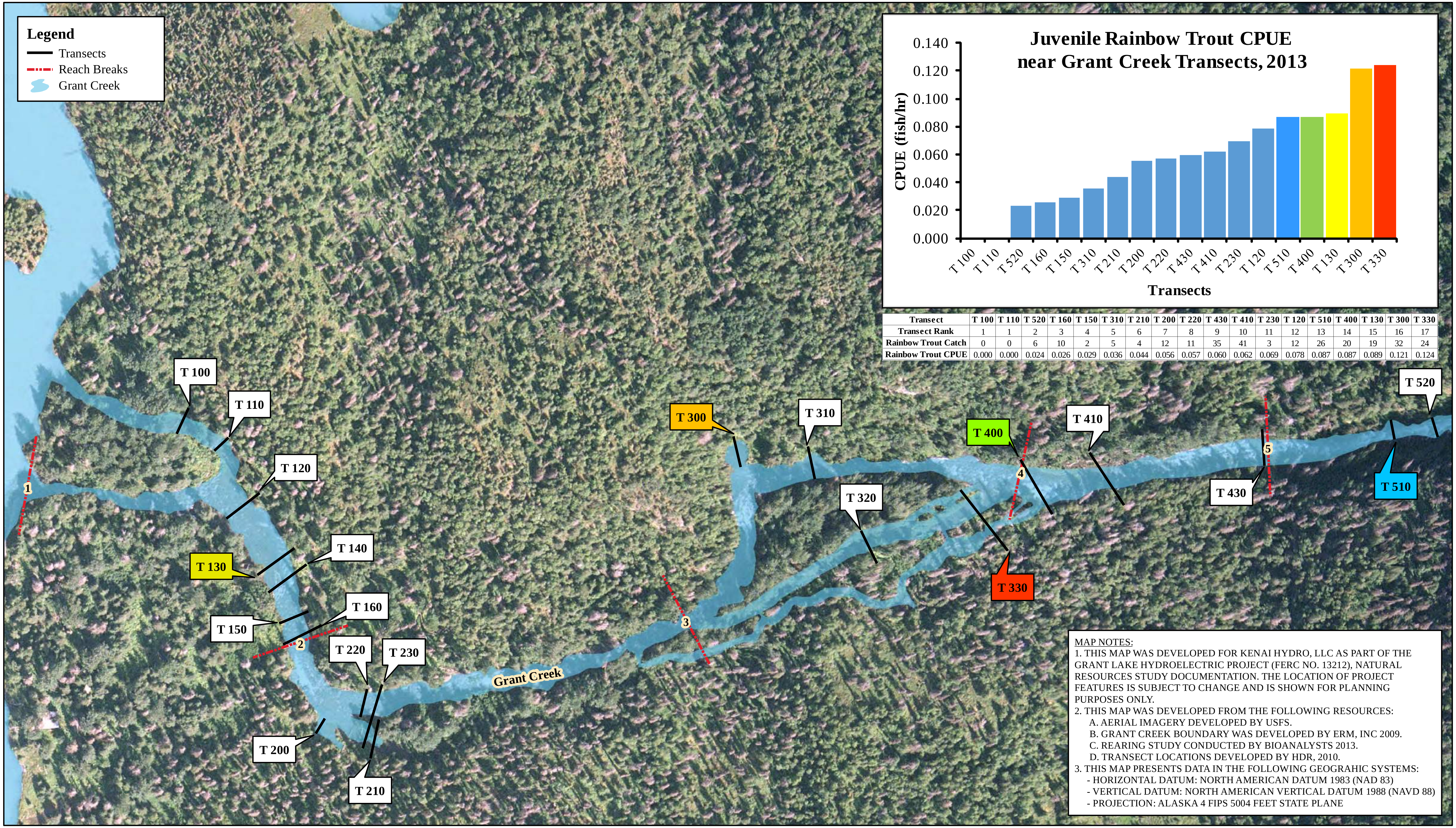
SCALE: 1:2,000



Transect	T 100	T 110	T 520	T 160	T 150	T 310	T 210	T 200	T 220	T 430	T 410	T 230	T 120	T 510	T 400	T 130	T 300	T 330
Transect Rank	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Rainbow Trout Catch	0	0	6	10	2	5	4	12	11	35	41	3	12	26	20	19	32	24
Rainbow Trout CPUE	0.000	0.000	0.024	0.026	0.029	0.036	0.044	0.056	0.057	0.060	0.062	0.069	0.078	0.087	0.087	0.089	0.121	0.124

MAP NOTES:
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REV	DATE	BY	DESCRIPTION

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Drawing Scale:

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GRANT LAKE NATURAL RESOURCES STUDY

Rainbow Trout
Rearing Habitat By Transect

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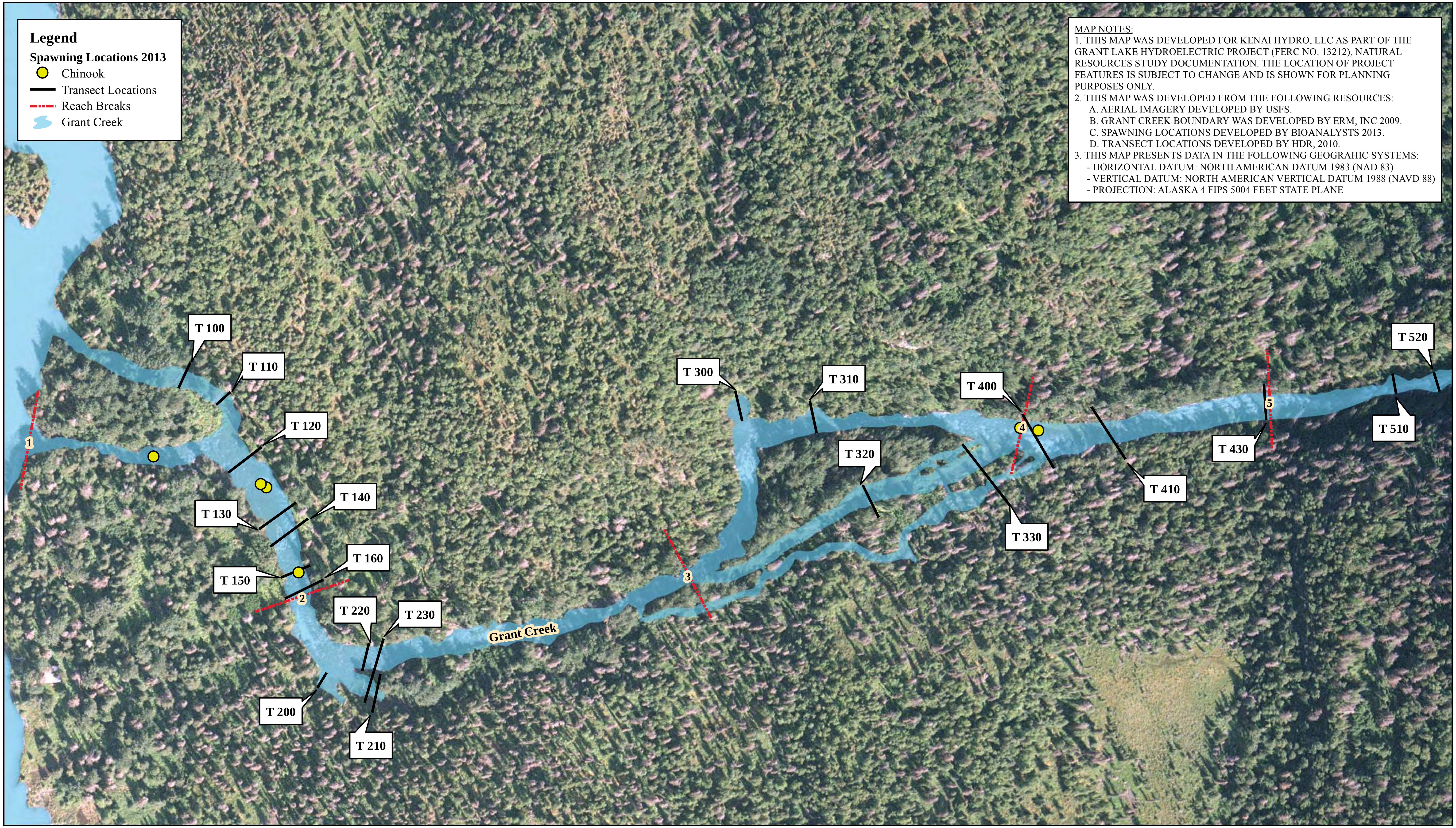
DRAWING



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GRANT LAKE NATURAL RESOURCES STUDY

Transect Locations &
Chinook Spawning Locations

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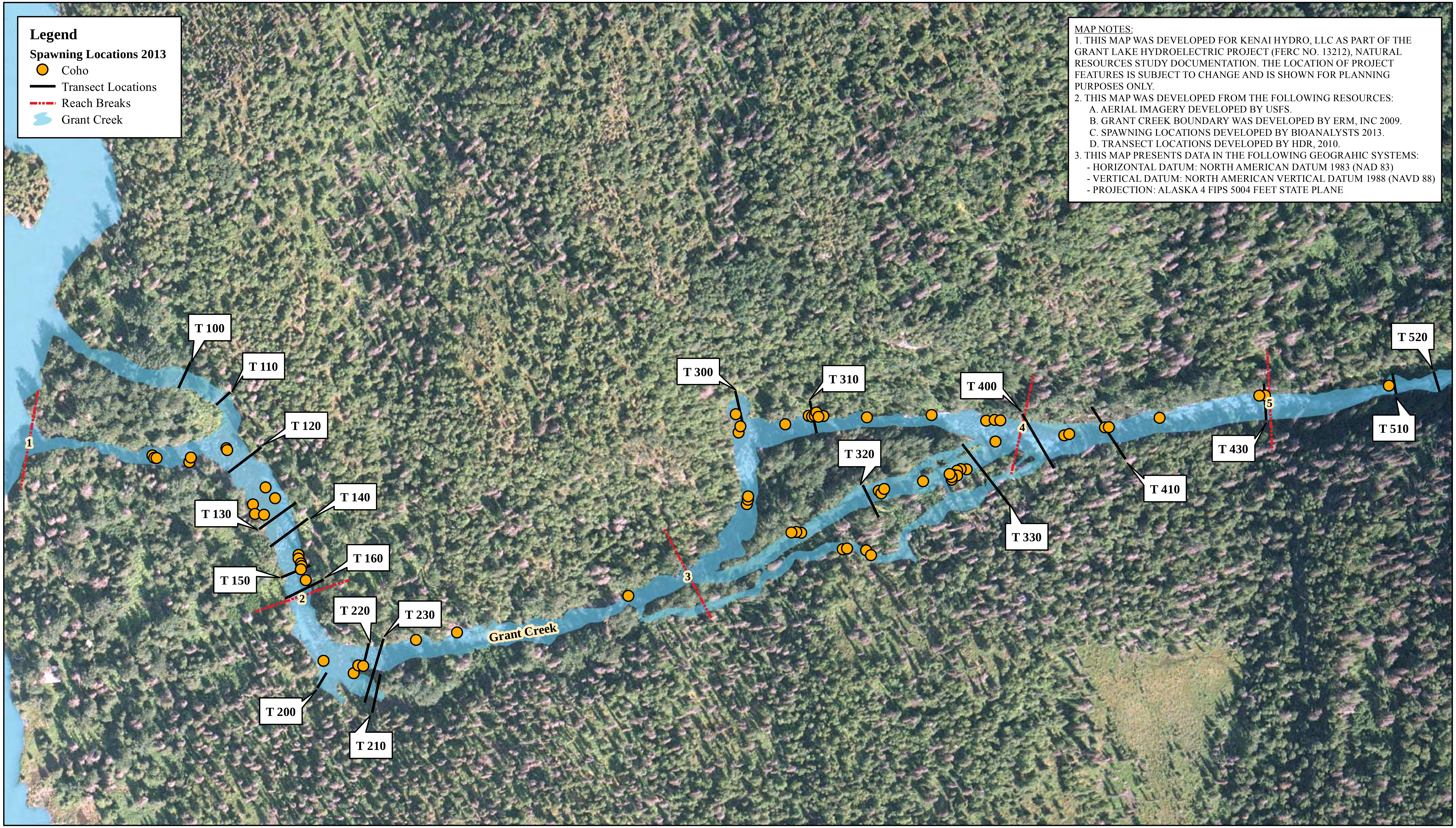
DRAWN J. Woodbury
CHECKED J. Blum
ISSUED DATE 7/18/2014
DRAWING
SCALE: 1:2,000



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GRANT LAKE NATURAL RESOURCES STUDY

Transect Locations & Coho Spawning Locations

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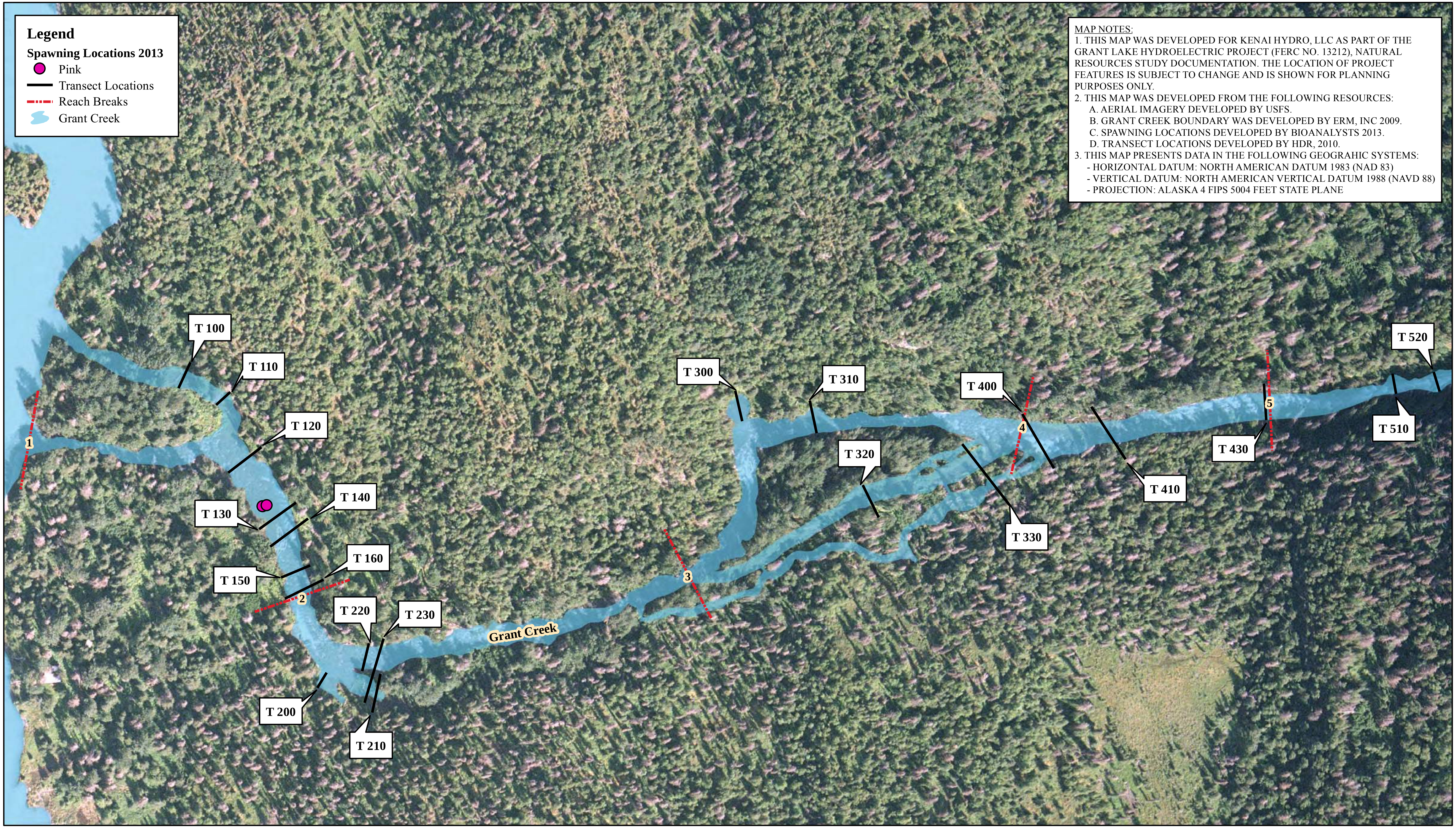
CHECKED	J. Blum
ISSUED DATE	7/18/2014
DRAWING	
SCALE:	1:2,000



REV.	DATE	BY	DESCRIPTION

N

Drawing Scale:
0 95 190 380
Feet

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GRANT LAKE NATURAL RESOURCES STUDY

Transect Locations & Pink Salmon Spawning Locations

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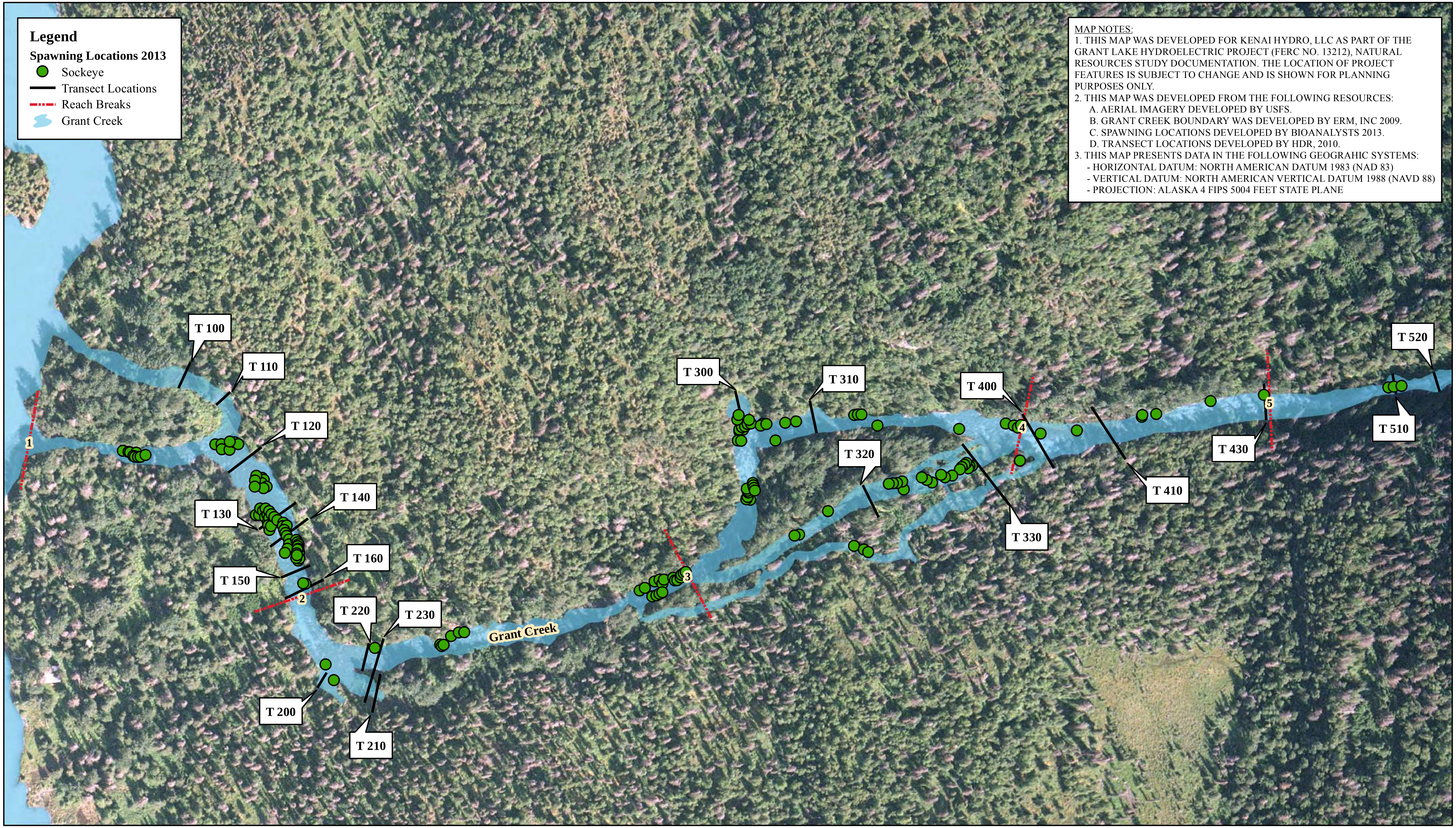

REV	DATE	BY	DESCRIPTION

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Drawing Scale:
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Feet

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GRANT LAKE NATURAL RESOURCES STUDY

Transect Locations & Sockeye Spawning Locations

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Appendix 2: Habitat Quantification/Transect Weighting Methodology

Grant Lake Hydroelectric Project (FERC No. 13212)

Habitat Quantification / Transect Weighting Methodology

Final Report

Prepared for
Kenai Hydro LLC

Prepared by

MCMILLEN
DESIGN with Vision. BUILD with Integrity.

August 2014

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Final Report
Grant Lake Hydroelectric Project (FERC No. 13212)

1 INTRODUCTION

As part of the Instream Flow assessment of habitat within Grant Creek, it is necessary to identify habitat types within reaches of Grant Creek, to quantify those habitats, and to weight them in proportion to their availability within lower Grant Creek. These analyses are then used to weight those transects that were selected and modeled within Reaches 1 through 4. As such, we have undertaken a process to identify and quantify habitat within the various reaches of Grant Creek. Our assessment has been tailored to provide metrics consistent with the work conducted by Flory (1999) on Falls Creek, AK; a summary of these results was provided by Alaska Department of Fish and Game. This document is a brief summary of the methodology used in our analysis.

2 MAP LAYOUT

A scaled map of Grant Creek, which depicted meso-habitats, was overlaid with reach breaks and transect locations. An 8.5 x 11 inch map of each reach was prepared, and the area (ft^2) associated within a given transect was added to each map; the upstream and downstream boundaries associated with each transect were based on one of two criteria:

1. In the event another transect was relatively close to the transect of interest, the boundary was located an equidistance from each transect, or
2. If the nearest transect was more than one meso-habitat away, then the boundary was located at the edge of the meso-habitat associated with that transect or some obvious geophysical feature within Grant Creek (Figure 3-1).

All non-transect sections of Grant Creek were also categorized, and numbered sequentially starting within the Reach 1 Distributary and working upstream (e.g., S1, S2, etc.).

3 MEASUREMENT OF HABITAT

With the prepared maps, it was then possible to measure the length (in millimeters) of each habitat type within a given reach. Each habitat type was associated with either a specific transect (e.g., T300, T310, etc.) or a non-transect area (e.g., S8, S9, etc.). In the event a single habitat type fell within a specific area, such as S8 (Figure 3-1), measurement of that habitat was relatively straightforward and was simply confined by the boundaries located at the Reach 2/3 break (downstream) and the boundary with S9 (upstream). In the event more than one habitat type existed within a specific area, it was then necessary to subjectively proportion the length of each habitat type for that site. A good example of this scenario is most of the Primary Secondary Channel of Reach 3 (Figure 3-1), where multiple meso-habitats occurred in all segments with the exception of S13, which consisted only of riffle habitat.

With each habitat type measured by reach, each transect and non-transect segment of Grant Creek quantified, and with additional information from the GIS database (i.e., reach length and overall area of each habitat type, in ft^2), it was then possible to calculate area of habitat associated with each segment within Grant Creek, and linear feet of habitat by segment. It was also possible to compile those data and generate results consistent with work by Flory (1999) on Falls Creek, AK. Figure 3-2 and Table 3-1 show an example of the first level of analysis, where transect and non-transect segments of Reach 1 are summarized to provide the proportion of habitat within the reach, and the overall area of habitat associated within those segments. Appendix 1 shows Grant Creek reaches and calculations of habitat areas within each reach.

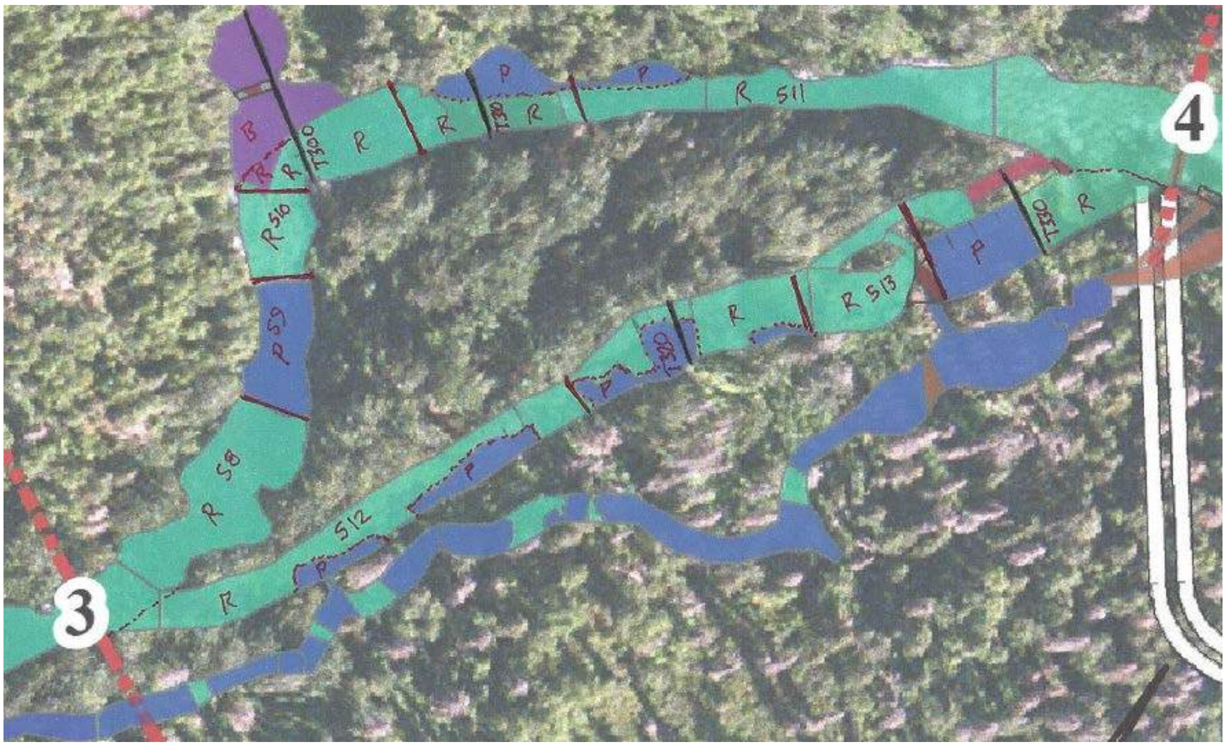


Figure 3-1. A map of Reach 3 that identifies transects, transect breaks, and habitat types that were used to assess habitat weighting.

Once habitat frequencies were established for each transect, available habitats (by type) were then scaled in proportion to their availability within that reach. The results were then summed and each transect was weighted in accordance with its area and assigned a length (in ft).

For example, in the Reach 1 Distributary, there are 7,495 ft^2 of pool habitat, and 6,004 ft^2 of riffle habitat, for a total of 13,499 ft^2 (Table 3-3). Of the habitat associated with Transects 100 and 110, T100 had 20.6% of the pool habitat and 70% of the riffle habitat; T110 had 79.4% of the pool habitat and 30% of the riffle habitat. For reach weighting, therefore, T100 had 20.6% of the 7,495 ft^2 of pool habitat (1,543 ft^2) and 70% of the 6,004 ft^2 of riffle habitat for a total of 5,746 ft^2 in the Reach 1 Distributary. That constituted 42.6% of the habitat within this reach. Given a length of 396 ft, T100 was weighted 169 ft (42.6% X 396). Each transect in each reach was weighted using this same method. The only deviation was in the Reach 2/3 side channels, where habitat was aggregated in both channels and weighted accordingly.

Table 3-2 shows the lengths of each reach. There are 396 linear ft of habitat in the Distributary in Reach 1, 2,788 linear ft of habitat in mainstem Reaches 1 – 4, and 1,479 linear ft in the Reach 2/3 side channels. Tables 3-3 – 3-8 show calculation details for each reach in lower Grant Creek. Table 3-9 summarizes weighting for all transects.

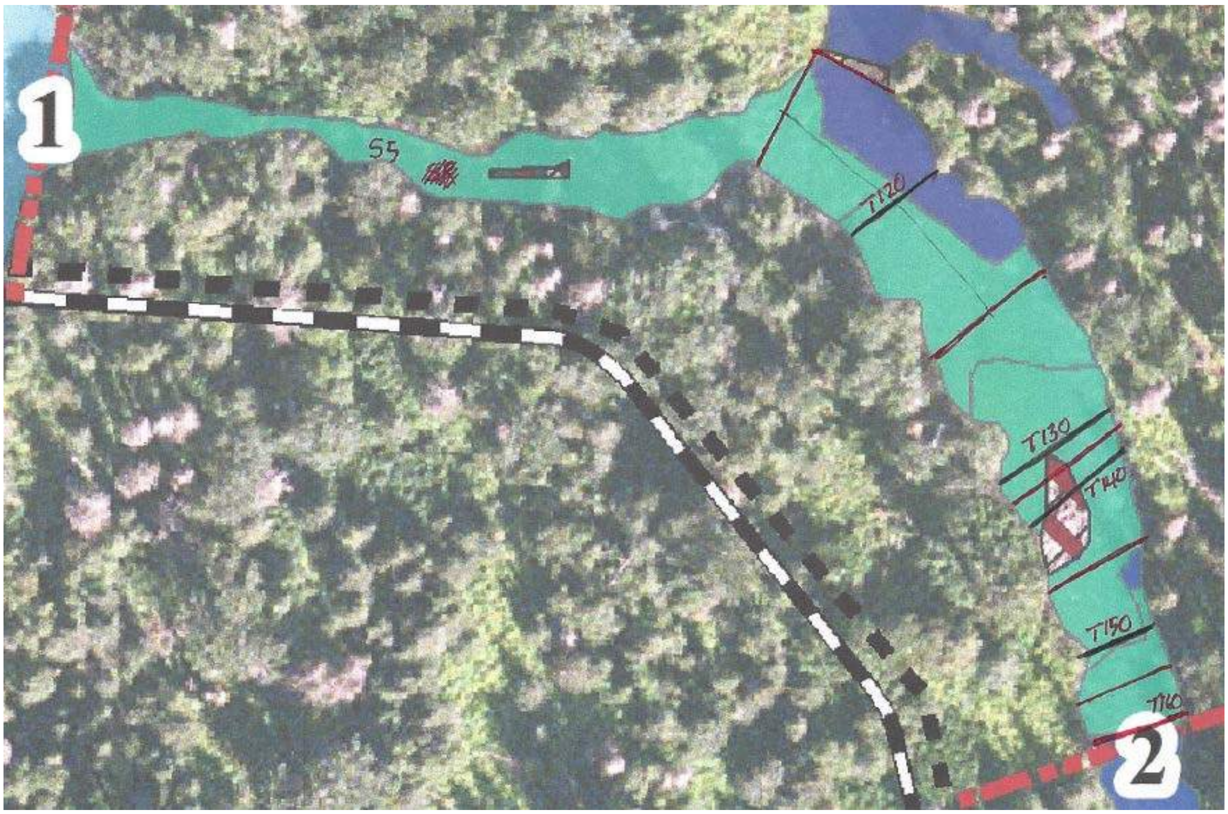


Figure 3-2. A map of Reach 1 that identifies transects, transect breaks, and habitat types that were used to assess habitat weighting.

Table 3-1. A summary of the proportion and area (ft^2) of habitat by type for transect and non-transect areas of Grant Creek, AK.

Reach	Transect/ Segment	Habitat	Reach Length (ft)	% of Habitat Within Reach	Habitat Area (ft^2)	Trans/Seg Area (ft^2)
Reach 1 Distributary	S1	Pool	396	33.3%	7,495	2,498
	S2	Riffle	396	21.3%	6,004	1,276
	S3	Pool	396	16.7%	7,495	1,249
	S3	Riffle	396	16.3%	6,004	976
	S4	Pool	396	6.4%	7,495	480
	S4	Riffle	396	25.0%	6,004	1,501
	T100	Riffle	396	26.3%	6,004	1,576
	T100	Pool	396	9.0%	7,495	673
	T110	Riffle	396	11.3%	6,004	675
	T110	Pool	396	34.6%	7,495	2,594
	Total	***Pool***			7,495	
		Riffle			6,004	
Reach 1 Mainstem	S5	Riffle	692	53.5%	23,168	12,394
	T120	Riffle	692	13.6%	23,168	3,146
	T120	Pool	692	94.4%	3,143	2,968
	T130	Riffle	692	12.8%	23,168	2,956
	T140	Riffle	692	7.8%	23,168	1,811
	T150	Riffle	692	8.6%	23,168	2,002
	T150	Pool	692	5.6%	3,143	175
	T160	Riffle	692	3.7%	23,168	858
	Total	***Pool***			3,143	
		Riffle			23,168	

Reach	Transect/ Segment	Habitat	Reach Length (ft)	% of Habitat Within Reach	Habitat Area (ft^2)	Trans/Seg Area (ft^2)
Reach 2 Mainstem	S6	Pool	820	86.4%	3,834	3,311
	T200	Backwater	820	38.9%	4,837	1,881
	T220	Riffle	820	16.8%	23,669	3,968
	T220	Glide	820	30.0%	1,613	484
	T230	Glide	820	70.0%	1,613	1,129
	T230	Backwater	820	44.4%	4,837	2,150
	T230	Riffle	820	10.8%	23,669	2,551
	T210	Backwater	820	16.7%	4,837	806
	S7	Riffle	820	72.5%	23,669	17,149
	S7	Pool	820	13.6%	3,834	523
	Total	***Backwater***			4,837	
		Riffle			23,669	
		Glide			1,613	
		Pool			3,834	
Reach 3 Mainstem	S8	Riffle	808	22.9%	25,585	5,866
	S9	Pool	808	66.7%	3,997	2,665
	S10	Riffle	808	22.4%	25,585	5,741
	T300	Backwater	808	100.0%	3,697	3,697
	T310	Riffle	808	5.9%	25,585	1,498
	T310	Pool	808	27.3%	3,997	1,090
	S11	Riffle	808	48.8%	25,585	12,480
	S11	Pool	808	6.1%	3,997	242
	Total	***Riffle***			25,585	
		Pool			3,997	
		Backwater			3,697	

Reach	Transect/ Segment	Habitat	Reach Length (ft)	% of Habitat Within Reach	Habitat Area (ft^2)	Trans/Seg Area (ft^2)
Reach 3 Primary Side Channel	S12	Riffle	606	48.8%	11,672	5,698
	S12	Pool	606	41.5%	5,018	2,083
	T320	Riffle	606	18.9%	11,672	2,206
	T320	Pool	606	24.5%	5,018	1,231
	S13	Riffle	606	18.9%	11,672	2,206
	T330	Pool	606	34.0%	5,018	1,704
	T330	Riffle	606	13.4%	11,672	1,562
	T330	Rapid	606	100.0%	511	511
Reach 3 Secondary Side Channel	S14	Cascade	873	100.0%	114	114
	S15	Run	873	100.0%	576	576
	S16	Pool	873	11.0%	9,908	1,094
	S17	Riffle	873	9.5%	2,683	256
	S18	Pool	873	13.0%	9,908	1,287
	S19	Riffle	873	7.1%	2,683	192
	S20	Pool	873	3.2%	9,908	322
	S21	Riffle	873	14.3%	2,683	383
	S22	Pool	873	16.2%	9,908	1,608
	S23	Riffle	873	21.4%	2,683	575
	S24	Pool	873	1.9%	9,908	193
	S25	Riffle	873	4.8%	2,683	128
	S26	Pool	873	24.0%	9,908	2,380
	S27	Riffle	873	14.3%	2,683	383
	S28	Pool	873	16.2%	9,908	1,608
	S29	Glide	873	10.7%	1,588	170
	S30	Pool	873	14.3%	9,908	1,415
	T330	Riffle	873	28.6%	2,683	767
	S31	Glide	873	89.3%	1,588	1,418

Reach	Transect/ Segment	Habitat	Reach Length (ft)	% of Habitat Within Reach	Habitat Area (ft^2)	Trans/Seg Area (ft^2)
	Total Side Channel	***Riffle***			14,355	
		Pool			14,926	
		Glide			1,588	
		Rapid			511	
		Cascade			114	
Reach 4 Mainstem	T400	Riffle	468	11.7%	17,649	2,061
	T410	Riffle	468	17.5%	17,649	3,092
	T410	Pocket Water	468	8.6%	3,709	318
	S32	Riffle	468	70.8%	17,649	12,496
	S32	Pocket Water	468	91.4%	3,709	3,391
	T430	Pool	468	100.0%	1,195	1,195
	Total	***Riffle***			17,649	
		Pocket Water			3,709	
		Pool			1,195	

Table 3-2. Lower Grant Creek reach lengths.

Reach	Length (ft)
R 1 Distributary	396
R 1 Mainstem	692
R 2	820
R 3 Mainstem	808
R 3 Side Channel	606
R 2/3 Side Channel	873
R 4	468
Total	
Distributary	396
Main Channel	2,788
Side Channel	1,479
Total	**4,663**

Table 3-3. Reach 1 Distributary area and transect weighting.

Total Length (ft)	**396**								
	Pool		**Riffle**		**Total**			**Reach Weights**	
Trans	**Area**	**% age**	**Area**	**% age**	**Pool**	**Riffle**	**Total**	**% age**	**Length**
T100	673	20.6%	1,576	70.0%	1,543	4,203	5,746	42.6%	169
T110	2,594	79.4%	675	30.0%	5,952	1,801	7,753	57.4%	227
Total	***3,267***		***2,252***		***7,495***	***6,004***	***13,499***		***396***

Table 3-4. Reach 1 main channel area and transect weighting.

Total Length (ft)	**692**								
	Pool		**Riffle**		**Total**			**Reach Weights**	
Trans	**Area**	**% age**	**Area**	**% age**	**Pool**	**Riffle**	**Total**	**% age**	**Length**
T120	2,968	94.4%	3,146	29.2%	2,968	6,766	9,734	37.0%	256
T130	0	0.0%	2,956	27.4%	0	6,356	6,356	24.2%	167
T140	0	0.0%	1,811	16.8%	0	3,896	3,896	14.8%	102
T150	175	5.6%	2,002	18.6%	175	4,306	4,480	17.0%	118
T160	0	0.0%	858	8.0%	0	1,845	1,845	7.0%	49
Total	***3,143***		***10,774***		***3,143***	***23,168***	***26,311***		***692***

Table 3-5. Reach 2 area and transect weighting.

Total Length (ft) = 820															
	Pool		Backwater		Glide		Riffle		Total					Reach Weights	
Trans	Area	% age	Area	% age	Area	% age	Area	% age	Pool	BackW	Glide	Riffle	Total	% age	Length
T200	0	0.0%	1,881	38.9%	0	0.0%	0	0.0%	0	1,881	0	0	1,881	6.2%	51
T210	0	0.0%	806	16.7%	0	0.0%	0	0.0%	0	806	0	0	806	2.7%	22
T220	0	0.0%	0	0.0%	484	30.0%	3,968	60.9%	0	0	484	14,407	14,891	49.4%	405
T230-M	0	0.0%	0	0.0%	1,129	70.0%	2,551	39.1%	0	0	1,129	9,262	10,391	34.5%	283
T230-BW	0	0.0%	2,149.8	44.4%	0	0.0%	0	0.0%	0	2,150	0	0	2,150	7.1%	58
Total	***0***		***4,837***		***1,613***		***6,520***		***0***	***4,837***	***1,613***	***23,669***	***30,119***		***819***

Table 3-6. Reach 3 main channel area and transect weighting.

Total Length (ft) = 808												
	Pool		Backwater		Riffle		Total				Reach Weights	
Trans	Area	% age	Area	% age	Area	% age	Pool	Backwater	Riffle	Total	% age	Length
T300	0	0.0%	3,697	100.0%	0	0.0%	0	3,697	0	3,697	11.1%	90
T310	1,090	100.0%	0	0.0%	1,498	100.0%	3,997	0	25,585	29,582	88.9%	718
Total	***1,090***		***3,697***		***1,498***		***3,997***	***3,697***	***25,585***	***33,279***		***808***

Table 3-7. Reach 2/3 side channels area and transect weighting.

Total Length (ft) = 1,479												
	Pool		Riffle		Rapids		Total				Reach Weights	
Trans	Area	% age	Area	% age	Area	% age	Pool	Riffle	Rapids	Total	% age	Length
T320	1,231	41.9%	2,206	48.6%	0	0.0%	2,104	5,677	0	7,782	45.2%	669
T330	1,704	58.1%	2,329	51.4%	511	100.0%	2,914	5,995	511	9,419	54.8%	810
Total	***2,935***		***4,535***		***511***		***5,018***	***11,672***	***511***	***17,201***		***1,479***

Table 3-8. Reach 4 area and transect weighting.

Total Length (ft) =	468											
	Pool		Pocket Water		Riffle		Total				Reach Weights	
Trans	Area	% age	Area	% age	Area	% age	Pool	PocketW	Riffle	Total	% age	Length
T400	0	0.0%	0	0.0%	2,061	40.0%	0	0	7,060	7,060	31.3%	146
T410	0	0.0%	318	100.0%	3,092	60.0%	0	3,709	10,589	14,298	63.4%	297
T430	1,195	100.0%	0	0.0%	0	0.0%	1,195	0	0	1,195	5.3%	25
Total	***1,195***		***318***		***5,153***		***1,195***	***3,709***	***17,649***	***22,553***		***468***

Table 3-9. Summary of reach and transect weighting (ft).

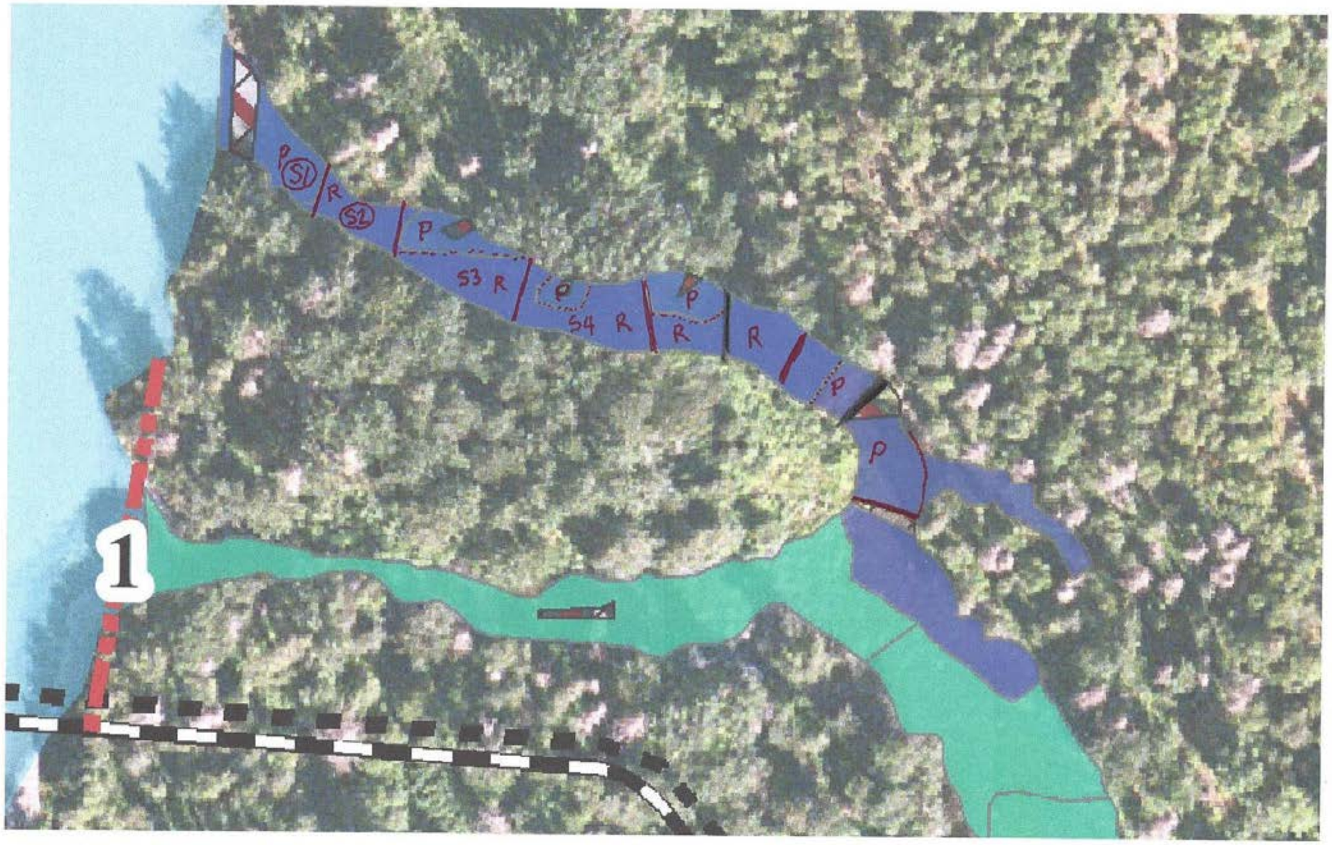
Reach	Transect	Length (ft)
1 - Distributary	100	169
	110	227
	Total	***396***
1 - Main Channel	120	256
	130	167
	140	102
	150	118
	160	49
	Total	***692***
2 - Main Channel	200	51
	210	22
	220	405
	230-M[1/]	283
	230-BW[2/]	58
	Total	***820***
3 - Main Channel	300	90
	310	718
	Total	***808***
2/3 Side Channels	320	669
	330	810
	Total	***1,479***
4 - Main Channel	400	146
	410	297
	430	25
	Total	468
Total		
Distributary		396
Main Channel		2,788
Side Channel		1,479
Total		***4,663***

4 LITERATURE CITED

Flory, E. A. 1999. Fish and fish habitats of the Falls Creek area. Prepared by Icy Strait Environmental Services, Gustavus, AK. Prepared for Gustavus Electric Company, Gustavus, AK. 46 pp.

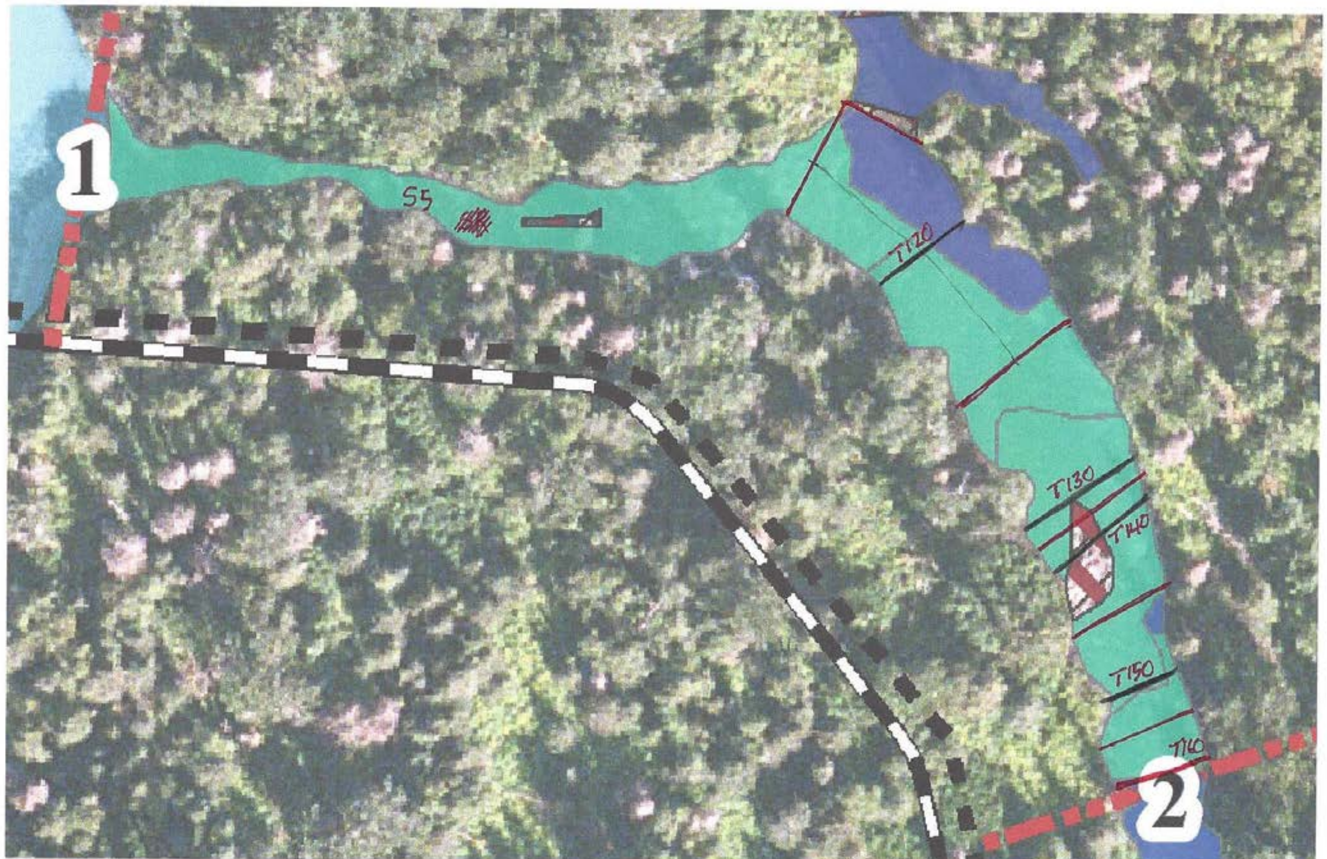
Appendix 1: Calculation of Reach Habitat Types and Transect Weighting, Grant Creek Instream Flow Study

R1- Distributary



S1	Pool	26		T100	Riffle	21	28
S2	Riffle	17		"	Pool	7	
S3	Pool	13	26	T110	Riffle	9	38
S3	Riffle	13		"	Pool	27	
S4	Pool	5	25				
S4	Riffle	20					

R1



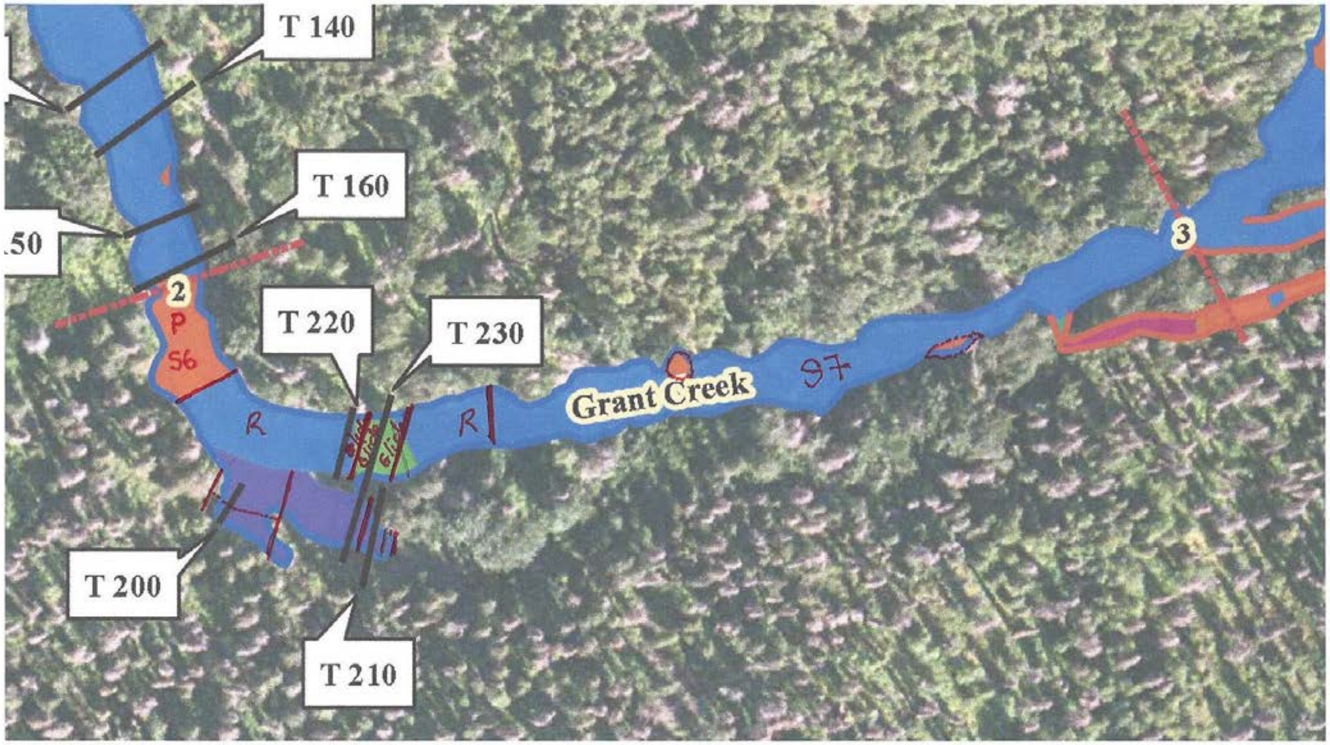
S5 Riffle 130
T120 Riffle 33 } 50
T120 Pool 17
T130 Riffle 31
T140 Riffle 19

T150 Riffle 21 } 22
T150 Pool 1
T160 Riffle 9

Pool = 18
Riffle = 243

Reach 2

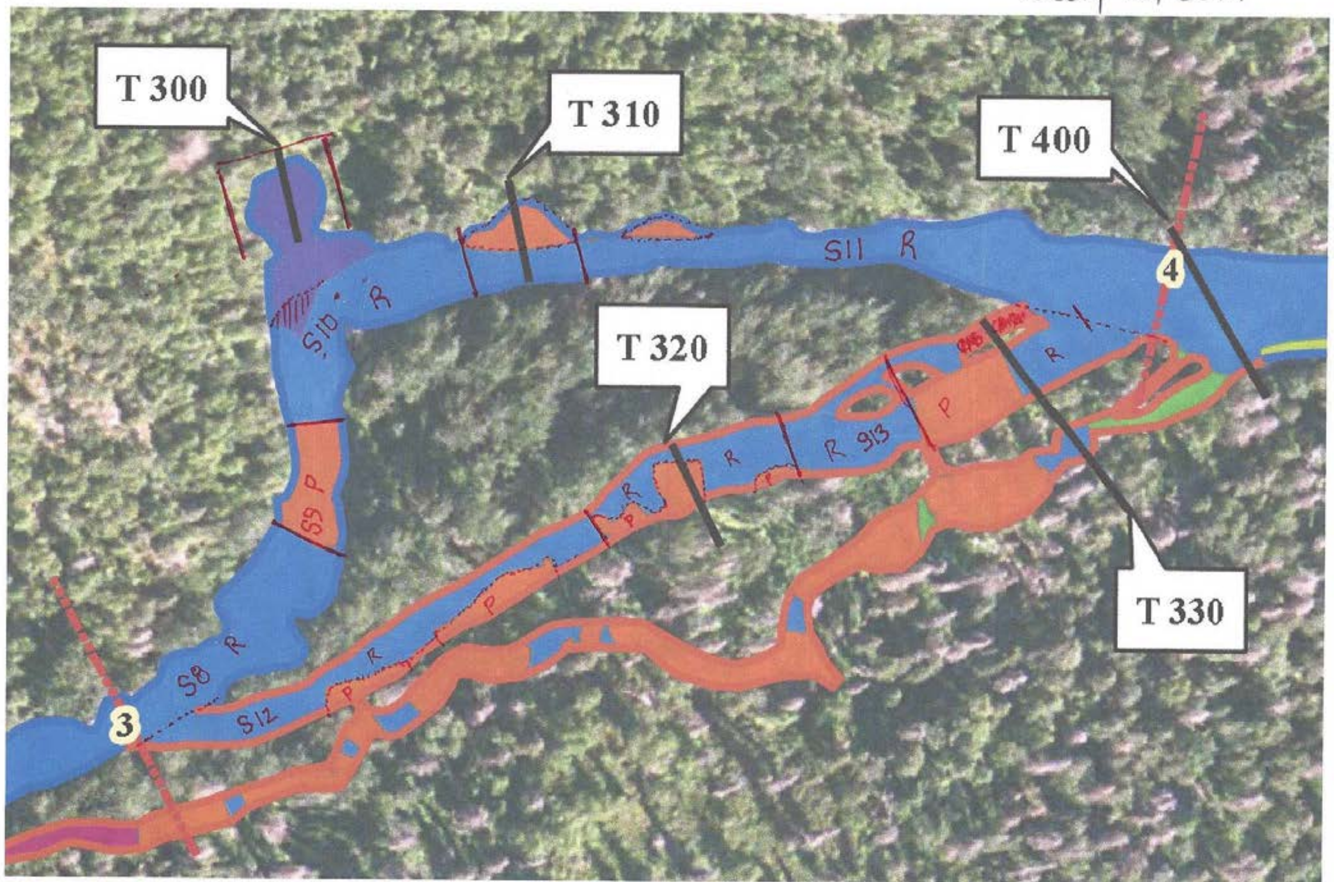
July 18, 2014



S6 Pool 19
T200 Back H_2O 14
T220 Riffle 28 } 31
Glide 3
T230 Glide 7
T230 Back H_2O 16
T230 Riffle 18

T210 Back H_2O 6
S7 Riffle 121 } 124
S7 Pool 3

Reach 3 July 18, 2014



Mainstem

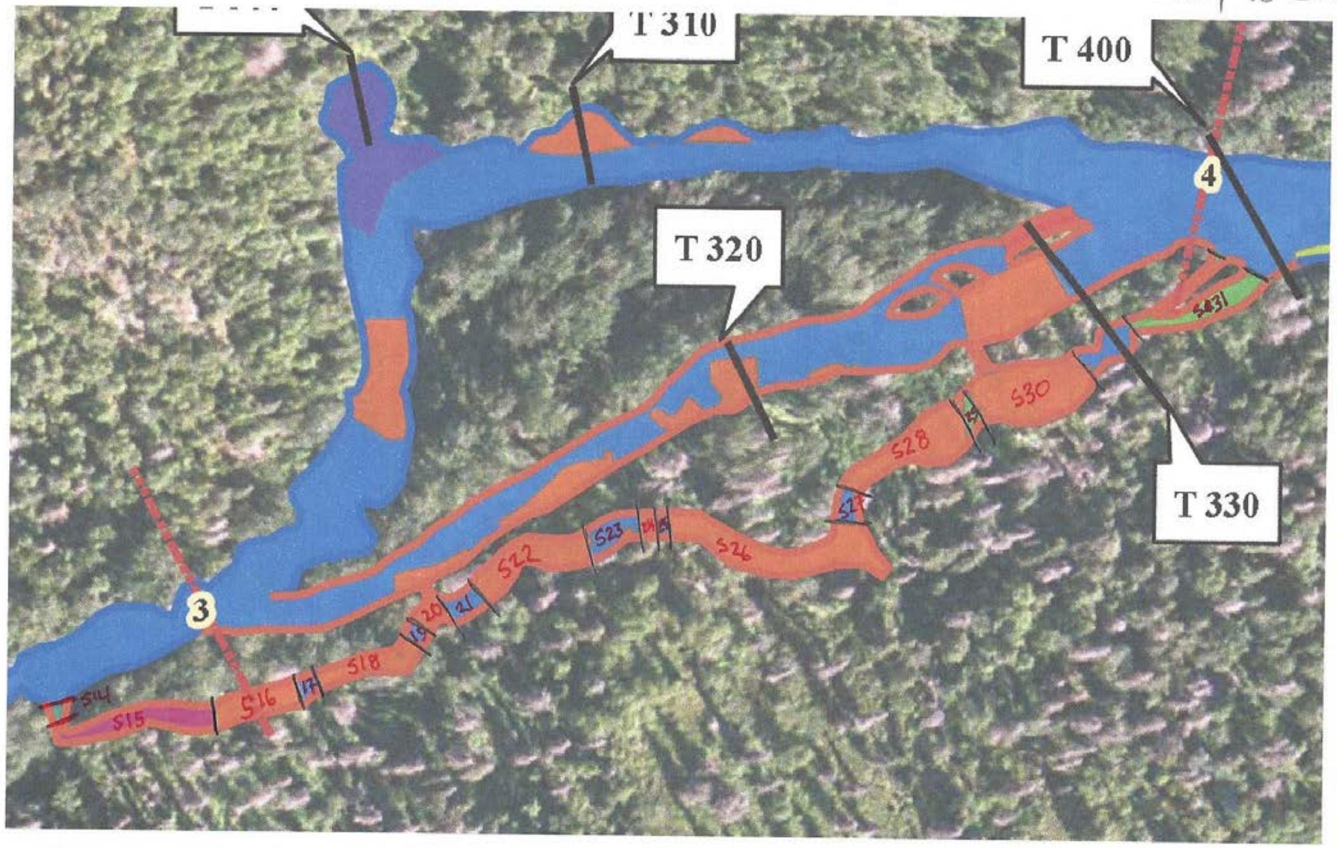
S8	Riffle	47	T310	Riffle	12	} 21
S9	Pool	22	T310	Pool	9	
S10	Riffle	46	S11	Riffle	100	} 102
T300	Back H_2O	20	S11	Pool	2	

Secondary

S12	Riffle	62	} 84	S13	Riffle	24	
S12	Pool	22		T330	Pool	18	} 35
T320	Riffle	24	} 37	T330	Riffle	17	
T320	Pool	13		T330	Rapid	---	

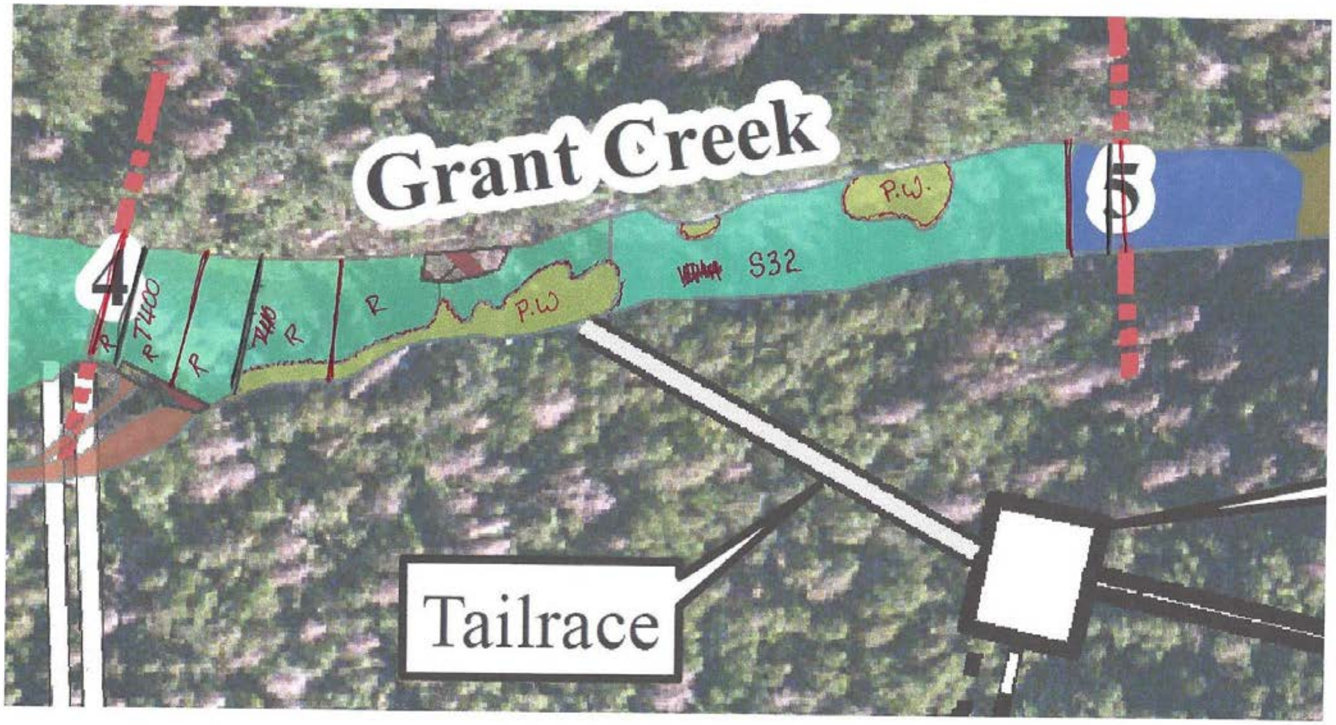
Reach 3 Secondary Side Channel

July 18 2014



S14	Cascade	3
S15	Run	31
S16	Pool	17
S17	Riffle	4
S18	Pool	20
S19	Riffle	3
S20	Pool	5
S21	Riffle	6
S22	Pool	25
S23	Riffle	9
S24	Pool	3
S25	Riffle	2
S26	Pool	37
S27	Riffle	6
S28	Pool	25
S29	Glide	3
S30	Pool	22
T330	Riffle	12
S31	Glide	25

R4



T400	Riffle	16	
T410	Riffle	24	27
T410	Pocket H_2O	3	
S32	Riffle	97	129
S32	Pocket H_2O	32	
T430	Pool	11	

Appendix 3: Final Grant Creek WUA

This appendix contains the following tables and figures:

Table A.3-1. Grant Creek spawning WUA.

Flow (cfs)	Chinook	Coho	Dolly Varden	Rainbow	Sockeye
10	1,068	5,568	18,631	14,839	5,238
20	6,599	9,209	27,940	23,150	8,323
30	12,856	12,213	32,314	27,879	10,782
40	17,810	14,677	36,115	31,648	12,930
50	21,367	16,867	39,113	34,761	14,825
60	24,260	18,649	41,288	37,342	16,632
70	26,813	20,247	43,146	39,482	18,001
80	29,371	21,867	44,807	41,434	19,090
90	31,474	23,114	46,150	43,147	20,074
100	33,798	24,291	46,641	44,529	20,917
110	36,017	25,399	46,605	45,565	21,690
120	37,711	26,241	46,197	46,302	22,432
130	39,104	27,015	45,651	46,884	23,046
140	40,431	27,649	45,110	47,342	23,556
150	41,662	28,071	44,505	47,692	24,041
160	42,863	28,316	43,850	47,765	24,489
170	43,998	28,505	43,217	47,726	24,876
180	45,084	28,647	42,739	47,703	25,244
190	46,151	28,794	42,561	47,668	25,482
200	46,974	28,861	42,306	47,466	25,584
225	48,741	29,158	42,011	47,180	26,137
250	49,687	29,635	42,450	46,882	26,601
275	50,337	30,151	42,759	46,908	26,985
300	51,161	30,591	42,739	46,909	27,420
325	51,863	31,095	43,001	47,169	27,805
350	52,248	31,584	43,342	47,577	28,147
375	52,471	31,905	43,417	47,716	28,560
400	52,715	32,329	43,300	47,709	29,021
450	52,861	33,469	42,684	47,613	29,815
500	53,165	34,506	41,583	47,525	30,523
550	54,165	35,033	40,231	47,346	31,094
600	55,510	35,105	38,968	46,818	31,504
650	56,596	34,953	37,471	45,930	31,663
700	57,242	34,576	35,683	44,740	31,720
750	57,401	34,030	34,027	43,370	31,537
800	57,174	33,323	32,467	41,998	31,152
850	56,583	32,508	30,975	40,471	30,640
900	56,024	31,561	29,541	38,767	30,056
950	55,423	30,558	28,140	37,026	29,419
1,000	54,640	29,598	26,718	35,417	28,802

Table A.3-2. Grant Creek fry rearing WUA.

Flow (cfs)	Chinook	Coho	Dolly Varden	Rainbow
10	93,680	77,590	102,219	62,468
20	96,290	73,052	109,681	63,732
30	102,978	76,830	116,702	69,555
40	110,212	82,216	119,827	75,214
50	114,072	84,107	118,341	78,294
60	114,860	83,429	115,523	78,864
70	113,859	81,717	112,962	77,912
80	112,035	79,704	111,138	76,708
90	110,487	78,216	109,706	75,548
100	108,806	77,131	108,300	74,715
110	107,783	77,094	107,869	74,103
120	107,160	77,356	108,238	73,267
130	107,259	78,093	108,932	72,726
140	108,223	79,427	110,204	73,077
150	109,775	80,844	111,670	73,786
160	111,216	82,011	113,087	74,767
170	113,469	83,793	114,815	76,272
180	115,219	85,228	116,995	77,321
190	123,962	93,392	126,896	83,981
200	125,591	94,651	128,222	85,224
225	131,369	98,462	132,156	89,319
250	135,690	101,765	137,008	92,170
275	140,535	105,427	140,688	95,269
300	145,442	108,532	142,503	98,864
325	148,318	109,888	143,360	101,208
350	149,991	110,652	143,398	102,628
375	150,896	110,881	142,625	103,429
400	151,012	110,259	141,628	103,383
450	150,234	108,527	140,925	102,382
500	149,890	107,125	140,120	100,892
550	148,960	105,678	138,794	99,267
600	148,041	104,950	138,512	97,744
650	148,545	104,949	138,419	97,269
700	148,820	104,784	138,264	96,500
750	149,488	105,003	137,825	95,852
800	150,103	104,820	136,502	94,953
850	150,158	104,680	134,977	93,836
900	149,692	103,251	132,513	92,547
950	148,320	101,160	130,552	90,330
1,000	146,560	98,592	128,412	87,935

Table A.3-3. Grant Creek juvenile and adult rearing WUA.

	Juvenile Rearing				Adult Rearing	
Flow (cfs)	Chinook	Coho	Dolly Varden	Rainbow	Dolly Varden	Rainbow
10	30,659	106,935	85,928	62,002	23,354	14,271
20	41,244	120,277	96,423	70,894	33,289	21,970
30	44,200	131,910	108,170	74,644	40,838	28,117
40	45,284	140,165	116,556	77,220	46,965	33,005
50	45,830	142,002	123,480	78,324	51,896	37,083
60	46,295	139,726	127,709	78,944	55,868	40,454
70	46,782	136,764	128,143	79,282	58,964	43,215
80	47,451	133,844	127,071	79,029	61,750	45,879
90	48,309	131,815	125,720	78,915	64,008	48,100
100	49,186	128,726	124,240	78,269	65,561	49,729
110	50,079	127,587	123,525	77,714	66,696	50,953
120	51,099	126,212	121,931	77,074	67,419	51,715
130	52,102	126,250	120,459	76,443	67,911	52,301
140	53,181	126,662	119,365	75,909	68,109	52,649
150	54,120	127,456	118,938	75,802	68,223	52,926
160	54,877	128,244	119,197	76,142	68,140	52,962
170	55,645	130,047	120,582	76,363	68,042	52,979
180	56,439	131,196	120,612	76,569	68,174	53,123
190	57,815	140,450	125,785	80,124	68,857	53,244
200	58,669	141,803	126,118	80,832	69,036	53,328
225	61,107	147,070	130,659	83,907	70,679	54,608
250	63,072	151,819	132,540	86,577	71,991	55,785
275	64,949	157,202	135,896	89,103	73,571	57,085
300	66,851	161,558	141,888	91,891	75,471	58,646
325	68,816	163,486	145,403	94,563	77,609	60,328
350	70,978	164,310	148,094	97,232	79,938	62,227
375	73,369	164,754	150,560	99,927	82,223	64,180
400	75,656	164,154	152,121	102,463	84,485	66,270
450	80,205	163,035	152,966	106,594	88,467	70,235
500	84,113	163,728	153,234	109,264	91,811	73,776
550	87,445	162,889	154,032	111,234	95,120	77,304
600	90,403	162,601	152,690	112,440	97,799	80,287
650	92,647	162,254	153,266	113,161	100,035	82,719
700	94,123	161,709	153,464	113,478	102,261	85,061
750	95,097	161,700	153,927	113,773	104,512	87,234
800	95,737	161,376	154,946	114,556	106,757	89,465
850	95,904	161,097	154,269	114,887	108,666	91,400
900	95,946	159,346	154,318	114,981	110,240	93,176
950	95,819	156,702	152,807	114,576	111,443	94,737
1,000	95,413	153,922	151,436	114,062	112,497	96,265

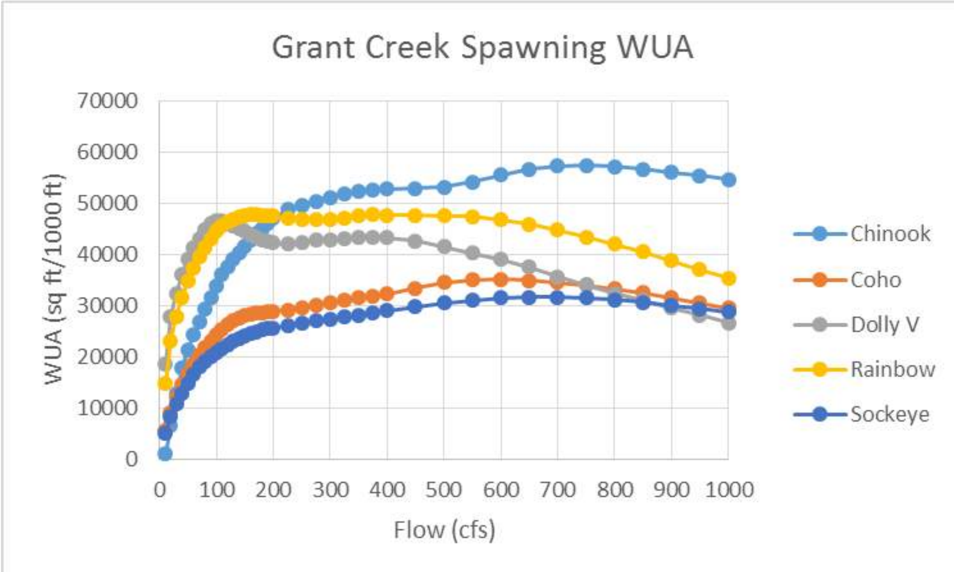


Figure A.3-1. Grant Creek spawning WUA.

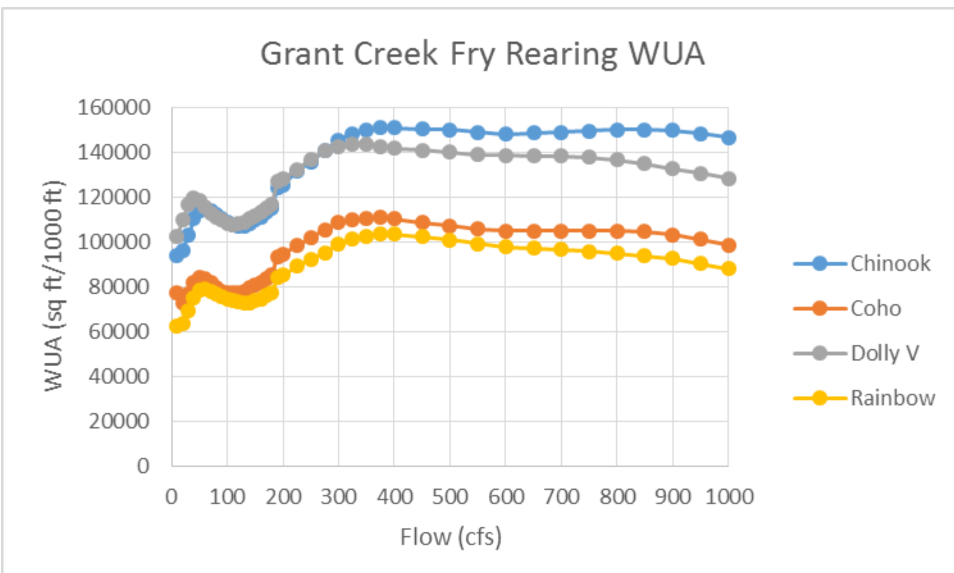


Figure A.3-2. Grant Creek fry rearing WUA.

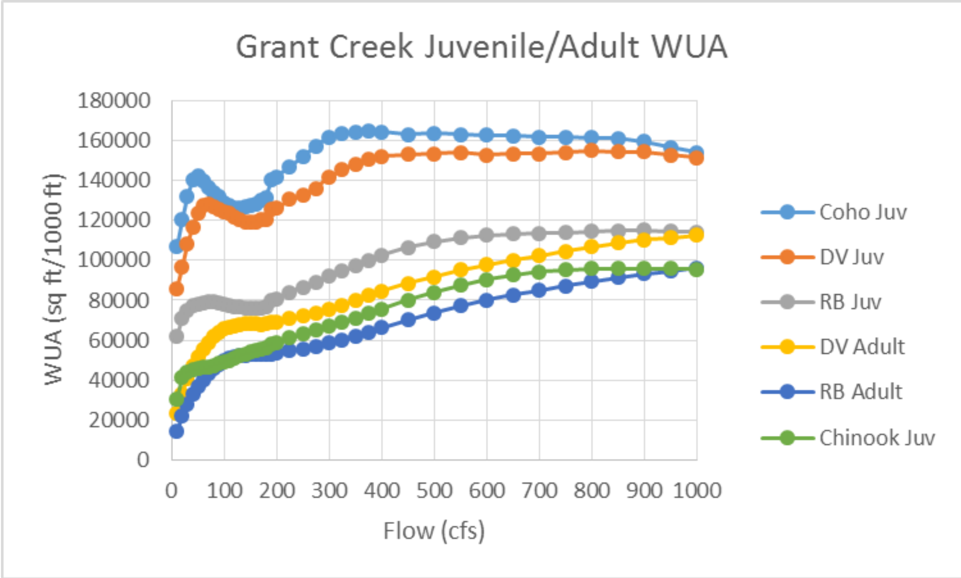


Figure A.3-3. Grant Creek juvenile and adult rearing WUA.

Appendix 4: Salmonid Effective Spawning and Incubation Analysis

Grant Lake Hydroelectric Project (FERC No. 13212)

Salmonid Effective Spawning and Incubation Analysis

Draft Report

Prepared for
Kenai Hydro LLC

Prepared by

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DESIGN with Vision. BUILD with Integrity.

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Salmonid Spawning and Incubation Analysis
Draft Report
Grant Lake Hydroelectric Project (FERC No. 13212)

1 INTRODUCTION

This report is intended to address issues and concerns regarding spawning flows and potential effects on incubating salmonid eggs at the proposed Grant Lake Hydroelectric Project (Project) flows.

The goals and objectives of the evaluation were as follows:

- Determine the amount and location of salmonid spawning habitat (as represented by transects selected during the Instream Flow Study) over a range of flows using current conditions (e.g., substrate and habitat as reflected in the Instream Flow Study). Flows for spawning reflect those examined for the Project, based on pre- and post-Project operation.
- Determine the effects of reductions in stream flow on incubating salmonid eggs, as determined by the models.

2 METHODS

McMillen, LLC (McMillen) ran the previously calibrated Instream Flow models used for the Instream Flow Study. The following data, including data sources, were used to run the models on the Project streams:

- McMillen selected all calibrated transects that had spawning habitat in the affected stream reaches. These included (Instream Flow Report, KHL 2014):
  - Reach 1 Distributary (2 transects)
  - Reach 1 Main Channel (5 transects)
  - Reach 2 Mainstem (3 transects) *[Note: 2 side channel transects in Reach 2 had no flow; as a result, they were not modeled for spawning]*
  - Reach 3 Mainstem (2 transects)
  - Reach 3 Side Channel (2 transects)
  - Reach 4 Mainstem (3 transects)
- Chinook, coho, and sockeye salmon, rainbow trout and Dolly Varden char spawning Habitat Suitability Criteria (HSC) Curves (Appendix 2 of the Instream Flow Report, KHL 2014)
- Bed elevation at each transect (Appendix 6 of the Instream Flow Report)
- Stage at given flows (from the HYDSIM sub module of RHABSIM; Appendix 6 of the Instream Flow Report, KHL 2014)

- Existing Chinook, coho, and sockeye salmon spawning substrate as reflected in the hydraulic models along the transects at flows ranging from 50 to 450 cubic feet per second (cfs) (Appendix 1 to this report)

McMillen used RHABSIM (Riverine Habitat Simulation System) by Thomas R. Payne and Associates (now with Normandeau Associates, Arcata, CA) to produce weighted usable area (WUA) curves for the spawning species listed above. One of the options available in the program is the ability to evaluate WUA on a cell-by-cell basis along each transect at a variety of flows.

WUA for an individual cell is calculated as:

S (depth) * S (velocity) * S (substrate) * the area the cell represents,

where S = the suitability index for depth, velocity, and substrate, respectively. A value of 1.0 for each suitability index is optimum, while a value of 0.0 indicates no value for that particular variable. For this analysis, two different scenarios were modeled:

1. Results of spawning for all species at a flow of 450 cfs (per request of the Alaska Department of Fish and Game [ADFG]), with an analysis of substrates still covered by at least 0.1 foot of water as flows are decreased; and
2. Median monthly and weekly flows (pre-Project and post-Project) for those time periods that reflect each species' spawning and incubation periodicity.

2.1 Value of Spawning Habitat

Any spawning habitat, regardless of the combined suitability value (e.g., S (depth) * S (velocity) * S (substrate)), was analyzed, provided the combined value > 0. Substrate HSC values (ranging from 0.0 – 1.0) were graphed and are found in Appendix 1.

2.2 Criteria for Protection of Incubating Eggs

The criterion used in this analysis was that the depth of water over a particular cell that was included as spawning/incubation habitat had to be at least 0.1 foot or greater (1.2 inches). This type of analysis has been used extensively by McMillen staff on Washington State hydroelectric projects as well as in the Box Canyon and Lower Wahleach Hydroelectric projects in British Columbia. The process to determine the WUA value included the following:

- The water surface elevation for the transect was calculated (from sub-module HYDSIM of RHABSIM) for each modeled flow;
- For each modeled flow, the depth of the water over that cell was calculated by subtracting the bed elevation of the cell from the calculated water surface elevation;
- If the depth of water over the cell was ≥ 0.1 foot, the WUA for that cell was used and added to the total WUA;
- If the depth of water over the cell was < 0.1 foot, a value of 0.0 was used, and

- Flows were modeled down from the spawning flows in 25-cfs and 5-cfs increments to 5 cfs as related to the Grant Creek stream gage *[Note: flows were scaled in the Reach 1 Distributary and Reach 3 side channels to correspond to the appropriate flow at the gage]*.

The level of protection afforded incubating eggs was then calculated as the percentage of spawning habitat still covered with at least 0.1 foot of water at a given incubation flow. The following ranges were used to evaluate level of protection.

Protection (%) of incubating eggs	Range
>98%	98% – 100%
≥90%	90% – 97.9%
≥80%	80% – 89.9%
≥70%	70% – 79.9%

2.3 Spawning Flows Modeled

McMillen used 450 cfs as the modeled flow for spawning activity for all species. Grant Creek salmonid periodicity, for all species and life history stages, including spawning, is provided in Table 3.1-1. In addition, McMillen analyzed monthly median flows, both pre-Project and post-Project for the months that the salmonid species spawned. During those periods when spawning did not occur during the entire month, median flows were calculated for the appropriate time periods only.

2.4 Incubation Flows

Grant Creek salmonid incubation timing was taken from Table 3.1-1. Median monthly and weekly flow aggregates were calculated from the 66-year synthesized pre-Project and post-Project hydrology. Percent protection of incubating eggs was then calculated for each species and flow increment for each transect.

2.5 Transect Location of Spawning Salmonids

Appendix 1 indicates the location of spawning Chinook, coho and sockeye salmon on the Instream Flow transects.

3 RESULTS

3.1 Target Species

Target species and periodicity are provided in Table 3.1-1.

3.2 Transects and Study Sites

Spawning gravels are relatively scarce on those transects within the Project area. Table 3.2-1 includes transects and study reaches that had spawnable gravel in the Project reaches. Seventeen transects were selected for modeling, based upon their likelihood to provide spawning habitat.

3.3 HSC Curves

The HSC curves used for the development of these analyses are provided as Appendix 2 of the Instream Flow Report (KHL 2014).

3.4 Spawning Periodicity Flows for Project Reaches

Table 3.4-1 summarizes salmonid spawning periodicity and median monthly flows for Grant Creek. In addition to analyzing a spawning flow of 450 cfs, median flows (both pre-Project and post-Project) were used to evaluate spawning and egg incubation protection. Table 3.4-1 summarizes median flows in the main channel of Grant Creek, as well as in the Reach 1 Distributary, Reaches 2/3 Side Channels, and the mainstem of Reach 3.

Appendix 1 depicts the bed elevation, salmon spawning substrate suitability values, and water surface elevations for flows ranging from 50 to 450 cfs. This appendix also includes the locations of known Chinook, coho, and sockeye salmon spawning on these transects. No rainbow trout or Dolly Varden char were observed spawning in Grant Creek.

Table 3.4-2 presents the effective spawning analysis, as well as the approximate flows that will protect spawning habitat. The flows at which 98%, 90%, 80%, and 70% of the spawning WUA were recorded using linear interpolation, if required.

Table 3.1-1. Life history and periodicity for Grant Creek salmonids.

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chinook	Spawning												
	Incubation/Emergence												
	Fry (<50mm)												
	Juvenile												
Coho	Spawning												
	Incubation/Emergence												
	Fry (<50mm)												
	Juvenile												
Sockeye	Spawning												
	Incubation/Emergence												
Dolly Varden	Spawning												
	Incubation/Emergence												
	Fry (<60mm)												
	Juvenile												
	Adult												
Rainbow	Spawning												
	Incubation/Emergence												
	Fry (<50mm)												
	Juvenile												
	Adult												

Table 3.2-1. Transects used to model spawning habitat on Grant Creek.

			Spawning Substrate Available on Transect				
Reach	**Transect**	**Channel Type**	**Chinook**	**Coho**	**Sockeye**	**D Varden**	**Rainbow**
1 - Distributary	100	Rearing Distributary	✓	✓	✓	✓	✓
	110	Rearing Distributary		✓	✓	✓	✓
1 - Main Channel	120	Spawning Riffle	✓	✓	✓	✓	✓
	130	Rearing Main	✓	✓	✓	✓	✓
	140	Rearing Main	✓	✓	✓	✓	✓
	150	Rearing Main	✓	✓	✓	✓	✓
	160	Rearing Main	✓	✓	✓	✓	✓
2 - Main Channel	200	Rearing Main	✓			✓	✓
	220	Rearing Main	✓	✓	✓	✓	✓
	230	Rearing Main	✓	✓	✓	✓	✓
3 - Main Channel	300	Rearing Main	✓	✓	✓	✓	✓
	310	Spawning Main	✓	✓	✓	✓	✓
3 - Side Channel	320	Rearing Secondary	✓	✓	✓	✓	✓
	330	Rearing Secondary	✓	✓	✓	✓	✓
4 - Main Channel	400	Rearing Main	✓	✓	✓	✓	✓
	410	Rearing Main	✓	✓	✓	✓	✓
	430	Spawning Main	✓	✓	✓	✓	✓

Table 3.4-1. Salmonid species periodicity and median monthly flows, both pre- and post-Project (flows in cfs).

*[Note: * = partial month]*.

Reach	**Species**	**Months**			
Mainstem	***Chinook***	Aug*	Sept*		
Reaches 1/2/3/4	Pre-Project	410	320		
	With Project	395	348		
	Coho	Sept*	Oct		
	Pre-Project	310	182		
	With Project	325	182		
	Sockeye	Aug	Sept		
	Pre-Project	422	313		
	With Project	395	329		
	Dolly Varden	Aug*	Sept	Oct	Nov*
	Pre-Project	388	313	182	110
	With Project	395	329	182	157

Reach	Species	Months			
	Rainbow	May*	Jun		
	Pre-Project	182	398		
	With Project	181	280		
Distributary Reach 1	***Chinook***	Aug*	Sept*		
	Pre-Project	4.08	3.18		
	With Project	3.93	3.46		
	Coho	Sept*	Oct		
	Pre-Project	3.08	1.81		
	With Project	3.23	1.80		
	Sockeye	Aug	Sept		
	Pre-Project	4.20	3.12		
	With Project	3.93	3.27		
	Dolly Varden	Aug*	Sept	Oct	Nov*
	Pre-Project	3.86	3.12	1.81	0
	With Project	3.93	3.27	1.81	0
	Rainbow	May*	Jun		
	Pre-Project	1.80	3.94		
	With Project	1.79	2.77		
Reach 3 Side Channels	***Chinook***	Aug*	Sept*		
	Pre-Project	64.8	50.6		
	With Project	62.5	55.0		
	Coho	Sept*	Oct		
	Pre-Project	49.0	28.8		
	With Project	51.3	28.8		
	Sockeye	Aug	Sept		
	Pre-Project	66.7	49.5		
	With Project	62.5	51.9		
	Dolly Varden	Aug*	Sept	Oct	Nov*
	Pre-Project	61.4	49.5	28.8	17.5
	With Project	62.5	51.9	28.8	24.8

Reach	Species	Months	
	Rainbow	May*	Jun
	Pre-Project	28.8	63.0
	With Project	28.6	44.3

Table 3.4-2. Approximate flows at which certain percentages of spawning and incubation habitat are protected, given an initial spawning flow of 450 cfs or median pre-Project and post-Project spawning flows (all values in cfs).

								Median flow during incubation months (Pre- and Post-Project)											
Reach	**Species**	**Month**	**Spawning Flow**	**≥ 98%**	**≥ 90%**	**≥ 80%**	**≥ 70%**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
Mainstem	**Chinook**		450	155	125	73	55												
Reaches 1 - 4		***Aug - pre****	410	146	89	50	45	410	313	182	94	59	45	36	30	31	127	398	493
		Aug - post*	395	144	90	57	42	395	329	182	140	104	91	82	77	78	151	280	390
		Sep-pre*	320	116	40	28	22		313	182	94	59	45	36	30	31	127	398	493
		Sep-post*	348	137	70	43	32		329	182	140	104	91	82	77	78	151	280	390
	Coho		450	228	170	139	110												
		Sep-pre*	310	149	91	65	53		310	182	94	59	45	36	30	31	127	398	493
		Sep-post*	325	164	97	67	54		325	182	140	104	91	82	77	78	151	280	390
		Oct-pre	182	73	55	27	7			182	94	59	45	36	30	31	127	398	493
		Oct-post	182	73	55	27	7			182	140	104	91	82	77	78	151	280	390
	Sockeye		450	223	154	132	88												
		Aug - pre	422	202	143	112	73	422	313	182	94	59	45	36	30	31	127	398	493
		Aug - post	395	193	137	104	70	395	329	182	140	104	91	82	77	78	151	280	390
		Sep - pre	313	154	113	72	60		313	182	94	59	45	36	30	31	127	398	493
		Sep - post	329	163	89	64	51		329	182	140	104	91	82	77	78	151	280	390
	Dolly V		450	224	204	159	135												
		Aug - pre*	388	216	174	139	113	388	313	182	94	59	45	36	30	31	127	398	
		Aug - post*	395	217	177	141	114	395	329	182	140	104	91	82	77	78	151	280	

Reach	Species	Month	Spawning Flow	≥ 98%	≥ 90%	≥ 80%	≥ 70%	Median flow during incubation months (Pre- and Post-Project) Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Mainstem	**Dolly V**	***Sep - pre***	313	198	146	119	85		313	182	94	59	45	36	30	31	127	398	
Reaches 1 - 4		***Sep - post***	329	88	85	85	62		329	182	140	104	91	82	77	78	151	280	
		Oct-pre	182	115	73	59	43			182	94	59	45	36	30	31	127	398	
		Oct-post	182	115	73	59	43			182	140	104	91	82	77	78	151	280	
		Nov-pre*	110	67	30	10	5				110	59	45	36	30	31	127	398	
		Nov-post*	157	151	121	83	45				157	104	91	82	77	78	151	280	
								May	**Jun**	**Jul**	**Aug**								
	Rain-bow		450	216	162	131	103												
		May - pre*	182	140	75	56	33	182	398	488	422								
		May - post*	181	139	71	45	13	181	280	390	395								
		Jun - pre	398						398	488	422								
		Jun - post	280	193	131	78	60		280	390	395								
Reach 1								**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul***
Distributary	**Chinook**		4.48	1.79	-	-	-												
		Aug - pre*	4.08	1.79	-	-	-	4.08	3.12	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	4.91
		Aug - post*	3.93	1.79	-	-	-	3.93	3.27	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	3.88
		Sep-pre*	3.18	1.79	-	-	-		3.12	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	4.91
		Sep-post*	3.46	1.79	-	-	-		3.27	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	3.88

Reach	Species	Month	Spawning Flow	≥ 98%	≥ 90%	≥ 80%	≥ 70%	Median flow during incubation months (Pre- and Post-Project) Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Reach 1	**Coho**		4.48	2.26	2.20	2.16	2.11												
Distributary		***Sep-pre****	3.08	1.79	-	-	-		3.08	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	4.91
		Sep-post*	3.23	1.79	-	-	-		3.23	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	3.88
		Oct-pre	1.81	1.79	-	-	-			1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	4.91
		Oct-post	1.80	1.79	-	-	-			1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	3.88
	Sockeye		4.48	2.23	2.18	2.13	2.07												
		Aug - pre	4.20	1.87	1.79	-	-	4.20	3.12	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	4.91
		Aug - post	3.93	1.79	-	-	-	3.93	3.27	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	3.88
		Sep - pre	3.12	1.79	-	-	-		3.12	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	4.91
		Sep - post	3.27	1.79	-	-	-		3.27	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	3.88
	Dolly V		4.48	2.26	2.19	2.13	2.07												
		Aug - pre*	3.86	1.97	1.79	-	-	3.86	3.12	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	
		Aug - post*	3.93	1.97	1.79	-	-	3.93	3.27	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	
		Sep - pre	3.12	1.90	1.79	-	-		3.12	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	
		Sep - post	3.27	1.92	1.79	-	-		3.27	1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	
		Oct-pre	1.81	1.79	-	-	-			1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	
		Oct-post	1.81	1.79	-	-	-			1.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	
		Nov-pre*	0.00	-	-	-	-				0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.96	
		Nov-post*	0.00	-	-	-	-				0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	

								Median flow during incubation months (Pre- and Post-Project)											
Reach	**Species**	**Month**	**Spawning Flow**	**≥ 98%**	**≥ 90%**	**≥ 80%**	**≥ 70%**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
Reach 1								**May**	**Jun**	**Jul**	**Aug**								
Distributary	**Rain-bow**		4.48	2.33	2.20	2.14	2.09												
		May - pre*	1.80	1.79	-	-	-	1.81	3.96	4.86	4.20								
		May - post*	1.79	1.79	-	-	-	1.80	2.79	3.88	3.93								
		Jun - pre	3.94	1.98	1.79	-	-		3.96	4.86	4.20								
		Jun - post	2.77	1.90	1.79	-	-		2.79	3.88	3.93								
								Aug	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul***
Reach 3 Side Channels	**Chinook**		71.2	2.3	2.0	1.7	1.3												
		Aug - pre*	64.8	2.3	2.0	1.5	1.0	68.3	52.2	30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	82.2
		Aug - post*	62.5	2.3	2.0	1.5	1.0	65.8	54.8	30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	65.0
		Sep-pre*	50.6	2.3	1.9	1.5	1.0		52.2	30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	82.2
		Sep-post*	55.0	2.3	1.9	1.5	1.0		54.8	30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	65.0
	Coho		71.2	5.3	2.3	2.1	1.8												
		Sep-pre*	49.0	5.2	2.3	2.0	1.7		51.7	30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	82.2
		Sep-post*	51.3	5.2	2.3	2.0	1.7		54.1	30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	65.0
		Oct-pre	28.8	5.2	2.3	1.9	1.6			30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	82.2
		Oct-post	28.8	5.2	2.3	1.9	1.6			30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	65.0
	Sockeye		71.2	5.3	2.3	2.1	0.7												
		Aug - pre	66.7	5.3	2.3	2.1	1.9	70.3	52.2	30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	82.2
		Aug - post	62.5	5.3	2.3	2.1	1.9	65.8	54.8	30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	65.0

Reach	Species	Month	Spawning Flow	≥ 98%	≥ 90%	≥ 80%	≥ 70%	Median flow during incubation months (Pre- and Post-Project)											
								Aug	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
Reach 3 Side Channels	**Sockeye**	***Sep - pre***	49.5	5.2	2.3	2.0	1.8		52.2	30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	82.2
		Sep - post	51.9	5.2	2.3	2.0	1.8		54.8	30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	65.0
	Dolly V		71.2	5.3	2.3	2.1	2.0												
		Aug - pre*	61.4	5.2	2.3	2.0	1.8	64.7	52.2	30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	
		Aug - post*	62.5	5.2	2.3	2.1	1.8	65.8	54.8	30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	
		Sep - pre	49.5	1.4	0.8	-	-		52.2	30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	
		Sep - post	51.9	5.2	2.2	2.0	1.7		54.8	30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	
		Oct-pre	28.8	4.9	2.1	1.8	1.4			30.3	15.6	9.9	7.5	6.0	5.0	5.1	21.1	66.4	
		Oct-post	28.8	4.9	2.1	1.8	1.4			30.3	23.3	17.3	15.2	13.7	12.8	12.9	25.2	46.7	
		Nov-pre*	17.5	2.4	2.1	1.7	1.4				18.4	9.9	7.5	6.0	5.0	5.1	21.1	66.4	
		Nov-post*	24.8	4.8	2.1	1.8	1.3				26.2	17.3	15.2	13.7	12.8	12.9	25.2	46.7	
								May	**Jun**	**Jul**	**Aug**								
	Rainbow		71.2	5.1	2.3	2.0	1.8												
		May - pre*	28.8	3.9	2.1	1.8	1.4	30.3	66.4	81.3	70.3								
		May - post*	28.6	3.9	2.1	1.8	1.4	30.2	46.7	65.0	65.8								
		Jun - pre	63.0	5.1	2.2	1.9	1.7		66.4	81.3	70.3								
		Jun - post	44.3	5.0	2.2	1.9	1.6		46.7	65.0	65.8								

Reach	Species	Month	Spawning Flow	≥ 98%	≥ 90%	≥ 80%	≥ 70%	Median flow during incubation months (Pre- and Post-Project)											
								Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Grant Creek	**Chinook**		450	151	122	71	52												
All Reaches		***Aug - pre****	410	146	94	50	43	410	313	182	94	59	45	36	30	31	127	398	493
		Aug - post*	395	145	94	56	40	395	329	182	140	104	91	82	77	78	151	280	390
		Sep-pre*	320	108	36	27	19		313	182	94	59	45	36	30	31	127	398	493
		Sep-post*	348	137	69	41	30		329	182	140	104	91	82	77	78	151	280	390
	Coho		450	226	167	136	92												
		Sep-pre*	310	149	93	64	48		310	182	94	59	45	36	30	31	127	398	493
		Sep-post*	325	160	102	65	51		325	182	140	104	91	82	77	78	151	280	390
		Oct-pre	182	73	53	23	7			182	94	59	45	36	30	31	127	398	493
		Oct-post	182	73	53	23	7			182	140	104	91	82	77	78	151	280	390
	Sockeye		450	221	151	129	75												
		Aug - pre	422	201	142	110	70	422	313	182	94	59	45	36	30	31	127	398	493
		Aug - post	395	192	136	102	67	395	329	182	140	104	91	82	77	78	151	280	390
		Sep - pre	313	151	53	70	56		313	182	94	59	45	36	30	31	127	398	493
		Sep - post	329	163	92	63	46		329	182	140	104	91	82	77	78	151	280	390
	Dolly V		450	243	203	160	134												
		Aug - pre*	388	216	173	139	111	388	313	182	94	59	45	36	30	31	127	398	
		Aug - post*	395	217	174	140	112	395	329	182	140	104	91	82	77	78	151	280	
		Sep - pre	313	166	146	121	79		313	182	94	59	45	36	30	31	127	398	
		Sep - post	329	185	148	122	49		329	182	140	104	91	82	77	78	151	280	

Reach	Species	Month	Spawning Flow	≥ 98%	≥ 90%	≥ 80%	≥ 70%	Median flow during incubation months (Pre- and Post-Project) Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Grant Creek		***Oct-pre***	182	118	72	57	36			182	94	59	45	36	30	31	127	398	
All Reaches		***Oct-post***	182	118	72	57	36			182	140	104	91	82	77	78	151	280	
		Nov-pre*	110	66	29	10	5				110	59	45	36	30	31	127	398	
		Nov-post*	157	150	120	80	44				157	104	91	82	77	78	151	280	
								May	**Jun**	**Jul**	**Aug**								
	Rainbow		450	216	163	129	155												
		May - pre*	182	140	73	53	29	182	398	488	422								
		May - post*	181	139	69	41	12	181	280	390	395								
		Jun - pre	398	209	149	122	74		398	488	422								
		Jun - post	280	190	129	73	56		280	390	395								

4 DISCUSSION

The analysis provided in this report is based upon transects that were selected for habitat modeling as part of the Instream Flow Study conducted for the Project in 2013. Spawning habitat was, and continues to be, sparse in these reaches due to peak flows, relatively high gradient, and low gravel recruitment, resulting in predominantly cobble-boulder substrates.

In general, Grant Creek flows from January through mid-May and in the November through December period will be higher post-Project than they currently are pre-Project (see Table 3.4-1). It is also important to note that under pre-Project flows, the Reach 1 Distributary dries up when flows in Grant Creek drop below approximately 180 cfs. If Project mitigation measures include altering the entrance to the Reach 1 Distributary, fish habitat, especially spawning and incubation habitat, will increase in this reach.

With these higher November through mid-May flows, incubating salmonid eggs will be afforded higher rates of protection with the Project in place than under the pre-Project regime. As a result, incubation will not be significantly affected.

5 LITERATURE CITED

KHL (Kenai Hydro LLC). 2014. Grant Lake Hydroelectric Project (FERC No. 13212). Aquatic Resources – Grant Creek Aquatic Habitat Mapping and Instream Flow Study Final Report. Prepared by McMillen, LLC. June 2014.

Appendix 1: Spawning Analysis Figures

This appendix contains the following figures:

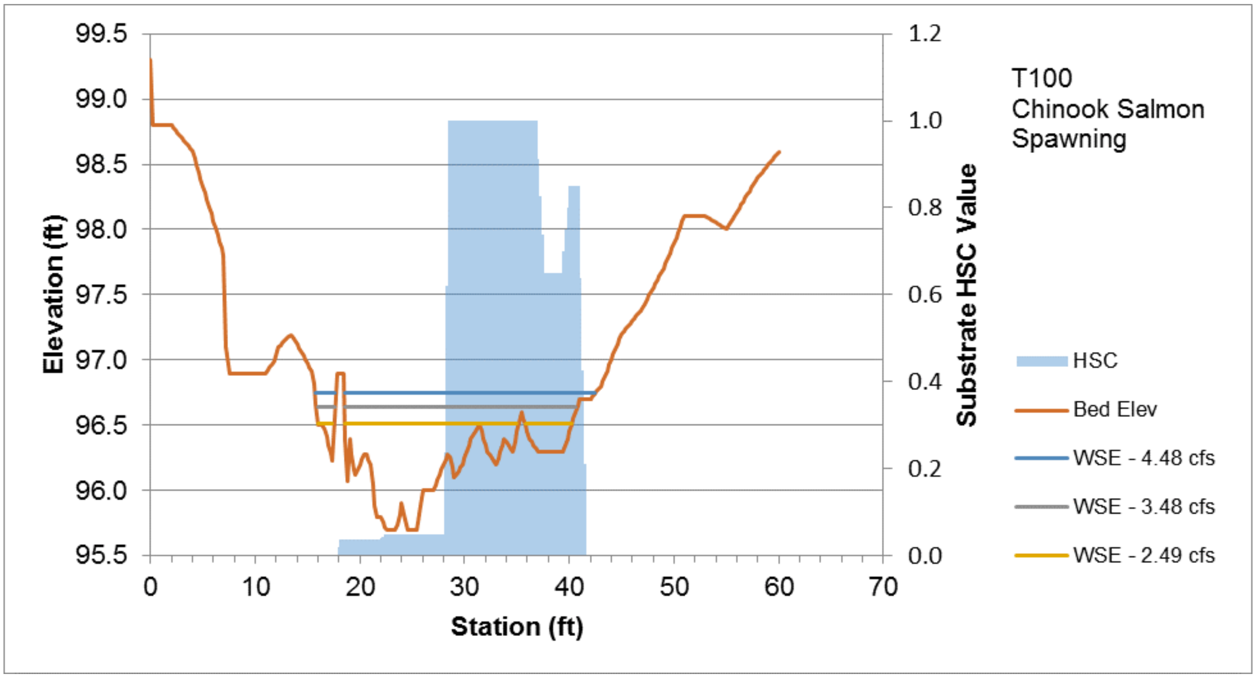

Figure A1-1. Transect 100 bed profile, Chinook spawning substrate values, and Water Surface Elevations (WSEs), 50 - 450 cfs (as measured at the Grant Creek gage).

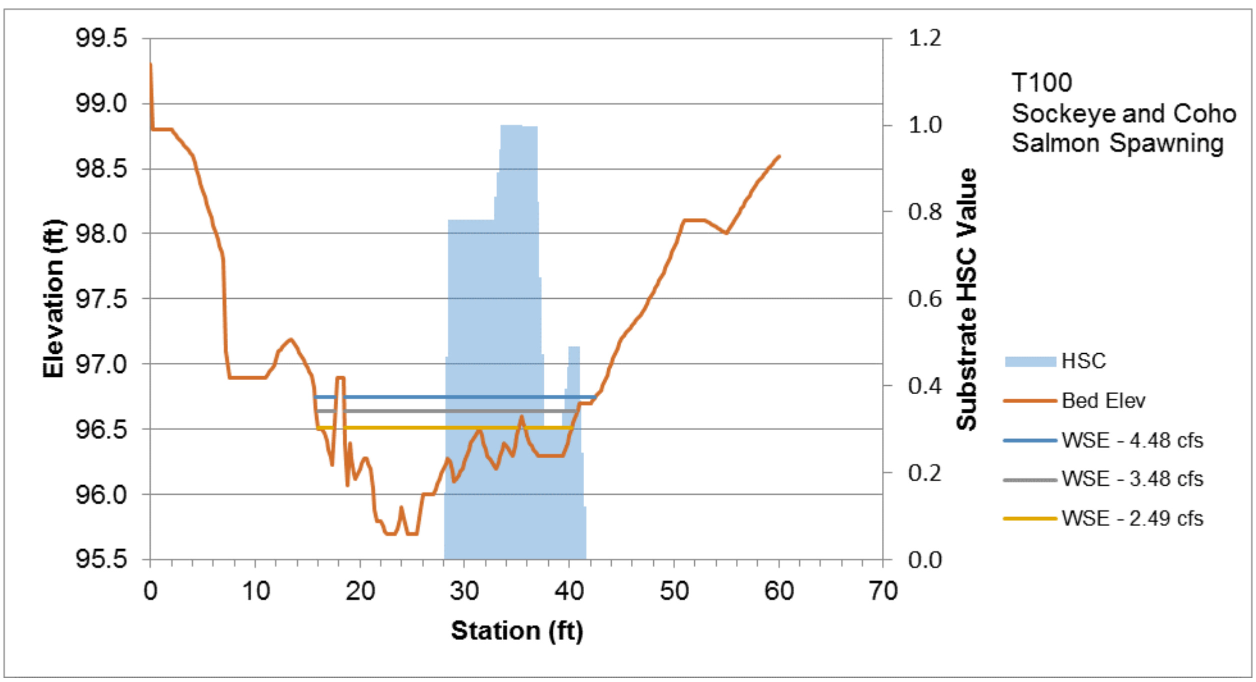

Figure A1-2. Transect 100 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

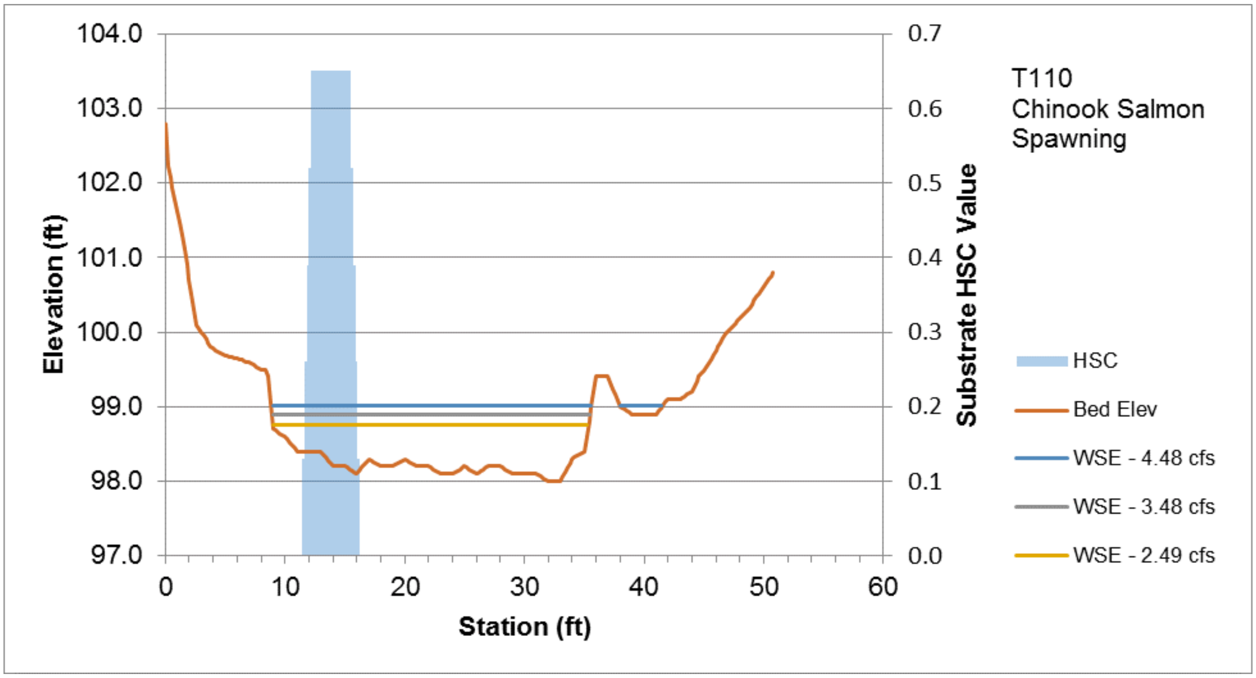

Figure A1-3. Transect 110 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

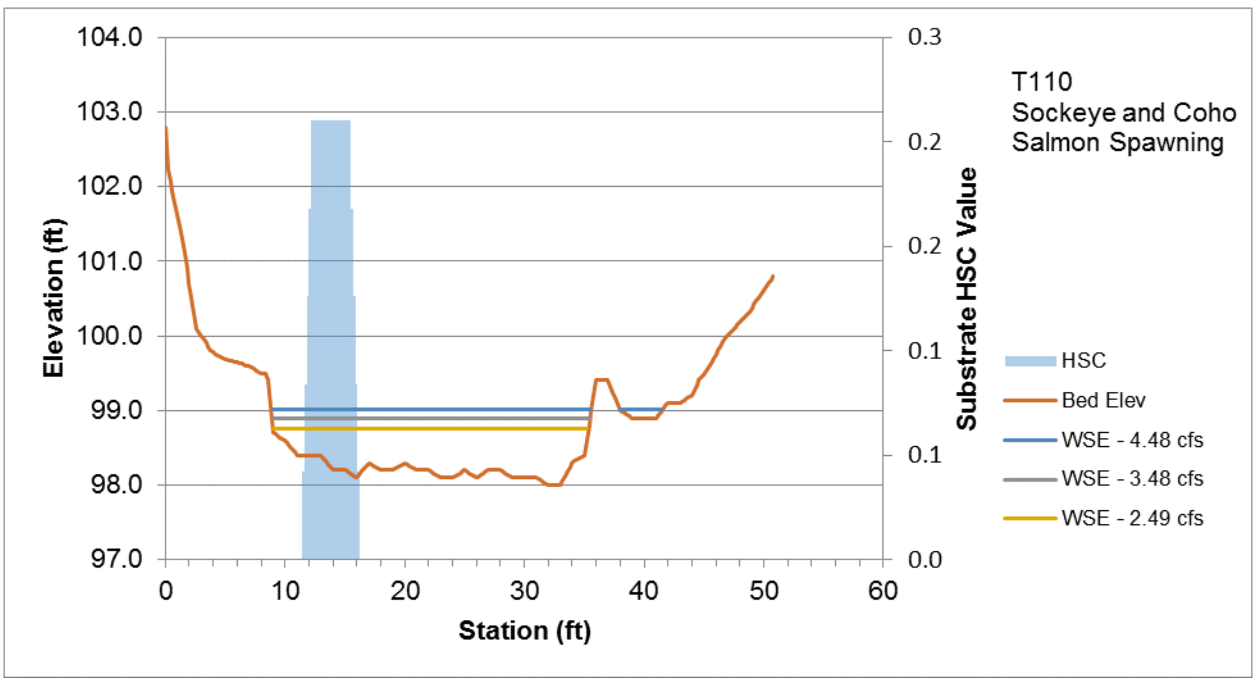

Figure A1-4. Transect 110 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

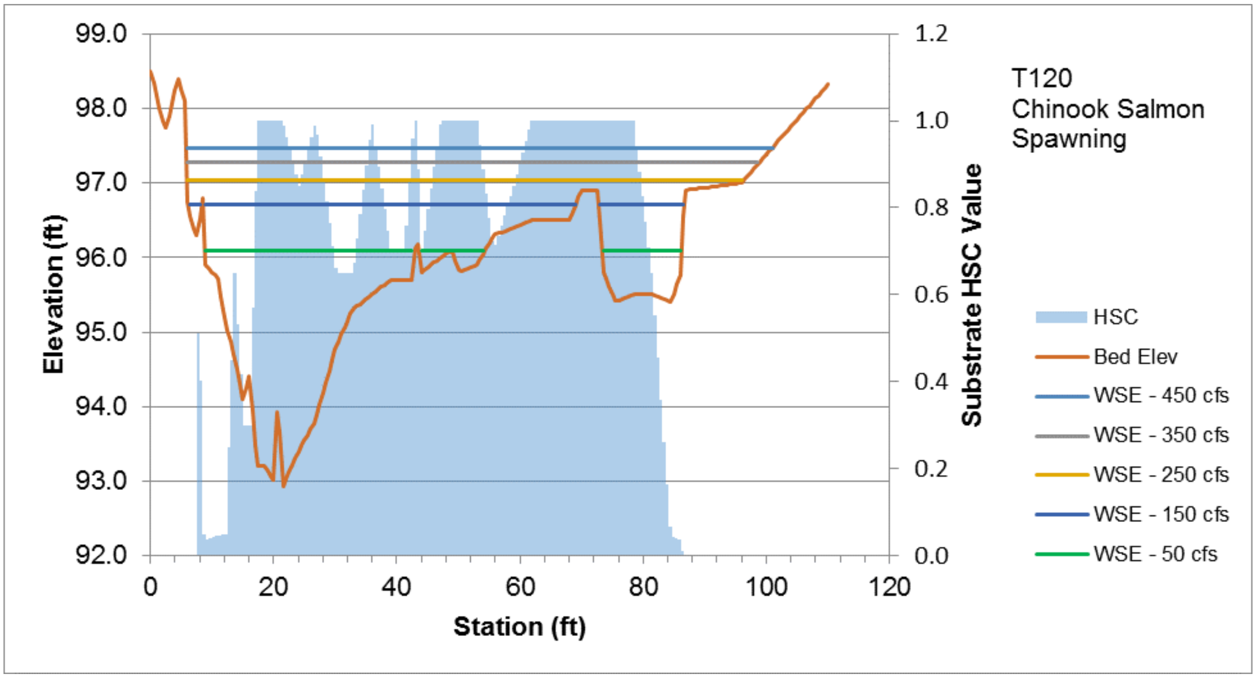

Figure A1-5. Transect 120 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

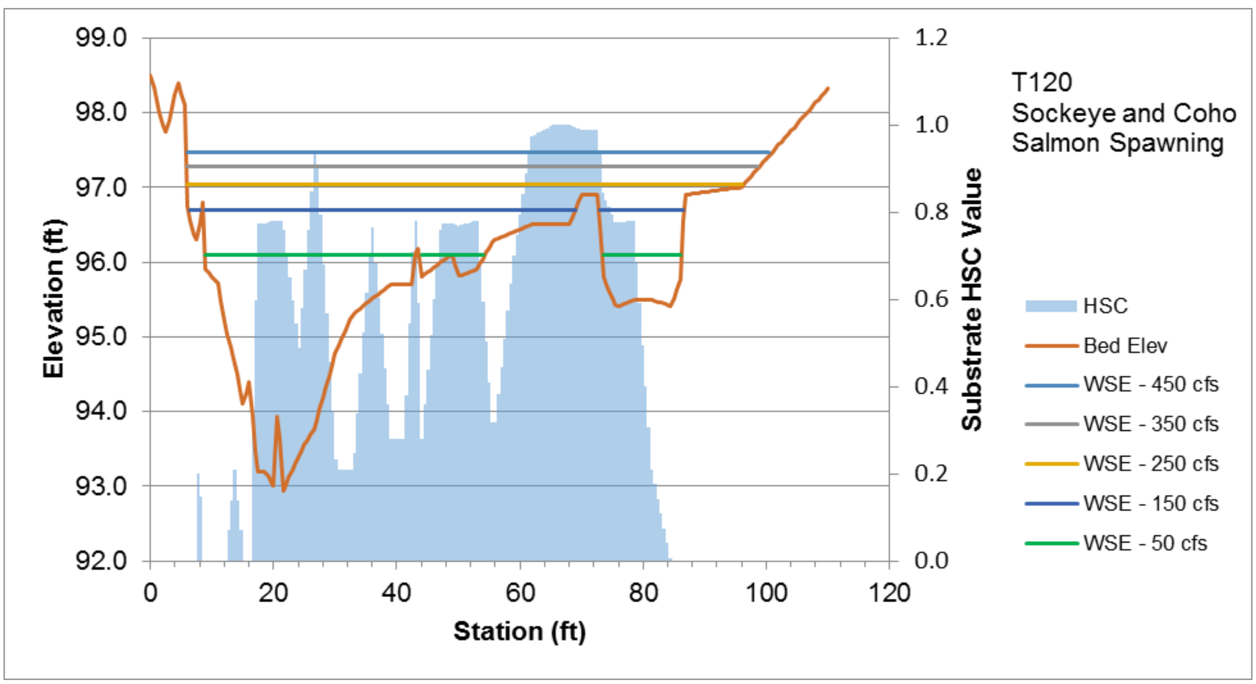

Figure A1-6. Transect 120 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

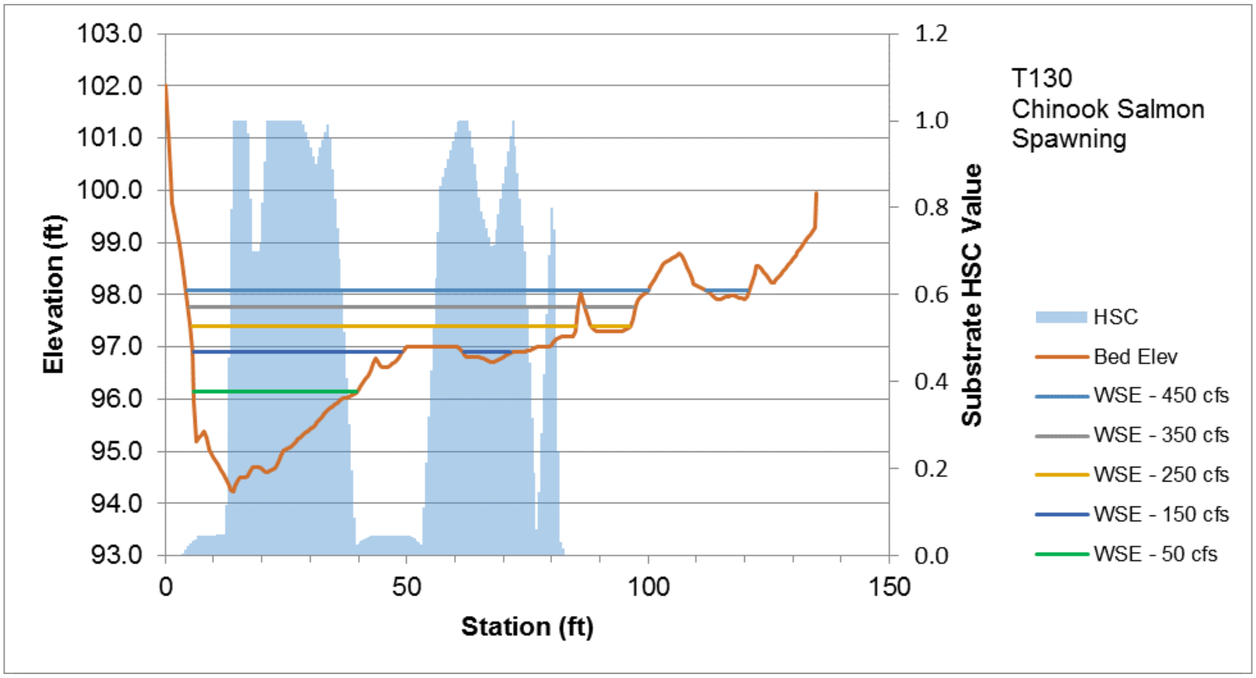

Figure A1-7. Transect 130 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

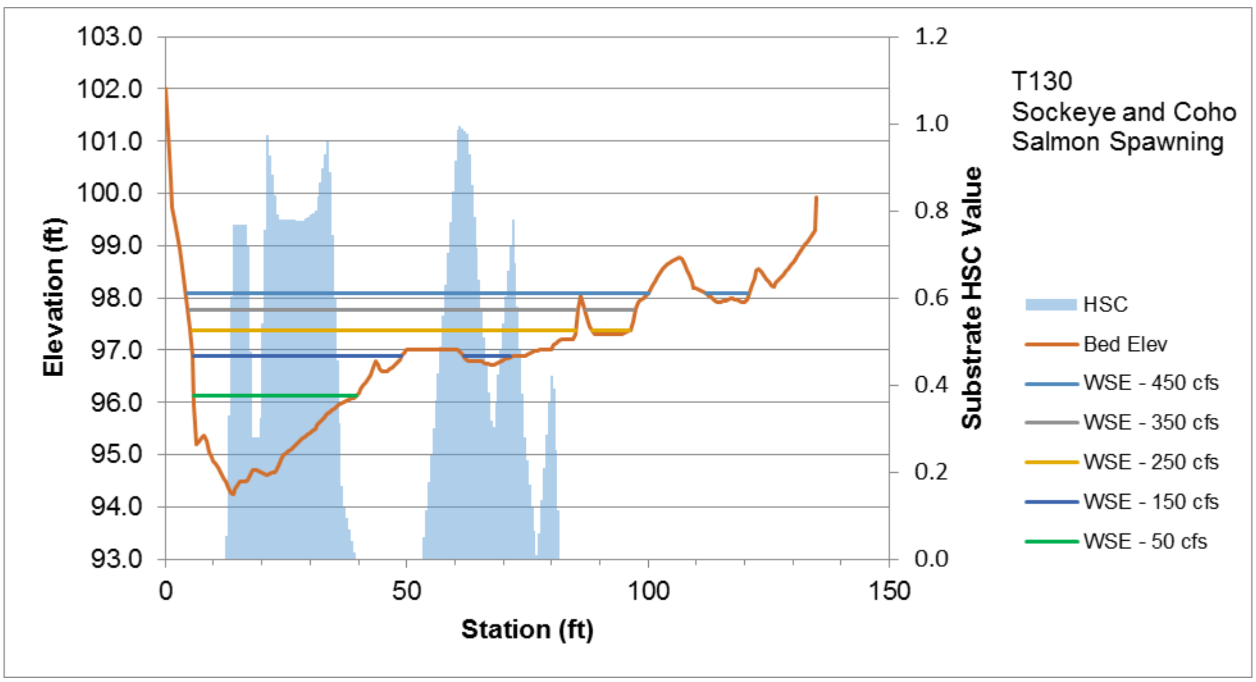

Figure A1-8. Transect 130 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

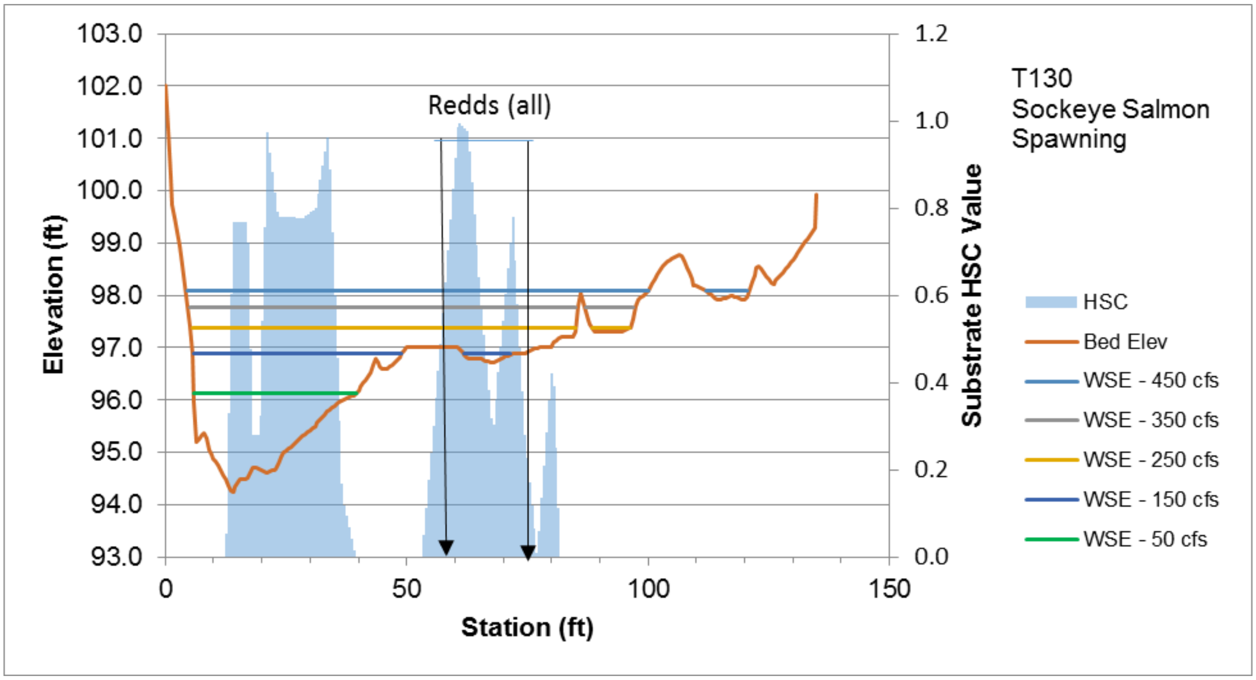

Figure A1-9. Transect 130 bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs.

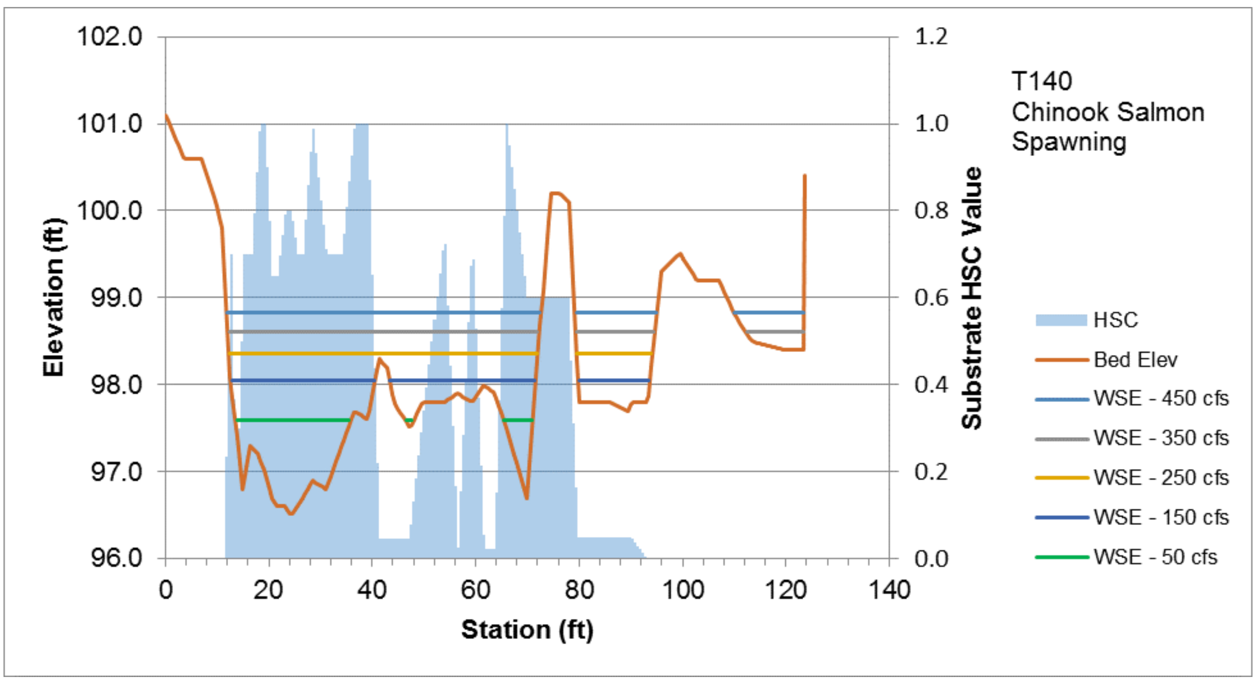

Figure A1-10. Transect 140 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

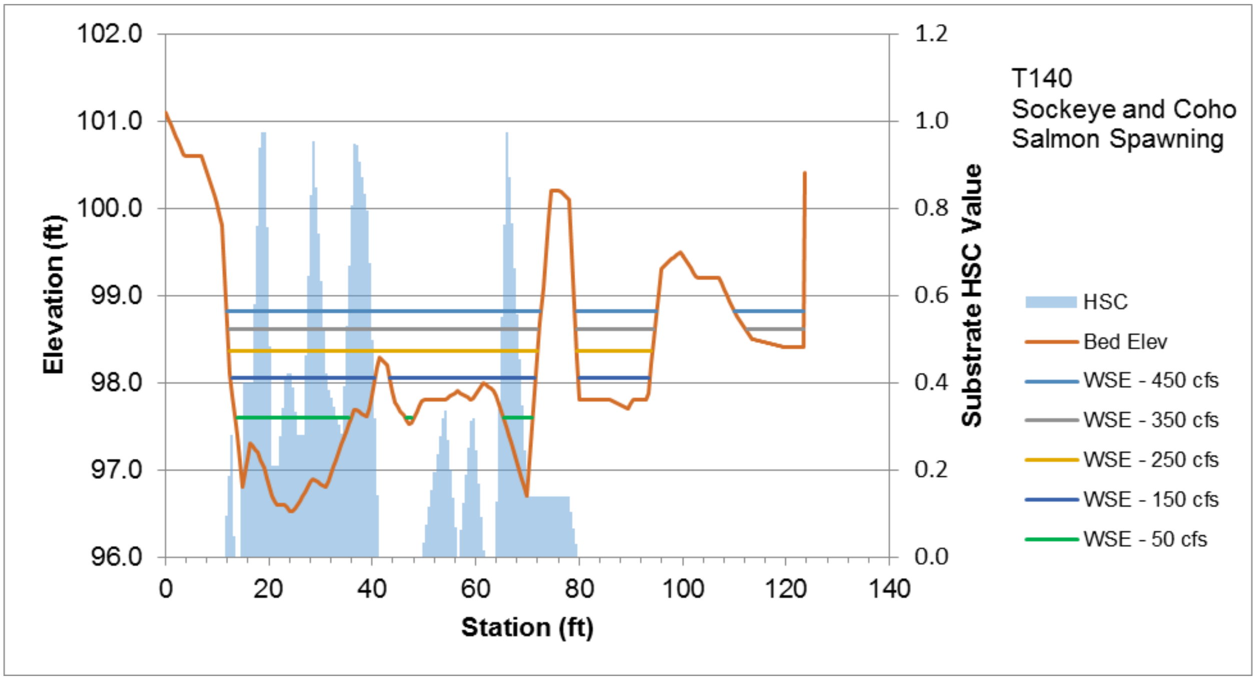

Figure A1-11. Transect 140 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

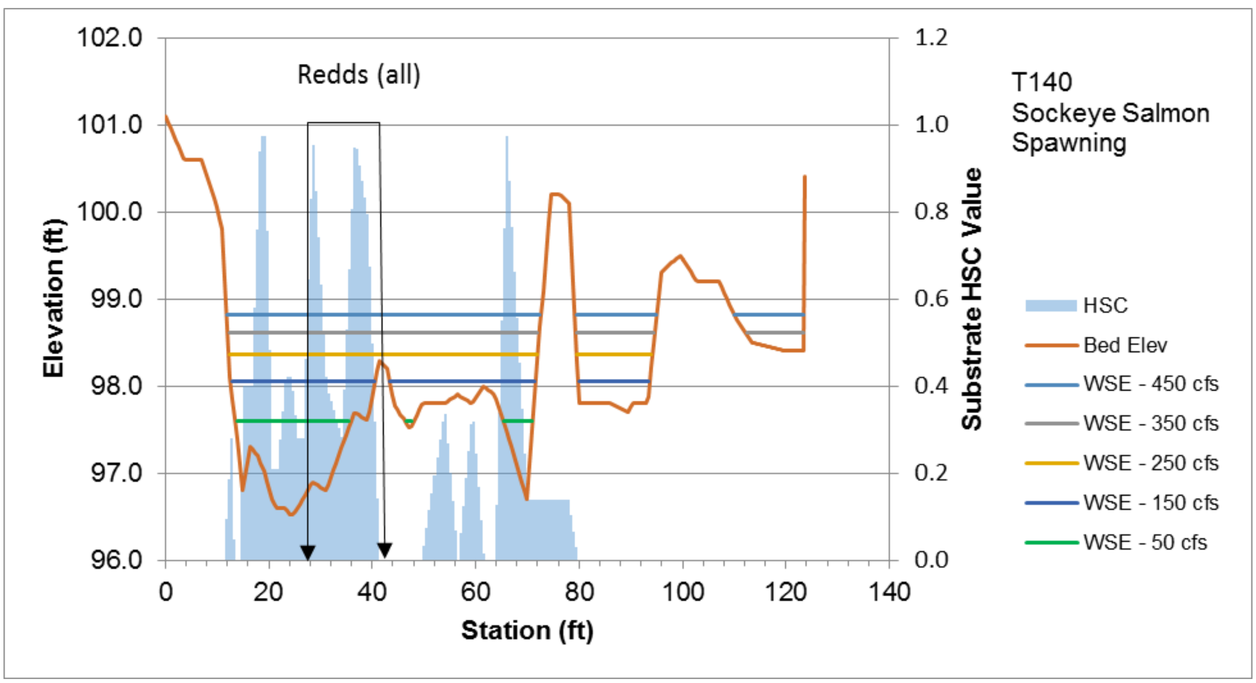

Figure A1-12. Transect 140 bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs.

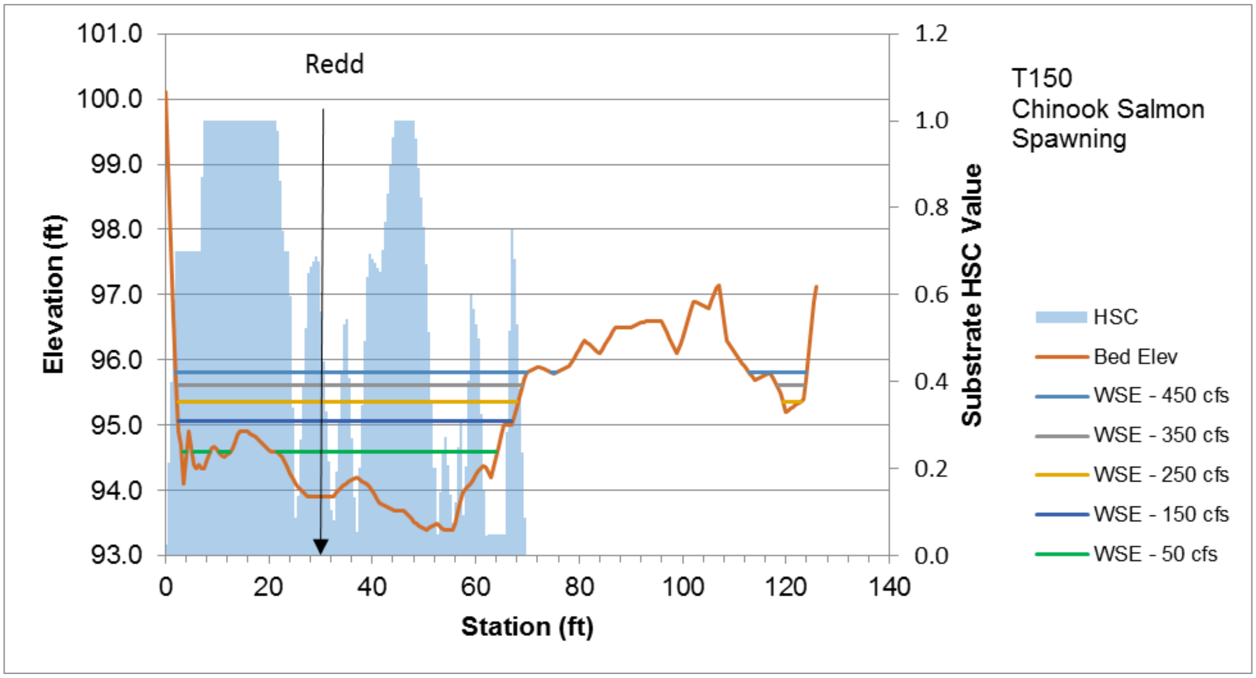

Figure A1-13. Transect 150 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

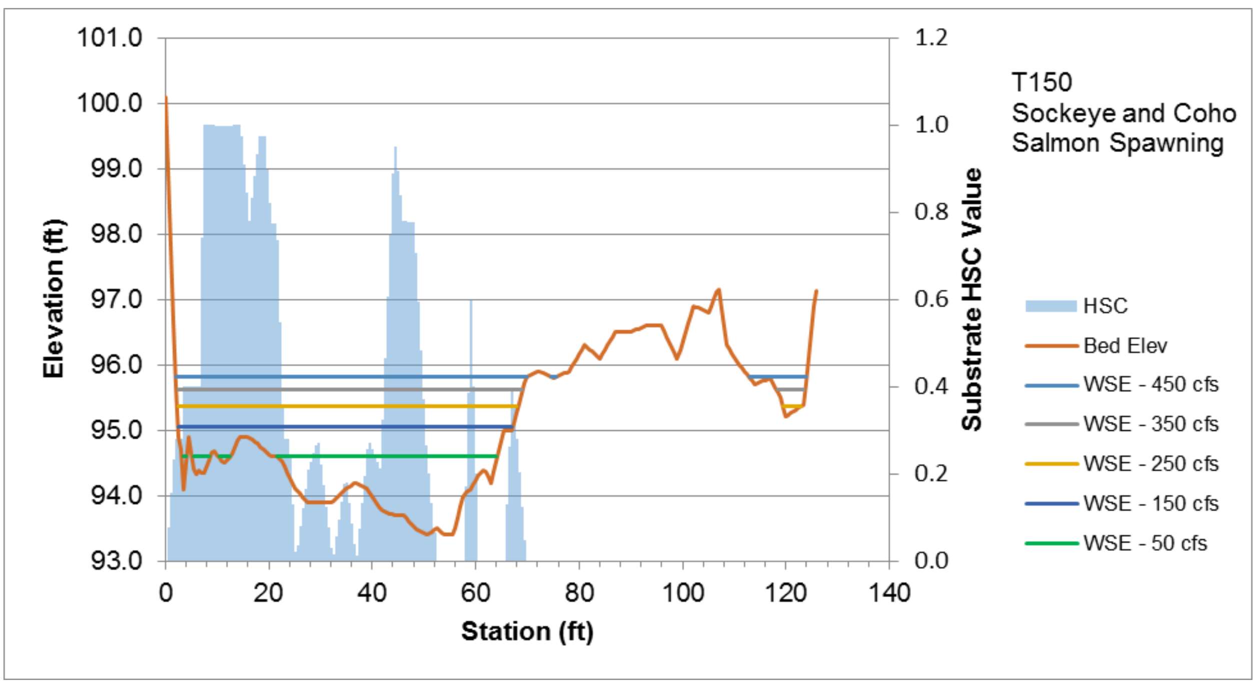

Figure A1-14. Transect 150 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

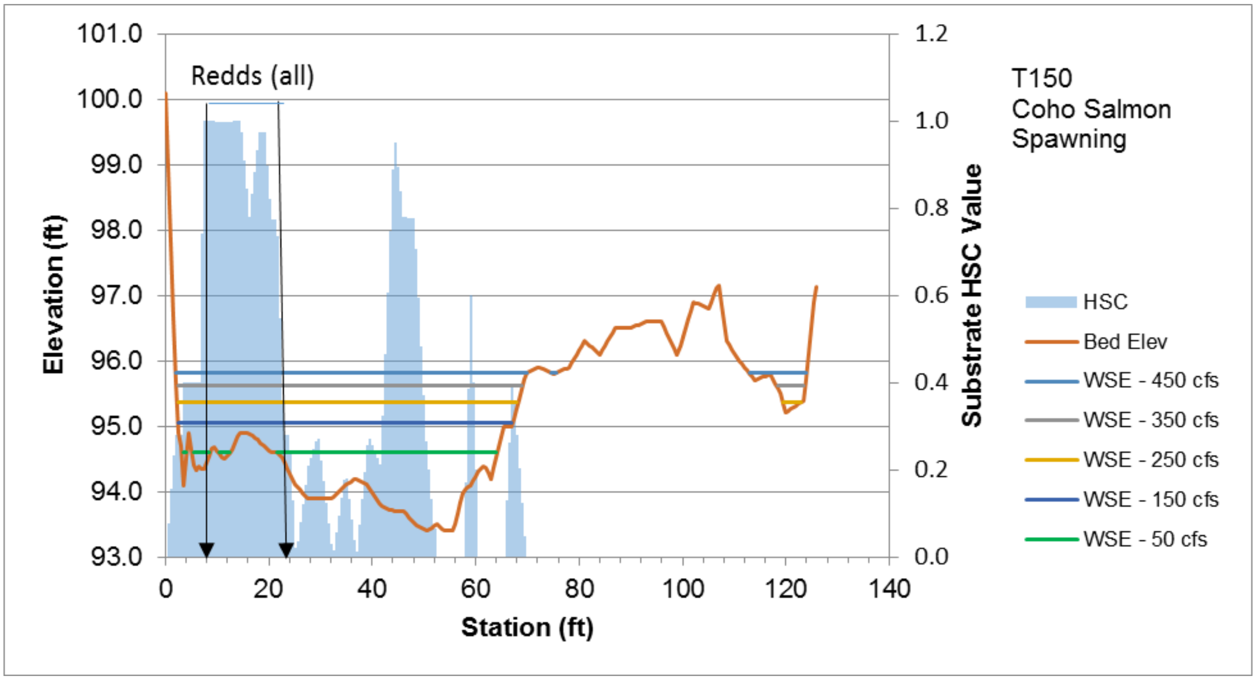

Figure A1-15. Transect 150 bed profile, coho spawning values, redd locations, and WSEs, 50 - 450 cfs.

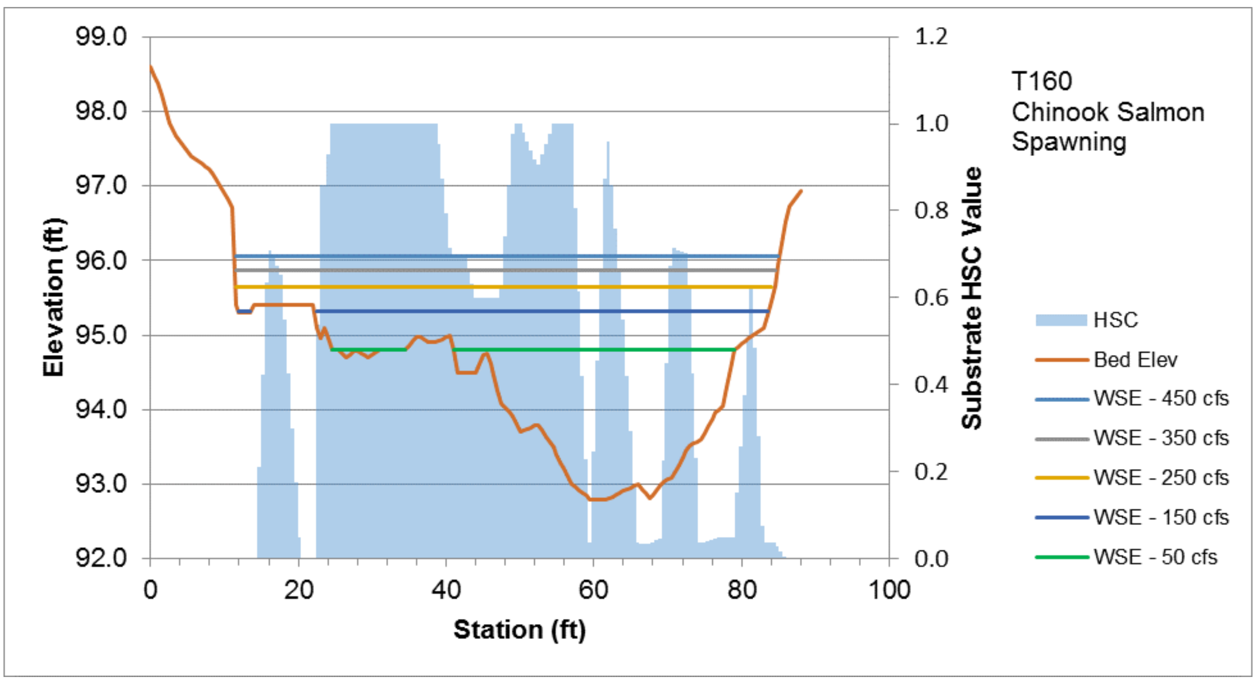

Figure A1-16. Transect 160 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

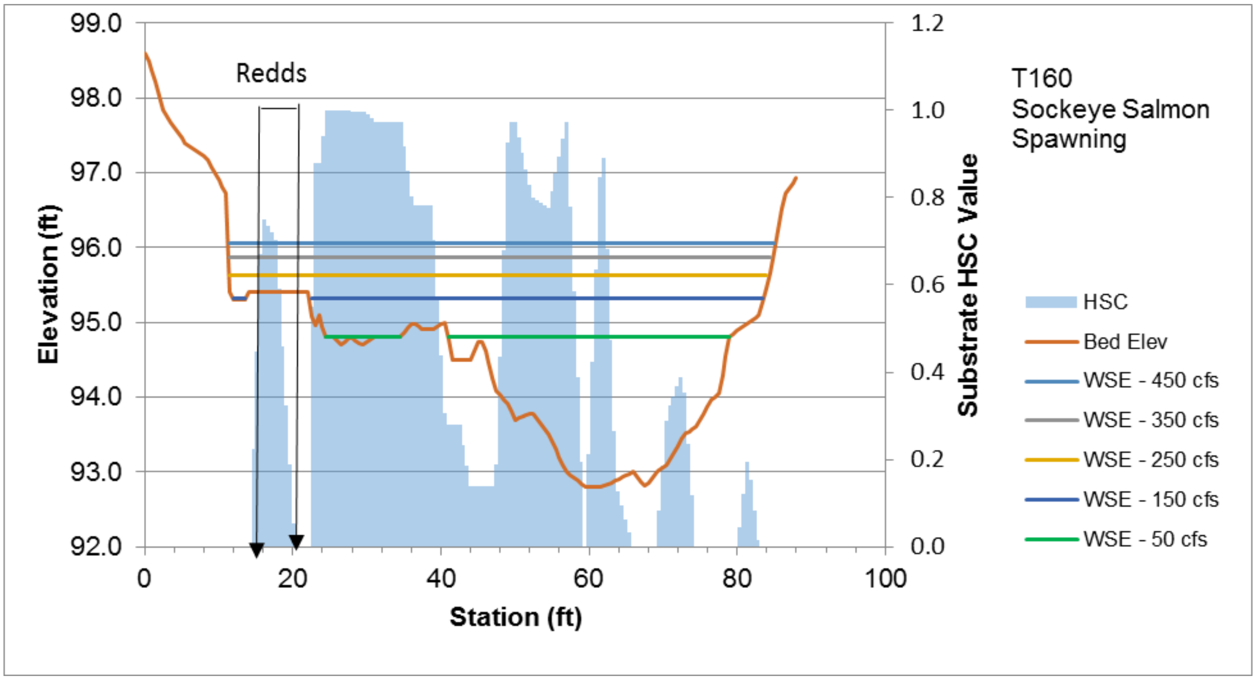

Figure A1-17. Transect 160 bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs.

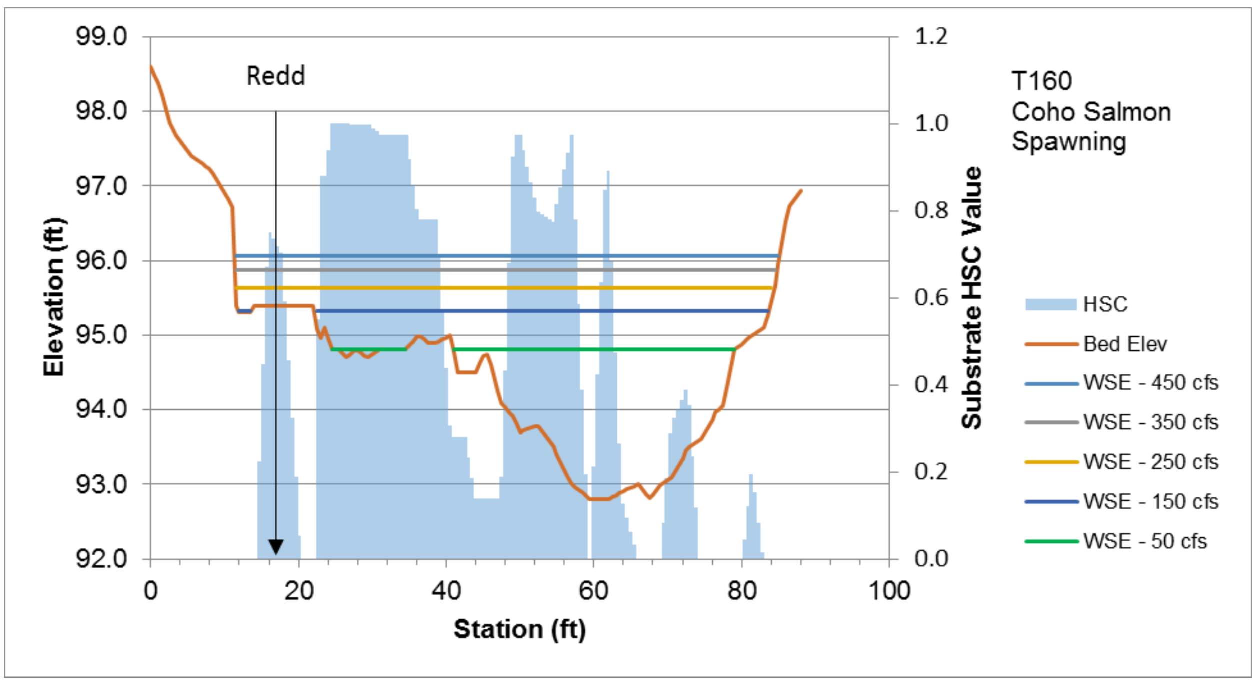

Figure A1-18. Transect 160 bed profile, coho spawning values, redd locations, and WSEs, 50 - 450 cfs.

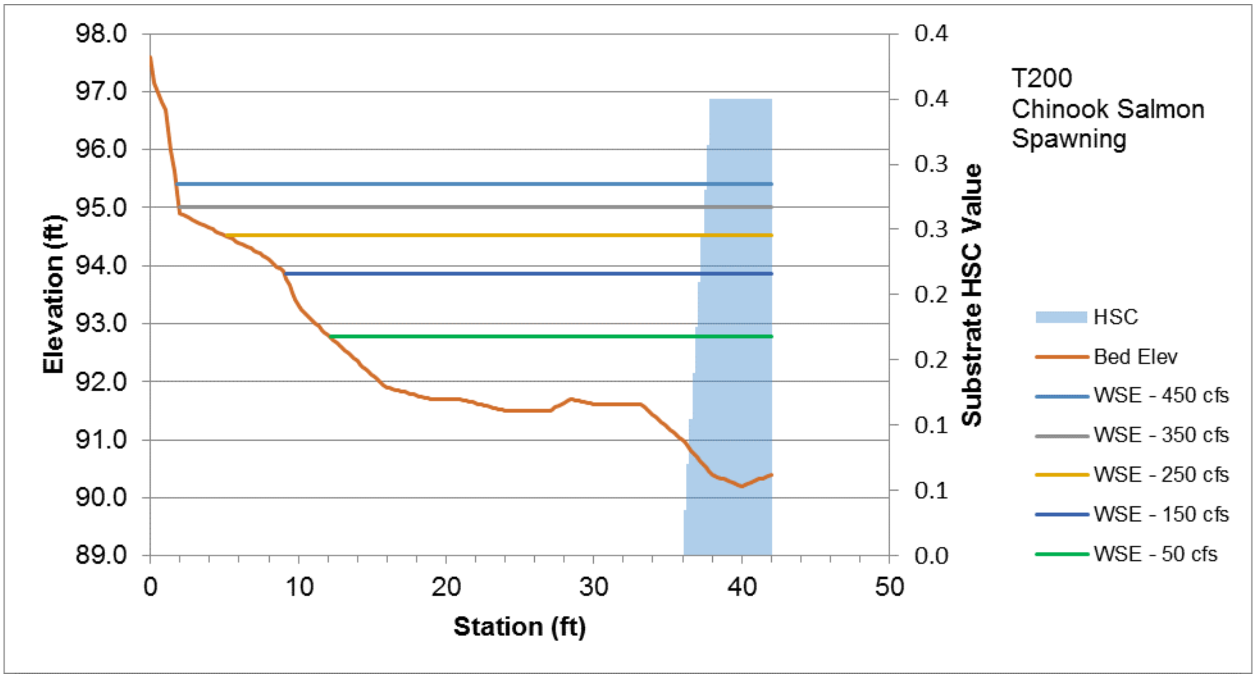

Figure A1-19. Transect 200 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

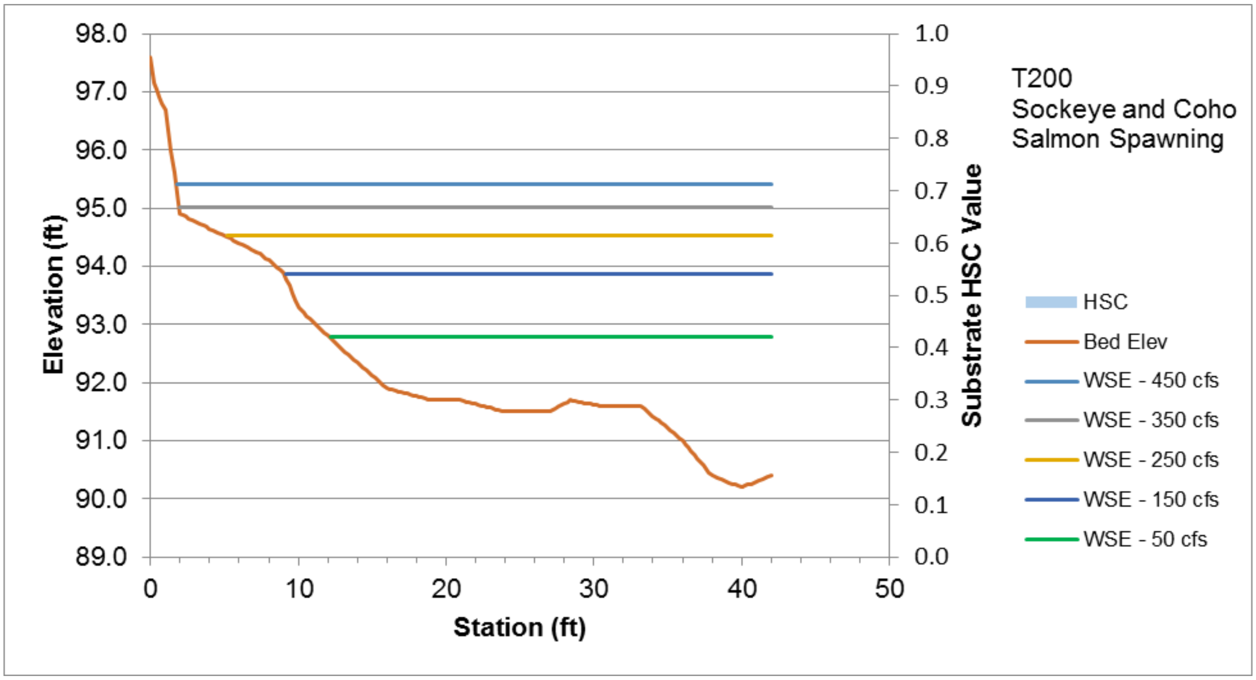

Figure A1-20. Transect 200 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

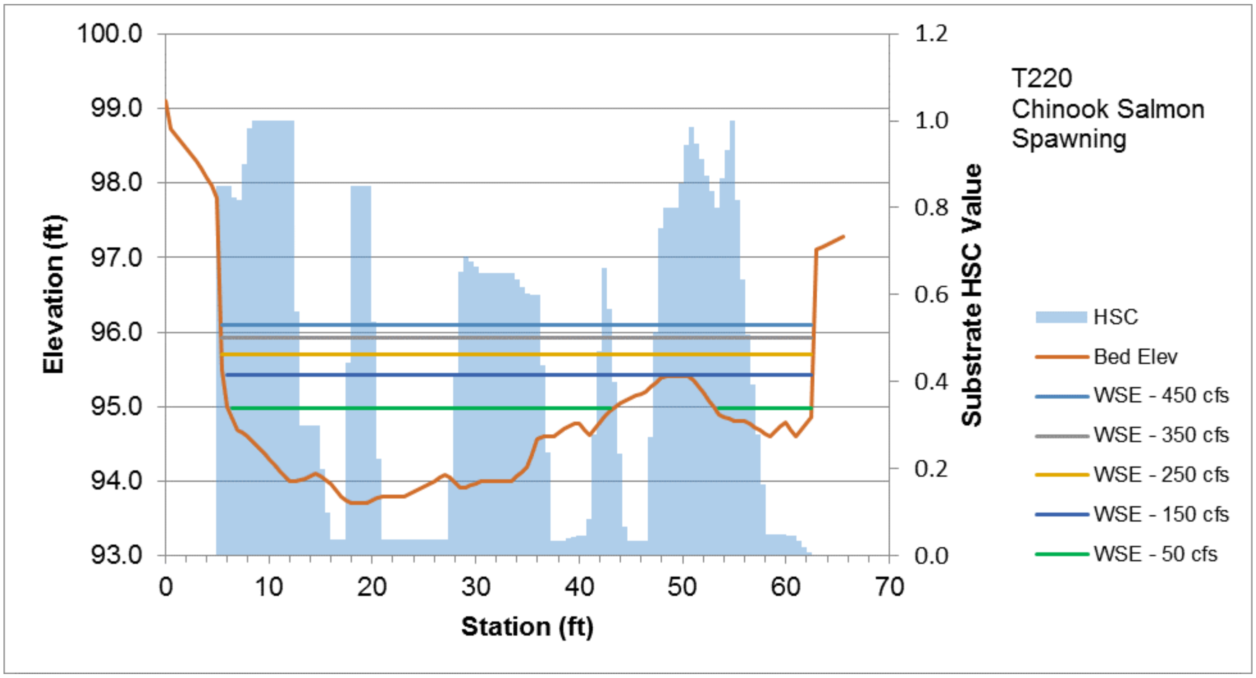

Figure A1-21. Transect 220 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

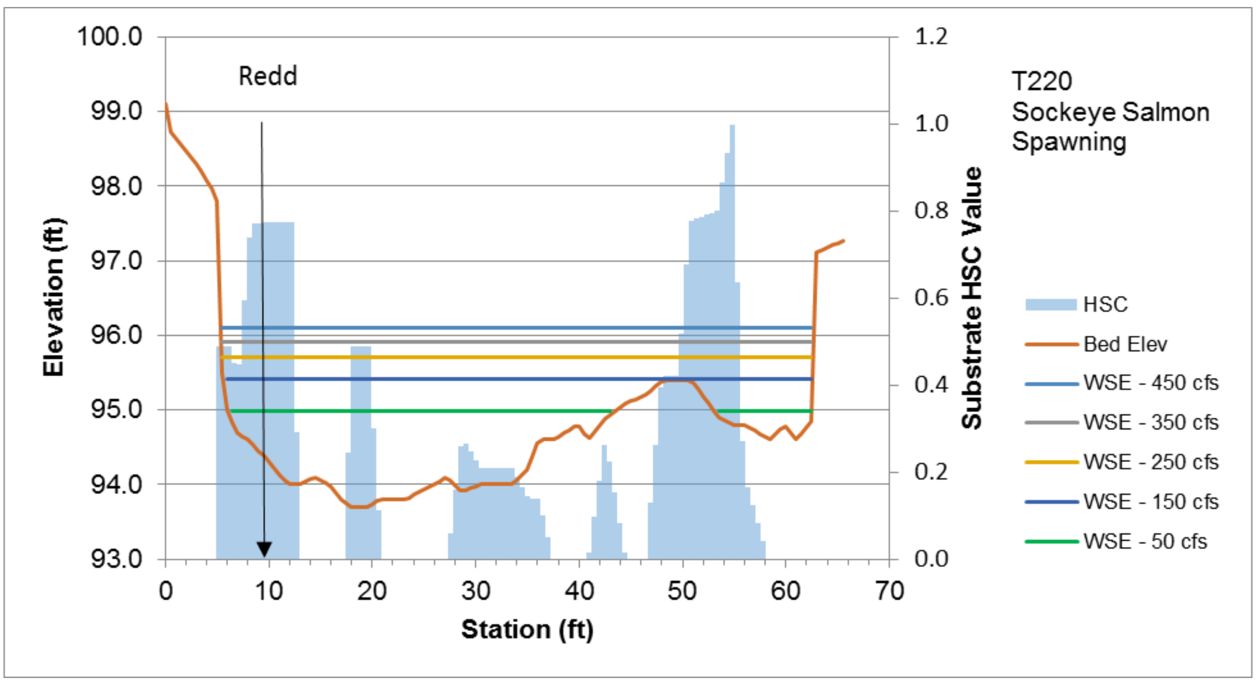

Figure A1-22. Transect 220 bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs.

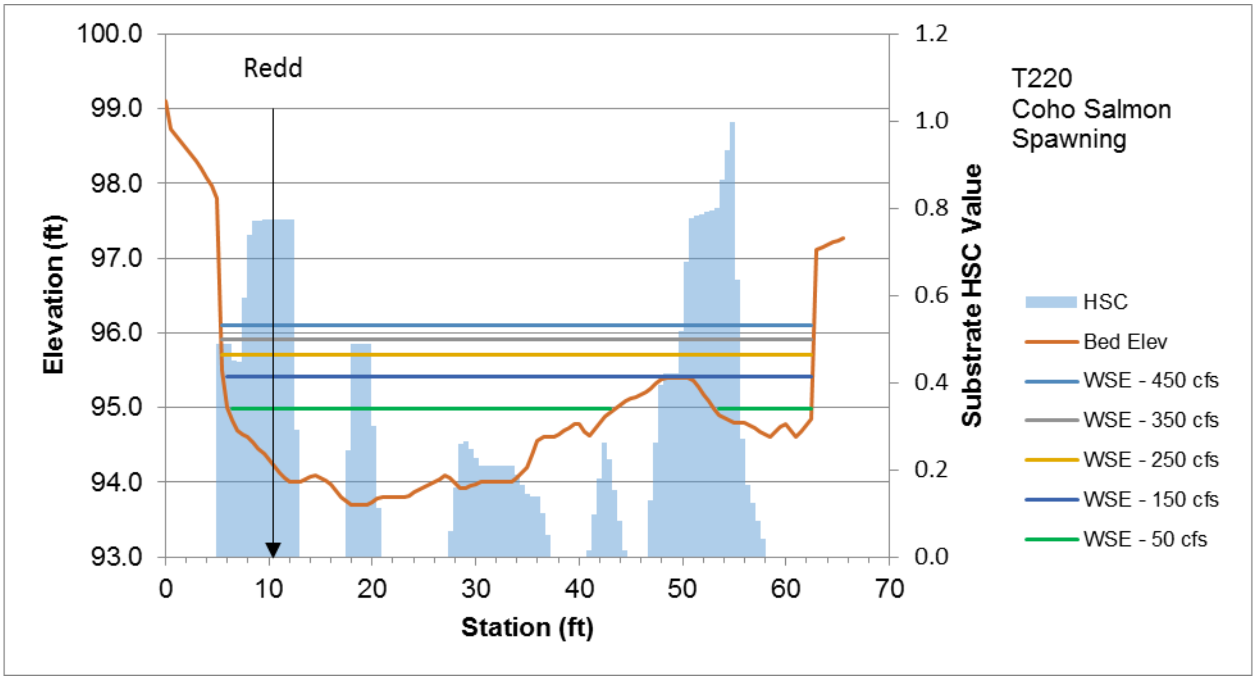

Figure A1-23. Transect 220 bed profile, coho spawning values, redd locations, and WSEs, 50 - 450 cfs.

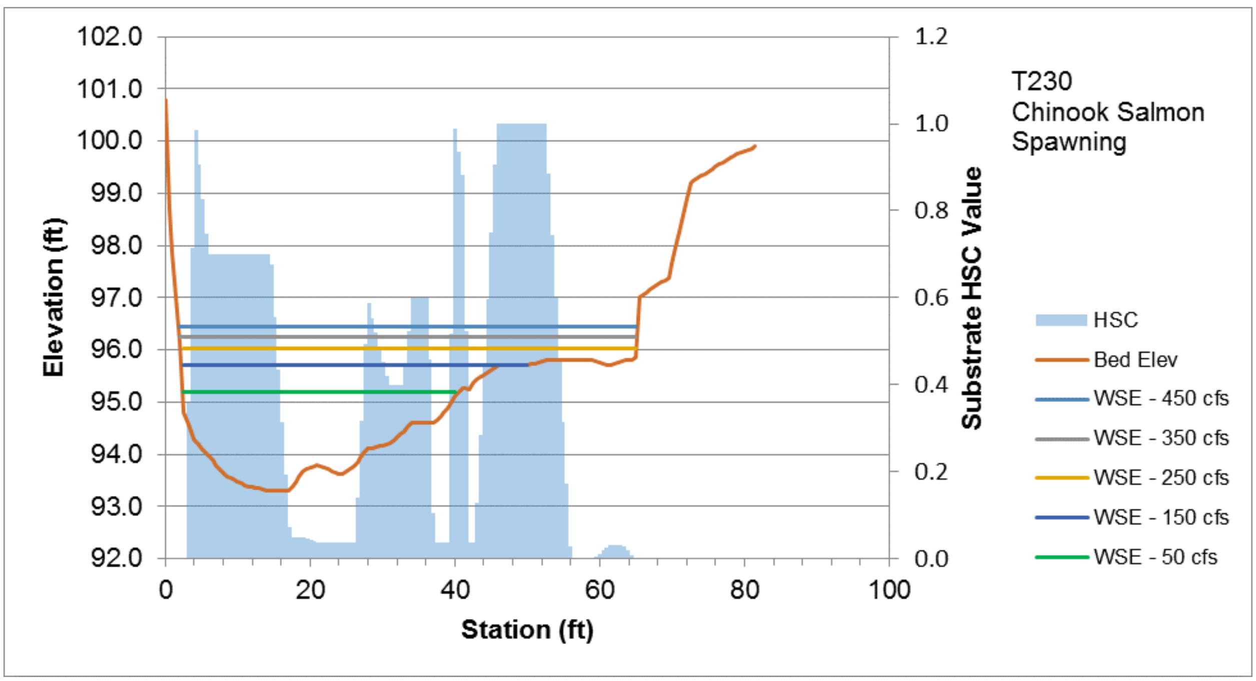

Figure A1-24. Transect 230 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

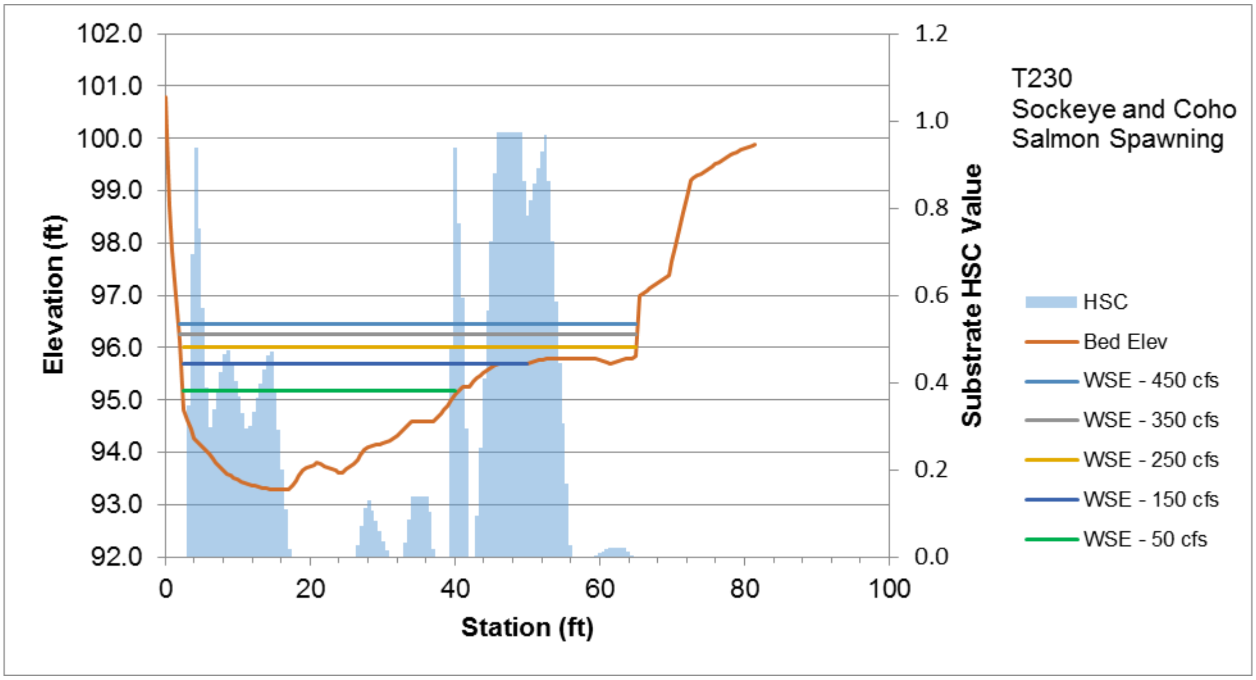

Figure A1-25. Transect 230 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

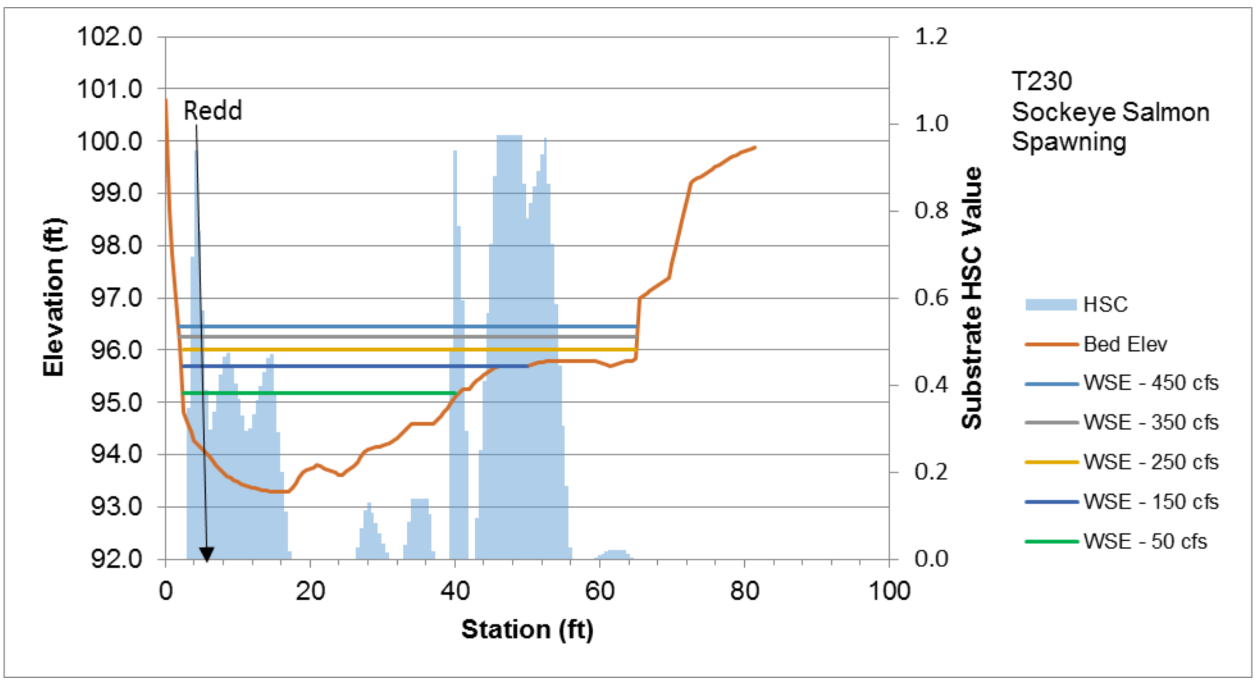

Figure A1-26. Transect 230 bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs.

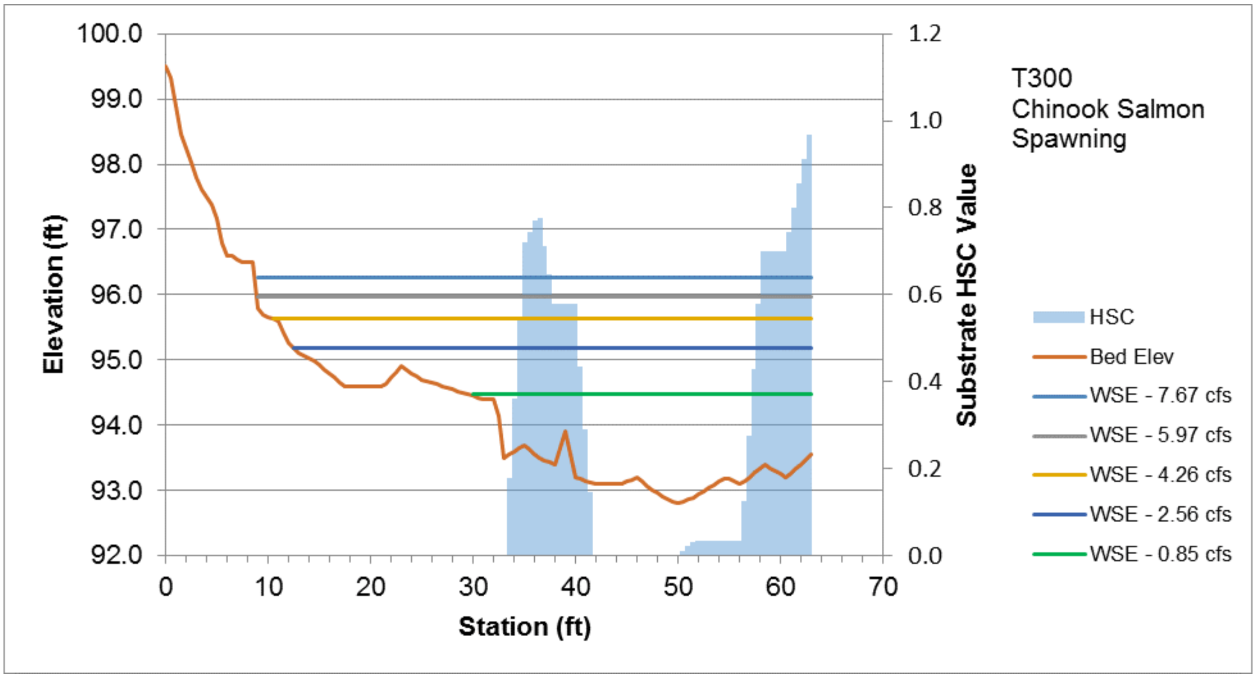

Figure A1-27. Transect 300 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

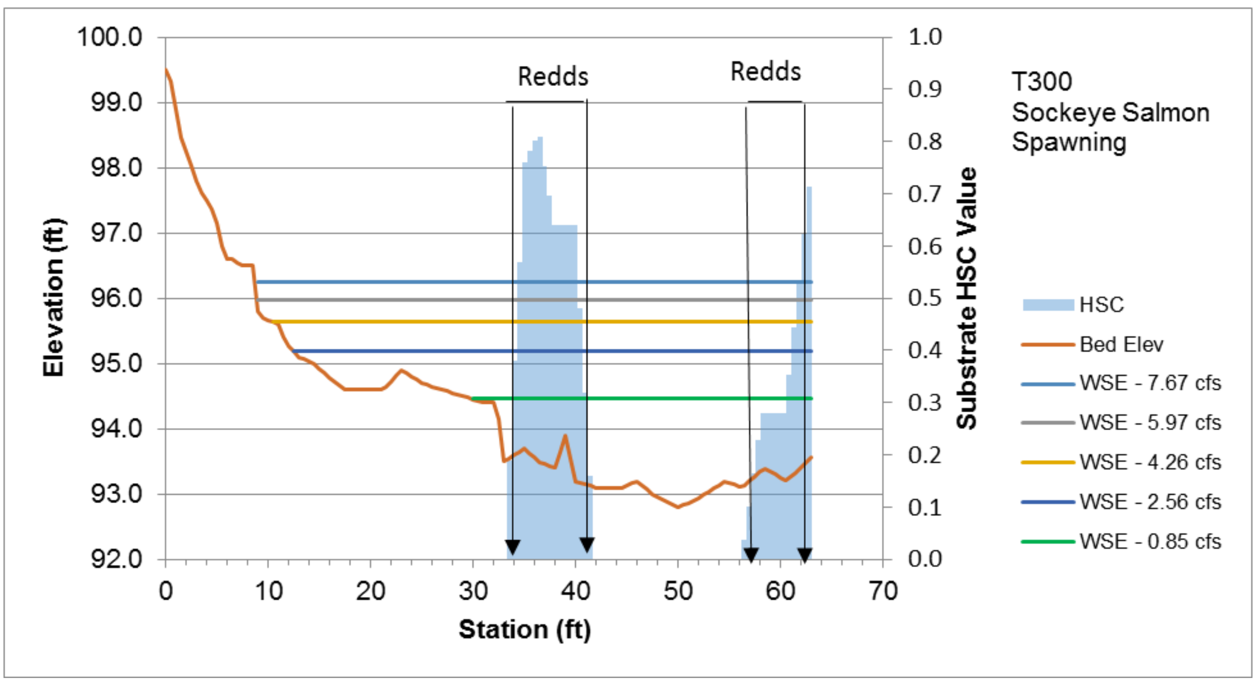

Figure A1-28. Transect 300 bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

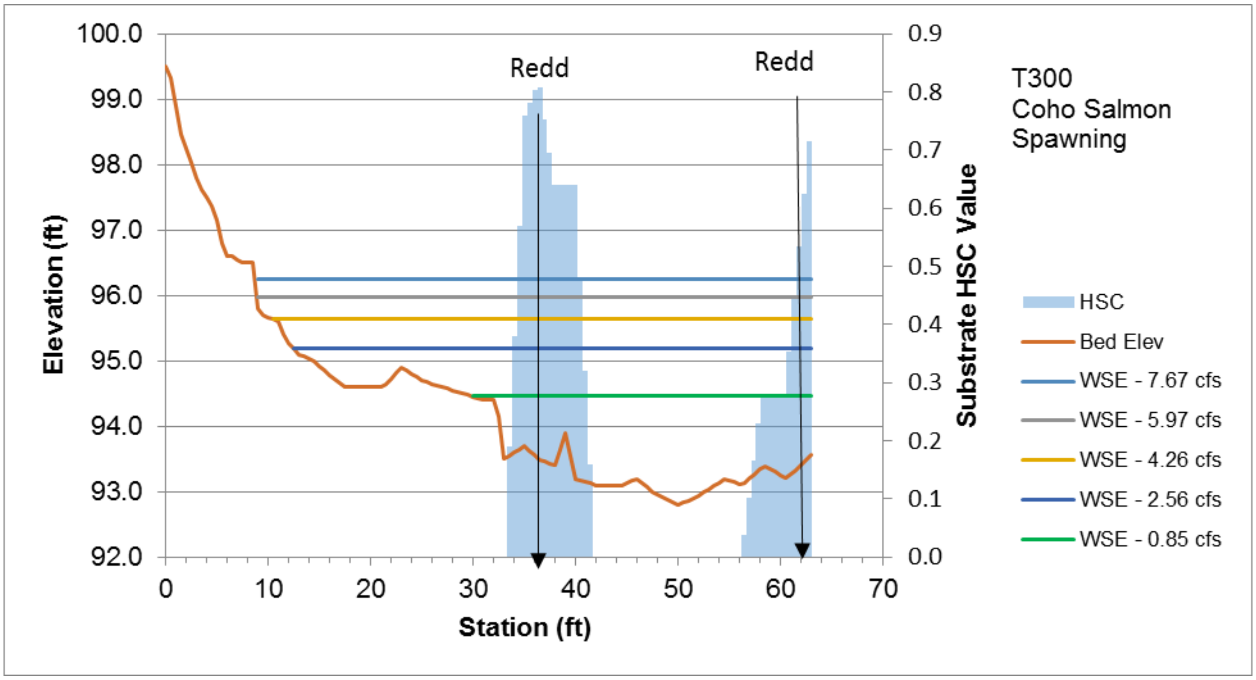

Figure A1-29. Transect 300 bed profile, coho spawning values, redd locations, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

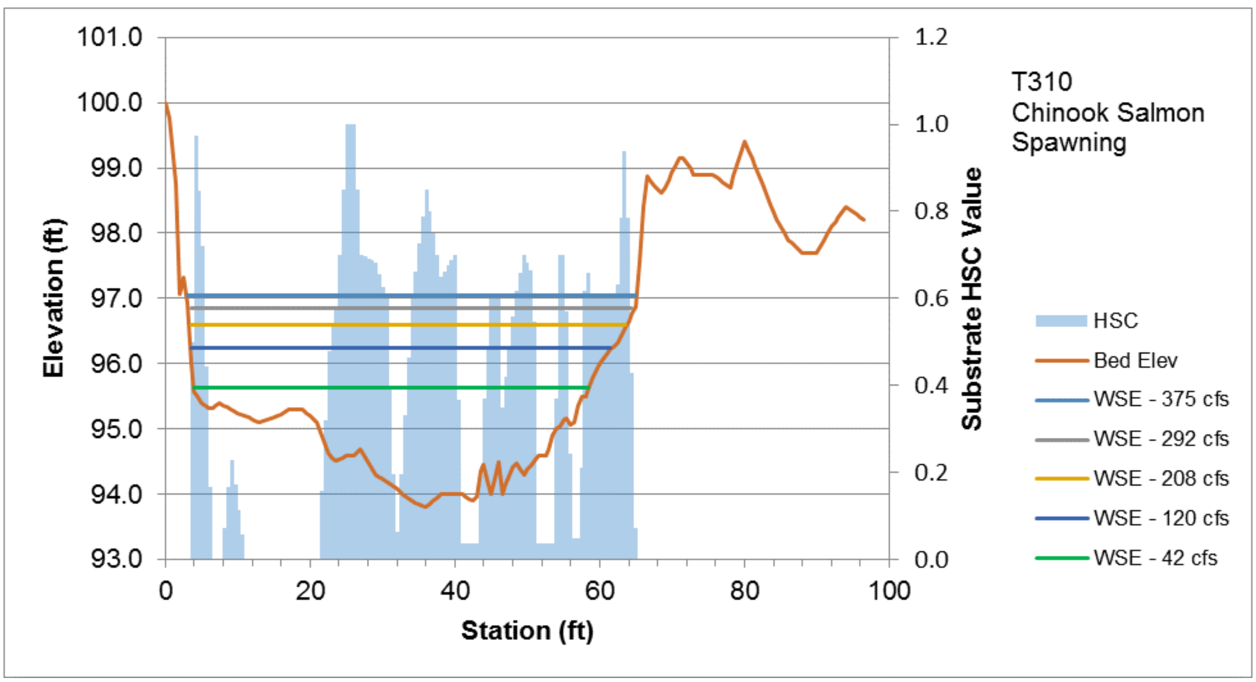

Figure A1-30. Transect 310 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

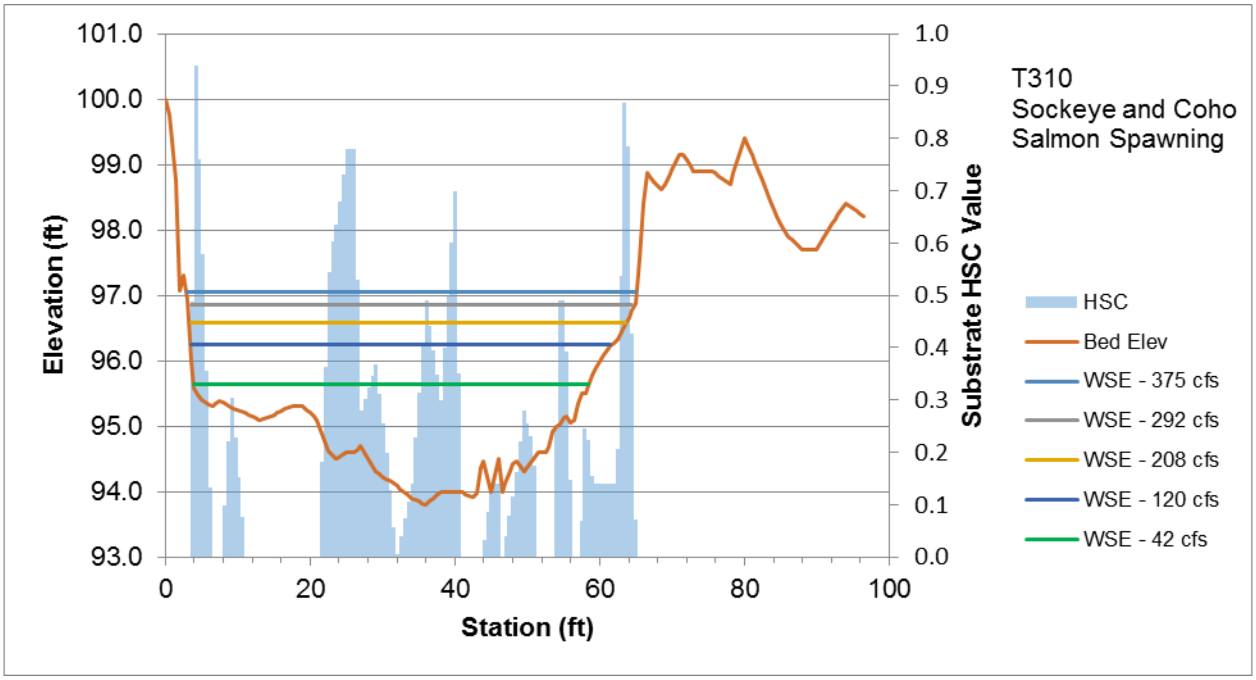

Figure A1-31. Transect 310 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

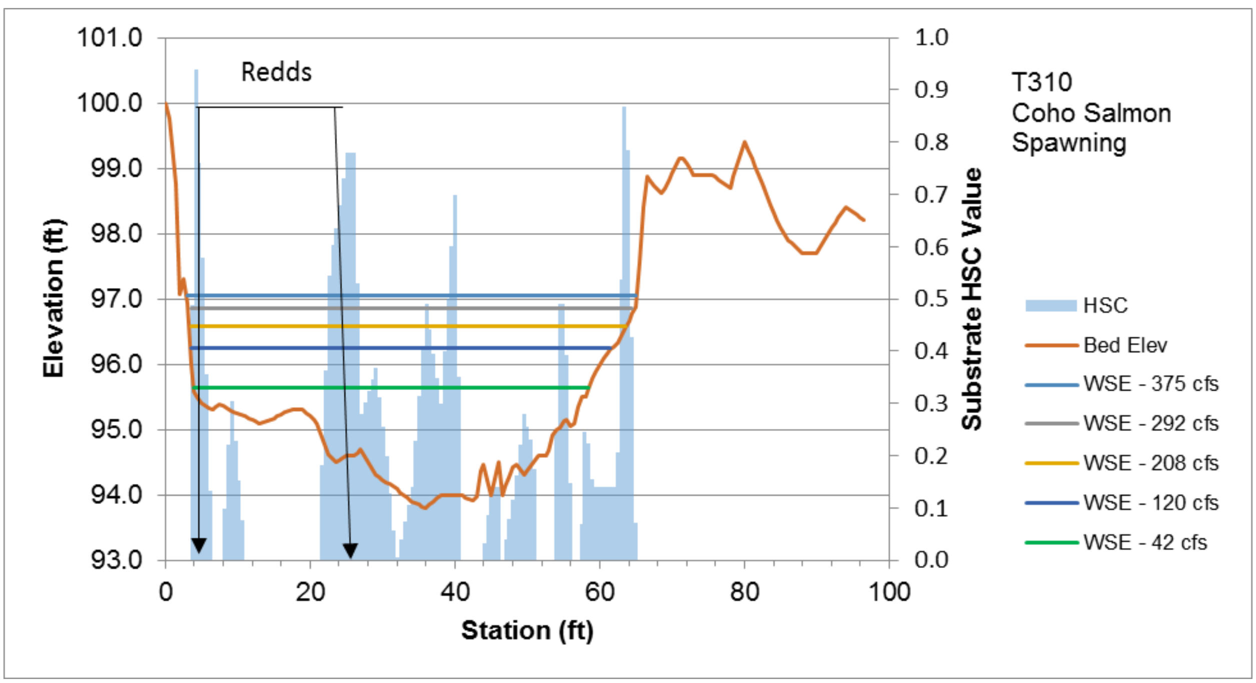

Figure A1-32. Transect 310 bed profile, coho spawning values, redd locations, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

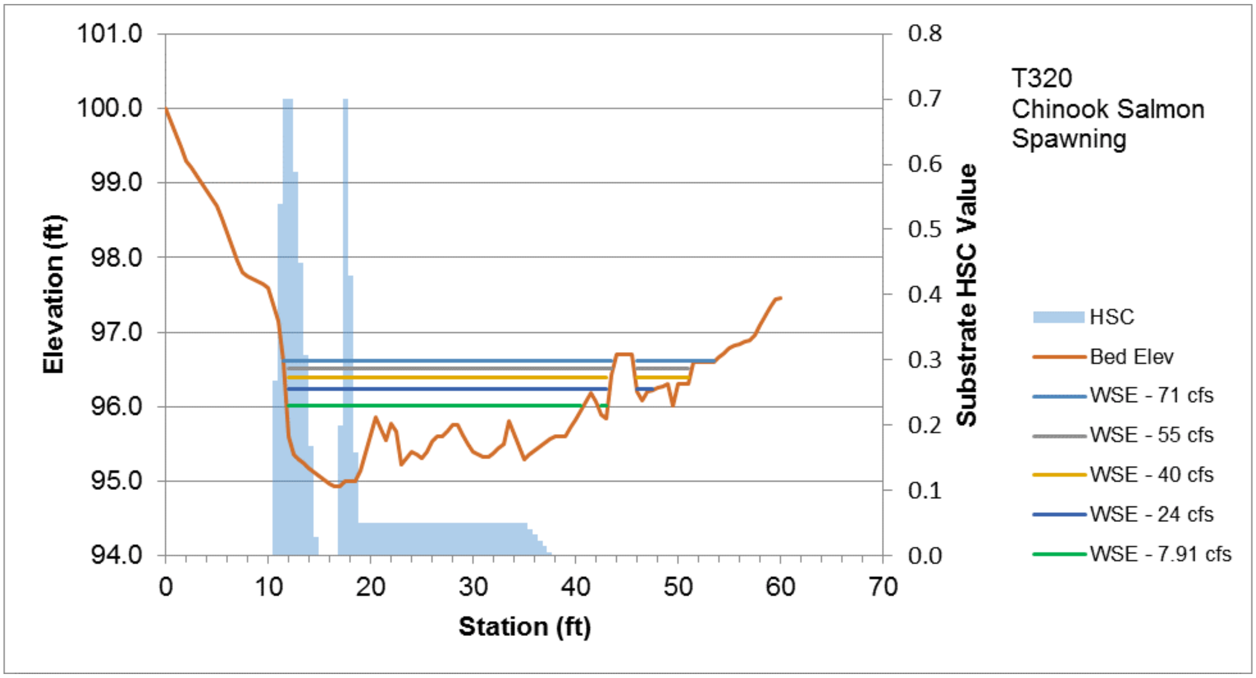

Figure A1-33. Transect 320 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

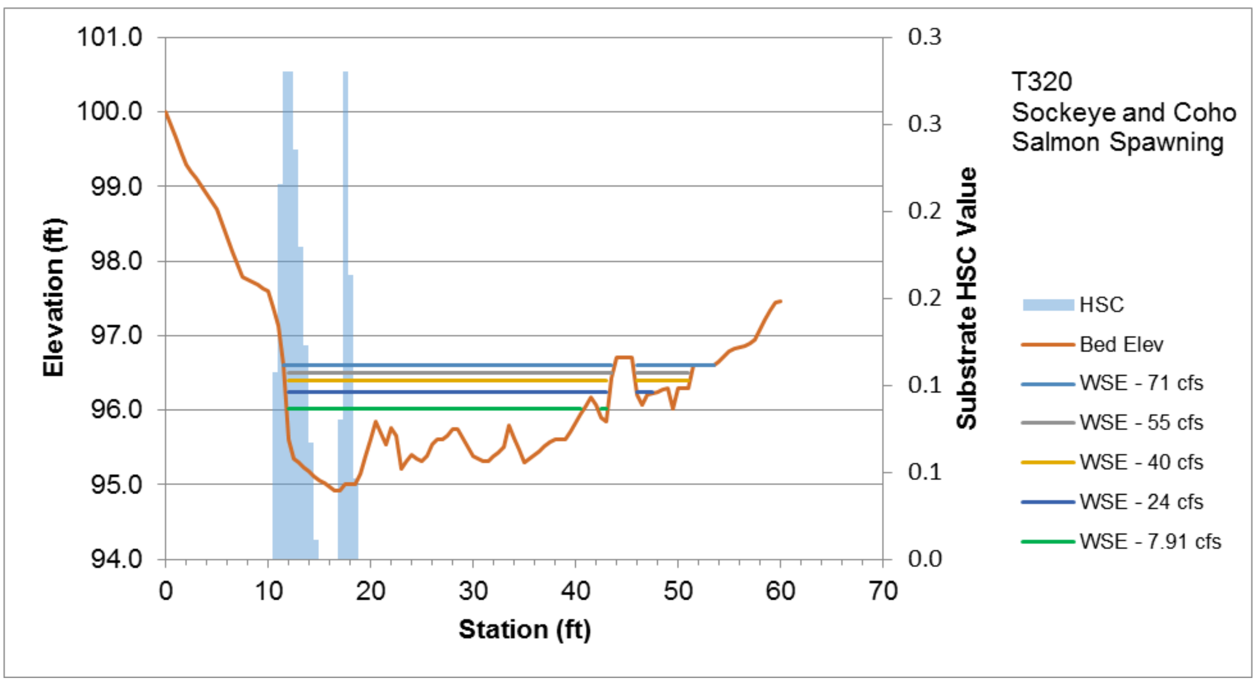

Figure A1-34. Transect 320 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

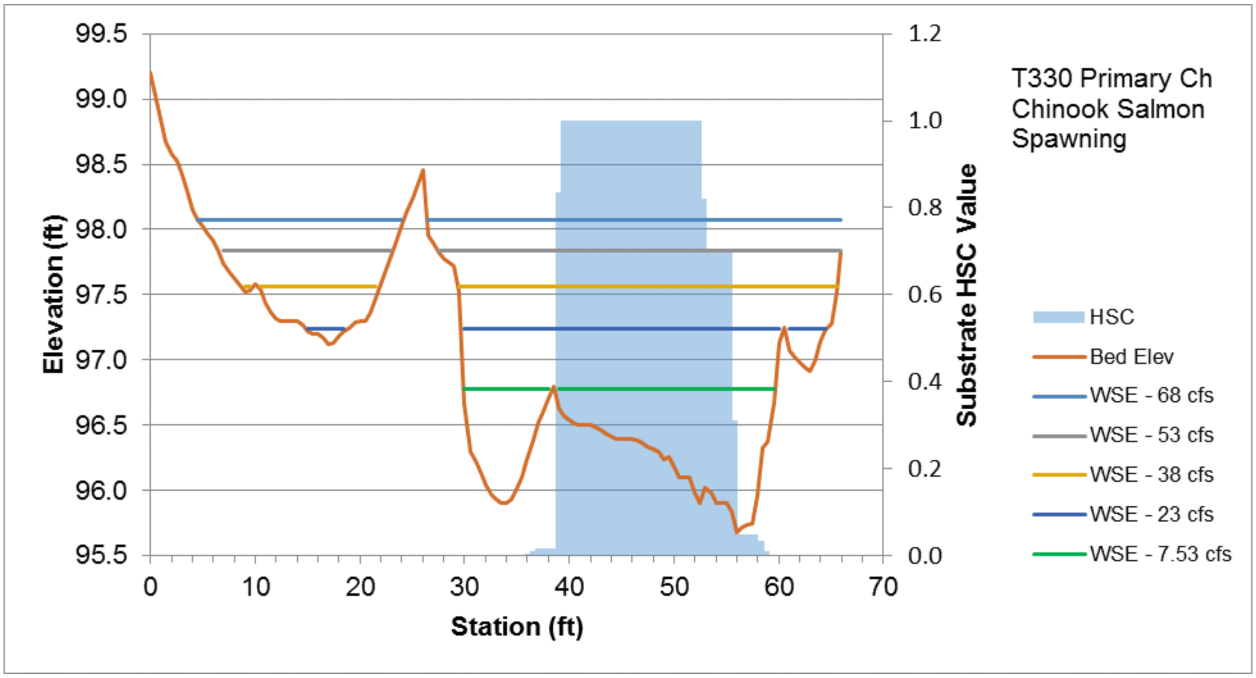

Figure A1-35. Transect 330 primary channel bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

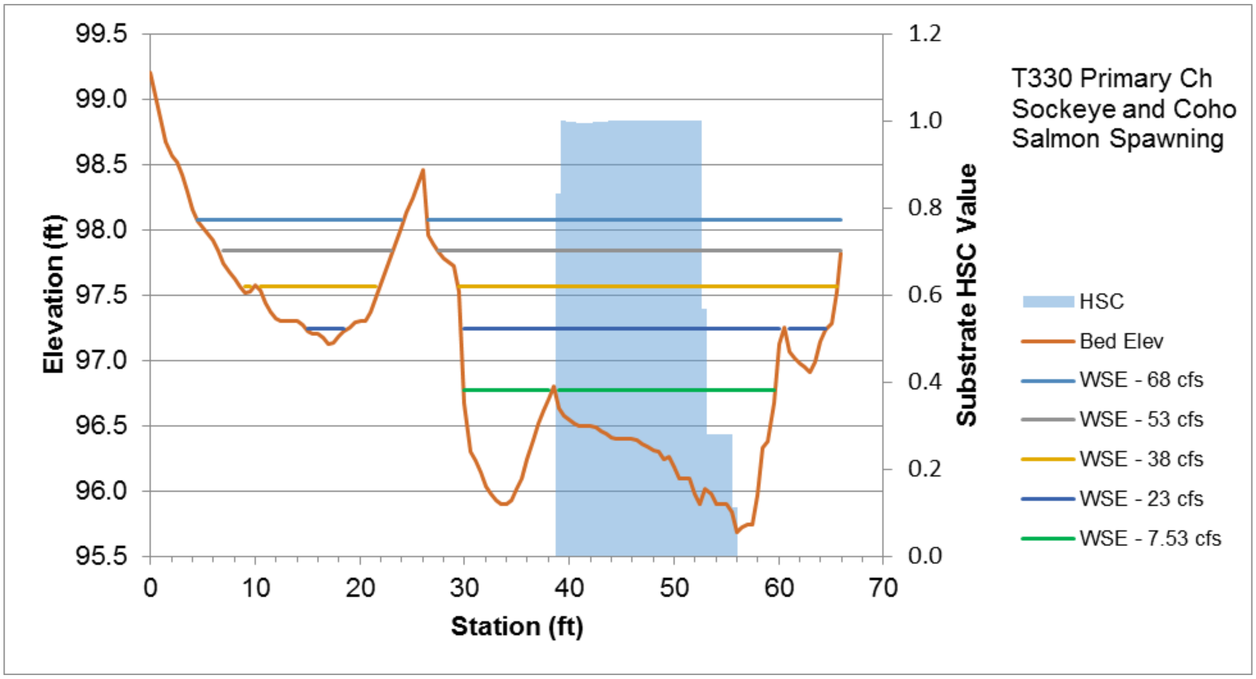

Figure A1-36. Transect 330 primary channel bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs (as measured at the Grant Creek gage).

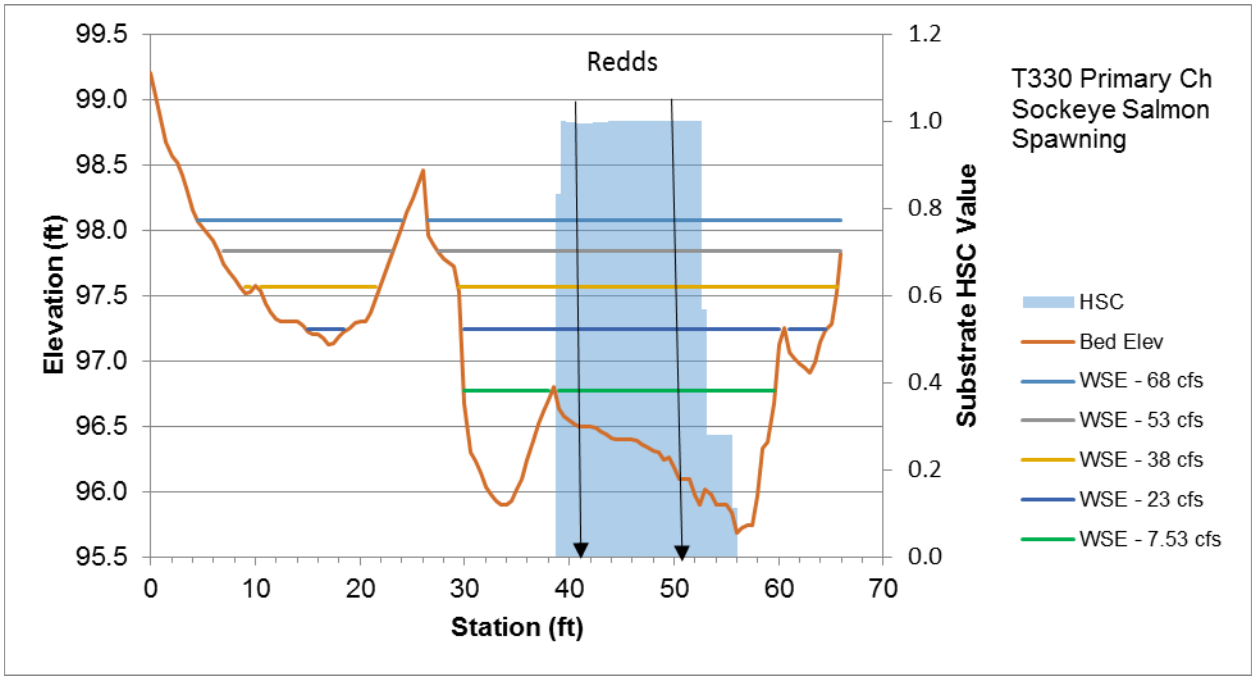

Figure A1-37. Transect 330 primary channel bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs.

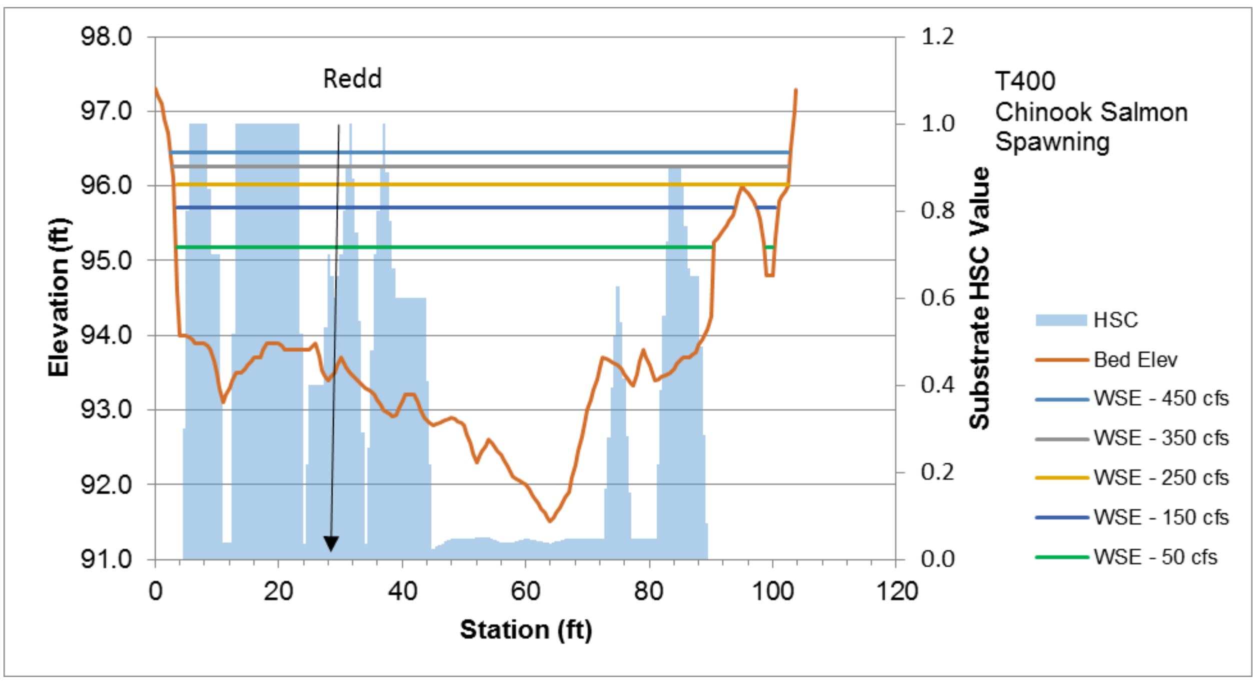

Figure A1-38. Transect 400 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

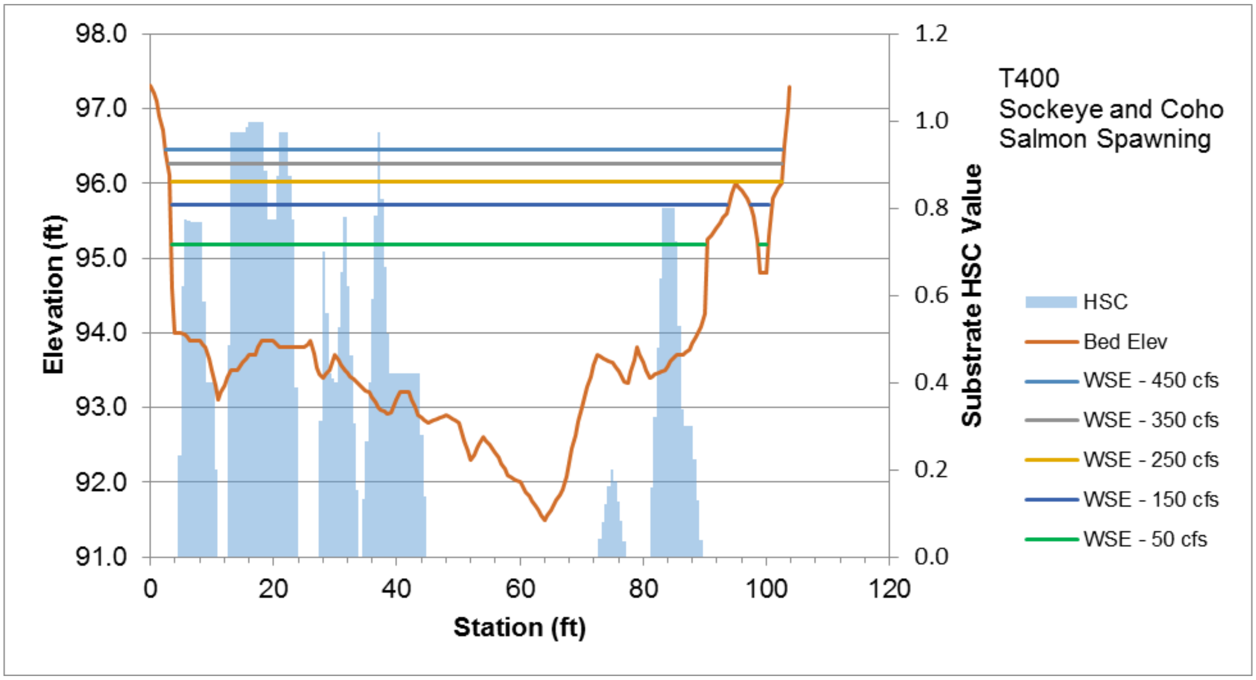

Figure A1-39. Transect 400 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

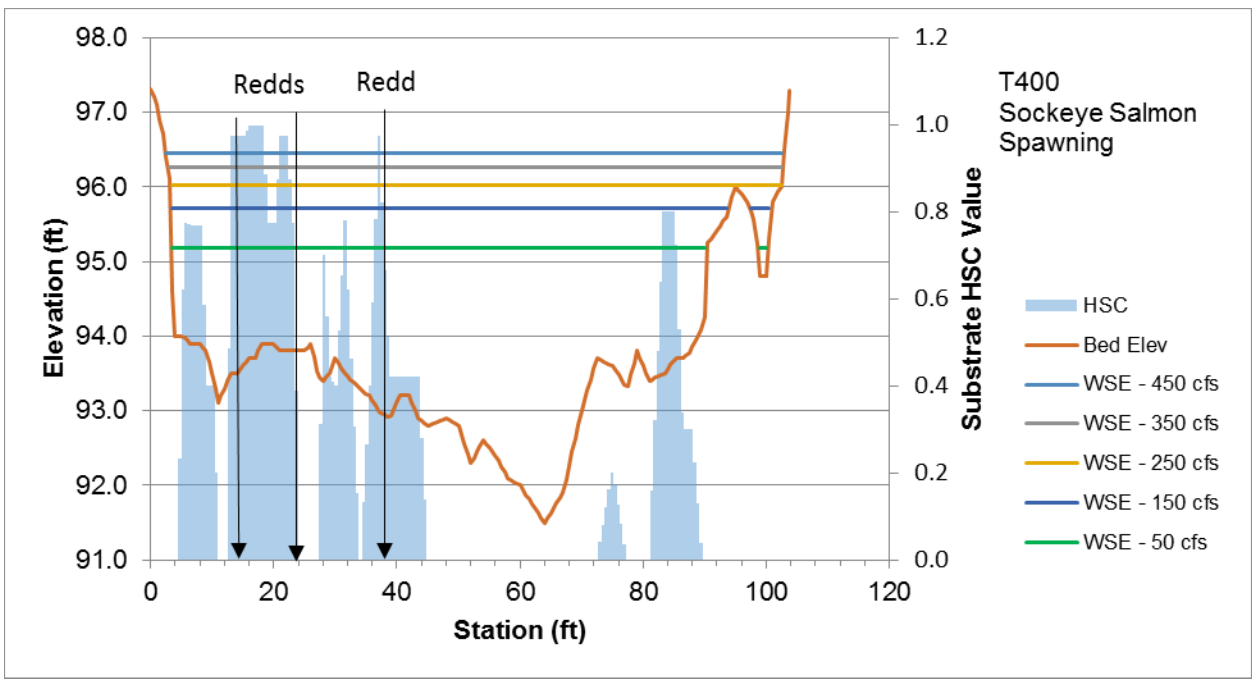

Figure A1-40. Transect 400 bed profile, sockeye spawning values, redd locations, and WSEs, 50 - 450 cfs.

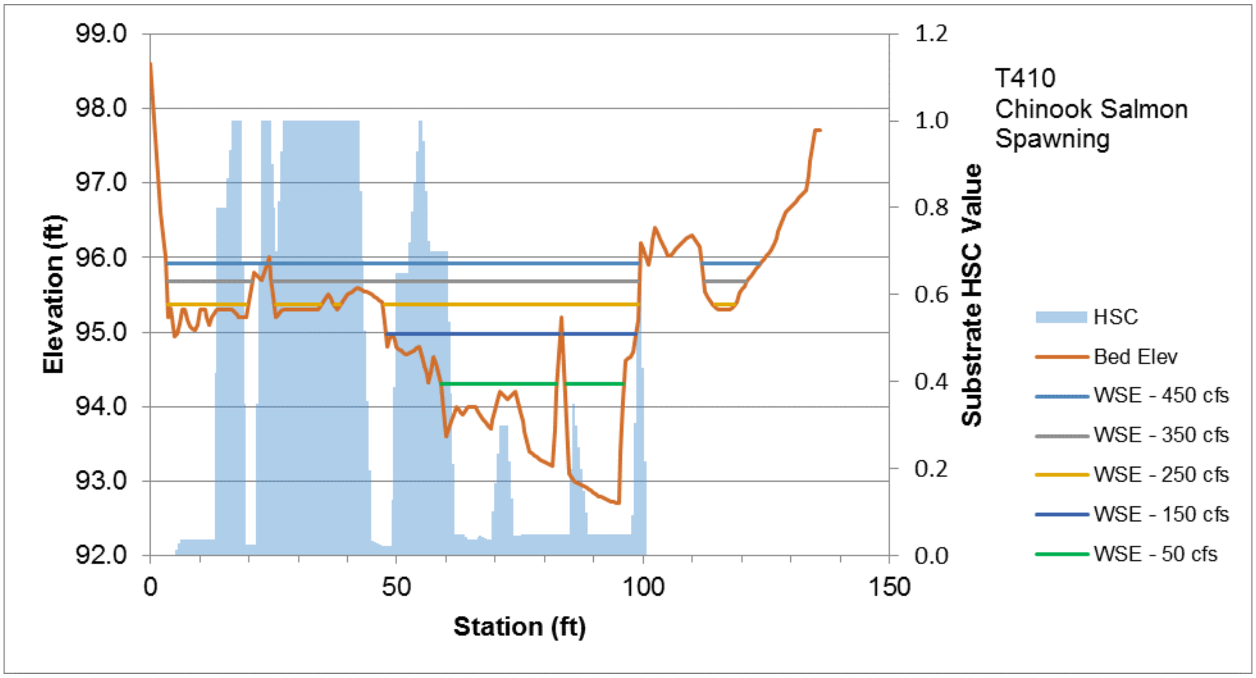

Figure A1-41. Transect 410 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

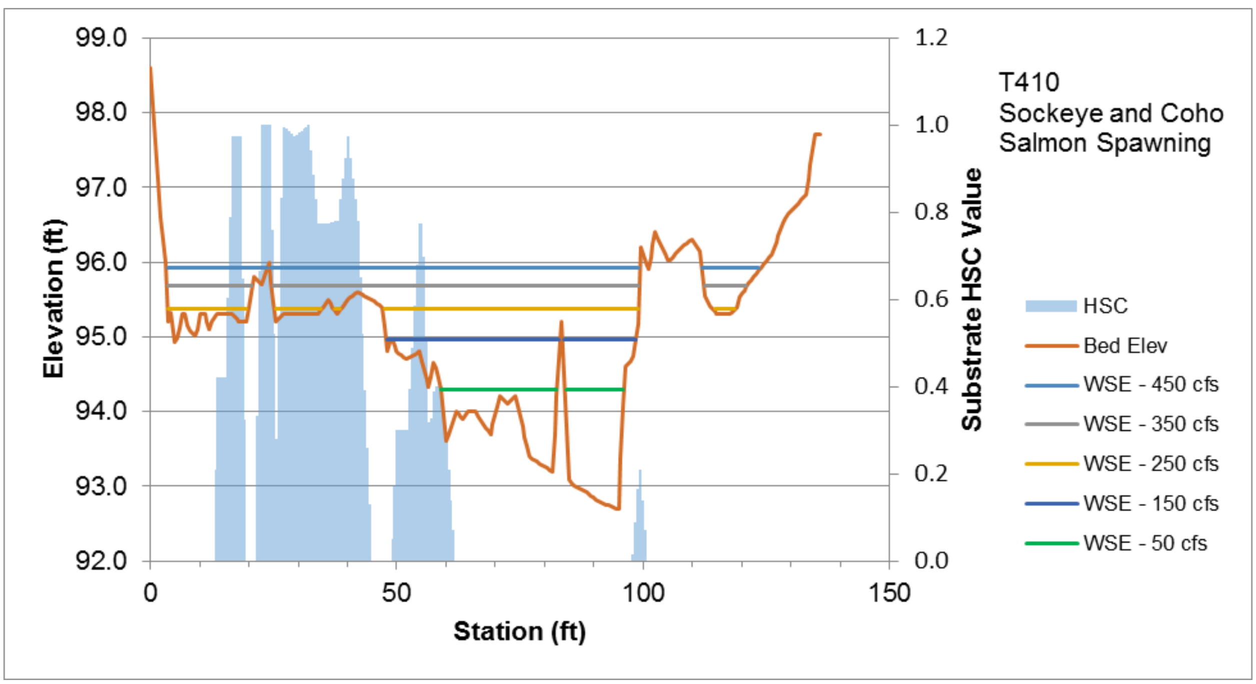

Figure A1-42. Transect 410 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

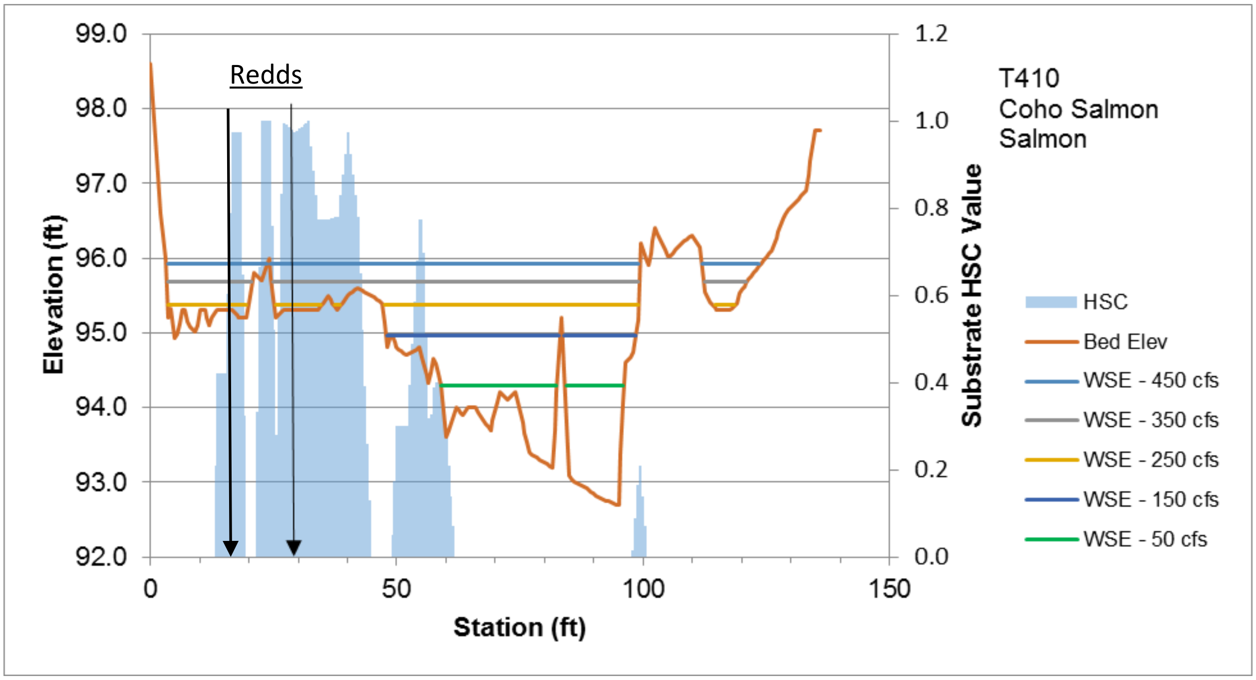

Figure A1-43. Transect 410 bed profile, coho spawning values, redd locations, and WSEs, 50 - 450 cfs.

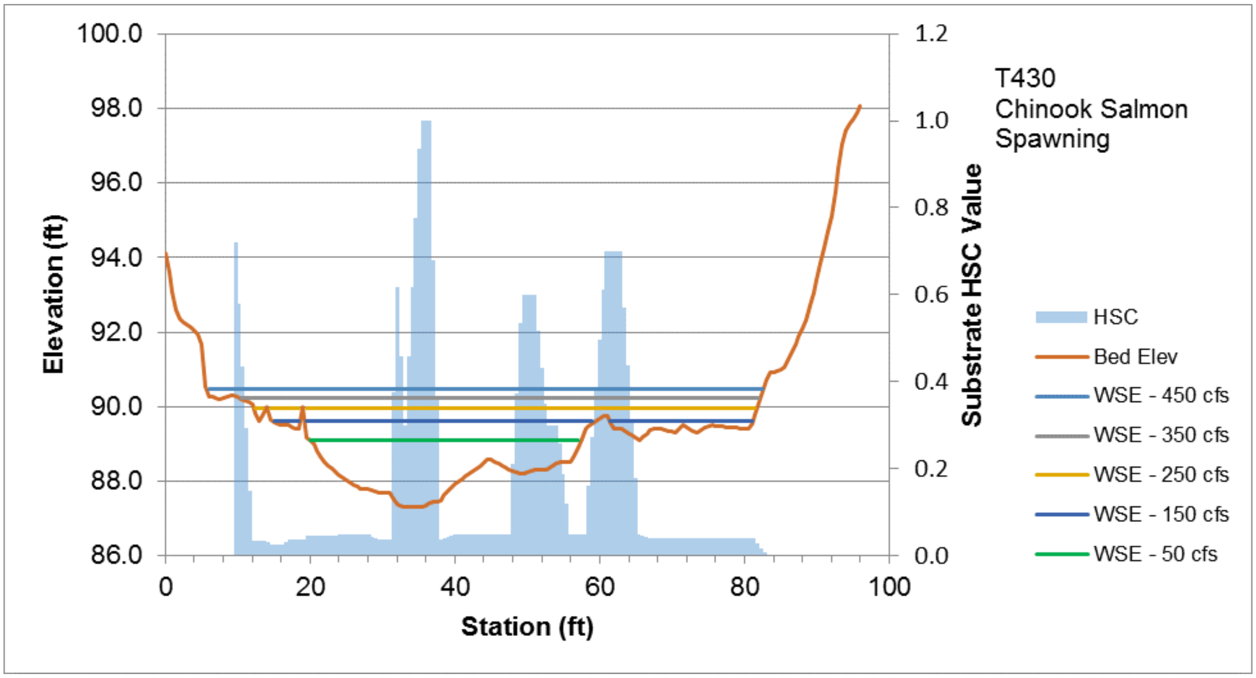

Figure A1-44. Transect 430 bed profile, Chinook spawning substrate values, and WSEs, 50 - 450 cfs.

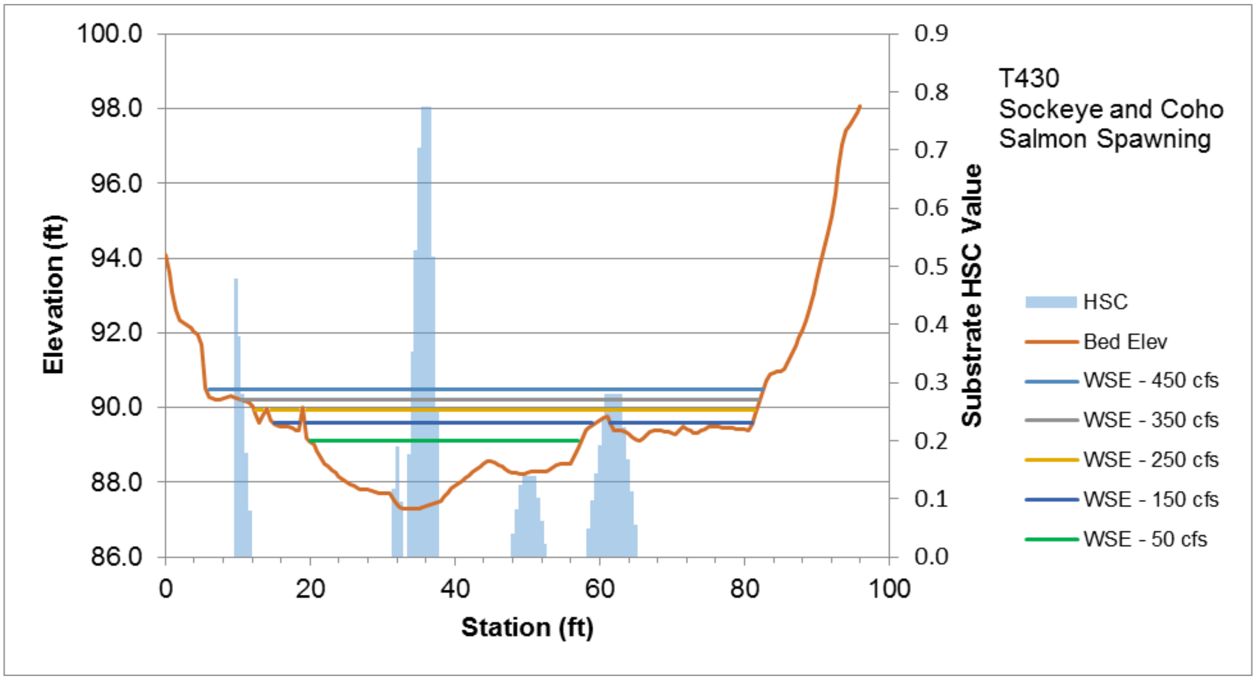

Figure A1-45. Transect 430 bed profile, sockeye and coho spawning substrate values, and WSEs, 50 - 450 cfs.

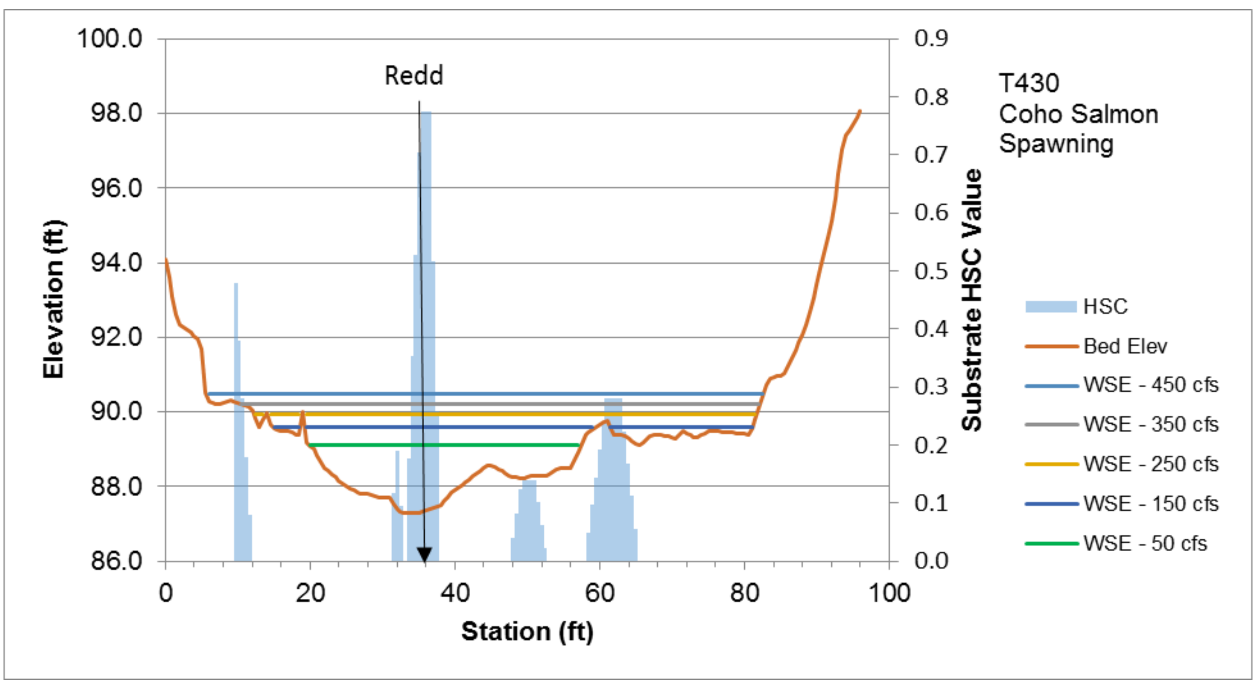

Figure A1-46. Transect 430 bed profile, coho spawning values, redd locations, and WSEs, 50 - 450 cfs.

Appendix 5: Grant Creek Habitat Time Series Analysis

Grant Lake Hydroelectric Project (FERC No. 13212)

Grant Creek Habitat Time Series Analysis

Draft Report

Prepared for
Kenai Hydro LLC

Prepared by

MCMILLEN
DESIGN with Vision. BUILD with Integrity.

October 2014

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Grant Lake Hydroelectric Project (FERC No. 13212)

1 INTRODUCTION

This report is intended to address a request from the Instream Flow Work Group (Work Group) to conduct a habitat time series analysis for the salmonid life history stages present in Grant Creek for the Grant Lake Hydroelectric Project (Project). This effort requires a long-term hydrologic record to compare Grant Creek flows without the Project (i.e., pre-Project) to flows for the same time period, assuming the Project is on-line and operating as proposed (i.e., with-Project).

The goals and objectives of this analysis were as follows:

- Calculate habitat for the Grant Creek salmonid species and life history stages, as measured by Weighted Usable Area (WUA).
- Compare the amount of habitat for the Grant Creek salmonids pre-Project and with-Project for the period of record.
- Calculate gains or losses in habitat with the Project on-line.

2 METHODS

McMillen, LLC (McMillen) ran the previously calibrated Grant Creek Instream Flow models used for the Instream Flow Study. Much of the data or work products required for the habitat time series analysis were developed subsequent to the Aquatic Resources – Grant Creek Aquatic Habitat and Instream Flow Study Final Report (KHL 2014). Data required to conduct the habitat time series analysis are listed below:

- Hydrologic Record. McMillen developed a long-term hydrologic record that extended from Calendar Year (CY) 1948 through CY 2013. The record was developed for pre-Project flows and with-Project flows and is a composite record of actual and synthesized data.
- Grant Creek final transect weighting for all transects.
- Final Grant Creek WUA, incorporating all species and life history stages for all transects.

McMillen used RHABSIM (Riverine Habitat Simulation System) by Thomas R. Payne and Associates (now with Normandeau Associates, Arcata, CA) to produce WUA curves for all salmonid spawning and rearing life history stages.

McMillen used Microsoft Excel© to calculate daily WUA values, using Grant Creek periodicity, and synthesized or measured flows for the years 1948 through 2013, both pre-Project and with-Project. Daily WUA for each species and life history stage were then averaged for the appropriate dates, based upon the periodicity of the species and life history stages.

3 RESULTS

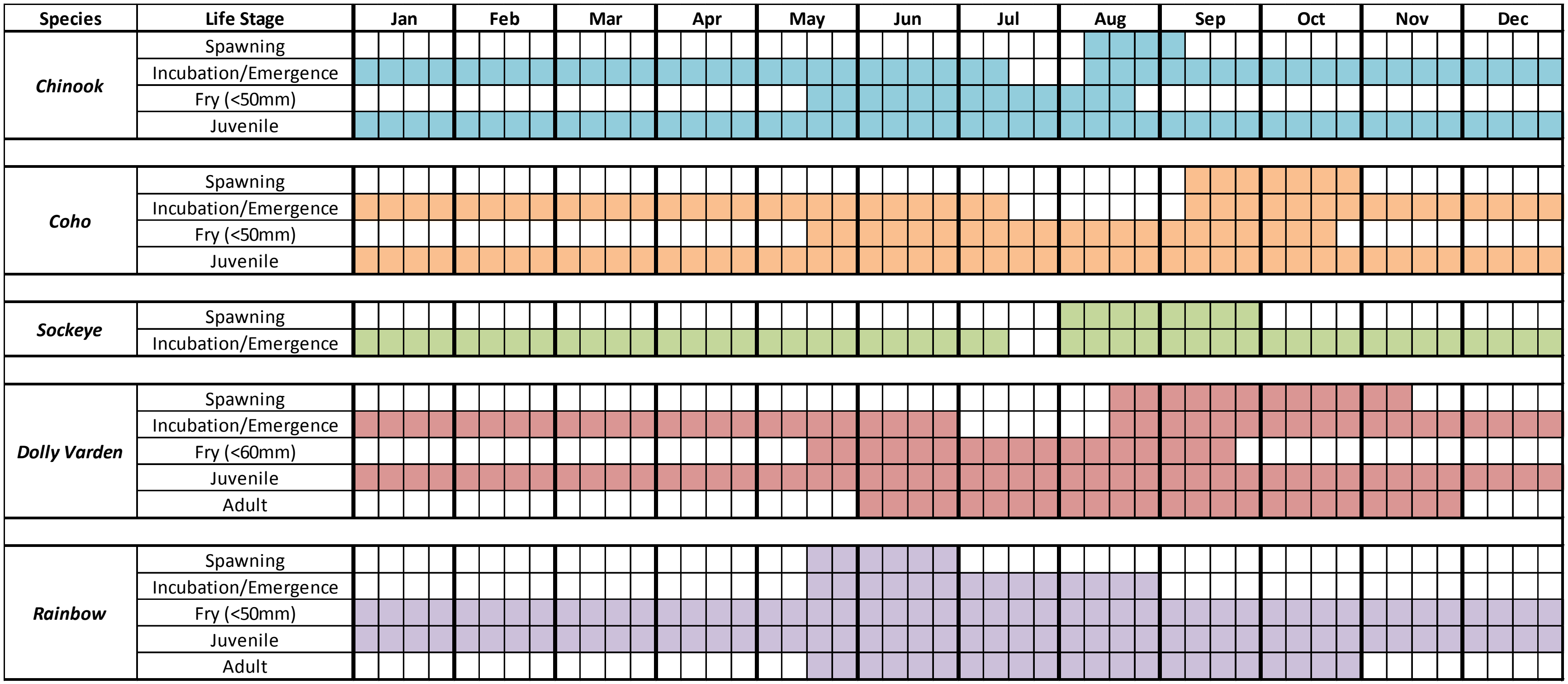
3.1 Target Species

Target species and life history stages are summarized in Table 3.1-1. Grant Creek periodicity is provided in Table 3.1-2.

Table 3.1-1. Potential target species and life history stages to be modeled in the Grant Creek Instream Flow Study.

Species	Spawning	Fry Rearing	Juvenile Rearing	Adult Rearing
Sockeye Salmon	✓			
Coho Salmon	✓	✓	✓	
Chinook Salmon	✓	✓	✓	
Rainbow Trout	✓	✓	✓	✓
Dolly Varden Char	✓	✓	✓	✓

Table 3.1-2. Life history and periodicity for Grant Creek salmonids.



3.2 Grant Creek Hydrology

As mentioned above, McMillen developed a composite, 66-year time series for Grant Creek for CY 1948 through CY 2013. Measured flows in Grant Creek were collected by the following:

- The U.S. Geologic Survey (USGS) (USGS gage 15246000 Grant Creek data – 1/1/1948 – 9/30/1958);
- Kenai Hydro LLC (KHL) (4/3/2013 – 12/31/2013); and
- Ebasco data (1981 – 1983, intermittent).

The record extension was based upon a correlation with overlapping Kenai River at Cooper Landing data (USGS 15258000) for the 1/1/1948 – 9/30/1958 period with the USGS data on Grant Creek. The hydrologic record was then extended from 10/1/1958 – 4/2/2013, excluding the Ebasco periods. That 66-year composite (measured and synthesized flows) record (pre-Project) was then revised to reflect the with-Project condition, producing two 66-year composite records for analysis.

3.3 Grant Creek Reach and Transect Weighting

Final Grant Creek transect and reach weighting were developed in consultation with the Work Group. A final transect weighting report was issued on August 4, 2014.

3.4 Grant Creek WUA

Once Grant Creek reach and transect weighting were established, KHL developed final WUA curves for the Grant Creek salmonid species and life history stages. These curves were then used to analyze daily flows for the 66-year period of record, pre-Project and with-Project. Results are provided below.

3.4.1 Chinook Salmon

WUA for Chinook salmon spawning and rearing are shown in Figures 3.4-1 to 3.4-3. With-Project WUA ranged from 96.9% of pre-Project for Chinook fry rearing, to 100.2% for Chinook juvenile rearing. Chinook spawning with-Project WUA was 99.5% of the pre-Project WUA.

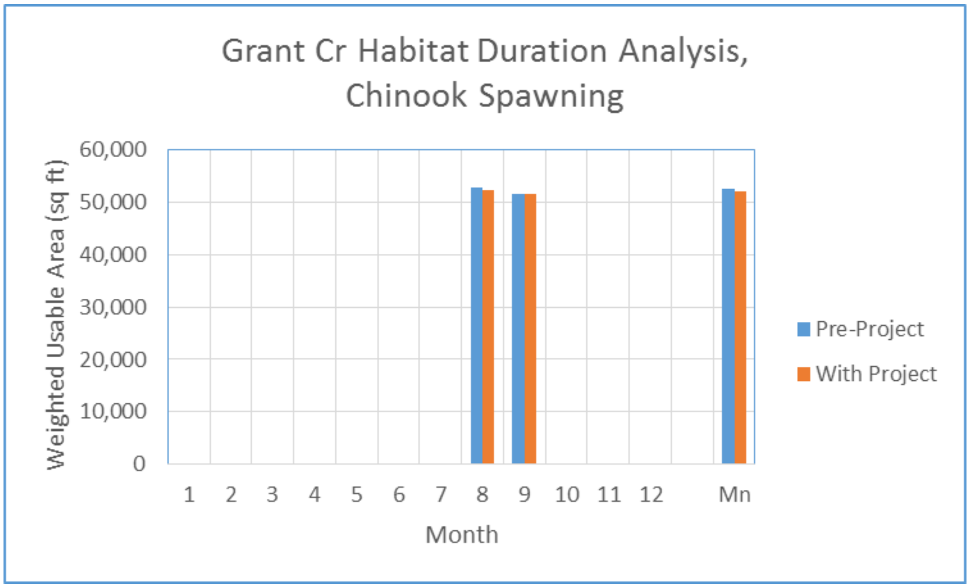


Figure 3.4-1. Chinook Spawning WUA

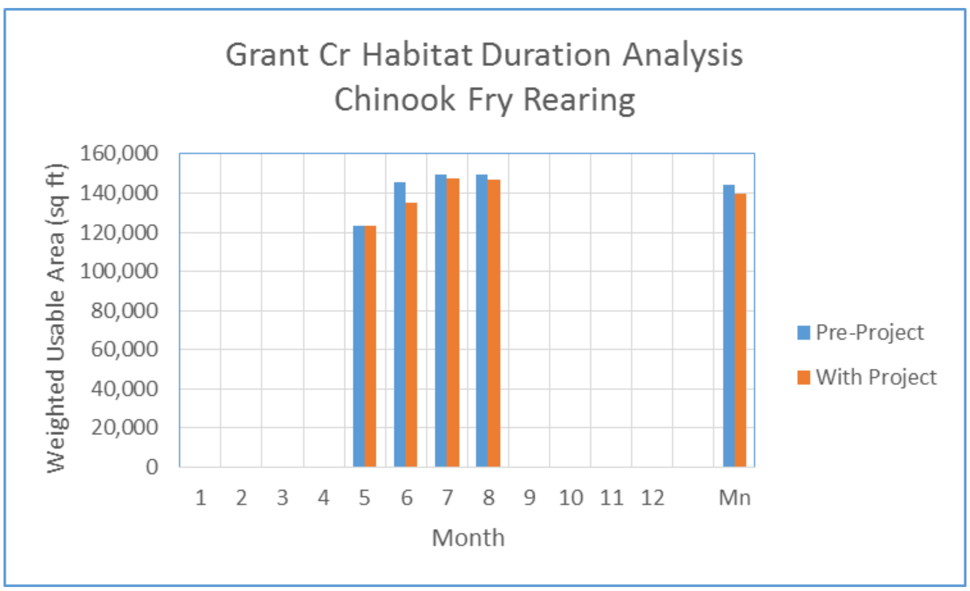


Figure 3.4-2. Chinook Fry Rearing WUA

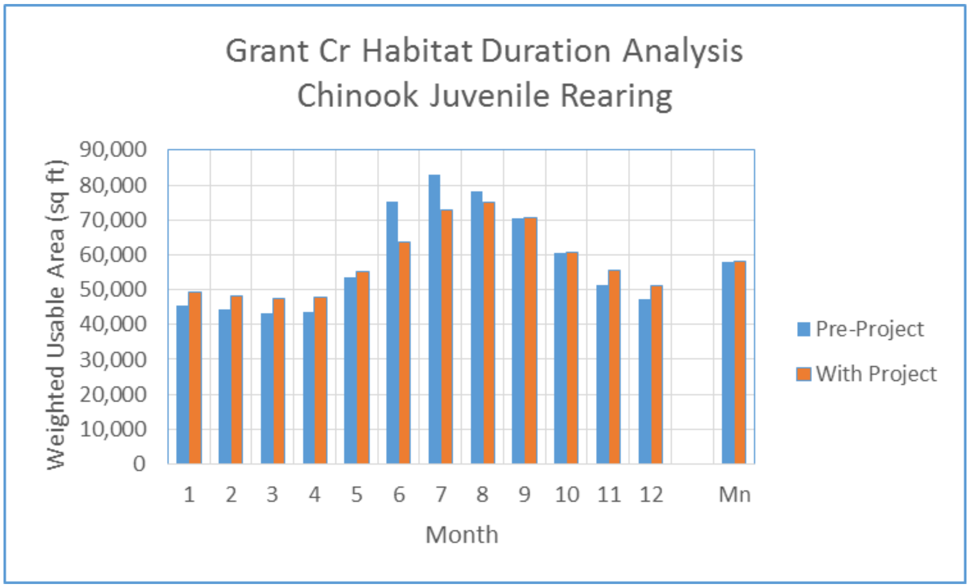


Figure 3.4-3. Chinook Juvenile Rearing WUA

3.4.2 Coho Salmon

WUA for coho salmon spawning and rearing are shown in Figures 3.4-4 to 3.4-6. With-Project WUA ranged from 99% of pre-Project for coho fry rearing, to slightly more than 100% for coho spawning. With-Project coho juvenile rearing WUA averaged 99.2% of pre-Project WUA; however, monthly with-Project WUA ranged from 93.9% to 103.8% of pre-Project WUA. With-Project WUA was generally higher than pre-Project WUA during the late fall – early spring months, when the Project would increase Grant Creek flows.

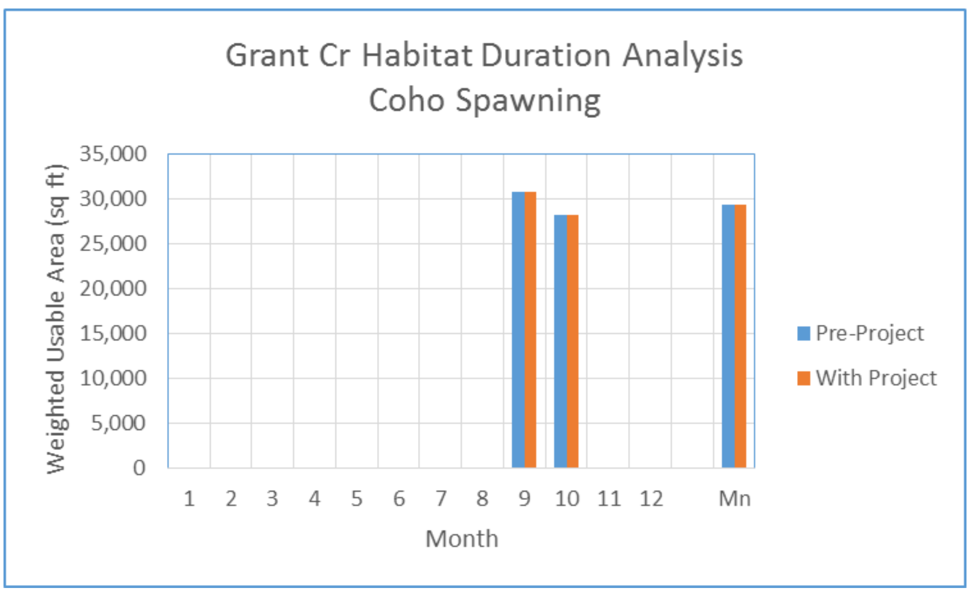


Figure 3.4-4. Coho Spawning WUA

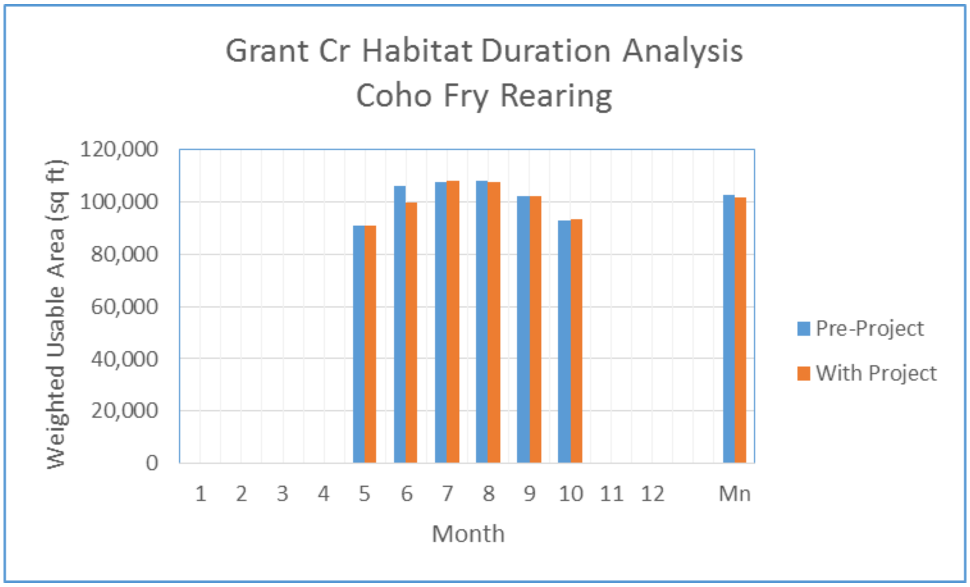


Figure 3.4-5. Coho Fry Rearing WUA

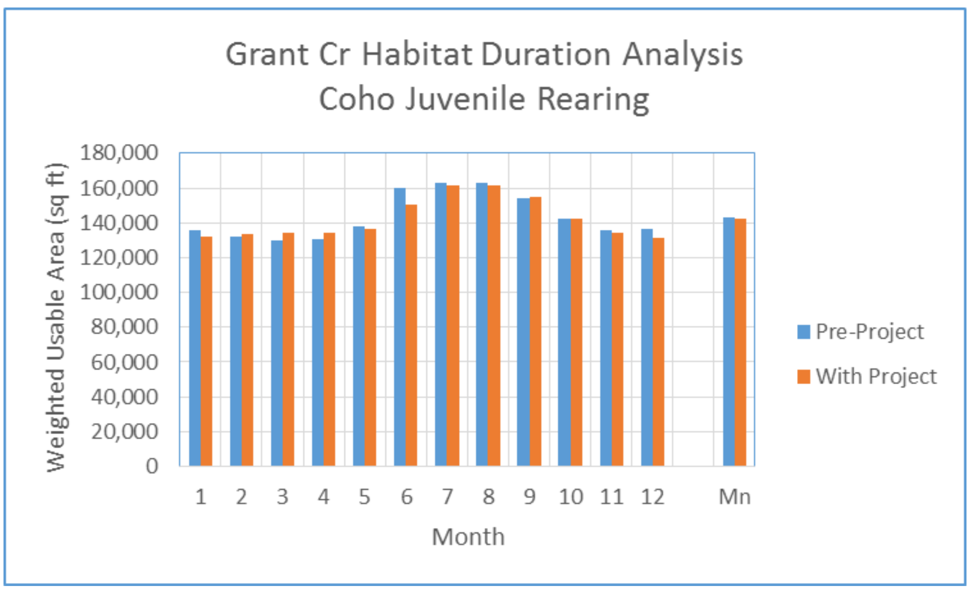


Figure 3.4-6. Coho Juvenile Rearing WUA

3.4.3 Sockeye Salmon

WUA for sockeye salmon spawning is shown in Figure 3.4-7. With-Project spawning WUA averaged 99% of pre-Project WUA, but ranged from 98.0% in August to 100.1% in September.

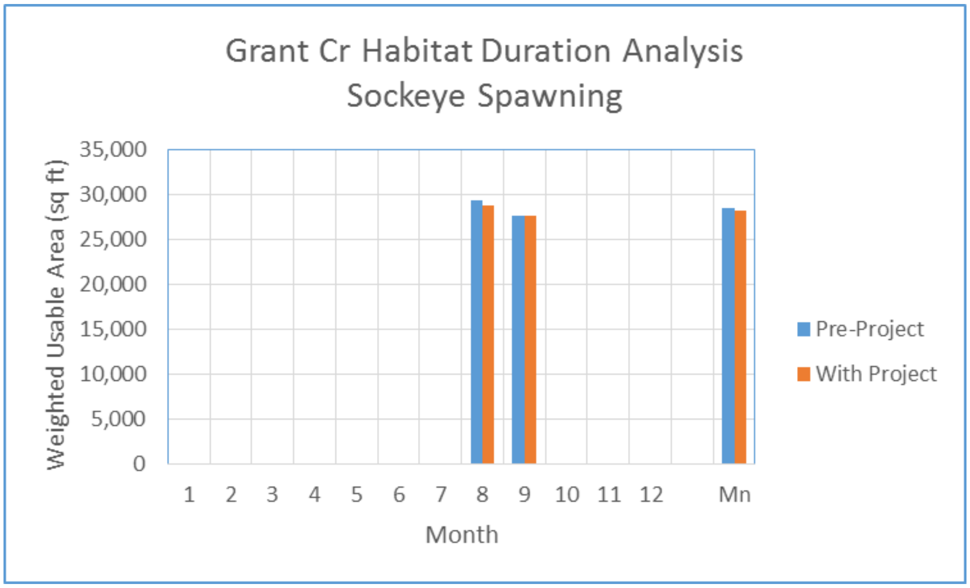


Figure 3.4-7. Sockeye Spawning WUA

3.4.4 Dolly Varden

WUA for Dolly Varden spawning and rearing are shown in Figures 3.4-8 to 3.4-11. With-Project WUA ranged from 96.5% of pre-Project WUA for Dolly Varden adult rearing to 102.9% for Dolly Varden juvenile rearing. Dolly Varden fry rearing post-Project WUA averaged 98.9% of the pre-project WUA, ranging from 94.9% to 100.6%. With-Project spawning WUA was slightly greater than pre-Project WUA (100.3%).

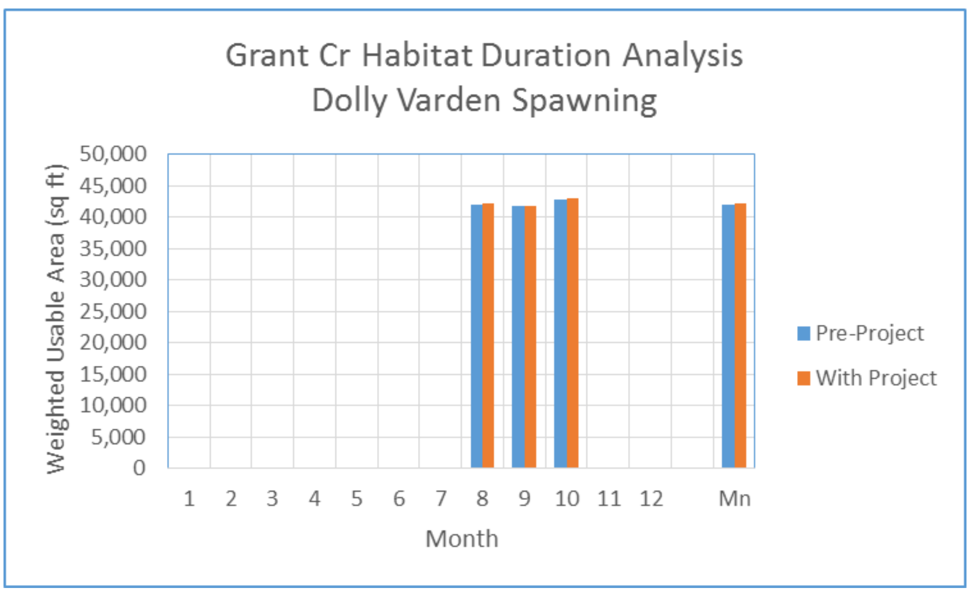


Figure 3.4-8. Dolly Varden Spawning WUA

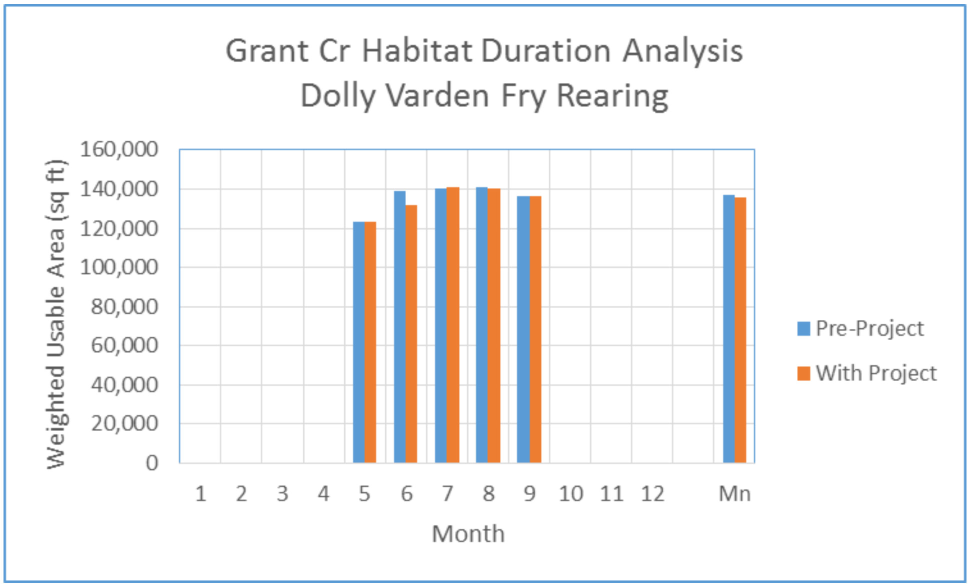


Figure 3.4-9. Dolly Varden Fry Rearing WUA

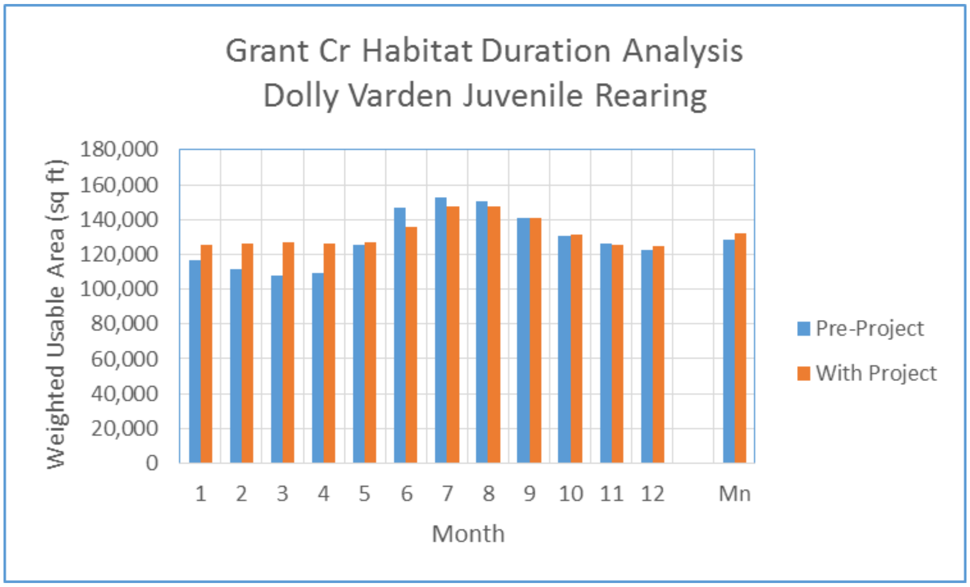


Figure 3.4-10. Dolly Varden Juvenile Rearing WUA

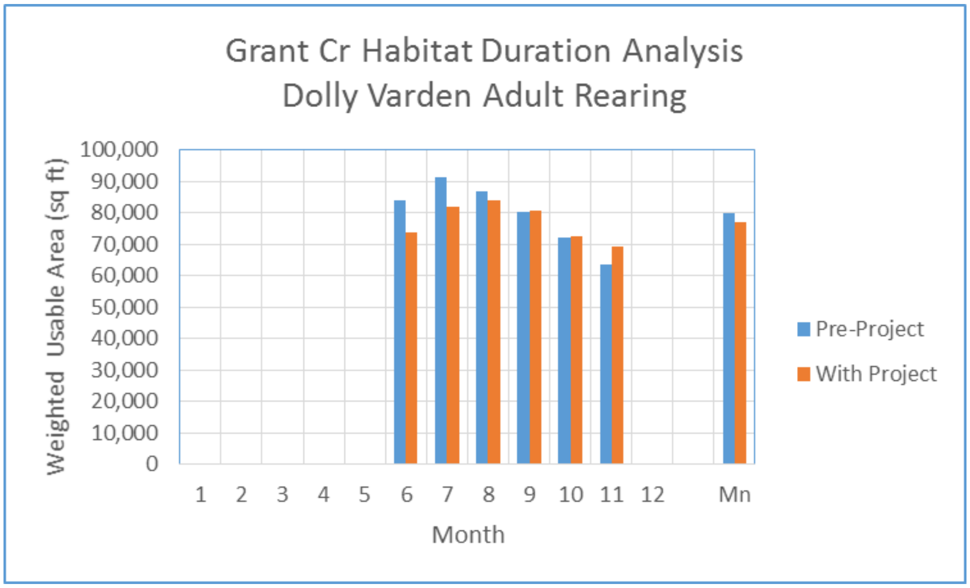


Figure 3.4-11. Dolly Varden Adult Rearing WUA

3.4.5 Rainbow Trout

WUA for rainbow trout spawning and rearing are shown in Figures 3.4-12 to 3.4-15. With-Project WUA ranged from 94.2% of pre-Project WUA for rainbow trout adult rearing to 101.4% for rainbow trout fry rearing. Rainbow trout juvenile rearing with-Project WUA averaged 99.3%, ranging from 88.9% – 106.8% of pre-Project WUA. Rainbow trout spawning with-Project WUA averaged 98.8% of pre-Project WUA, ranging from 98% to 100.1%.

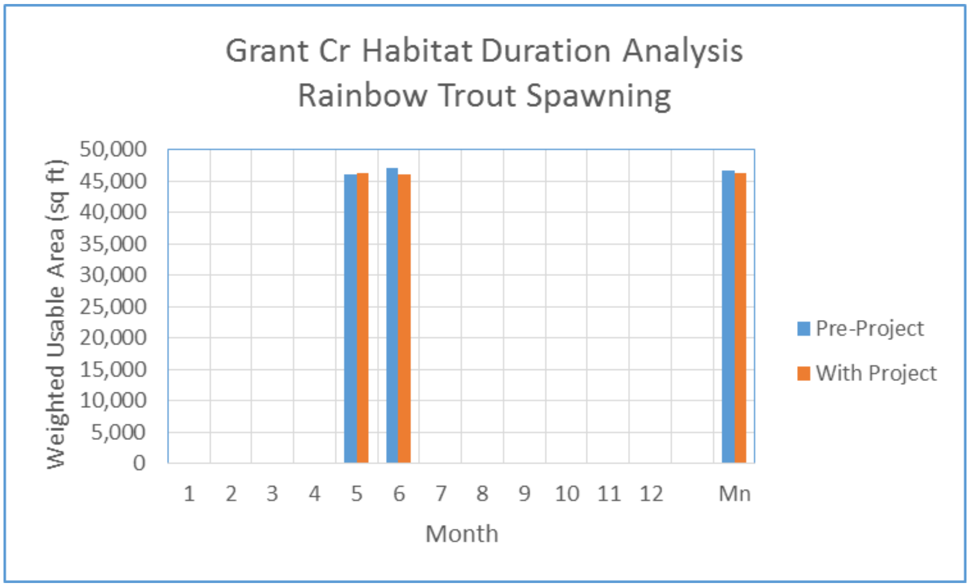


Figure 3.4-12. Rainbow Trout Spawning WUA

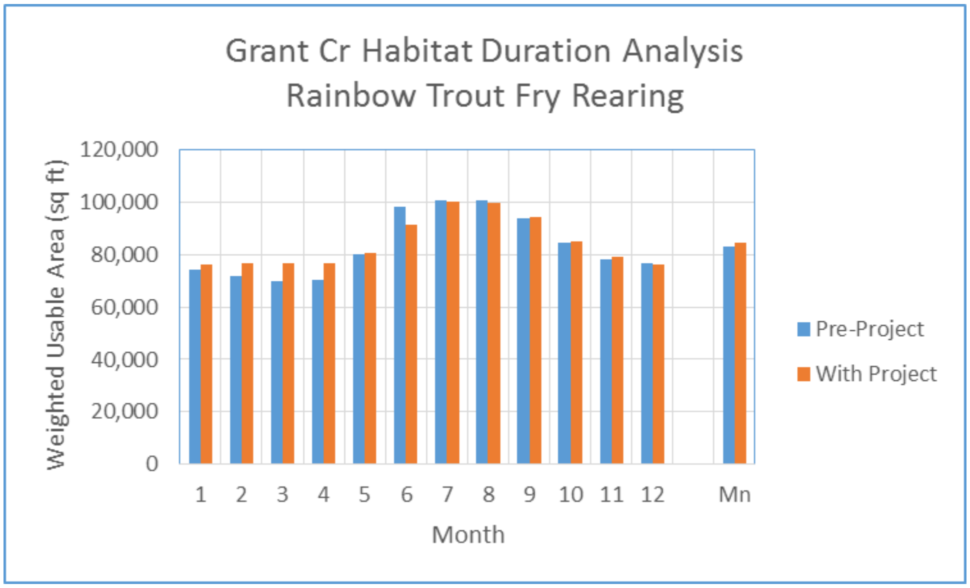


Figure 3.4-13. Rainbow Trout Fry Rearing WUA

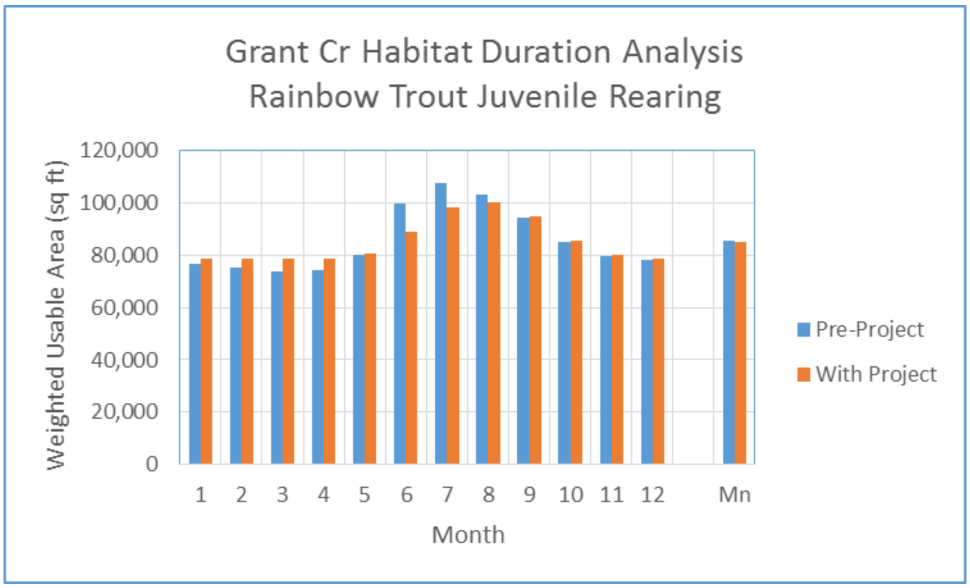


Figure 3.4-14. Rainbow Trout Juvenile Rearing WUA

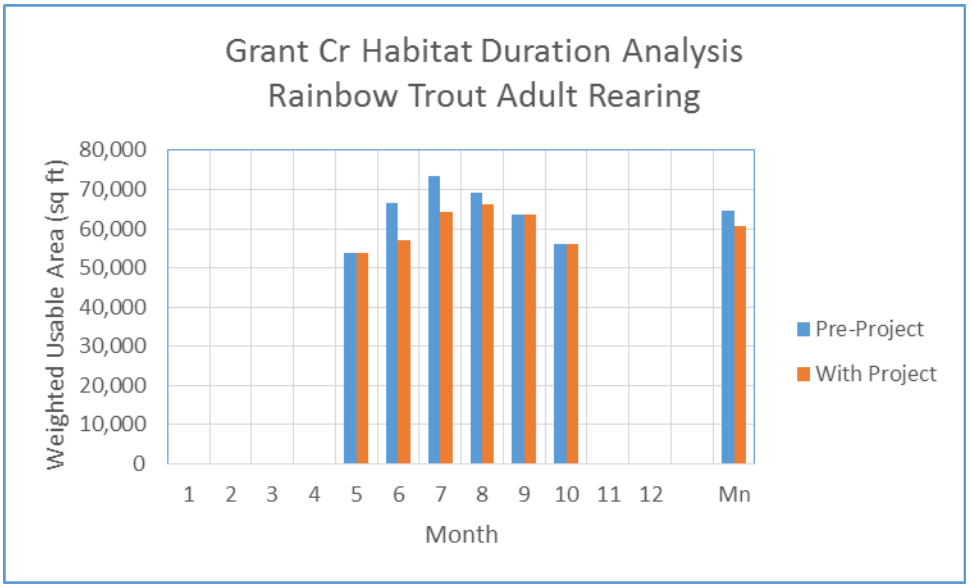


Figure 3.4-15. Rainbow Trout Adult Rearing WUA

3.4.6 Summary

Pre-Project and with-Project WUA for all species and life history stages are shown in Figures 3.4-16 to 3.4-19 and are listed in Table 3.4-1. Overall, with-Project WUA is nearly identical to pre-Project WUA (99.8%). With the exception of resident adult (i.e., Dolly Varden and rainbow trout) with-Project rearing WUA (96.7% of pre-Project WUA), with-Project WUA is within 0.1% or is greater than pre-Project WUA.

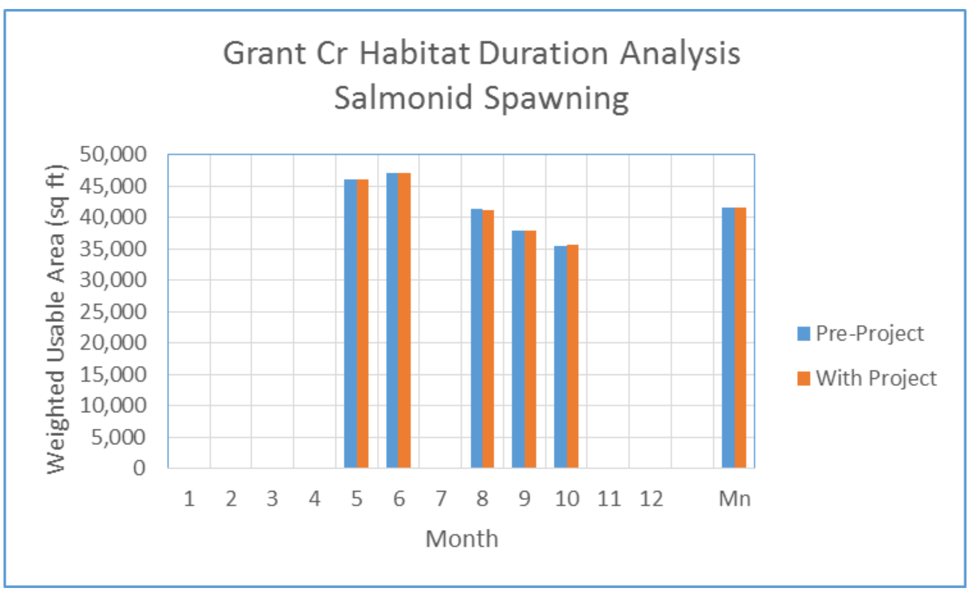


Figure 3.4-16. Salmonid Spawning WUA

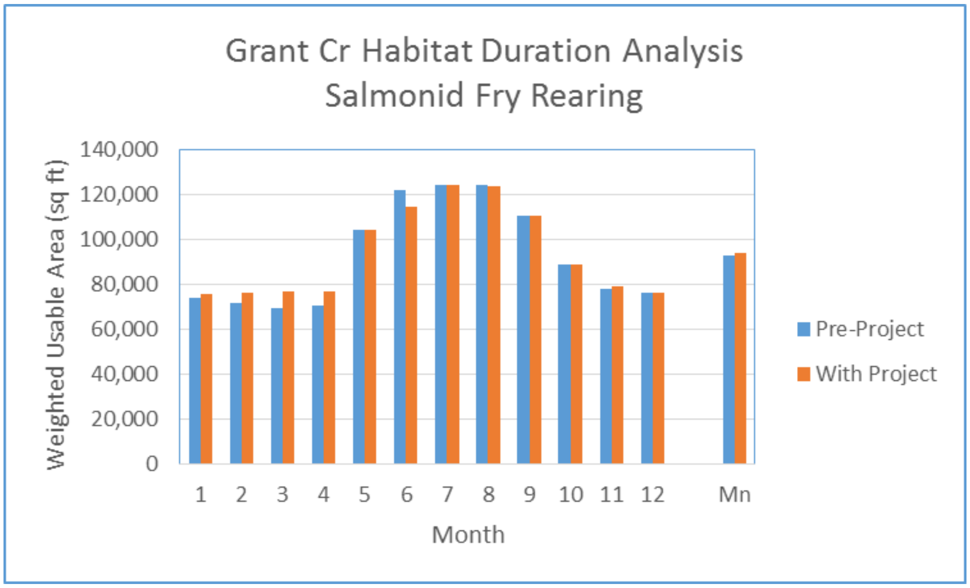


Figure 3.4-17. Salmonid Fry Rearing WUA

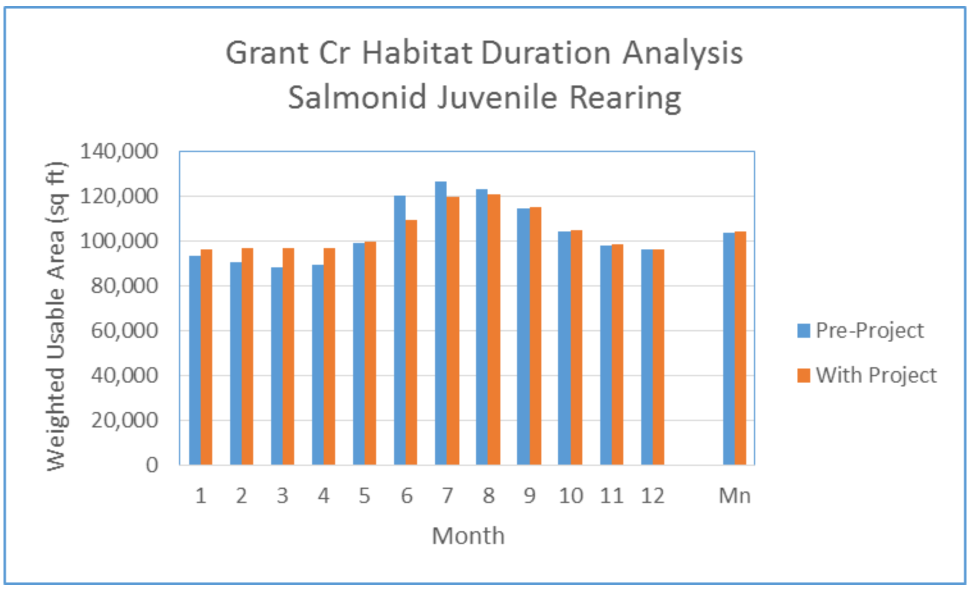


Figure 3.4-18. Salmonid Juvenile Rearing WUA

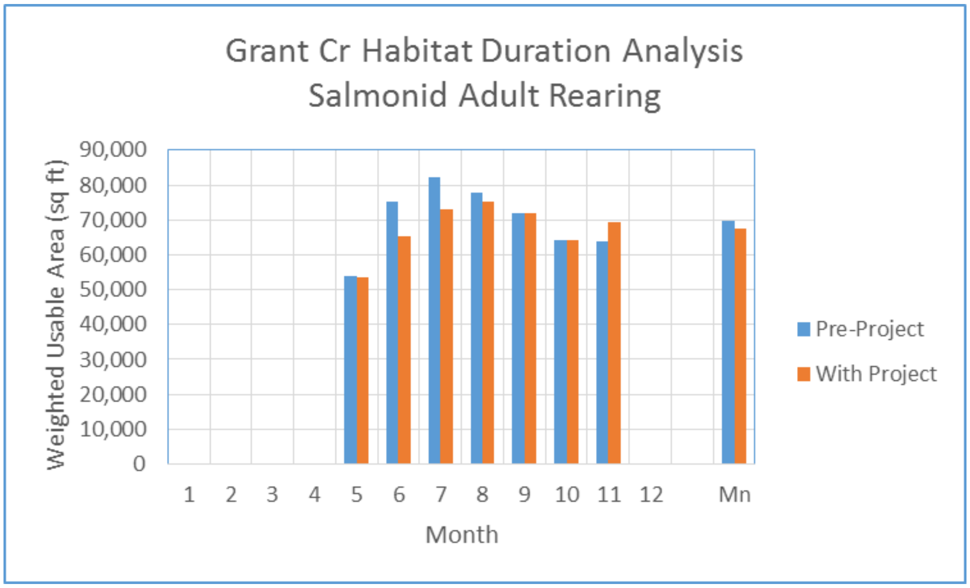


Figure 3.4-19. Salmonid Adult Rearing WUA

Table 3.4-1. Grant Creek pre-Project and with-Project WUA for life history stages.

Life Stage	Weighted Usable Area		
	Pre-Project	**With Project**	**Percentage**
Spawning	41,635	41,607	99.93%
Fry Rearing	93,043	94,060	101.09%
Juvenile Rearing	103,890	104,437	100.53%
Adult Rearing	69,868	67,553	96.69%
Mean	***77,109***	***76,914***	***99.75%***

The analysis provided in this report is based on final transect weighting, final WUA for each species and life history stage, and the 66-year hydrologic record for pre-Project and with-Project flows.

Overall, with-Project WUA is nearly identical to pre-Project WUA, at 99.8%. The lowest with-Project WUA is for Dolly Varden and rainbow trout adult rearing. Adult rearing periodicity for these species extends from mid-May to the end of November. Project flows are reduced during the summer (June – August), which are the reason for lower adult rearing with-Project WUA during this period. If resident fish adult rearing WUA were removed from the analysis, overall with-Project WUA would be 100.6% of the pre-Project WUA.

This analysis does not take into consideration potential mitigation and enhancement measures for the Project. For example, currently the Reach 1 distributary does not become wetted until flows in Grant Creek reach approximately 180 cfs; even when wetted, this distributary receives less than 1% of the Grant Creek flow. If this distributary were to be reconfigured to allow more water into the distributary and at lower Grant Creek flows, WUA for spawning and rearing in this distributary would increase significantly. This proposed enhancement measure, along with documented additional and more consistent flows in the Reach 2/3 side channel complex, will likely increase habitat availability during operations to a level above the current natural condition.

4 LITERATURE CITED

KHL (Kenai Hydro LLC). 2014. Grant Lake Hydroelectric Project (FERC No. 13212). Aquatic Resources – Grant Creek Aquatic Habitat Mapping and Instream Flow Study Final Report. Prepared by McMillen, LLC. June 2014.

Begin forwarded message:

Resent-From: <cory.warnock@mcmillen-llc.com>
From: "Salzetti, Mikel" <MSalzetti@HomerElectric.com>
Date: October 29, 2014 at 12:13:29 PM PDT
To: "Cory Warnock (cory.warnock@mcmillen-llc.com)" <cory.warnock@mcmillen-llc.com>
Cc: "Gallagher, Joe" <JGallagher@HomerElectric.com>, "Zubeck, Brad" <BZubeck@HomerElectric.com>, Bruce Jaffa <bruce@jaffaconstruction.com>
Subject: FW: Grant Lake

Cory:

Will you please see that Bruce gets added to our Stakeholders list and ensure that he gets a notice when the DLA goes out for comment.

Thanks,

Mike

-----Original Message-----
From: Zubeck, Brad
Sent: Wednesday, October 29, 2014 11:10 AM
To: Bruce Jaffa
Cc: CAROLE@JAFFACONSTRUCTION.COM; Gallagher, Joe; Salzetti, Mikel
Subject: RE: Grant Lake

Hi Bruce,

I am glad to hear that you continue to be a proponent of the Grant Lake project. I will copy both Joe Gallagher and the current Project Manager, Mike Salzetti, with this email and then you'll have their contact info for any future correspondence. Thanks!

Best Regards,
Brad Zubeck
HEA/AEEC PM
907-398-1057 Cell
907-335-6232 SCT Project Site

-----Original Message-----

From: Bruce Jaffa [mailto:bruce@jaffaconstruction.com]
Sent: Wednesday, October 29, 2014 11:04 AM
To: Zubeck, Brad
Cc: CAROLE@JAFFACONSTRUCTION.COM
Subject: Grant Lake

Brad,

I probably cannot attend the Moose Pass work session on the status of the Grant Lake Hydro this Nov 6th. I would like to have the opportunity to follow the presentation and offer comments related to the project. I have flown into Grant many times since the studies began and continue to believe in utilizing this energy source. I do not have an e-mail for Joe Gallagher. Can you pass this letter on or send his e-mail.

Regards

--
Bruce Jaffa
Quality Control Manager
Jaffa Construction, Inc.
907-224-8002
907-240-0362 mobile

From:	Cory Warnock <cory.warnock@mcmillen-llc.com>
Sent:	Friday, October 31, 2014 10:33 AM
To:	jjh@seward.net
Cc:	Emily Andersen
Subject:	Grant Lake Project Public Meeting
Attachments:	November 6 public meeting psa.pdf

Hi Jeff,

Hope this email finds you well. I'm guessing you may have already heard about the upcoming public meeting for the Grant Lake Project but wanted to get you the announcement (attached) just in case you hadn't.

Thanks and again, hope all is well,

Cory

Cory Warnock
Senior Licensing and Regulatory Consultant

McMillen, LLC
www.mcmillen-llc.com
5771 Applegrove Ln.
Ferndale, Wa. 98248
O – 360-384-2662
C – 360-739-0187
F – 360-542-2264

Subject: Fwd: Grant Lk permit questions, POA-2008-1492 Grant Lake (UNCLASSIFIED)
Attachments: ORM_Upload_ValidationRules.xlsx; ATT00001.htm; ORM_Upload_Sheet_AqResources_only.xlsm; ATT00002.htm; ORM_Upload_Sheet_Consolidated.xlsm; ATT00003.htm; ORM_Upload_ValidationInstructions.txt; ATT00004.htm

Begin forwarded message:

> **From:** "McCafferty, Katherine A POA" <Katherine.A.McCafferty2@usace.army.mil>
> **To:** "Levia Shoutis" <Levia.Shoutis@erm.com>
> **Cc:** "Cory Warnock (cory.warnock@mcmillen-llc.net)" <cory.warnock@mcmillen-llc.net>, "Speerstra, Linda POA" <Linda.Speerstra@usace.army.mil>
> **Subject: RE: Grant Lk permit questions, POA-2008-1492 Grant Lake (UNCLASSIFIED)**
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
> Hi Levia,
>
> Our goal is to make a decision on Standard Permits within 120 days from receiving a complete application.
>
> It is our task to make the factual determinations under the 404(b)(1) guidelines, using the information provided in the lead agency's NEPA document and in the application that is submitted to us. For each factor, we will want to make sure that we have enough information to discuss the potential short-term and long-term effects of the proposed discharge on the physical, chemical, and biological components of the aquatic environment. Consultants have provided us with a draft of this analysis, when they are trying to expedite a permit evaluation, but this is not a requirement.
>
> The difference between a preliminary JD (PJD) and an approved JD (AJD) is whether we the determination if the water has a demonstrated connection to navigable waters. Regardless of whether it is a PJD or an AJD we still need the information to determine if the three criteria are present for a wetland, or if an ordinary high water mark is present for a stream/open water. You will need to provide the excel tables and the majority of the information requested in our 2010 Special Public Notice The SPN can be found here: http://www.poa.usace.army.mil/Portals/34/docs/regulatory/specialpns/SPN-2010-45.pdf. If you are going to request a PJD, you can leave out any information discussing surface or shallow sub-surface water connections. For your info, the Excel tables have been updated, the newest versions are attached.

Have a good weekend,

Katie McCafferty
Project Manager
Regulatory Division, Kenai Field Office
U.S. Army Corps of Engineers, Alaska District
805 Frontage Road, Suite 200C
Kenai, AK 99611
Direct: 907-283-3562
Office: 907-283-3519

Check out our website for more info: http://www.poa.usace.army.mil/Missions/Regulatory.aspx

-----Original Message-----
From: Levia Shoutis [mailto:Levia.Shoutis@erm.com]
Sent: Friday, October 31, 2014 9:38 AM
To: McCafferty, Katherine A POA
Cc: Cory Warnock (cory.warnock@mcmillen-llc.net)
Subject: [EXTERNAL] Grant Lk permit questions

Hi Katy,

I'm getting organized to prepare the 404 Application package for KHL for the Grant Lake Project. I've got a few permitting questions for you:

* What is the typical timeframe on getting a 404 application turned around (e.g. from when we submit the application to the Corps)- 60 days?

* We'd like move to permitting using a preliminary rather than an approved JD. To confirm, do we still need to complete the jurisdictional determination report, and the Excel tables documenting connection to TNW, RPD, etc? Or can we present our wetland/waters report documenting all delineated wetlands, but not provide a specific JD report?

* 404(b)(1) Analysis: Based on discussions with you in the past, I believe the Corps will complete this analysis based on reports provided in our 404 Application package (e.g. 404 Application, wetland/waters report, and associated figures). Is this correct or do you expect a standalone 404(b)(1) Analysis as part of the 404 Application? I ask because I've provided the Analysis to the Corps in situations when a permit needs to be expedited, but I don't think that is standard?

I've also cc'd Cory here to confirm he doesn't have any additional questions for you, I'm sure we'll have more soon...

Thanks and hope you're well,

Levia

Levia Shoutis

Environmental Resources Management (ERM), Inc.
P.O. Box 582

1 Ninth St. Island Dr.

Livingston, MT 59047
406-222-7600 x229

406-570-6194 Cell
406-222-7677 Fax

levia.shoutis@erm.com <mailto:levia.shoutis@erm.com>
www.erm.com <http://www.oasisenviro.com/>

Please visit ERM's web site: http://www.erm.com

Classification: UNCLASSIFIED
Caveats: NONE

From: Cory Warnock
Sent: Saturday, November 01, 2014 12:43 PM
To: Mike Salzetti; Emily Andersen
Subject: Fwd: Grant Lake dam public meeting Thursday, Nov 6, 6pm, Moose Pass

FYI

Begin forwarded message:

> **Resent-From:** <cory.warnock@mcmillen-llc.com>
> **From:** Michael Yarborough <salvagerecovery@gmail.com>
> **Date:** November 1, 2014 at 12:23:38 PM PDT
> **To:** Cory Warnock <cory.warnock@mcmillen-llc.com>
> **Subject: Fwd: Grant Lake dam public meeting Thursday, Nov 6, 6pm, Moose Pass**
>
> ---------- Forwarded message ----------
> From: **Mark Luttrell** <prufrock@arctic.net>
> Date: Sat, Nov 1, 2014 at 9:03 AM
> Subject: Grant Lake dam public meeting Thursday, Nov 6, 6pm, Moose Pass
> To: Mark Luttrell and Ann Ghicadus <prufrock@arctic.net>
>
> Hi all:
>
> Over the past 6 years, the proposal to dam Grant Lake above Moose Pass has changed shape many times and what Homer Electric Association (Kenai Hydro Ltd) proposes now is unclear. Check out KHL's website to get a sense of it. They are hosting a meeting to discuss it in Moose Pass on Thursday, November 6, 6-9pm at the Moose Pass community hall. You'll learn a lot if you attend.
>
> This is important. If completed, the dam and 3.5 miles of roads would mar wildland, reduce recreation opportunities, threaten historic sites and artifacts, threaten salmon habitat, diminish scenery and go against local sentiment. It would provide very little power and no long term jobs.
>
> Mark Luttrell
> Seward
>
> Here's an alert from the good folks at the Center for Water Advocacy:

Public Meeting on Grant Lake Hydro Project scheduled for November 6th in Moose Pass

The Grant Lake Hydropower Project

The Homer Electric Authority (HEA) is pushing ahead with all that remains of what was once a proposal to build a **network of multiple hydroelectric dams, reservoirs, intakes, roads, diversions, pipelines, tunnels, powerhouses, and transmission lines that would have, irreversibly, industrialized the headwaters of the Kenai River** near Cooper Landing, Moose Pass and Seward. The original proposal was dropped due to a grass roots effort that rose up in opposition to the hydropower network and it's **impacts to natural flows, the ecological and hydrological health of tributaries and cumulative impacts downstream within the Kenai River Watershed.** Not just water and fishery but other resources would have been effected by the network including historic sites like the **Iditarod National Historic Trail Not and the Kenai Peninsula local economy** which is dependent on outdoor recreation and tourism. Given insider manipulations and complex levels of state and federal bureaucracy,conservationists, however, are concerned that if the Grant Lake hydro-power project is constructed, it **could be used as a precedent to revisit the original network proposal.**

The Homer Electric Association (HEA), will be holding a **public meeting** to discuss the development of the proposed **Grant Lake Hydroelectric Project** near Moose Pass. Over the past three years, Kenai Lake Hydro, a wholly owned subsidary of HEA, has been collaborating with Stakeholders and the Federal Energy Regulatory Commission (FERC) to **conduct natural resource studies and developed an engineering/design program** for the Project.

According to KHL "[a]s a result of the positive findings related to these endeavors, KHL is in the process of developing it's FERC License Application and plans on submitting it for public and agency comment early in 2015....At the November 6th public meeting, project **representatives will discuss the engineering and design plans, elaborate on**

the anticipated schedule for development and answer any questions that individuals may have with respect to the overall design and process associated with the Grant Lake Project."

Come to the public meeting and tell HEA that we do not need the Grant Lake Hydropower project if it will **lead to a network of environmentally damaging hydro-power projects in the Kenai River Watershed.** Also, tell them that, as demonstrated by the disastrous impacts to countless watersheds and fish and wildlife habitat in the lower 48, **Alaska does not need the irreversible environmental and social effects of mega level hydropower development**.

Details related to the meeting:
Grant Lake Hydroelectric Project Public Meeting
Thursday November 6, 2014 (6pm - 9pm)
Moose Pass Community Hall
33657 Depot Road, Moose

For more information on the Grant Lake Hydropower Project go to www.tcfwa.org.

Visit our Website!

--
Michael R. Yarborough
Senior Archeologist
Cultural Resource Consultants LLC
3504 E. 67th Avenue
Anchorage, Alaska 99507

Anchorage: (907) 349-3445
Cell: (907) 306-6069

Attachments: DNR_Park_use_permit_signed.pdf

earthscape
1343 G Street, Suite 101
Anchorage, AK 99501

P 907.279.2688

From: McMillan, Matthew [mailto:matthew.mcmillan@stantec.com]
Sent: Monday, November 03, 2014 10:14 AM
To: Russell, Pamela J (DNR)
Cc: Dwayne Adams
Subject: RE: Trail Camera Permit for Grant Lake Region

Pam,

Thanks for this. I attached the signed copy. Let me know if you need me to mail a hard copy to you.

Matt

From: Russell, Pamela J (DNR) [mailto:pamela.russell@alaska.gov]
Sent: Saturday, November 01, 2014 2:07 PM
To: McMillan, Matthew
Subject: RE: Trail Camera Permit for Grant Lake Region

Hi Matt,

I am finally getting caught up on my permits. I have attached a copy of the permit for you to review. Please have the top page signed and send it back to my office.

As you will notice I only permitted three of the cameras, one of the cameras is on general state land not within the Kenai River Special Management area. So I am wondering if you received a permit from mining, land and water out of Anchorage. You may want to give them a call at 907-269-8400.

Let me know if you have any question

Pamela Russell

Div. of Parks and Outdoor Recreation
Natural Resource Specialist III
514 Donald E Gilman River Center
Soldotna, AK 99669
907-714-2471

The Division of Parks and Outdoor Recreation provides outdoor recreation opportunities and conserves and interprets natural, cultural, and historic resources for the use, enjoyment, and welfare of the people

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From: McMillan, Matthew [matthew.mcmillan@stantec.com]
Sent: Monday, October 06, 2014 12:23 PM
To: Russell, Pamela J (DNR)
Subject: RE: Trail Camera Permit for Grant Lake Region

Pam,

I just wanted to follow up with you to see if there was anything I need to do and if a permit extension is needed? Thanks!

Matt

From: McMillan, Matthew
Sent: Friday, October 03, 2014 9:07 AM
To: 'pamela.russell@alaska.gov'
Subject: Trail Camera Permit for Grant Lake Region

Pam,

Attached is the permit application that was sent in April, to my knowledge. We would like to extend the permit for another year if possible to October 1, 2015. Let me know if there is anything else you may need from me. Thanks again.

Matthew McMillan
Stantec
2515 A Street Anchorage AK 99503-2709
Phone: (907) 343-5252
Fax: (907) 258-4653
matthew.mcmillan@stantec.com

Division of Parks and Outdoor Recreation

Alaska Department of Natural Resources

Park Use Permit

Park Unit: Kenai River Special Management Area **Permit #** 14-KA-1973

First Name Dwayne **Last Name:** Adams

Company Name: Homer Electric Assn/Grant Lake Hydro Project

Address: 3977 Lake Street **City:** Homer **State:** AK **Zip:** 99603

KPB Tax Parcel # 12516022/12531006/12520101 **KRC Tracking #** 600

Location of Authorized Activity

T4N, R1W, SEC 13 S.M..SW 0880002 ASLS 86-176 Tract A/ T5N R1E SEC 31, S.M. SW govt Lots 1,2,5,&6 &w!/2 E1/2 & E1/2 W1/2

Description of Authorized Acitivty

This permit authorizes the installation of 3 mini cameras to trees to detect movement that assists in quantifying trail use.

Cameras 1 is located at the Vagt Lake trail head, Camera 2 is by the railroad trestle and camera 3 is at the beginning of Saddle trail head. All the cameras have been secured within a steel housing and then secured to the tree with an adjustable nylon strap and steel lockable cable.

A'' 'rash will be removed from the state park caused by this activity.

Tree cutting and vegetation removal is prohibited.

The crew members are responsible for all fees related to park use outside this permit.
Any damage that may occur to state land will be the responsibility of the applicant to restore to its original state.
The permittee shall remove all litter caused by their activities and shall make a reasonable effort to pick up and remove from the park litter which they find in the vicinity of their activity within the park.

Issue Date: **03/30/14** **Expiration Date** **11/01/15**

The permittee agrees to abide by the terms and conditions of this permit, including any attached stipulations, and will confine his/her activities to those described herein. Permit required by 11 AAC 18.010.

Permittee Signature

Pamela Russell
Issuing Official

Natural Resource Specialist
Title

1/3/14
Date

11/1/14
Date

Grant Lake Hydroelectric Project (FERC No. 13212) Licensing

Consultation Record

Phone/E-mail /One on One Meeting Log

Contact Name: Ethan Shutt and Dara Glass

Agency/Organization: CIRI

Phone No./E-mail Address: dglass@ciri.com

Date: 11/5/14

Time: 2:00pm AST

Grant Lake Licensing Team Contact: Cory Warnock

Summary of Conversation and/or E-mail Exchange: Mike Salzetti and Mr. Warnock met with CIRI representatives Ethan Shutt and Dara Glass at the CIRI office in Anchorage to update them on Grant Lake Project progress and to provide Mr. Shutt with some visual representations of the project site and associated infrastructure.

Meeting Time – Approximately 20 minutes

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
6:00PM – 9:31PM

Presenters: Mike Salzetti (HEA), John Stevenson (BioAnalysts, Inc.), John Blum (McMillen, LLC), Cory Warnock (McMillen, LLC), Mike Yarborough (Cultural Resource Consultants), Dwayne Adams (Earthscape), Mort McMillen (McMillen, LLC)

Attendees: See sign-in sheet (Attachment A)

Attachments

A – Sign-in sheet
B – Public Meeting Presentation

Mike Salzetti (HEA) opened the meeting at 6:07pm by briefly introducing the project and the project team. He introduced the audience to the project resources (paper copies) made available at the meeting and gave instructions regarding the single question survey that Kenai Hydro (KHL) would like to have meeting attendees complete and turn in.

Mike explained that the main purpose of the meeting is to summarize and share the results of the various resource studies. He emphasized that tonight's presentation would only be an overview of what is a body of very detailed information. The detailed study plans and results are available on KHL's website.

Mike explained that Kenai Hydro LLC is a wholly-owned subsidiary of HEA.

Mike provided a brief history of the project from work in the 1980's, to more recent studies, and leading up to the material to be presented today. Mike explained that following the scoping process in June of 2010, it was evident that Stakeholders desired studies that were more quantitative in nature than those developed earlier. As such, KHL refine the study plans based on comments, hired appropriate study consultants and vetted the refined plans with Stakeholders to confirm their adequacy. The studies were then implemented in 2013/2014. Mike then explained the key project features: a water fall at the outlet of Grant Lake, steep topography, and proximity to infrastructure (transmission lines, road & rail system).

The project's operating assumptions were presented to the group. There is no longer a dam associated with the project. Lake level will fluctuate from 0 to -13ft (Elev. 703-690-ft). There will be a tunnel, a powerhouse, and a detention pond.

John Stevenson (BioAnalysts) gave his presentation of the Aquatic/Fisheries Studies. John identified four anadromous salmonid species that are found in Grant Creek, which include pink, Chinook, sockeye, and coho salmon. Key resident species include rainbow trout and Dolly Varden. Based on visual, redd, carcass and radio telemetry surveys, John pointed out that Reaches 1 and 3 were most important to all species of interest, and that only 1.3 percent of all spawning occurred in Reach 5. He explained that this was a summary of what amounted to an extensive amount of data. Primary methods included but were not limited to:

- Use of a weir
- Radio tagging and tracking
- Incline plane traps
- Minnow trapping
- Spawning surveys
- Snorkeling
- Floy tagging
- Genetic sampling

John reiterated that the entirety of the study report and associated results could be found on the KHL website. John's portion of the presentation is incorporated into the attached document.

John Blum (McMillen) presented the instream flow study results. He explained that the purpose of the study is to answer two questions: 1) Where is the preferred fish habitat and, 2) How does the project hydrology affect this habitat? Minimum instream flow rates for the bypass reach were presented along with their influence on the fish habitat of Grant Creek. John explained that the entirety of the report and associated results can be found on KHL's website. John's portion of the presentation is incorporated into the attached document.

*** A short break was taken from approximately 7:10-7:19pm. ***

Cory Warnock (McMillen) presented the Water Resources and Terrestrial study plans and summaries. Water quality was found to be consistent with results from previous studies in the 1980's as well as the 2009 study data. The Terrestrial Study looked at botanical, wetlands, and wildlife resources. The study findings were summarized by noting the species and counts observed within the study area. Cory noted that the project intake design and lake levels were altered to avoid impacting botanical resources identified in the study. Cory explained that the entirety of the report and associated results can be found on KHL's website. Cory's portion of the presentation is incorporated into the attached document.

Mike Yarborough (Cultural Resource Consultants), presented the Cultural Resource study and findings. The study conducted included a literature review and pedestrian surveys… no native Alaskan sites were discovered in the surveys. Some of the information has been kept confidential at the request of the agencies and per the Section 106 process. Fourteen newly identified historic sites were identified and only one was recommended as eligible for the National Register. Impacts were deemed as minimal and mostly associated with potential increased access as a result of the project.

Dwayne Adams (Earthscape) presented the Recreational and Visual Resource study findings. The study looked at both winter and summer uses of the area. Noise levels were also assessed; typically 40dB or less with peak levels at 80-90dB from airplane flyovers or snowmachines. Work to address the commemorative Iditarod National Historic Trail impacts were explained. Dwayne explained that the entirety of the report and associated results can be found on KHL's website. Dwayne's portion of the presentation is incorporated into the attached document.

Mort McMillen (McMillen) presented an overview of the proposed project design and the elements that addressed the findings or issues identified by the studies. Construction would be expected to take place over two summers. Efforts are made to mitigate construction impacts through planning, monitoring, and Best Management Practices. Mort explained that the entirety of the infrastructural design and associated operational regime would be described in the DLA. Mort's portion of the presentation is incorporated into the attached document.

At 8:19pm, the meeting was opened for questions from the audience.

Q: Mark Luttrell said that he felt that KHL was there to tell the public what we are going to do, not "if" KHL was going to do the project. He said that he thought the public was against the project and was "torqued" that HEA does not seem to have heard this input.
A: Mike replied that the public has been informed of the process and has been kept in the loop regarding the Project status, and that while there are some elements of the public that are opposed to a Grant Creek Project, there are also proponents, including HEA's Board of Directors and HEA members. Furthermore, Stakeholders which include both state and federal entities have been heavily involved with development of operating conditions.

Q: Mike Cooney asked what the estimated capital construction cost was.
A: Mike Salzetti said it is approx. $58M.

Q: What % of the overall power production will this project represent?
A: Mike Salzetti said this plant would produce about 4% of HEA's energy usage.

Q: What other renewable projects is HEA investigating?
A: Mike Salzetti stated that HEA is looking at tidal and solar energy projects. Mike explained that wind energy is an intermittent source and can impact our gas contracts and cost.

Q: Mike Cooney asked if the number of sockeye fry counted during the 2013 study in Grant Creek would allow us to accurately predict the contribution of Grant Creek sockeye to the Kenai system run.
A: John Stevenson said that the study was not able to quantify the number of sockeye fry produced in Grant Creek, and that Sockeye fry move very quickly out of the Grant Creek drainage and rear in downstream lakes such as Lower Trail Lake or Kenai Lake.

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
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Q: Mike Cooney asked again if there is there a way to quantify what the rearing effect of Grant Lake on Trail Lake and Kenai River fisheries?
A: John said he could not say what Grant Creek contributes relative to other tributaries to the Kenai River since that was not part of the scope of study. Cory Warnock added that while fish quantities are difficult to extrapolate (to other areas), the fish habitat pre- and post-project would help to form opinions of effects on fish productions. Ricky Gease said that Grant Creek has a very small population of sockeye relative to the entire sockeye return to the Kenai system (in 2013, about 1,150 sockeye returned to Grant Creek, while approximately 1,000,000 sockeye returned to the Kenai system overall). Mr. Gease briefly explained correlations to the Cooper Lake hydro relicensing project. The increase of flows to the creek during the winter months seems to have a net positive effect on rearing capacity for juvenile fish.

Q: Hal Shepherd asked why the Integrated Licensing Process not used for this project. I'm concerned that Stakeholders haven't had the opportunity to weigh-in on the project.
A: Cory Warnock stated that KHL was using the Traditional Licensing Process or "TLP" and that this process was vetted with Stakeholders and subsequently approved for use by FERC. With the TLP, KHL was able to go back and use the process to revise its study plans to address concerns that were voiced. Public agencies and their experts have been collaborating extensively with KHL during the study process. Many meetings, workshops, conference calls at all phases have been taking place.

Q: How often have the state and Federal agencies been involved and what input have they had?
A: Cory Warnock referred to the slide in the presentation that listed the various consultation meetings. Agency experts were consulted in Dec 2012 to review the latest study plans. Plans were adjusted to address their comments. In March 2013-Nov 2013 the data were collected and the remainder of the year was spent preparing reports. This was followed by 6-8 meetings to present the results, much like tonight, to the agency Stakeholders. In July, a meeting was conducted to take input on the preliminary engineering and design. A large instream flow work group was formed to vet the results of the studies. All of the meeting notes and agency input are documented and this information is available on the KHL website.

Q: Will there be any provision for flushing flows?
A: Cory Warnock indicated that much of the canyon reach is well armored and it is sediment-starved. He stated that most of the sediment that was routed from Reach 5 (bypass reach) to the high quality habitat areas (Reach 1-4) likely occurred during episodic events (slides, quakes, etc.). Cory acknowledged that some level of sediment comes from Reach 5 and as such, one of the mitigation efforts that is proposed is to monitor sediment in the creek in an adaptive management approach. Plans will be made to address mitigation of sediment in the creek. If, during the first couple years of operation, it is determined that sediment routing is being negatively impacted out of Reach 5, KHL will meet with Stakeholders and discuss the appropriate option between flushing flows and/or gravel supplementation to allow for the continued natural level of sediment deposition into Reaches 1-4.

Q: Beside this project, is Bradley Lake the only HEA hydro project?

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A: Mike Salzetti clarified that Bradley Lake is not owned by HEA, but HEA operates it for the project participants and enjoys a small share of the energy produced by the plant.

Q: What lessons from operating the Bradley Lake have we learned and applied to this project?
A: Mike Salzetti said that we have applied lessons learned from other hydro projects, such as operationally to optimize flows for energy production and sizing of the project. Mort McMillen added that when you look at historical hydro projects, they tended to be oversized. The way that powerhouses are laid out is important and the project design calling for two 2.5MW units is important vs. having a 1- and a 4-MWuntThe current design allows for sharing spare parts, etc. With respect to the tunnel, we have learned how to craft the construction specifications and sequence of construction to minimize costs. Mike Salzetti also said that our level of study has been significantly more rigorous compared to previous projects.

Q: Why didn't the negative project sentiment from earlier meetings have a larger affect?
A: Mike Salzetti said that a more quantitative approach needed to be taken and more substantive data needed to be collected and subsequently analyzed for project impacts. KHL has done that.

Q: Has HEA conducted a survey of its members to see how many support this project?
A: Mike Salzetti explained that our Board of Directors is elected to represent our members. The Board has been a proponent of the project.

Q: When we are looking at potential mitigation measures, in Reach 1there are 2 large projects in the area that "reformatted" (glide-riffle-glide?) the lower reaches (to improve habitat). Is there any concept for Grant Creek to reformat or optimize the "distributary reach", similar to Dave's creek or Stetson Creek?
A: Cory Warnock said that KHL plans to modify the upstream control at the distributary to permit consistent flows that would allow improved habitat. Monitoring efforts will be in place to ensure that this habitat is being maintained and utilized.

Q: Ricky Gease stated that he was impressed by the project's ability to model a 66-year hydrologic history. He stated that something lacking in Alaska, in general, is water flow data over time. Is there any way to take the data that we have collected here and work with Stakeholders to develop a comprehensive Kenai River watershed model? Could this be done?
A: Cory Warnock said that what the project could contribute to such an effort is that the project plans to leave its gaging station in place to continue to collect flow data and potentially allow for synthesis of hydrologic data to other basin around the Kenai Peninsula. Mike Salzetti said that overall, the development of a watershed model is a great idea, but it is not currently a proposed KHL mitigation measure.

Q: What do you call the trail going to the Case Mine?

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A: Dwayne Adams stated that the trails in that area are called “Grant Lake Trail north” and the portage trail is called the “Saddle Trail”.

Q: The proposed access road appears to cross State Land. Who would be best to make comments to regarding the access road?
A: Mike Salzetti indicated that in addition to commenting on the Draft License Application (DLA), comments should be given to State Lands, State Parks and the US Forest Service.

Q: Are there plans to have a public restrooms on the project?
A: Mike said it depends on the decisions made with respect to access being allowed via project routes. If public access is allowed, then it may be a mitigation measure.

Q: Mark Luttrell said he thinks that the Recreation Study is not complete. Would HEA commit to doing a comprehensive usage study including Seward & Cooper Landing?
A: Dwayne Adams asked how this would be relevant to the questions for Grant Lake. One of the questions may be latent demand… i.e., if we build it, will they come?
Q: What are the exact questions to be asked that would answer what impact increased access would have on things, such as the creek banks?
A: Dwayne stated that it is very difficult to design a study to assess latent demand. We expect that the access would be used and these uses have been quantified in the current study.

Q: An individual stated that every year he has come and seen the project presentations, and he has been impressed. If this project is built, this person thinks that usage will increase. He indicated that he does not favor the project and is concerned about the potential increased usage. He expressed frustration that Moose Pass is not being served by HEA, but HEA is benefitting from having a project in Moose Pass.
A: Mike Salzetti drew a comparison to the Bradley Lake Project that serves and benefits all of the Railbelt, but is located away from the utilities and communities that it serves.

Q: Did you say that if the access is opened or closed will determined by input tonight?
A: Mike Salzetti said no, that is was a more comprehensive process than just this informal survey and that the agencies will provide input as well. The Forest Service is in the process of updating their Forest Plan and they will likely address the access and usage to this area.

Q: Who makes the final decision related to access?
A: Mike Salzetti stated FERC does with input from Stakeholders. If you really want your voice heard, you must comment during the DLA comment period. Tonight is an informal survey.

Q: Were effects of flow on the Lower Trail Lake ice modeled?
A: Cory Warnock stated that this has not been modeled or assessed.

Q: Is the genetic (fish) population in Grant Creek isolated?

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A: John Stevenson stated that the genetic data was collected per the request of ADF&G and they now have all of the samples. KHL doesn't have the results from the State's study, but there is no reason to think that fish from Grant Creek are genetically isolated.

Q: Where will the intake tower will be located, have we taken into account climate change effects on this location?
A: Mort McMillen stated that the design of the intake allows for water temperature to be taken into consideration by moving the elevation of the intake. From a hydrology viewpoint, this is why KHL looked at the hydrologic history and design the project for flexibility of the intake structure.
Q: What is your timeline for licensing and construction?
A: Cory Warnock stated that the plan is to have the DLA complete and available for comment by early spring. There is a 90-day public comment period, and then a Final License Application (FLA) will be prepared to address the comments received which will be filed with FERC. FERC's review and ruling on the FLA could take from 9-months to 2-years. Final engineering design then typically takes 1 year and construction would take approximately 2 years. From final engineering to commissioning of the project is estimated to take approximately 3 years.

Q: What is the length of the FERC license?
A: 30-50 years.

Q: How long would it take for HEA to realize its return on its investment of $58M?
A: Mike Salzetti stated that gas pricing plays a big role in estimating this payback. The payback period is expected to be a 30-50-years, but beyond this time it produces very inexpensive power.

Q: Mark Luttrell asked if HEA would commit to 2 more public meetings, one in Seward and one in Cooper Landing and structure them to take more public comment?
A: Mike Salzetti stated that he would need to think about this.

Q: A suggestion was made that HEA needs to take more public comment on the study results due to the fact that he fears that FERC will rubber stamp this project based on the results of our studies.
A: Cory Warnock said that FERC does not rubber stamp projects; it is not a foregone conclusion that FERC would issue a license. Mike Salzetti added that this meeting is not required by the (licensing) process and KHL is conducting this meeting tonight as a good-faith effort to inform and involve the public in advance of their ability to review and comment on the DLA.

Q: Jim Herbert stated that they came tonight to obtain information. HEA is in Moose Pass's backyard. The local benefit is perceived to be little and the impact is large. He stated that HEA needed to consider some sort of local contribution or remediation for the impact that locals feel the project will have on them and their community.
A: Mike Salzetti stated that KHL would take this into consideration.

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Q: Mike Cooney said that he thinks that there are likely to be large impacts to local residents, but very little benefit. He thinks that FERC awarding a license is a foregone conclusion. He would like for HEA to collaborate with the community to develop the project plan. He said that he made this request of HEA in 2009. He asks for a collaborative process.

After a call for any further questions and seeing none, the meeting adjourned at 9:31pm.

Begin forwarded message:

From: "Daniel J. Hertrich" <DHertrich@aidea.org>
Date: November 8, 2014 at 1:55:36 PM PST
To: "Mike Salzetti (msalzetti@homerelectric.com)" <msalzetti@homerelectric.com>
Cc: Douglas Ott <DOtt@aidea.org>, Sean Skaling <sskaling@aidea.org>, "Cory Warnock" <cory.warnock@mcmillen-llc.us>, Morton Mcmillen <morton.mcmillen@mcmillen-llc.com>, "Cory Warnock (cory.warnock@mcmillen-llc.com)" <cory.warnock@mcmillen-llc.com>
Subject: Grant Lake Project Update

Thank you Mike, Mort, and Cory for the project update. It is evident that Homer Electric has made great progress in the project evaluation and license consultation and development for what is clearly a challenging project given its location and potential environmental issues. I think that the work performed to date will provide significant benefits in improving public perception of hydro projects and will benefit future projects involving significant agency interaction and the need for experienced and qualified teams to perform the work to develop similar projects.

Homer Electric's commitment to move this project forward is commended and I encourage you to keep up the good work. I look forward to a future draft license application that I expect will be sufficient to evaluate the merits of the project and serve as the basis for continued development if warranted.

Daniel Hertrich, P.E.
Hydroelectric Program & Project Manager
Alaska Energy Authority
813 W Northern Lights Blvd
Anchorage, AK 99503
dhertrich@aidea.org
(907) 771-3045 office
(907) 223-0678 mobile

From: Cory Warnock <cory.warnock@mcmillen-llc.us>
Sent: Monday, November 10, 2014 12:04 PM
To: Emily Andersen
Subject: Fwd: Grant Lk permit questions, POA-2008-1492 Grant Lake (UNCLASSIFIED)

FYI

Begin forwarded message:

Resent-From: <cory.warnock@mcmillen-llc.net>
From: "McCafferty, Katherine A POA" <Katherine.A.McCafferty2@usace.army.mil>
Date: November 10, 2014 at 11:20:02 AM PST
To: Levia Shoutis <Levia.Shoutis@erm.com>
Cc: "Cory Warnock (cory.warnock@mcmillen-llc.net)" <cory.warnock@mcmillen-llc.net>, "Speerstra, Linda POA" <Linda.Speerstra@usace.army.mil>
Subject: RE: Grant Lk permit questions, POA-2008-1492 Grant Lake (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Levia,
In their effort to expedite our evaluation, we have recently seen agents provide drafts us with of the 404(b)(1) and public interest review in the format which we use for our environmental assessment document. I am currently working through the first project in which the agent provided us with their draft 404 (b)(1) analysis and public interest review, so I do not have a sense whether this will end up expediting the permit evaluation process or not.

Katie McCafferty
Project Manager
Regulatory Division, Kenai Field Office
U.S. Army Corps of Engineers, Alaska District
805 Frontage Road, Suite 200C
Kenai, AK 99611
Direct: 907-283-3562
Office: 907-283-3519

Check out our website for more info: http://www.poa.usace.army.mil/Missions/Regulatory.aspx

-----Original Message-----
From: Levia Shoutis [mailto:Levia.Shoutis@erm.com]
Sent: Monday, November 03, 2014 8:07 AM
To: McCafferty, Katherine A POA
Cc: Cory Warnock (cory.warnock@mcmillen-llc.net); Speerstra, Linda POA
Subject: [EXTERNAL] RE: Grant Lk permit questions, POA-2008-1492 Grant Lake (UNCLASSIFIED)

Thanks, Katie, that helps to clarify. For the PJD, we'll use the updated tables and the SPN-2010-45 guidance to provide you with a detailed wetland delineation report. For the 404(b)(1), could you give me an idea of how much providing you with a draft might "expedite"? I know it's hypothetical, just trying to get an idea of whether it's something KHL would like us to do.
Thanks again,
Levia

Levia Shoutis
Environmental Resources Management (ERM), Inc.
P.O. Box 582
1 Ninth St. Island Dr.
Livingston, MT 59047
406-222-7600 x229
406-570-6194 Cell
406-222-7677 Fax
levia.shoutis@erm.com
www.erm.com

-----Original Message-----
From: McCafferty, Katherine A POA [mailto:Katherine.A.McCafferty2@usace.army.mil]
Sent: Friday, October 31, 2014 3:32 PM
To: Levia Shoutis
Cc: Cory Warnock (cory.warnock@mcmillen-llc.net); Speerstra, Linda POA
Subject: RE: Grant Lk permit questions, POA-2008-1492 Grant Lake (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Levia,

Our goal is to make a decision on Standard Permits within 120 days from receiving a complete application.

It is our task to make the factual determinations under the 404(b)(1) guidelines, using the information provided in the lead agency's NEPA document and in the application that is submitted to us. For each factor, we will want to make sure that we have enough information to discuss the potential short-term and long-term effects of the proposed discharge on the physical, chemical, and biological components of the aquatic environment. Consultants have provided us with a draft of this analysis, when they are trying to expedite a permit evaluation, but this is not a requirement.

The difference between a preliminary JD (PJD) and an approved JD (AJD) is whether we the determination if the water has a demonstrated connection to navigable waters. Regardless of whether it is a PJD or an AJD we still need the information to determine if the three criteria are present for a wetland, or if an ordinary high water mark is present for a stream/open water. You will need to provide the excel tables and the majority of the information requested in our 2010 Special Public Notice The SPN can be found here: http://www.poa.usace.army.mil/Portals/34/docs/regulatory/specialpns/SPN-2010-45.pdf. If you are going to request a PJD, you can leave out any information discussing surface or shallow sub-surface water connections. For your info, the Excel tables have been updated, the newest versions are attached.

Have a good weekend,

Katie McCafferty
Project Manager
Regulatory Division, Kenai Field Office
U.S. Army Corps of Engineers, Alaska District
805 Frontage Road, Suite 200C
Kenai, AK 99611
Direct: 907-283-3562
Office: 907-283-3519

Check out our website for more info: http://www.poa.usace.army.mil/Missions/Regulatory.aspx

-----Original Message-----
From: Levia Shoutis [mailto:Levia.Shoutis@erm.com]
Sent: Friday, October 31, 2014 9:38 AM
To: McCafferty, Katherine A POA
Cc: Cory Warnock (cory.warnock@mcmillen-llc.net)
Subject: [EXTERNAL] Grant Lk permit questions

Hi Katy,

I'm getting organized to prepare the 404 Application package for KHL for the Grant Lake Project. I've got a few permitting questions for you:

* What is the typical timeframe on getting a 404 application turned around (e.g. from when we submit the application to the Corps)- 60 days?

* We'd like move to permitting using a preliminary rather than an approved JD. To confirm, do we still need to complete the jurisdictional determination report, and the Excel tables documenting connection to TNW, RPD, etc? Or can we present our wetland/waters report documenting all delineated wetlands, but not provide a specific JD report?

* 404(b)(1) Analysis: Based on discussions with you in the past, I believe the Corps will complete this analysis based on reports provided in our 404 Application package (e.g. 404 Application, wetland/waters report, and associated figures). Is this correct or do you expect a standalone 404(b)(1) Analysis as part of the 404 Application? I ask because I've provided the Analysis to the Corps in situations when a permit needs to be expedited, but I don't think that is standard?

I've also cc'd Cory here to confirm he doesn't have any additional questions for you, I'm sure we'll have more soon...

Thanks and hope you're well,

Levia

Levia Shoutis

Environmental Resources Management (ERM), Inc.
P.O. Box 582

1 Ninth St. Island Dr.

Livingston, MT 59047
406-222-7600 x229

406-570-6194 Cell
406-222-7677 Fax

levia.shoutis@erm.com <mailto:levia.shoutis@erm.com> www.erm.com
<http://www.oasisenviro.com/>

Please visit ERM's web site: http://www.erm.com

Classification: UNCLASSIFIED
Caveats: NONE

From: Cory Warnock
Sent: Tuesday, November 11, 2014 7:57 AM
To: Griffin, David W (DNR); Cory Warnock; 'Mike Salzetti'
Cc: Thomas, Ryan J (DNR); Longan, Sara W (DNR); Emily Andersen
Subject: RE: Grant Lake Hydro - DNR MOU?

Hi David,

Thanks for the note and attending the public meeting. Mike is working remotely for the next two weeks with an extremely busy schedule. Once he returns, we will coordinate and contact Ms. Longan to discuss a path forward with respect to the items you describe below. To be clear, would you also like to continue to be in the loop with regard to the project or are you transferring primary agency coordination over? Either is fine, just want to make sure all appropriate parties are Cc'd.

Thanks.

From: Griffin, David W (DNR) [mailto:david.griffin@alaska.gov]
Sent: Monday, November 10, 2014 3:01 PM
To: Cory Warnock; 'Mike Salzetti'
Cc: Thomas, Ryan J (DNR); Longan, Sara W (DNR)
Subject: Grant Lake Hydro - DNR MOU?

Cory and Mike,

Hi, just following up regarding the discussion I had with you during the meeting in Moose Pass last week (Nov. 6). In that discussion I mentioned that it would be in the interest of Kenai Hydro to develop an MOU with the Dept. of Natural Resources in order to give the Grant Lake Hydro project the attention that it deserves.

As this project moves into the licensing phase additional needs will surely be required of DNR staff, both from the Division of Parks and Outdoor Recreation and the Division of Mining, Land and Water. The project will surely require additional permitting for activities above and beyond what was required during the feasibility phase – activities such as seismic, geophysical explorations, etc; and if successful, permitting and oversight of construction.

Since the project area encompasses state land managed by the Division of Parks and Outdoor Recreation, we will be tasked with defining what is/isn't considered compatible uses on these lands; and certain administrative actions may need to take place to address the roles and responsibilities of the land owners. There may also be a need to revise the Kenai Area Plan, and the Kenai River Comprehensive Management Plan to reclassify the lands in the project area (a process that will likely require thorough public review).

I would like for you to contact the DNR Office of Project Management and Permitting, specifically the Executive Director, Sara Longan. Her office specializes in the coordination of large projects for the state – hydroelectric, mining, oil/gas, roads, etc. Sara can better explain how her office can best assist you, she can be reached at (907) 269-8732, or by email: sara.longan@alaska.gov.

Thank you,

David Griffin

From: Cory Warnock <cory.warnock@mcmillen-llc.us>
Sent: Tuesday, November 11, 2014 8:11 AM
To: 'Mark Luttrell (prufrock@arctic.net)'
Cc: Mike Salzetti; Emily Andersen
Subject: Kenai Hydro proposal summary

Hi Mark,

Mike is currently working remotely and has sporadic access to email over the next two weeks. In an effort to be as responsive as possible and get you the information you're looking for, he forwarded this along to me. As you know, we are in the process of developing the Draft License Application for the Grant Lake Project. As such, I expect that our engineers will have a first-cut of the comprehensive Project description drafted in the next two days. As I'd like you to have the most up to date version possible, my intent is to front-load my internal review of that particular section, confirm that Mike has reviewed as well and then get you that text. Again, it should provide you the most context and be generally consistent with the description you'll subsequently have the opportunity to review with the rest of the DLA in a few months. So, I'll get you that description soon.

Sound like an ok approach?

From: Mark Luttrell [prufrock@arctic.net]
Sent: Monday, November 10, 2014 12:44 PM
To: Salzetti, Mikel
Subject: Kenai Hydro proposal summary

Hi Mike:

I read through the KHL website and didn't find a succinct summary of your project as currently proposed. Can you provide me a link or documents?

Thanks to you and all your crew in holding the meeting in Moose Pass. It was important that the public learned of the newest iteration of your project and that you heard the public's concerns.

Mark Luttrell
Seward

From: jjh@seward.net [mailto:jjh@seward.net]
Sent: Saturday, November 15, 2014 8:36 AM
To: Cory Warnock
Subject: RE: Grant Lake Project Public Meeting

Cory,

Thanks for responding to my questions they address my major concerns. I intend to publicly support the project once all of the pieces are in place. I believe it is hypocritical for a community self-proclaimed to be green or environmentally aware to be opposed to hydro power only because it is NIMBY. My hope is the project would be a testament to how a hydro project could be as innocuous as possible visibly and a betterment to the environment. I see no reason why this can't be achieved.

The land access is still a little troubling since it is up in the air. Perhaps after application is submitted, with the details presented, KHL could sponsor a meeting with the land managers to discuss access options. Blocking the bridge may be the best option to being as close to status quo as possible. I would think that KHL would prefer this, since its equipment wouldn't be an attractive nuisance for liability.

I can have some side conversations with friends in the community about specific needs. I do know the fire company is looking at getting a water supply to the new fire station and is looking for an auxillary station south of town near Crown Point, Lawing or Primrose.

Thanks for your secondary list benefits. I wasn't aware of the oportunity to directly feed Moose Pass if the main transmissions lines go down between Daves Creek and Anchorage. That has been a big problem in the past since response time is always 12 hrs or more. These secondary benefits need to be articulated and explained. If I don't get it no one else does!

Hopefully, the next time you folks visit Moose Pass we can have a cup of coffee.

Best,

Jeff

On 2014-11-14 09:56, Cory Warnock wrote:

Hi Jeff,

My apologies for taking a bit to get back to you. I appreciate your inquiries. My responses are below (in red) and if you have any further questions or need for dialogue, don't hesitate to give me a call or shoot me an email.

1) Is there a way to bury the transmission lines? I am of the opinion that the best thing to do is to make the foot print, especially visual, non-intrusive and make the project a hallmark for hydro-power. – We agree and we are currently evaluating burying the transmission line vs. having it above ground and our preference would be to have it buried. If the financial evaluation is consistent with our preference, that is how we plan to proceed.

2) Who manages the land? If the community want to prohibit public access would that be the responsibility of the operator or land manager .(i.e. USFS?) and to that end, will there be full time staff monitoring the plant? – The project area lands are a combination of State (ADNR/KRSMA and USFS) lands. Ultimately, land access and use is defined by the agency and typically enforced through the project proponent. That said, state and federal agencies have expressed a desire to gauge public preference (as they should) with respect to access prior to making a determination in that regard. With respect to operations, the project would be operated remotely (no full-time staff present). However, routine maintenance and confirmation of appropriate functionality would be conducted on a regular basis requiring KHL staff to be on site quite regularly.

3) What carrot can you throw the community to support the project? I believe self-interest will guide community support and I personally can't see a benefit other than altruistic belief in alternative energy. Perhaps there are some community needs that could be addressed. – Jeff, I completely agree with your thought process and would be curious to hear what ideas you might have with respect to community needs given your local presence in the community. From KHL's perspective, they have identified a series of secondary benefits for Moose Pass which include:

–Distributed Generation (grid stability)
–Local Generation Source (backup power if transmission from Anchorage fails)
–Potential for Cost Saving Power Exchange Agreements (no wheeling tariff for either Seward or HEA & less line loss)

–Potentially Deconstrains Bradley Lake Transmission
–Assists with Alaska's Renewable Energy Goal of 50% Renewable by 2025
–Could Assist Alaska in complying with proposed EPA 111(d) rules (CO_2 Emission Reduction)

KHL fully recognizes that these benefits are likely not as tangible as what a majority of the public may have in mind but given the current state of power supply in the area, this is what we have identified. I'd like to apologize for not getting over to say hello during the meeting. I saw you sitting over by the door but wasn't able to slip away to touch base until it was too late. I appreciate you attending, your support for the process and project and as always, am more than happy to discuss further if you'd like.

Hope all is going well up there and I'll look forward to talking soon, Cory

From: jjh@seward.net [mailto:jjh@seward.net]
Sent: Sunday, November 09, 2014 8:18 AM
To: Cory Warnock
Subject: Re: Grant Lake Project Public Meeting

Cory,

I attended the meeting and appreciated your groups presentation especially to a generally hostile group. I personally don't think many of the attendees represent the majority of people who live in Moose Pass who, if informed, may support the project.

I have a few questions.

1) Is there a way to bury the transmission lines? I am of the opinion that the best thing to do is to make the foot print, especially visual, non intrusive and make the project a hallmark for hydro-power.

2) Who manages the land? If the community want to prohibit public access would that be the responsibility of the operator or land manager .(i.e. USFS?) and to that end, will there be full time staff monitoring the plant?

3) What carrot can you throw the community to support the project? I believe self-interest will guide community support and I personally can't see a benefit other than altruistic belief in alternative energy. Perhaps there are some community needs that could be addressed.

Jeff Hetrick

On 2014-10-31 09:33, Cory Warnock wrote:

> Hi Jeff,

Hope this email finds you well. I'm guessing you may have already heard about the upcoming public meeting for the Grant Lake Project but wanted to get you the announcement (attached) just in case you hadn't.

Thanks and again, hope all is well,

Cory

Cory Warnock

Senior Licensing and Regulatory Consultant

McMillen, LLC

www.mcmillen-llc.com

5771 Applegrove Ln.

Ferndale, Wa. 98248

O – 360-384-2662

C – 360-739-0187

F – 360-542-2264

-----Original Message-----
From: Mark Luttrell [mailto:prufrock@arctic.net]
Sent: Monday, November 24, 2014 11:55 AM
To: Cory Warnock
Subject: Re: Kenai Hydro proposal summary

Hi Cory

Thanks for the quick response. I'll hang on…

Mark

On Nov 24, 2014, at 7:26 AM, Cory Warnock <cory.warnock@mcmillen-llc.us> wrote:

> Hi Mark,
>
> As you know, we are in the process of drafting the Draft License Application (DLA). Mike Salzetti has been working remotely on a project for the past two weeks. Prior to distributing the Project description to you, Mike needs to review and approve the text. Our Project description is becoming quite refined as a result of all the natural resources and engineering work that has been done. As such, it is imperative that all details are accurate and up to date prior to global public distribution with the DLA. The drafting of this overall document is our top priority right now. Once Mike (Cc'd) has had the opportunity to review, I'll get you the up to date description.
>
> Thanks,
>
> Cory
>
> -----Original Message-----
> From: Mark Luttrell [mailto:prufrock@arctic.net]
> Sent: Sunday, November 23, 2014 8:03 PM
> To: Cory Warnock
> Subject: Re: Kenai Hydro proposal summary
>
> Hi Cory:
>
> Is the Grant Lake project summary available?
>
> Mark Luttrell
>
>

>
>
> On Nov 12, 2014, at 7:32 AM, Cory Warnock <cory.warnock@mcmillen-llc.us> wrote:
>
>> Hi Mark,
>>
>> Not sure what attachment may have come along with the email but I hadn't intended to attach anything to the email. I'll get you the project description soon.
>>
>> Cory
>>
>> -----Original Message-----
>> From: Mark Luttrell [mailto:prufrock@arctic.net]
>> Sent: Tuesday, November 11, 2014 5:55 PM
>> To: Cory Warnock
>> Subject: Re: Kenai Hydro proposal summary
>>
>> Hi:
>>
>> Thanks for the quick response. Its fine for me to wait a few days. I just want to give my list the most accurate and most easily digestible information. By the way, I couldn't open the attachment.
>>
>> Thanks Cory
>> Mark
>>
>>
>>
>> On Nov 11, 2014, at 7:11 AM, Cory Warnock <cory.warnock@mcmillen-llc.us> wrote:
>>
>>> <winmail.dat>
>>
>

From: Gallagher, Joe <JGallagher@HomerElectric.com>
Sent: Monday, November 24, 2014 1:18 PM
To: jj.kaiser63@gmail.com
Cc: Cory Warnock; Emily Andersen; 'Mike Salzetti'
Subject: Grant Lake
Attachments: 2014-11-06 DRAFT Moose Pass Public Meeting Minutes.pdf

Hi JJ, here is the note and draft meeting minutes that was sent out recently to the folks that attended the meeting on Nov. 6th in Moose Pass. We have added your name to the contact list and I apologize that you weren't on the list for the meeting. The presentation from the Moose Pass meeting should be available in early December on the Kenai Hydro web site. Thanks,

Joe

Joe Gallagher
Director of Member Relations
Homer Electric Association
Kenai, AK 99611
907-283-2324
907-398-3478 (cell)

Attached are the draft meeting minutes from the public meeting held in Moose Pass on November 6th. KHL's plan is to finalize these minutes per any comments/revisions you all may have and then post a complete package from the meeting (attendance list, meeting minutes, presentations, etc.) to the website. Responses with comments and suggested revisions incorporated would be appreciated by Friday, December 5th.

There were a couple of email addresses that were difficult to read on the attendance sheet so I'm hopeful that I was able to reach as many folks as possible. Thank you for your attendance at the meeting and in advance for your review of the attached. Don't hesitate to send me an email if you have any questions,

Cory Warnock
Senior Licensing and Regulatory Consultant

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O – 360-384-2662
C – 360-739-0187
F – 360-542-2264

From: Cory Warnock <cory.warnock@mcmillen-llc.com>
Sent: Monday, November 24, 2014 11:45 AM
To: mike@alaska-energy.com; 'Mark Luttrell'; irene@arctic.net; dearimage.dw@gmail.com; Thomas, Ryan J (DNR); jherbert8000@gmail.com; katie.johnson@alaska.gov; hal.shepherd@tcfwa.org; pm99588@yahoo.com; 'Ricky Gease'; mcooney@arctic.net; peruprairie@hotmail.com; glaser@seward.net; dgease@gmail.com; 'David Griffin'; 'Shina Duvall'; andybacon20@yahoo.com; clairshipton@gmail.com; jjh@seward.net; dyrkss@yahoo.com
Cc: 'Mike Salzetti'; Morton Mcmillen; John Blum; John Stevenson; 'Michael Yarborough'; 'Dwayne Adams'; Emily Andersen
Subject: DRAFT November 6th Grant Lake Project Public Meeting Minutes
Attachments: 2014-11-06 DRAFT Moose Pass Public Meeting Minutes.pdf

Grant Lake Project Public Meeting Attendees

Hi all,

Attached are the draft meeting minutes from the public meeting held in Moose Pass on November 6th. KHL's plan is to finalize these minutes per any comments/revisions you all may have and then post a complete package from the meeting (attendance list, meeting minutes, presentations, etc.) to the website. Responses with comments and suggested revisions incorporated would be appreciated by Friday, December 5th.

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From: Donna Wottlin [mailto:bearimage.dw@gmail.com]
Sent: Monday, November 24, 2014 2:13 PM
To: Cory Warnock
Subject: Re: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Got it. Thank you, Donna Wottlin

Sent from my iPad

On Nov 24, 2014, at 10:50 AM, Cory Warnock <cory.warnock@mcmillen-llc.com> wrote:

See below and the attached. Had a little trouble reading some of the email addresses written on the attendance sheets. Had to take a bit of a guess with respect to certain addresses. Hopefully this attempt gets to you.

Thanks.

From: Cory Warnock [mailto:cory.warnock@mcmillen-llc.com]
Sent: Monday, November 24, 2014 11:45 AM
To: 'mike@alaska-energy.com'; 'Mark Luttrell (prufrock@arctic.net)'; 'irene@arctic.net'; 'dearimage.dw@gmail.com'; Thomas, Ryan J (DNR); 'jherbert8000@gmail.com'; 'katie.johnson@alaska.gov'; 'hal.shepherd@tcfwa.org'; 'pm99588@yahoo.com'; 'Ricky Gease (ricky@krsa.com)'; 'mcooney@arctic.net'; 'peruprairie@hotmail.com'; 'glaser@seward.net'; 'dgease@gmail.com'; 'David Griffin (david.griffin@alaska.gov)'; 'Shina Duvall'; 'andybacon20@yahoo.com'; 'clairshipton@gmail.com'; 'jjh@seward.net'; 'dyrkss@yahoo.com'
Cc: 'Mike Salzetti'; 'Morton Mcmillen'; 'John Blum'; 'John Stevenson'; 'Michael Yarborough'; 'Dwayne Adams'; Emily Andersen
Subject: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Grant Lake Project Public Meeting Attendees

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F – 360-542-2264

<2014-11-06 DRAFT Moose Pass Public Meeting Minutes.pdf>

From: Cory Warnock <cory.warnock@mcmillen-llc.com>
Sent: Monday, November 24, 2014 11:51 AM
To: andbacon20@yahoo.com; bearimage.dw@gmail.com; claireshipton@gmail.com
Cc: Emily Andersen
Subject: FW: DRAFT November 6th Grant Lake Project Public Meeting Minutes
Attachments: 2014-11-06 DRAFT Moose Pass Public Meeting Minutes.pdf

Categories: Green category

See below and the attached. Had a little trouble reading some of the email addresses written on the attendance sheets. Had to take a bit of a guess with respect to certain addresses. Hopefully this attempt gets to you.

Thanks.

From: Cory Warnock [mailto:cory.warnock@mcmillen-llc.com]
Sent: Monday, November 24, 2014 11:45 AM
To: 'mike@alaska-energy.com'; 'Mark Luttrell (prufrock@arctic.net)'; 'irene@arctic.net'; 'dearimage.dw@gmail.com'; Thomas, Ryan J (DNR); 'jherbert8000@gmail.com'; 'katie.johnson@alaska.gov'; 'hal.shepherd@tcfwa.org'; 'pm99588@yahoo.com'; 'Ricky Gease (ricky@krsa.com)'; 'mcooney@arctic.net'; 'peruprairie@hotmail.com'; 'glaser@seward.net'; 'dgease@gmail.com'; 'David Griffin (david.griffin@alaska.gov)'; 'Shina Duvall'; 'andybacon20@yahoo.com'; 'clairshipton@gmail.com'; 'jjh@seward.net'; 'dyrkss@yahoo.com'
Cc: 'Mike Salzetti'; 'Morton Mcmillen'; 'John Blum'; 'John Stevenson'; 'Michael Yarborough'; 'Dwayne Adams'; Emily Andersen
Subject: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Grant Lake Project Public Meeting Attendees

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O – 360-384-2662

From: Cory Warnock <cory.warnock@mcmillen-llc.com>
Sent: Monday, November 24, 2014 11:53 AM
To: andbacon2@yahoo.com
Cc: Emily Andersen
Subject: FW: DRAFT November 6th Grant Lake Project Public Meeting Minutes
Attachments: 2014-11-06 DRAFT Moose Pass Public Meeting Minutes.pdf

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Thanks.

From: Cory Warnock [mailto:cory.warnock@mcmillen-llc.com]
Sent: Monday, November 24, 2014 11:45 AM
To: 'mike@alaska-energy.com'; 'Mark Luttrell (prufrock@arctic.net)'; 'irene@arctic.net'; 'dearimage.dw@gmail.com'; Thomas, Ryan J (DNR); 'jherbert8000@gmail.com'; 'katie.johnson@alaska.gov'; 'hal.shepherd@tcfwa.org'; 'pm99588@yahoo.com'; 'Ricky Gease (ricky@krsa.com)'; 'mcooney@arctic.net'; 'peruprairie@hotmail.com'; 'glaser@seward.net'; 'dgease@gmail.com'; 'David Griffin (david.griffin@alaska.gov)'; 'Shina Duvall'; 'andybacon20@yahoo.com'; 'clairshipton@gmail.com'; 'jjh@seward.net'; 'dyrkss@yahoo.com'
Cc: 'Mike Salzetti'; 'Morton Mcmillen'; 'John Blum'; 'John Stevenson'; 'Michael Yarborough'; 'Dwayne Adams'; Emily Andersen
Subject: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Grant Lake Project Public Meeting Attendees

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KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
6:00PM – 9:31PM

Presenters: Mike Salzetti (HEA), John Stevenson (BioAnalysts, Inc.), John Blum (McMillen, LLC), Cory Warnock (McMillen, LLC), Mike Yarborough (Cultural Resource Consultants), Dwayne Adams (Earthscape), Mort McMillen (McMillen, LLC)

Attendees: See sign-in sheet

Mike Salzetti (HEA) opened the meeting at 6:07pm by briefly introducing the project and the project team. He introduced the audience to the project resources (paper copies) made available at the meeting and gave instructions regarding the single question survey that Kenai Hydro (KHL) would like to have meeting attendees complete and turn in.

Mike explained that the main purpose of the meeting is to summarize and share the results of the various resource studies. He emphasized that tonight's presentation would only be an overview of what is a body of very detailed information. The detailed study plans and results are available on KHL's website.

Mike explained that Kenai Hydro LLC is a wholly-owned subsidiary of HEA.

Mike provided a brief history of the project from work in the 1980's, to more recent studies, and leading up to the material to be presented today. Mike explained that following the scoping process in June of 2010, it was evident that Stakeholders desired studies that were more quantitative in nature than those developed earlier. As such, KHL refine the study plans based on comments, hired appropriate study consultants and vetted the refined plans with Stakeholders to confirm their adequacy. The studies were then implemented in 2013/2014. Mike then explained the key project features: a water fall at the outlet of Grant Lake, steep topography, and proximity to infrastructure (transmission lines, road & rail system).

The project's operating assumptions were presented to the group. There is no longer a dam associated with the project. Lake level will fluctuate from 0 to -13ft (Elev. 703-690-ft). There will be a tunnel, a powerhouse, and a detention pond.

John Stevenson (BioAnalysts) gave his presentation of the Aquatic/Fisheries Studies. John identified four anadromous salmonid species that are found in Grant Creek, which include pink, Chinook, sockeye, and coho salmon. Key resident species include rainbow trout and Dolly Varden. Based on visual, redd, carcass and radio telemetry surveys, John pointed out that Reaches 1 and 3 were most important to all species of interest, and that only 1.3 percent of all spawning occurred in Reach 5. He explained that this was a summary of what amounted to an extensive amount of data. Primary methods included but were not limited to:

- Use of a weir
- Radio tagging and tracking
- Incline plane traps

- Minnow trapping
- Spawning surveys
- Snorkeling
- Floy tagging
- Genetic sampling

John reiterated that the entirety of the study report and associated results could be found on the KHL website. John's portion of the presentation is incorporated into the attached document.

John Blum (McMillen) presented the instream flow study results. He explained that the purpose of the study is to answer two questions: 1) Where is the preferred fish habitat and, 2) How does the project hydrology affect this habitat? Minimum instream flow rates for the bypass reach were presented along with their influence on the fish habitat of Grant Creek. John explained that the entirety of the report and associated results can be found on KHL's website. John's portion of the presentation is incorporated into the attached document.

*** A short break was taken from approximately 7:10-7:19pm. ***

Cory Warnock (McMillen) presented the Water Resources and Terrestrial study plans and summaries. Water quality was found to be consistent with results from previous studies in the 1980's as well as the 2009 study data. The Terrestrial Study looked at botanical, wetlands, and wildlife resources. The study findings were summarized by noting the species and counts observed within the study area. Cory noted that the project intake design and lake levels were altered to avoid impacting botanical resources identified in the study. Cory explained that the entirety of the report and associated results can be found on KHL's website. Cory's portion of the presentation is incorporated into the attached document.

Mike Yarborough (Cultural Resource Consultants), presented the Cultural Resource study and findings. The study conducted included a literature review and pedestrian surveys… no native Alaskan sites were discovered in the surveys. Some of the information has been kept confidential at the request of the agencies and per the Section 106 process. Fourteen newly identified historic sites were identified and only one was recommended as eligible for the National Register. Impacts were deemed as minimal and mostly associated with potential increased access as a result of the project.

Dwayne Adams (Earthscape) presented the Recreational and Visual Resource study findings. The study looked at both winter and summer uses of the area. Noise levels were also assessed;typically 40dB or less with peak levels at 80-90dB from airplane flyovers or snowmachines. Work to address the commemorative Iditarod National Historic Trail impacts were explained. Dwayne explained that the entirety of the report and associated results can be found on KHL's website. Dwayne's portion of the presentation is incorporated into the attached document.

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
6:00PM – 9:31PM

Mort McMillen (McMillen) presented an overview of the proposed project design and the elements that addressed the findings or issues identified by the studies. Construction would be expected to take place over two summers. Efforts are made to mitigate construction impacts through planning, monitoring, and Best Management Practices. Mort explained that the entirety of the infrastructural design and associated operational regime would be described in the DLA. Mort's portion of the presentation is incorporated into the attached document.

At 8:19pm, the meeting was opened for questions from the audience.

Q: Mark Luttrell said that he felt that KHL was there to tell the public what we are going to do, not "if" KHL was going to do the project. He said that he thought the public was against the project and was "torqued" that HEA does not seem to have heard this input.
A: Mike replied that the public has been informed of the process and has been kept in the loop regarding the Project status, and that while there are some elements of the public that are opposed to a Grant Creek Project, there are also proponents, including HEA's Board of Directors and HEA members. Furthermore, Stakeholders which include both state and federal entities have been heavily involved with development of operating conditions.

Q: Mike Cooney asked what the estimated capital construction cost was.
A: Mike Salzetti said it is approx. $58M.

Q: What % of the overall power production will this project represent?
A: Mike Salzetti said this plant would produce about 4% of HEA's energy usage.

Q: What other renewable projects is HEA investigating?
A: Mike Salzetti stated that HEA is looking at tidal and solar energy projects. Mike explained that wind energy is an intermittent source and can impact our gas contracts and cost.

Q: Mike Cooney asked if the number of sockeye fry counted during the 2013 study in Grant Creek would allow us to accurately predict the contribution of Grant Creek sockeye to the Kenai system run.
A: John Stevenson said that the study was not able to quantify the number of sockeye fry produced in Grant Creek, and that Sockeye fry move very quickly out of the Grant Creek drainage and rear in downstream lakes such as Lower Trail Lake or Kenai Lake.

Q: Mike Cooney asked again if there is there a way to quantify what the rearing effect of Grant Lake on Trail Lake and Kenai River fisheries?
A: John said he could not say what Grant Creek contributes relative to other tributaries to the Kenai River since that was not part of the scope of study. Cory Warnock added that while fish quantities are

difficult to extrapolate (to other areas), the fish habitat pre- and post-project would help to form opinions of effects on fish productions. Ricky Gease said that Grant Creek has a very small population of sockeye relative to the entire sockeye return to the Kenai system (in 2013, about 1,150 sockeye returned to Grant Creek, while approximately 1,000,000 sockeye returned to the Kenai system overall). Mr. Gease briefly explained correlations to the Cooper Lake hydro relicensing project. The increase of flows to the creek during the winter months seems to have a net positive effect on rearing capacity for juvenile fish.

Q: Hal Sheperd asked why the Integrated Licensing Process not used for this project. I'm concerned that Stakeholders haven't had the opportunity to weigh-in on the project.
A: Cory Warnock stated that KHL was using the Traditional Licensing Process or "TLP" and that this process was vetted with Stakeholders and subsequently approved for use by FERC. With the TLP, KHL was able to go back and use the process to revise its study plans to address concerns that were voiced. Public agencies and their experts have been collaborating extensively with KHL during the study process. Many meetings, workshops, conference calls at all phases have been taking place.

Q: How often have the state and Federal agencies been involved and what input have they had?
A: Cory Warnock referred to the slide in the presentation that listed the various consultation meetings. Agency experts were consulted in Dec 2012 to review the latest study plans. Plans were adjusted to address their comments. In March 2013-Nov 2013 the data were collected and the remainder of the year was spent preparing reports. This was followed by 6-8 meetings to present the results, much like tonight, to the agency Stakeholders. In July, a meeting was conducted to take input on the preliminary engineering and design. A large instream flow work group was formed to vet the results of the studies. All of the meeting notes and agency input are documented and this information is available on the KHL website.

Q: Will there be any provision for flushing flows?
A: Cory Warnock indicated that much of the canyon reach is well armored and it is sediment-starved. He stated that most of the sediment that was routed from Reach 5 (bypass reach) to the high quality habitat areas (Reach 1-4) likely occurred during episodic events (slides, quakes, etc.). Cory acknowledged that some level of sediment comes from Reach 5 and as such, one of the mitigation efforts that is proposed is to monitor sediment in the creek in an adaptive management approach. Plans will be made to address mitigation of sediment in the creek. If, during the first couple years of operation, it is determined that sediment routing is being negatively impacted out of Reach 5, KHL will meet with Stakeholders and discuss the appropriate option between flushing flows and/or gravel supplementation to allow for the continued natural level of sediment deposition into Reaches 1-4.

Q: Beside this project, is Bradley Lake the only HEA hydro project?
A: Mike Salzetti clarified that Bradley Lake is not owned by HEA, but HEA operates it for the project participants and enjoys a small share of the energy produced by the plant.

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
6:00PM – 9:31PM

Q: What lessons from operating the Bradley Lake have we learned and applied to this project?
A: Mike Salzetti said that we have applied lessons learned from other hydro projects, such as operationally to optimize flows for energy production and sizing of the project. Mort McMillen added that when you look at historical hydro projects, they tended to be oversized. The way that powerhouses are laid out is important and the project design calling for two 2.5MW units is important vs. having a 1- and a 4-MWuntThe current design allows for sharing spare parts, etc. With respect to the tunnel, we have learned how to craft the construction specifications and sequence of construction to minimize costs. Mike Salzetti also said that our level of study has been significantly more rigorous compared to previous projects.

Q: Why didn't the negative project sentiment from earlier meetings have a larger affect?
A: Mike Salzetti said that a more quantitative approach needed to be taken and more substantive data needed to be collected and subsequently analyzed for project impacts. KHL has done that.

Q: Has HEA conducted a survey of its members to see how many support this project?
A: Mike Salzetti explained that our Board of Directors is elected to represent our members. The Board has been a proponent of the project.

Q: When we are looking at potential mitigation measures, in Reach 1there are 2 large projects in the area that "reformatted" (glide-riffle-glide?) the lower reaches (to improve habitat). Is there any concept for Grant Creek to reformat or optimize the "distributary reach", similar to Dave's creek or Stetson Creek?
A: Cory Warnock said that KHL plans to modify the upstream control at the distributary to permit consistent flows that would allow improved habitat. Monitoring efforts will be in place to ensure that this habitat is being maintained and utilized.

Q: Ricky Gease stated that he was impressed by the project's ability to model a 66-year hydrologic history. He stated that something lacking in Alaska, in general, is water flow data over time. Is there any way to take the data that we have collected here and work with Stakeholders to develop a comprehensive Kenai River watershed model? Could this be done?
A: Cory Warnock said that what the project could contribute to such an effort is that the project plans to leave its gaging station in place to continue to collect flow data and potentially allow for synthesis of hydrologic data to other basin around the Kenai Peninsula. Mike Salzetti said that overall, the development of a watershed model is a great idea, but it is not currently a proposed KHL mitigation measure.

Q: What do you call the trail going to the Case Mine?
A: Dwayne Adams stated that the trails in that area are called "Grant Lake Trail north" and the portage trail is called the "Saddle Trail".

Q: The proposed access road appears to cross State Land. Who would be best to make comments to regarding the access road?

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
6:00PM – 9:31PM

A: Mike Salzetti indicated that in addition to commenting on the Draft License Application (DLA), comments should be given to State Lands, State Parks and the US Forest Service.

Q: Are there plans to have a public restrooms on the project?
A: Mike said it depends on the decisions made with respect to access being allowed via project routes. If public access is allowed, then it may be a mitigation measure.

Q: Mark Luttrell said he thinks that the Recreation Study is not complete.Would HEA commit to doing a comprehensive usage study including Seward & Cooper Landing?
A: Dwayne Adams asked how this would be relevant to the questions for Grant Lake. One of the questions may be latent demand… i.e., if we build it, will they come?
Q: What are the exact questions to be asked that would answer what impact increased access would have on things, such as the creek banks?
A: Dwayne stated that it is very difficult to design a study to assess latent demand. We expect that the access would be used and these uses have been quantified in the current study.

Q: An individual stated that every year he has come and seen the project presentations, and he has been impressed. If this project is built, this person thinks that usage will increase. He indicated that he does not favor the project and is concerned about the potential increased usage. He expressed frustration that Moose Pass is not being served by HEA, but HEA is benefitting from having a project in Moose Pass.
A: Mike Salzetti drew a comparison to the Bradley Lake Project that serves and benefits all of the Railbelt, but is located away from the utilities and communities that it serves.

Q: Did you say that if the access is opened or closed will determined by input tonight?
A: Mike Salzetti said no, that is was a more comprehensive process than just this informal survey and that the agencies will provide input as well. The Forest Service is in the process of updating their Forest Plan and they will likely address the access and usage to this area.

Q: Who makes the final decision related to access?
A: Mike Salzetti stated FERC does with input from Stakeholders. If you really want your voice heard, you must comment during the DLA comment period. Tonight is an informal survey.

Q: Were effects of flow on the Lower Trail Lake ice modeled?
A: Cory Warnock stated that this has not been modeled or assessed.

Q: Is the genetic (fish) population in Grant Creek isolated?
A: John Stevenson stated that the genetic data was collected per the request of ADF&G and they now have all of the samples. KHL doesn't have the results from the State's study, but there is no reason to think that fish from Grant Creek are genetically isolated.

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
6:00PM – 9:31PM

Q: Where will the intake tower will be located, have we taken into account climate change effects on this location?
A: Mort McMillen stated that the design of the intake allows for water temperature to be taken into consideration by moving the elevation of the intake. From a hydrology viewpoint, this is why KHL looked at the hydrologic history and design the project for flexibility of the intake structure.
Q: What is your timeline for licensing and construction?
A: Cory Warnock stated that the plan is to have the DLA complete and available for comment by early spring. There is a 90-day public comment period, and then a Final License Application (FLA) will be prepared to address the comments received which will be filed with FERC. FERC's review and ruling on the FLA could take from 9-months to 2-years. Final engineering design then typically takes 1 year and construction would take approximately 2 years. From final engineering to commissioning of the project is estimated to take approximately 3 years.

Q: What is the length of the FERC license?
A: 30-50 years.

Q: How long would it take for HEA to realize its return on its investment of $58M?
A: Mike Salzetti stated that gas pricing plays a big role in estimating this payback. The payback period is expected to be a 30-50-years, but beyond this time it produces very inexpensive power.

Q: Mark Luttrell asked if HEA would commit to 2 more public meetings, one in Seward and one in Cooper Landing and structure them to take more public comment?
A: Mike Salzetti stated that he would need to think about this.

Q: A suggestion was made that HEA needs to take more public comment on the study results due to the fact that he fears that FERC will rubber stamp this project based on the results of our studies.
A: Cory Warnock said that FERC does not rubber stamp projects; it is not a foregone conclusion that FERC would issue a license. Mike Salzetti added that this meeting is not required by the (licensing) process and KHL is conducting this meeting tonight as a good-faith effort to inform and involve the public in advance of their ability to review and comment on the DLA.

Q: An attendee stated that they came tonight to obtain information. HEA is in Moose Pass's backyard. The local benefit is perceived to be little and the impact is large.
A: Mike Salzetti stated that KHL would take this into consideration.

Q: Mike Cooney said that he thinks that there are likely to be large impacts to local residents, but very little benefit. He thinks that FERC awarding a license is a foregone conclusion. He would like for HEA to collaborate with the community to develop the project plan. He said that he made this request of HEA in 2009. He asks for a collaborative process.

After a call for any further questions and seeing none, the meeting adjourned at 9:31pm.

Grant Lake Hydroelectric Project (FERC No. 13212) Licensing

Consultation Record

Phone/E-mail /One on One Meeting Log

Contact Name: Katie McKafferty

Agency/Organization: USACE, Kenai AK

Phone No./E-mail Address: 907-283-3519 (called her at her telework # 907-252-2878);

Katherine.A.McCafferty2@usace.army.mil

Date: 12/5/14

Time: 9 am MDT

Grant Lake Licensing Team Contact: Levia Shoutis

Summary of Conversation and/or E-mail Exchange:

Phone conversation regarding details of the DLA, jurisdictional determination and 404 application for Grant Lake Project.

- 404 tables: Katie had sent Levia a set of tables to use as part of the 404 and JD submittal, confirming details on the tables;
- Discussion of impact types: Levia showed Katie a working table of impact types to be quantified in the DLA, for discussion. Discussed the following:
  - Inundation of detention pond wetland: discussed whether this should be a permanent or temporary impact. Katie and Levia agreed that it should be considered permanent, given that the flooding frequency was unknown;
  - Fill vs vegetation clearing: Katie added that "fill" includes any grubbing or blading while clearing vegetation, even temporary
  - Katie thought the table reasonably displayed the different impact types (permanent, temporary, fill, veg, inundation, etc)

Grant Lake Project

Grant Lake Update
Kenai River Special Management Area
Advisory Board
December 11, 2014
Mike Salzetti

Presentation Overview

- Key Natural Project Features
- Project Infrastructure Review
- Natural Resources Studies
- Infrastructure & Operational Parameters
- DLA

KEY NATURAL PROJECT Features

Waterfall

There is a natural anadromous barrier at the outlet of Grant Lake.

Key Natural Project Features

Steep Topology

Vast majority of the potential energy occurs in the 1st half mile of stream.

KEY NATURAL PROJECT FEATURES

Short River

1. Approximately 1 mile of creek length.
2. Most valuable habitat continues to see full water flow.

Key Natural Project Features

Existing Infrastructure

1. Two Miles of Road Construction
2. One Mile of Transmission Line
3. Access to the Seward Highway
4. Access to the Railroad

Project Infrastructure

Aquatic Resources
(Fisheries Assessment)

Studies
- Salmon Spawning Distribution & Abundance
- Resident & Rearing Fish Abundance and Distribution
- Habitat Mapping
- Instream Flow Studies

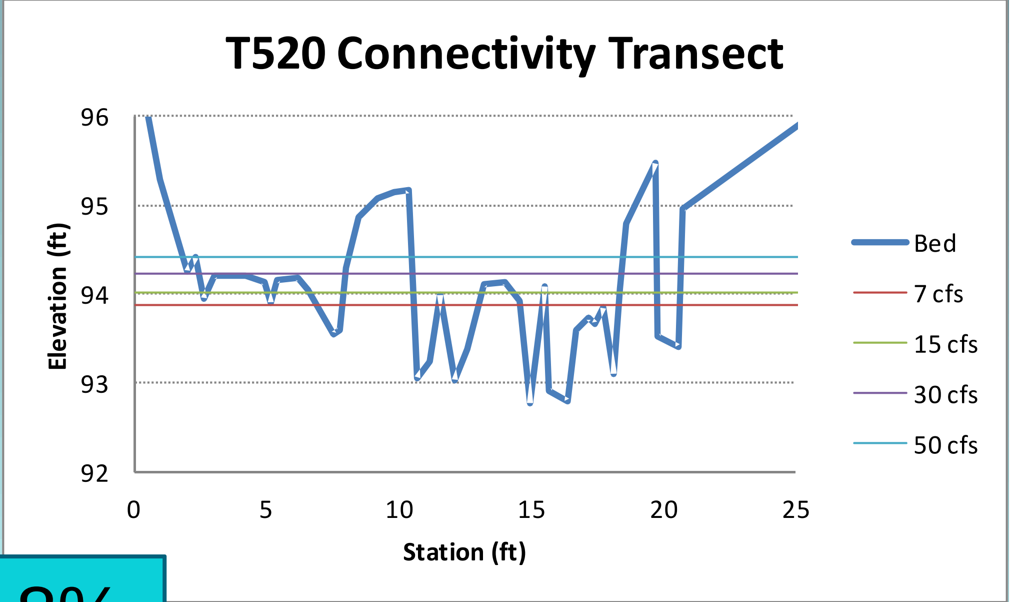
Methods
- Adult Weir
  - o Enumeration
  - o Biological Samples & Data
  - o Radio & Floy Tagging
- Surveys (Visual, Redd, Carcass)
- Juvenile Incline Plane Traps
- Minnow Trapping
- Snorkel Surveys
- Beach Seining

Aquatic Resources
(Fisheries Assessment)




Aquatic Resources

(Instream Flow Studies & Habitat Mapping)



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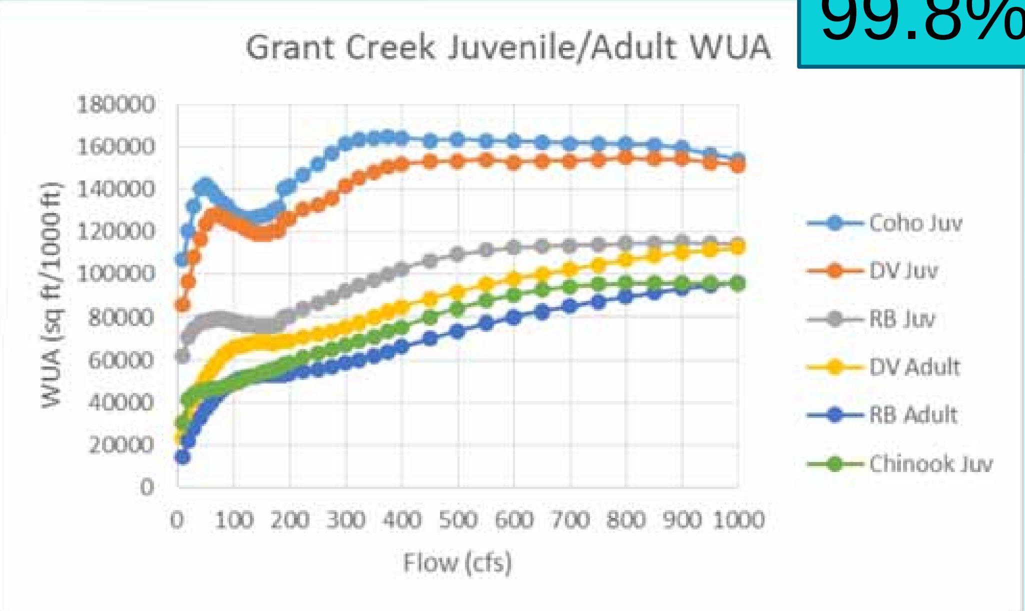
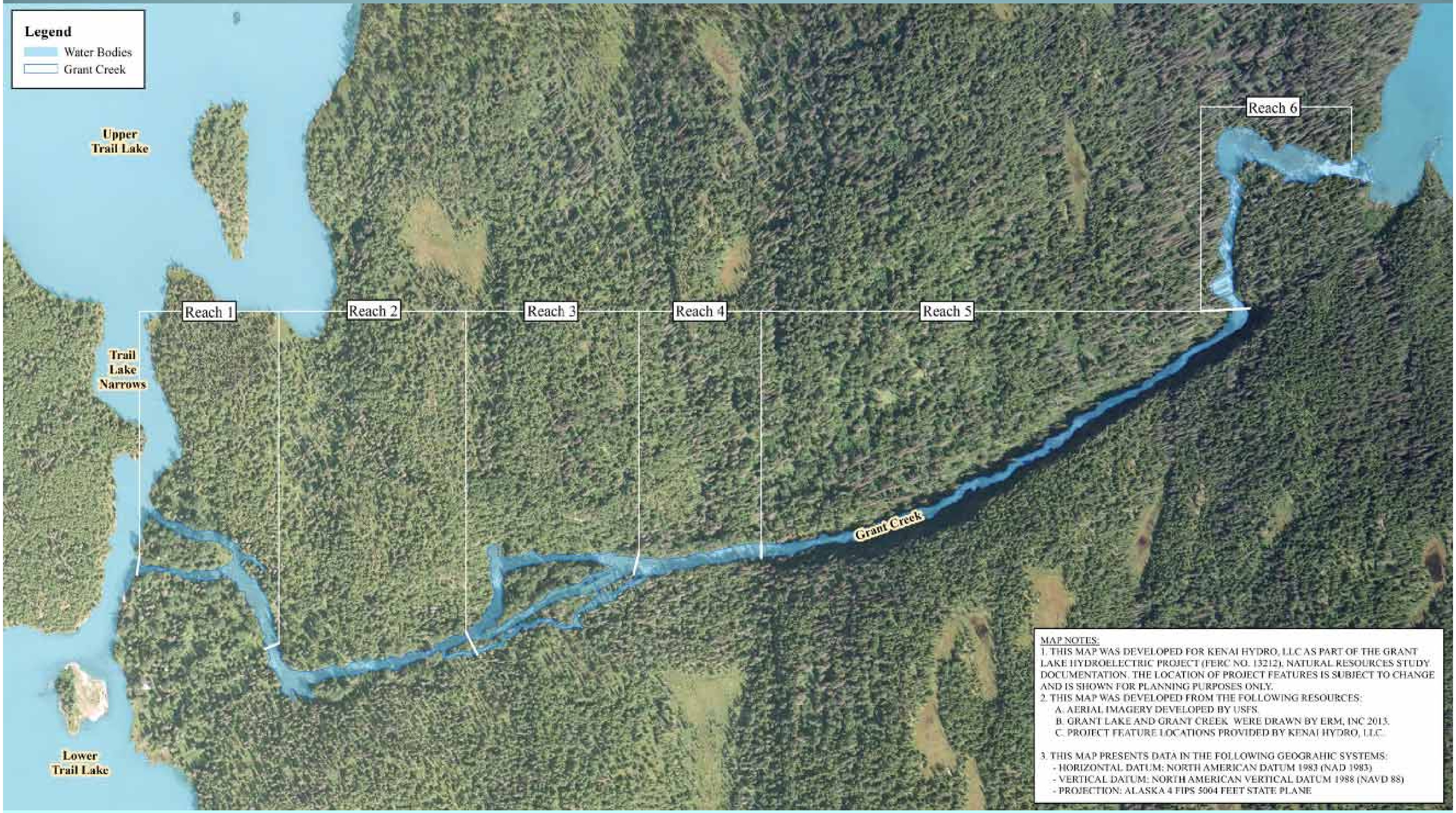


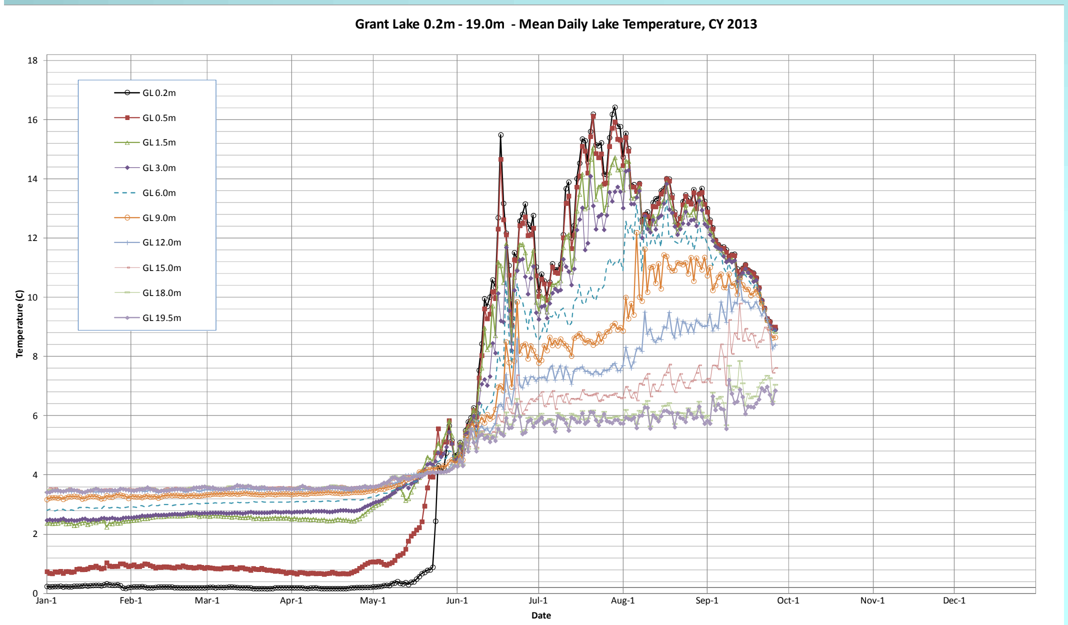
Habitat Mitigation



Water Resources

Studies

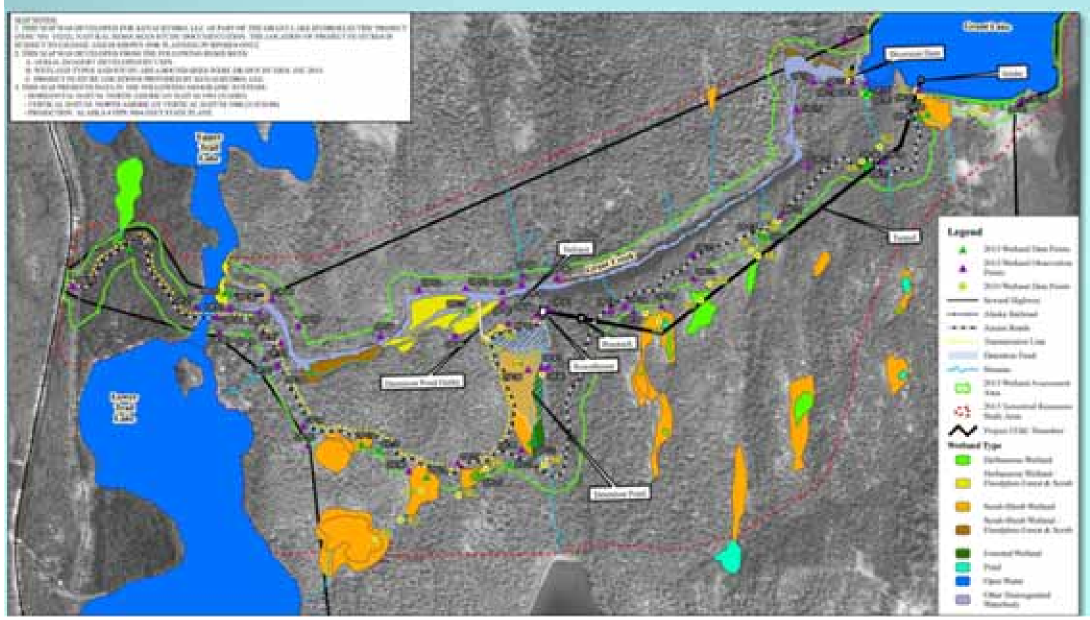
- Water Quality & Temperature
- Hydrology Studies (Stream Gaging)
- Macroinvertebrate & Periphyton
- Geomorphology (Sediment Transport)



Terrestrial Resources

<u>Studies</u>

- Botanical
- Wetlands Mapping & Classification
- Wildlife Studies



Recreation and Visual Resources

Studies

- Recreation Resources (summer & winter)
- Visual Resources

Cultural Resources

Studies
- Extensive Literature Review
- Field Survey of the Area of Potential Effect (APE)

Recommendations of
- Eligibility
- Effect

Operations Parameters

Table 1. Grant Creek Biology, Hydrology, and Operations Summary Table

	Stage	Species		January	February	March	April	May	June	July	August	September	October	November	December
Biology	Spawning	Chinook													
		Coho													
		Sockeye													
		Dolly Varden													
		Rainbow													
	Incubating	Chinook													
		Coho													
		Sockeye													
		Dolly Varden													
		Rainbow													
	Juveniles	Chinook													
		Coho													
		Sockeye													
		Dolly Varden													
		Rainbow													
	Fry	Chinook													
		Coho													
		Sockeye													
		Dolly Varden													
		Rainbow													
	Adult	Dolly Varden													
		Rainbow													
Hydrology	Composite Streamflow Record (CY 1948-2013)	Maximum Flow	(cfs)	326	227	116	160	566	2140	1210	1383	1731	1295	851	570
		20% Exceedance		64	51	41	47	215	512	573	524	480	317	151	87
		Average Flow		52	43	33	36	146	409	503	444	367	233	123	73
		Median Flow		45	36	30	31	127	398	488	422	313	182	94	59
		80% Exceedance		32	25	21	22	62	290	419	346	215	115	67	42
		Minimum Flow		12	11	6	13	17	102	210	173	65	45	28	18
Operations	Typical Unit Operation	1 MW Unit (75 cfs)		Running	Running	Running	Running	Running	Off	Running	Running	Running	Off	Off	Running
		4 MW Unit (310 cfs)		Off	Off	Off	Off	Running	Running	Running	Running	Running	Running	Running	Off

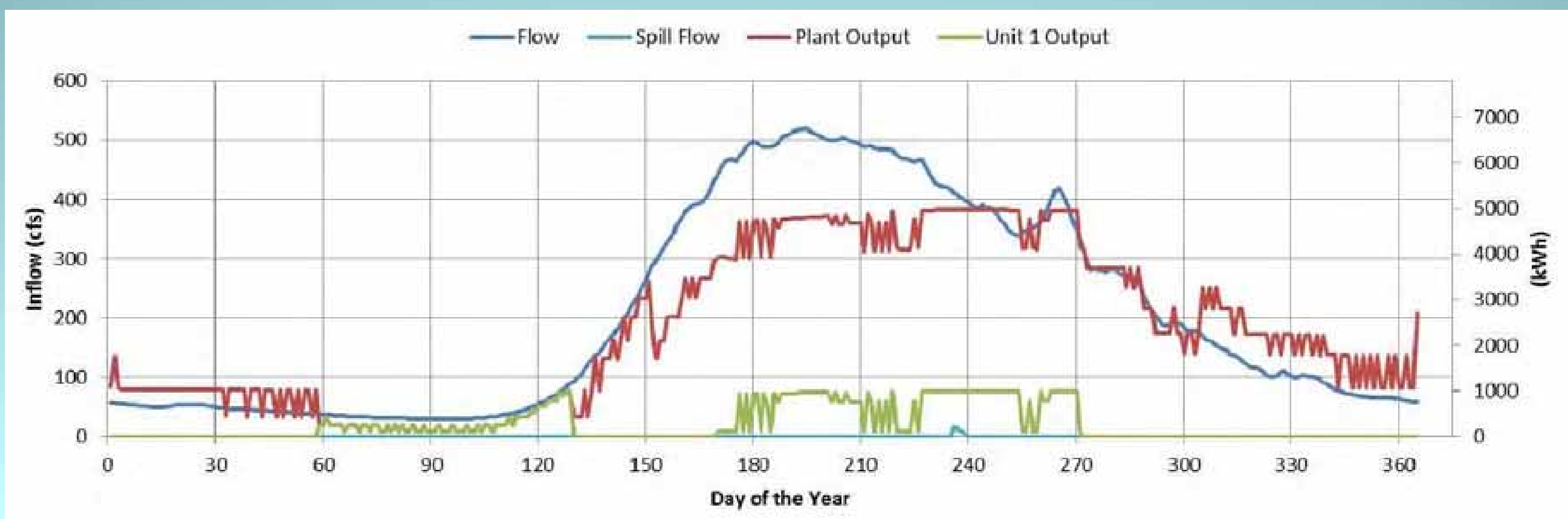
Table 2. Grant Creek Instream Flows under Natural Conditions and with Project Operations

			January				February				March				April				May				June			
Biological Parameters	Instream Flow Release (Reach 5)	(cfs)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Main Channel Flow (Reach 1-4) - Natural		55	51	51	52	47	45	41	39	36	34	32	31	30	31	35	45	69	101	152	227	318	382	431	483
	Main Channel Flow (Reach 1-4) - with Project		133	128	128	128	124	119	115	106	36	34	33	30	30	30	35	46	68	97	155	224	199	260	310	360
	Approximate Reach 2/3 Side Channel Flow - Natural		9	8	9	9	8	7	7	6	6	6	5	5	5	5	6	8	12	17	25	38	53	64	72	81
	Approximate Reach 2/3 Side Channel Flow - with Project		22	21	21	21	21	20	19	18	6	6	5	5	5	5	6	8	11	16	26	37	33	43	52	60
Reservoir Rule Curve	Maximum Elevation																									
	Drafting/Filling		Drafting																				Filling			
	Minimum Elevation																									

			July				August				September				October				November				December			
Biological Parameters	Instream Flow Release (Reach 5)	(cfs)	5	5	5	5	10	10	10	10	10	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5
	Main Channel Flow (Reach 1-4) - Natural		494	517	507	496	484	469	440	402	379	347	379	364	280	272	216	184	159	133	109	99	92	74	67	63
	Main Channel Flow (Reach 1-4) - with Project		370	390	388	375	365	347	395	399	395	374	372	365	282	273	212	187	234	207	185	180	172	150	141	147
	Approximate Reach 2/3 Side Channel Flow - Natural		82	86	84	83	81	78	73	67	63	58	63	61	47	45	36	31	26	22	18	16	15	12	11	10
	Approximate Reach 2/3 Side Channel Flow - with Project		62	65	65	63	61	58	66	67	66	62	62	61	47	46	35	31	39	35	31	30	29	25	24	24
Reservoir Rule Curve	Maximum Elevation																									
	Drafting/Filling																		Drafting							
	Minimum Elevation																									

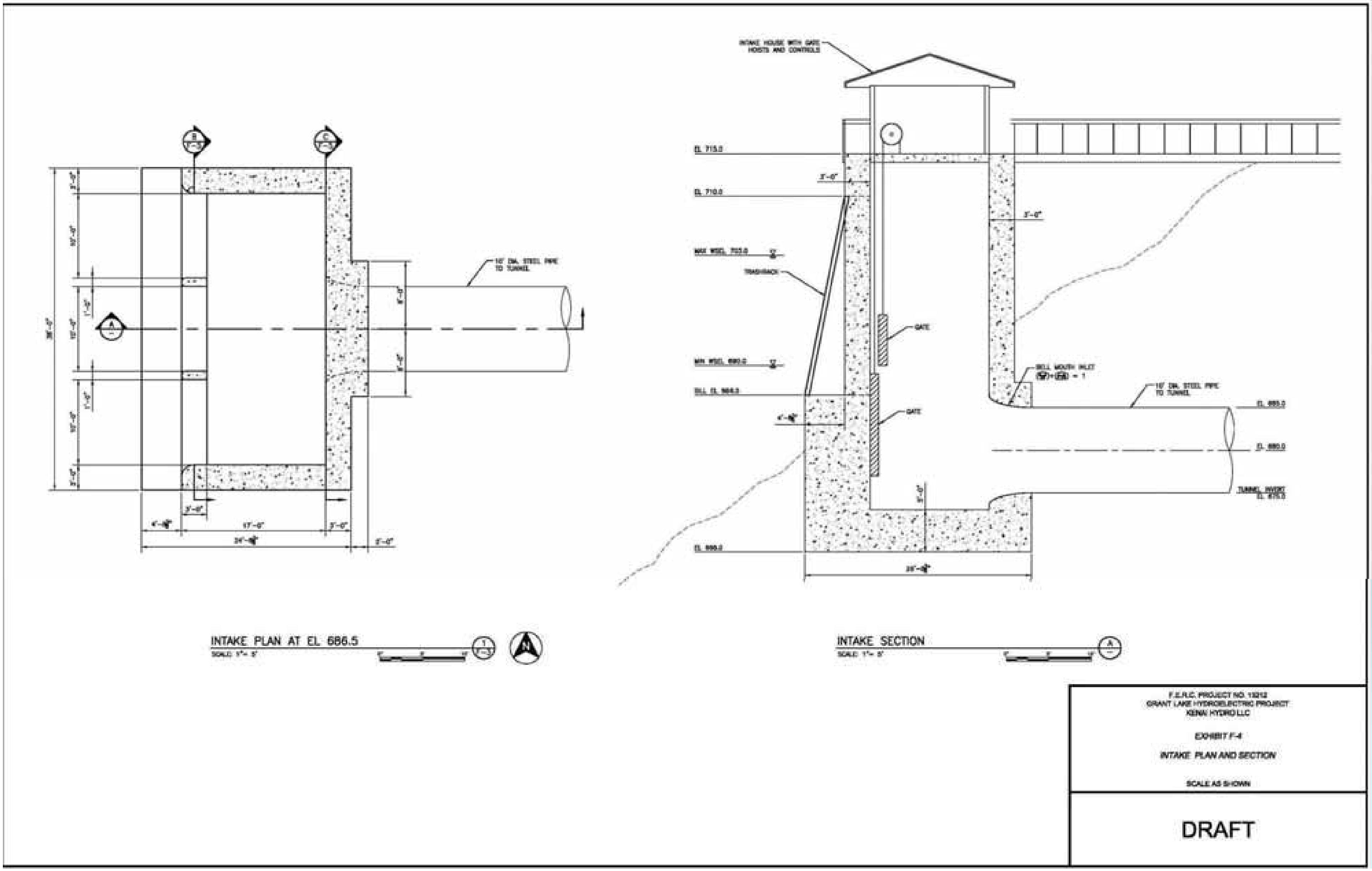
Generation Model Results

- Energy Production: 19,500 MWh Annually (based on Average Daily Flows)
- Plant Factor: 0.45



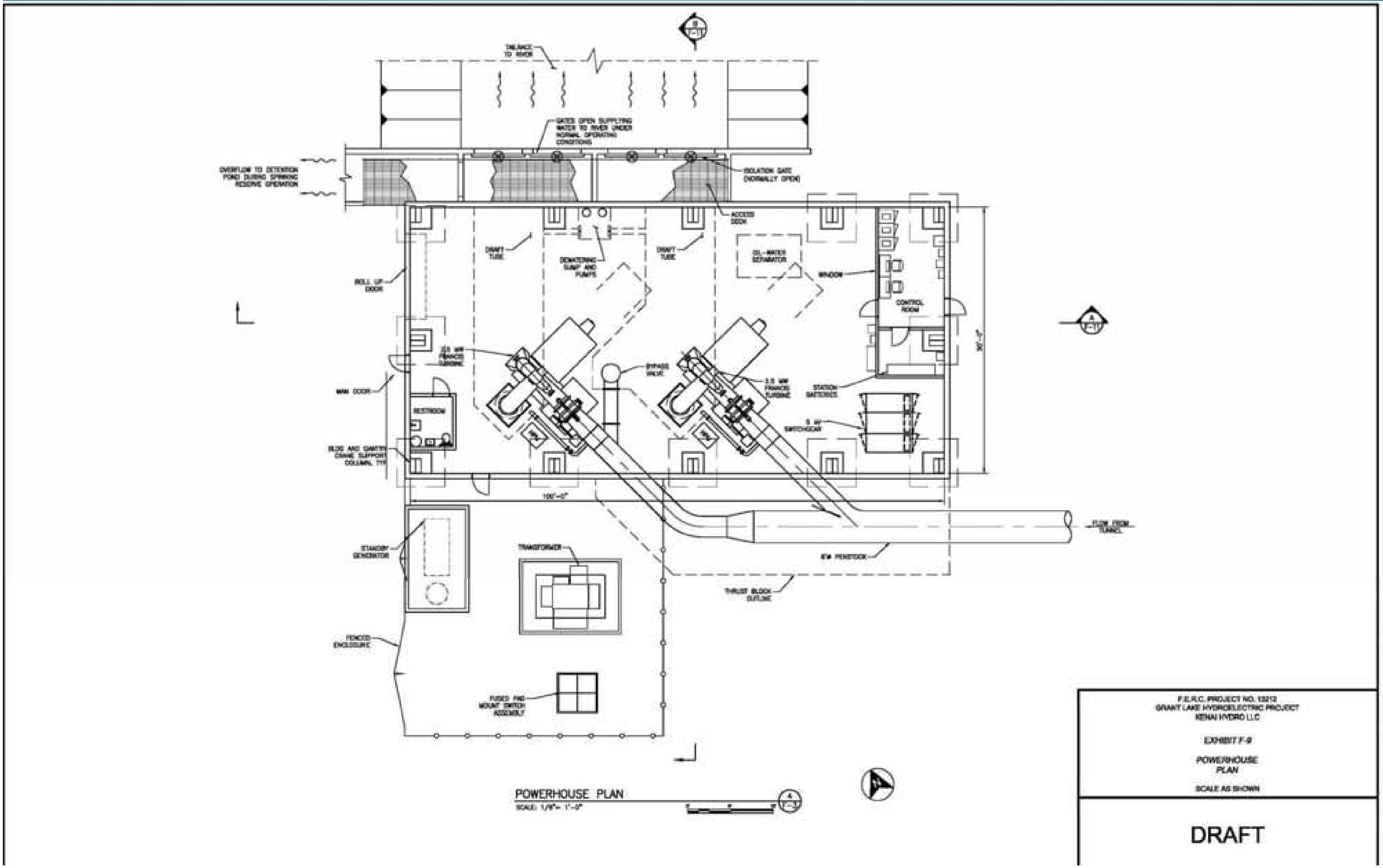
Infrastructure Development

(Intake Structure)



Infrastructure Development

(Powerhouse Plan)



Draft License Application

Initial Statement

Exhibit A: Project Description

Exhibit B: Project Operations & Resource Utilization

Exhibit C: Construction Schedule

Exhibit D: Project Costs & Financing

Exhibit E: Environmental Analysis

Exhibit F: General Design Drawings & Supporting Info

Exhibit G: Project Boundary Maps

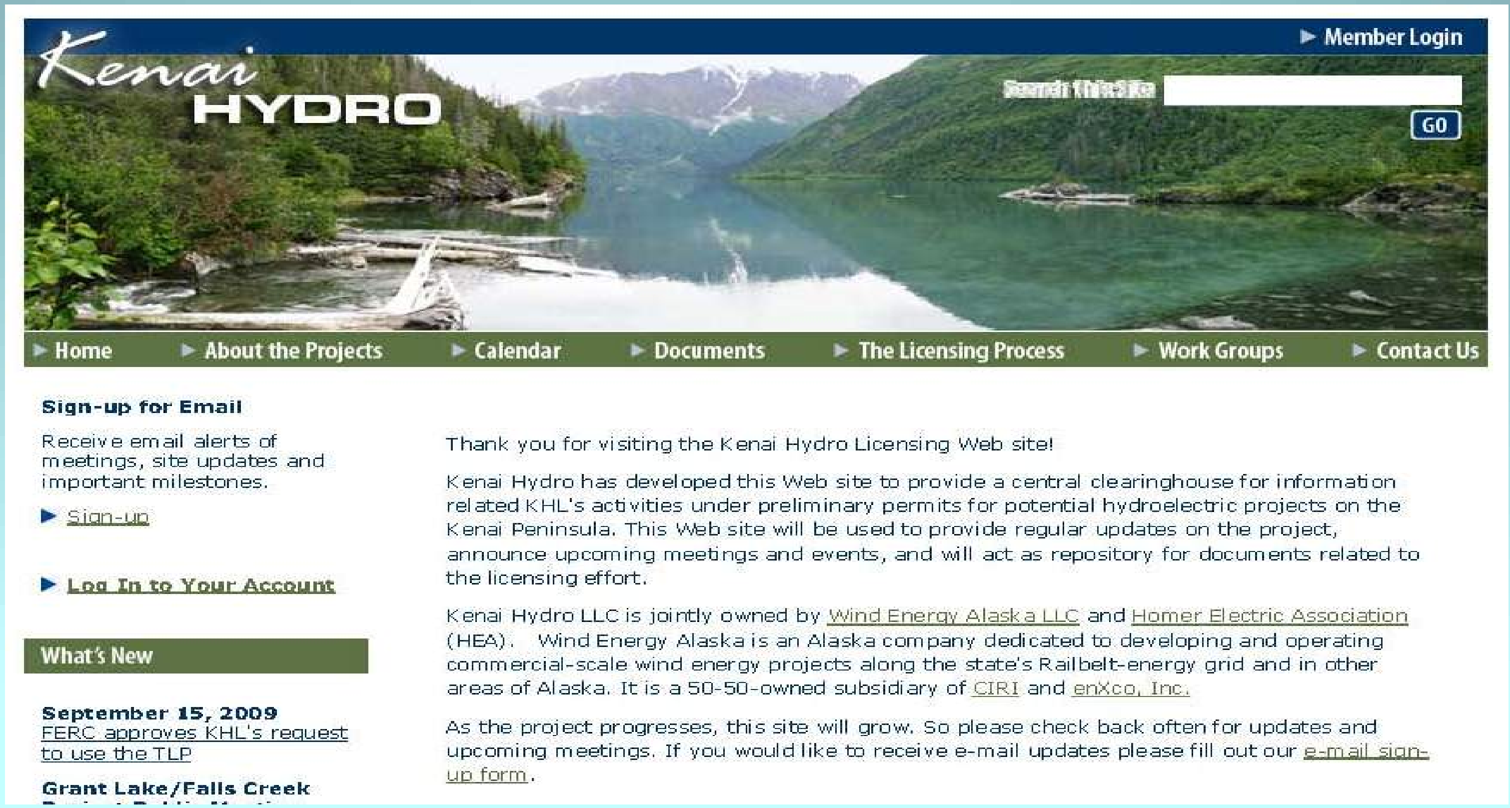
Project Information

Kenai Hydro, LLC website

(www.kenaihydro.com)

FERC E-Subscription Service

(www.ferc.gov)



QUESTIONS

Grant Lake Hydroelectric Project (FERC No. 13212) Licensing

Consultation Record

Phone/E-mail /One on One Meeting Log

Contact Name: Katie McKafferty

Agency/Organization: USACE, Kenai AK

Phone No./E-mail Address: 907-283-3519; Katherine.A.McCafferty2@usace.army.mil

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Date: 3/31/14

Time: 12 pm MDT

Grant Lake Licensing Team Contact: Levia Shoutis

Summary of Conversation and/or E-mail Exchange:

- JD and 404 Application structure:
    - Levia confirmed that Katie is OK with reviewing all of the documents to date to glean all the information needed for her determinations, rather than compiling all information in one place (e.g. a "Wetlands and Waters Report".
    - Information on what info is presented where will be explicit
    - Any relevant updates (e.g. update to wetland assessment area and wetland acreages) will be included in the new docs (JD or 404 app).
- Corps tables: Katie provided Levia w/the most up to date ORM tables ("Omnibus Regulatory Module", tables used for upload to the Corps database). Levia confirmed that two AqResources spreadsheets get submitted, 1) one for JD (includes all mapped areas in wetland assessment area), 2) one for 404, includes only fill areas (perm and temp).
- Stream impacts:
    - Katie confirmed that any area not already overlain by, and accounted for by a mapped wetland polygon, needs to be converted into a polygon in ArcGIS to be accounted for as a polygon for mitigation purposes.

- Because there’s no specific mitigation instrument for linear features in AK, all get mitigated as area features.

- Detention pond inundation: based on Cory’s confirmation that the detention pond would only be filled for a couple of hours, a few times a year, and thus wouldn’t alter the vegetation community, I asked Katie if this could be considered a temporary, rather than permanent impact. She said we can make the case for that, and she’ll make the ultimate call.

Kenai Hydro, LLC
3977 Lake Street
Homer, AK 99603

December 15, 2014

Secretary Kimberly D. Bose
Federal Energy Regulatory Commission
Attn: DHAC, PJ-12.2
888 First Street, NE
Washington, DC 20426

- FILED ELECTRONICALLY -

Final Grant Lake Project Public Meeting Minutes

Dear Secretary Bose:

Kenai Hydro, LLC (KHL) hereby submits its Grant Lake Project Public Meeting Minutes for the public meeting held in Moose Pass on November 6, 2014. The complete package includes:

- Public Meeting Minutes
- Public Meeting Sign-in Sheets
- Public Meeting Presentation Given by KHL

On November 6, 2014, KHL held a Public Meeting in Moose Pass to present the natural resource study results to the public, discuss design characteristics of the Project, describe progress related to the develop of the Draft License Application (DLA) and field any questions the public may have in advance of the formal distribution of the DLA for public review and comment.

KHL is in the process of developing their DLA and associated management plans with the current intent of distributing to FERC and the public for comment in early 2015. To date, our comprehensive natural resource results and impact assessments, engineering feasibility and preliminary design work and collaboration with stakeholders corroborate KHL's impression that the Grant Lake Hydroelectric Project presents an extremely viable opportunity for KHL to diversify its generation portfolio and reduce its current level of dependence on fossil fuel generation.

Kenai Hydro, LLC
3977 Lake Street
Homer, AK 99603

KHL is committed to keeping FERC apprised of developments during Draft and Final License Application development and will be scheduling another progress/advisory call with our FERC Representative, Ken Hogan soon. As always, please don't hesitate to call or email if you have any questions or concerns.

Sincerely,

/s/ Mikel Salzetti

Mikel Salzetti
Project Manager
Kenai Hydro, LLC

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
6:00PM – 9:31PM

Presenters: Mike Salzetti (HEA), John Stevenson (BioAnalysts, Inc.), John Blum (McMillen, LLC), Cory Warnock (McMillen, LLC), Mike Yarborough (Cultural Resource Consultants), Dwayne Adams (Earthscape), Mort McMillen (McMillen, LLC)

Attendees: See sign-in sheet (Attachment A)

Attachments

A – Sign-in sheet
B – Public Meeting Presentation

Mike Salzetti (HEA) opened the meeting at 6:07pm by briefly introducing the project and the project team. He introduced the audience to the project resources (paper copies) made available at the meeting and gave instructions regarding the single question survey that Kenai Hydro (KHL) would like to have meeting attendees complete and turn in.

Mike explained that the main purpose of the meeting is to summarize and share the results of the various resource studies. He emphasized that tonight's presentation would only be an overview of what is a body of very detailed information. The detailed study plans and results are available on KHL's website.

Mike explained that Kenai Hydro LLC is a wholly-owned subsidiary of HEA.

Mike provided a brief history of the project from work in the 1980's, to more recent studies, and leading up to the material to be presented today. Mike explained that following the scoping process in June of 2010, it was evident that Stakeholders desired studies that were more quantitative in nature than those developed earlier. As such, KHL refine the study plans based on comments, hired appropriate study consultants and vetted the refined plans with Stakeholders to confirm their adequacy. The studies were then implemented in 2013/2014. Mike then explained the key project features: a water fall at the outlet of Grant Lake, steep topography, and proximity to infrastructure (transmission lines, road & rail system).

The project's operating assumptions were presented to the group. There is no longer a dam associated with the project. Lake level will fluctuate from 0 to -13ft (Elev. 703-690-ft). There will be a tunnel, a powerhouse, and a detention pond.

John Stevenson (BioAnalysts) gave his presentation of the Aquatic/Fisheries Studies. John identified four anadromous salmonid species that are found in Grant Creek, which include pink, Chinook, sockeye, and coho salmon. Key resident species include rainbow trout and Dolly Varden. Based on visual, redd, carcass and radio telemetry surveys, John pointed out that Reaches 1 and 3 were most important to all species of interest, and that only 1.3 percent of all spawning occurred in Reach 5. He explained that this was a summary of what amounted to an extensive amount of data. Primary methods included but were not limited to:

- Use of a weir
- Radio tagging and tracking
- Incline plane traps
- Minnow trapping
- Spawning surveys
- Snorkeling
- Floy tagging
- Genetic sampling

John reiterated that the entirety of the study report and associated results could be found on the KHL website. John's portion of the presentation is incorporated into the attached document.

John Blum (McMillen) presented the instream flow study results. He explained that the purpose of the study is to answer two questions: 1) Where is the preferred fish habitat and, 2) How does the project hydrology affect this habitat? Minimum instream flow rates for the bypass reach were presented along with their influence on the fish habitat of Grant Creek. John explained that the entirety of the report and associated results can be found on KHL's website. John's portion of the presentation is incorporated into the attached document.

*** A short break was taken from approximately 7:10-7:19pm. ***

Cory Warnock (McMillen) presented the Water Resources and Terrestrial study plans and summaries. Water quality was found to be consistent with results from previous studies in the 1980's as well as the 2009 study data. The Terrestrial Study looked at botanical, wetlands, and wildlife resources. The study findings were summarized by noting the species and counts observed within the study area. Cory noted that the project intake design and lake levels were altered to avoid impacting botanical resources identified in the study. Cory explained that the entirety of the report and associated results can be found on KHL's website. Cory's portion of the presentation is incorporated into the attached document.

Mike Yarborough (Cultural Resource Consultants), presented the Cultural Resource study and findings. The study conducted included a literature review and pedestrian surveys… no native Alaskan sites were discovered in the surveys. Some of the information has been kept confidential at the request of the agencies and per the Section 106 process. Fourteen newly identified historic sites were identified and only one was recommended as eligible for the National Register. Impacts were deemed as minimal and mostly associated with potential increased access as a result of the project.

Dwayne Adams (Earthscape) presented the Recreational and Visual Resource study findings. The study looked at both winter and summer uses of the area. Noise levels were also assessed; typically 40dB or less with peak levels at 80-90dB from airplane flyovers or snowmachines. Work to address the commemorative Iditarod National Historic Trail impacts were explained. Dwayne explained that the entirety of the report and associated results can be found on KHL's website. Dwayne's portion of the presentation is incorporated into the attached document.

Mort McMillen (McMillen) presented an overview of the proposed project design and the elements that addressed the findings or issues identified by the studies. Construction would be expected to take place over two summers. Efforts are made to mitigate construction impacts through planning, monitoring, and Best Management Practices. Mort explained that the entirety of the infrastructural design and associated operational regime would be described in the DLA. Mort's portion of the presentation is incorporated into the attached document.

At 8:19pm, the meeting was opened for questions from the audience.

Q: Mark Luttrell said that he felt that KHL was there to tell the public what we are going to do, not "if" KHL was going to do the project. He said that he thought the public was against the project and was "torqued" that HEA does not seem to have heard this input.
A: Mike replied that the public has been informed of the process and has been kept in the loop regarding the Project status, and that while there are some elements of the public that are opposed to a Grant Creek Project, there are also proponents, including HEA's Board of Directors and HEA members. Furthermore, Stakeholders which include both state and federal entities have been heavily involved with development of operating conditions.

Q: Mike Cooney asked what the estimated capital construction cost was.
A: Mike Salzetti said it is approx. $58M.

Q: What % of the overall power production will this project represent?
A: Mike Salzetti said this plant would produce about 4% of HEA's energy usage.

Q: What other renewable projects is HEA investigating?
A: Mike Salzetti stated that HEA is looking at tidal and solar energy projects. Mike explained that wind energy is an intermittent source and can impact our gas contracts and cost.

Q: Mike Cooney asked if the number of sockeye fry counted during the 2013 study in Grant Creek would allow us to accurately predict the contribution of Grant Creek sockeye to the Kenai system run.
A: John Stevenson said that the study was not able to quantify the number of sockeye fry produced in Grant Creek, and that Sockeye fry move very quickly out of the Grant Creek drainage and rear in downstream lakes such as Lower Trail Lake or Kenai Lake.

KENAI HYDRO LLC, GRANT LAKE PROJECT
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Q: Mike Cooney asked again if there is there a way to quantify what the rearing effect of Grant Lake on Trail Lake and Kenai River fisheries?
A: John said he could not say what Grant Creek contributes relative to other tributaries to the Kenai River since that was not part of the scope of study. Cory Warnock added that while fish quantities are difficult to extrapolate (to other areas), the fish habitat pre- and post-project would help to form opinions of effects on fish productions. Ricky Gease said that Grant Creek has a very small population of sockeye relative to the entire sockeye return to the Kenai system (in 2013, about 1,150 sockeye returned to Grant Creek, while approximately 1,000,000 sockeye returned to the Kenai system overall). Mr. Gease briefly explained correlations to the Cooper Lake hydro relicensing project. The increase of flows to the creek during the winter months seems to have a net positive effect on rearing capacity for juvenile fish.

Q: Hal Shepherd asked why the Integrated Licensing Process not used for this project. I'm concerned that Stakeholders haven't had the opportunity to weigh-in on the project.
A: Cory Warnock stated that KHL was using the Traditional Licensing Process or "TLP" and that this process was vetted with Stakeholders and subsequently approved for use by FERC. With the TLP, KHL was able to go back and use the process to revise its study plans to address concerns that were voiced. Public agencies and their experts have been collaborating extensively with KHL during the study process. Many meetings, workshops, conference calls at all phases have been taking place.

Q: How often have the state and Federal agencies been involved and what input have they had?
A: Cory Warnock referred to the slide in the presentation that listed the various consultation meetings. Agency experts were consulted in Dec 2012 to review the latest study plans. Plans were adjusted to address their comments. In March 2013-Nov 2013 the data were collected and the remainder of the year was spent preparing reports. This was followed by 6-8 meetings to present the results, much like tonight, to the agency Stakeholders. In July, a meeting was conducted to take input on the preliminary engineering and design. A large instream flow work group was formed to vet the results of the studies. All of the meeting notes and agency input are documented and this information is available on the KHL website.

Q: Will there be any provision for flushing flows?
A: Cory Warnock indicated that much of the canyon reach is well armored and it is sediment-starved. He stated that most of the sediment that was routed from Reach 5 (bypass reach) to the high quality habitat areas (Reach 1-4) likely occurred during episodic events (slides, quakes, etc.). Cory acknowledged that some level of sediment comes from Reach 5 and as such, one of the mitigation efforts that is proposed is to monitor sediment in the creek in an adaptive management approach. Plans will be made to address mitigation of sediment in the creek. If, during the first couple years of operation, it is determined that sediment routing is being negatively impacted out of Reach 5, KHL will meet with Stakeholders and discuss the appropriate option between flushing flows and/or gravel supplementation to allow for the continued natural level of sediment deposition into Reaches 1-4.

Q: Beside this project, is Bradley Lake the only HEA hydro project?

A: Mike Salzetti clarified that Bradley Lake is not owned by HEA, but HEA operates it for the project participants and enjoys a small share of the energy produced by the plant.

Q: What lessons from operating the Bradley Lake have we learned and applied to this project?
A: Mike Salzetti said that we have applied lessons learned from other hydro projects, such as operationally to optimize flows for energy production and sizing of the project. Mort McMillen added that when you look at historical hydro projects, they tended to be oversized. The way that powerhouses are laid out is important and the project design calling for two 2.5MW units is important vs. having a 1- and a 4-MWuntThe current design allows for sharing spare parts, etc. With respect to the tunnel, we have learned how to craft the construction specifications and sequence of construction to minimize costs. Mike Salzetti also said that our level of study has been significantly more rigorous compared to previous projects.

Q: Why didn't the negative project sentiment from earlier meetings have a larger affect?
A: Mike Salzetti said that a more quantitative approach needed to be taken and more substantive data needed to be collected and subsequently analyzed for project impacts. KHL has done that.

Q: Has HEA conducted a survey of its members to see how many support this project?
A: Mike Salzetti explained that our Board of Directors is elected to represent our members. The Board has been a proponent of the project.

Q: When we are looking at potential mitigation measures, in Reach 1there are 2 large projects in the area that "reformatted" (glide-riffle-glide?) the lower reaches (to improve habitat). Is there any concept for Grant Creek to reformat or optimize the "distributary reach", similar to Dave's creek or Stetson Creek?
A: Cory Warnock said that KHL plans to modify the upstream control at the distributary to permit consistent flows that would allow improved habitat. Monitoring efforts will be in place to ensure that this habitat is being maintained and utilized.

Q: Ricky Gease stated that he was impressed by the project's ability to model a 66-year hydrologic history. He stated that something lacking in Alaska, in general, is water flow data over time. Is there any way to take the data that we have collected here and work with Stakeholders to develop a comprehensive Kenai River watershed model? Could this be done?
A: Cory Warnock said that what the project could contribute to such an effort is that the project plans to leave its gaging station in place to continue to collect flow data and potentially allow for synthesis of hydrologic data to other basin around the Kenai Peninsula. Mike Salzetti said that overall, the development of a watershed model is a great idea, but it is not currently a proposed KHL mitigation measure.

Q: What do you call the trail going to the Case Mine?

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A: Dwayne Adams stated that the trails in that area are called “Grant Lake Trail north” and the portage trail is called the “Saddle Trail”.

Q: The proposed access road appears to cross State Land. Who would be best to make comments to regarding the access road?
A: Mike Salzetti indicated that in addition to commenting on the Draft License Application (DLA), comments should be given to State Lands, State Parks and the US Forest Service.

Q: Are there plans to have a public restrooms on the project?
A: Mike said it depends on the decisions made with respect to access being allowed via project routes. If public access is allowed, then it may be a mitigation measure.

Q: Mark Luttrell said he thinks that the Recreation Study is not complete. Would HEA commit to doing a comprehensive usage study including Seward & Cooper Landing?
A: Dwayne Adams asked how this would be relevant to the questions for Grant Lake. One of the questions may be latent demand… i.e., if we build it, will they come?
Q: What are the exact questions to be asked that would answer what impact increased access would have on things, such as the creek banks?
A: Dwayne stated that it is very difficult to design a study to assess latent demand. We expect that the access would be used and these uses have been quantified in the current study.

Q: An individual stated that every year he has come and seen the project presentations, and he has been impressed. If this project is built, this person thinks that usage will increase. He indicated that he does not favor the project and is concerned about the potential increased usage. He expressed frustration that Moose Pass is not being served by HEA, but HEA is benefitting from having a project in Moose Pass.
A: Mike Salzetti drew a comparison to the Bradley Lake Project that serves and benefits all of the Railbelt, but is located away from the utilities and communities that it serves.

Q: Did you say that if the access is opened or closed will determined by input tonight?
A: Mike Salzetti said no, that is was a more comprehensive process than just this informal survey and that the agencies will provide input as well. The Forest Service is in the process of updating their Forest Plan and they will likely address the access and usage to this area.

Q: Who makes the final decision related to access?
A: Mike Salzetti stated FERC does with input from Stakeholders. If you really want your voice heard, you must comment during the DLA comment period. Tonight is an informal survey.

Q: Were effects of flow on the Lower Trail Lake ice modeled?
A: Cory Warnock stated that this has not been modeled or assessed.

Q: Is the genetic (fish) population in Grant Creek isolated?

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A: John Stevenson stated that the genetic data was collected per the request of ADF&G and they now have all of the samples. KHL doesn't have the results from the State's study, but there is no reason to think that fish from Grant Creek are genetically isolated.

Q: Where will the intake tower will be located, have we taken into account climate change effects on this location?
A: Mort McMillen stated that the design of the intake allows for water temperature to be taken into consideration by moving the elevation of the intake. From a hydrology viewpoint, this is why KHL looked at the hydrologic history and design the project for flexibility of the intake structure.
Q: What is your timeline for licensing and construction?
A: Cory Warnock stated that the plan is to have the DLA complete and available for comment by early spring. There is a 90-day public comment period, and then a Final License Application (FLA) will be prepared to address the comments received which will be filed with FERC. FERC's review and ruling on the FLA could take from 9-months to 2-years. Final engineering design then typically takes 1 year and construction would take approximately 2 years. From final engineering to commissioning of the project is estimated to take approximately 3 years.

Q: What is the length of the FERC license?
A: 30-50 years.

Q: How long would it take for HEA to realize its return on its investment of $58M?
A: Mike Salzetti stated that gas pricing plays a big role in estimating this payback. The payback period is expected to be a 30-50-years, but beyond this time it produces very inexpensive power.

Q: Mark Luttrell asked if HEA would commit to 2 more public meetings, one in Seward and one in Cooper Landing and structure them to take more public comment?
A: Mike Salzetti stated that he would need to think about this.

Q: A suggestion was made that HEA needs to take more public comment on the study results due to the fact that he fears that FERC will rubber stamp this project based on the results of our studies.
A: Cory Warnock said that FERC does not rubber stamp projects; it is not a foregone conclusion that FERC would issue a license. Mike Salzetti added that this meeting is not required by the (licensing) process and KHL is conducting this meeting tonight as a good-faith effort to inform and involve the public in advance of their ability to review and comment on the DLA.

Q: Jim Herbert stated that they came tonight to obtain information. HEA is in Moose Pass's backyard. The local benefit is perceived to be little and the impact is large. He stated that HEA needed to consider some sort of local contribution or remediation for the impact that locals feel the project will have on them and their community.
A: Mike Salzetti stated that KHL would take this into consideration.

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
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Q: Mike Cooney said that he thinks that there are likely to be large impacts to local residents, but very little benefit. He thinks that FERC awarding a license is a foregone conclusion. He would like for HEA to collaborate with the community to develop the project plan. He said that he made this request of HEA in 2009. He asks for a collaborative process.

After a call for any further questions and seeing none, the meeting adjourned at 9:31pm.

Attachment A

Public Meeting Sign-in Sheets

Grant Lake Hydroelectric Project (FERC No. 13212)
Grant Lake Project Public Meeting
November 6, 2014
Moose Pass Community Hall, Moose Pass, AK

Name	Residential Location	Phone	Email
Cory Warnock	Ferndale, Wa.	360-384-2662	cory.warnock@mcmillen-llc.com
John Stevenson	Redmond, WA	206 390-7116	john.stevenson@biOanalysts.net
Mike Insalaco	Seward	907-830-7393	mike@Alaska-energy.com
Hal Shepherd	Homer	907-491-1355	hal.shepherd@[illegible].org
Mark Luttrell	Seward	907 224 5372	profrdck@arctic.net
Irene Lindquist	Moose PASS	288-3186	irene@arctic.net
Donna Wottlin	Seward	224-5711	bearimage.dw@gmail.com
J. Anyl	Moose Pass		
Ryan Thomas	Anchorage	907 269 8692	ryan.j.thomas@alaska.gov
Bob Baldwin	Cooper Landing	907-250-3513	akengr@yahoo.com
Jim Herbert	SWD	224-8600	jherbert8600@gmail.com
Katie Baldwin-Johnson	Cooper Landing	440-6664	katiejohnson@alaska.gov
JUDITH Odhner	Moose Pass	288-3628	
BRAD ZUBECK	KENAI	907 395-6232	

Grant Lake Hydroelectric Project (FERC No. 13212)
Grant Lake Project Public Meeting
November 6, 2014
Moose Pass Community Hall, Moose Pass, AK

Name	Residential Location	Phone	Email
Mike Yarborough	Anchorage	907 349-3445	Archeology@acsalaska.net
Dwayne Adams	Anchorage	907 274 2688	wdadams@earthscape.alaska.com
John Lang	Moose Pass	907-288-7719	
Jenny Nassen	Moose Pass	907-288-3119	Pm99588@yahoo.com
Ricky Gease	Kenai	262.8588	ricky@krsa.com

Grant Lake Hydroelectric Project (FERC No. 13212)
Grant Lake Project Public Meeting
November 6, 2014
Moose Pass Community Hall, Moose Pass, AK

Name	Residential Location	Phone	Email
Mike Salzetti	Kenai	(907) 283-2375	msalzetti@homerelectric.com
MORT MCMILLEN	BOISE	(208)342-4214	morton.mcmillen@mcmillen-llc.com
MIKE COONEY	MOOSE PASS	907 288 5022	mcooney@arctic.net
Angela Coleman	Moose Pass	907-288-3110	perupraisie@hotmail.com
Mike Glasar	mile 20	288-3133	glaser@seward.net
DENNIS GEASE	KENAI	472-9291	dgease@gmail.com
David Griffin	Anchorage	222-3846	david.griffin@alaska.gov
Shina duVall	Anchorage	269-8720	shina.duvall@alaska.gov
Andrew Bacon	Seward	362-7719	andbacon20@yahoo.com
Claire Shipton	Moose Pass	288-4111	claireshipton@gmail.com
David Pearson	Moose Pass	288-4111	
Jeff Hetrick	"		jjh@seward.net
Jeanette Hanneman	Seward	907 317-4518	dyrkss@yahoo.com

KENAI HYDRO LLC, GRANT LAKE PROJECT
DRAFT MOOSE PASS PUBLIC MEETING NOTES
NOV. 6, 2014
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Attachment B

Public Meeting Presentation

Grant Lake Hydroelectric Project

Public Meeting

November 6, 2014 – Moose Pass, AK

MCMILLEN
DESIGN with Vision. BUILD with Integrity.

In Association with
HEA

Introductions

- HEA
  - Mike Salzetti Manager of Fuel Supply & Renewable Energy Development
  - Brad Zubeck Manager of Engineering - Power Supply
  - Joe Gallagher Director of Member Relations

- Consulting Team
  - Cory Warnock – Project Manager (McMillen, LLC)
  - Mort McMillen – Lead Engineer (McMillen, LLC)
  - John Blum – Senior Instream Flow Scientist (McMillen, LLC)
  - John Stevenson – Senior Fisheries Biologist (Bioanalysts Inc)
  - Mike Yarborough – Cultural Specialist (Cultural Resource Consultants)
  - Dwayne Adams – Recreation/Aesthetics Specialist (Earthscape Alaska)

Presentation Overview

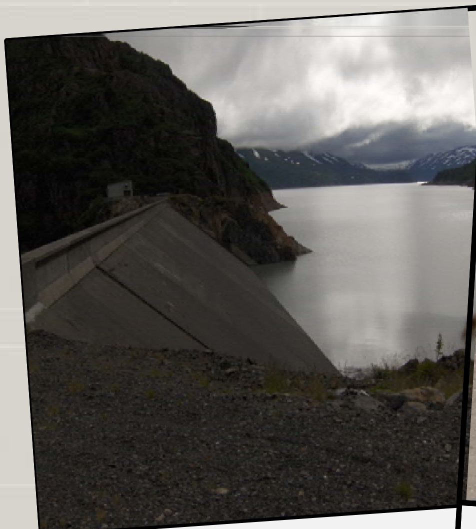
- Project Introduction
- Natural Resource Studies
- Engineering / Infrastructure / Operations
- Licensing Overview
- Questions

INTRODUCTION TO HEA

- 158 Employees
- Member-Owned Cooperative
- 32,853 Meter
- 2,392 Mile of Energized Line
- 3,166 Sq. Mile of Service Territory
- Sales of 482 GWh/year
- Governed by an Elected Board of Directors

WHY

- Members via the BOD Desire Renewable Energy
- Independent Light
- Cook Inlet Gas Situation



Renewables

Independent Light

NCC Power Plant

Cook Inlet Gas

History

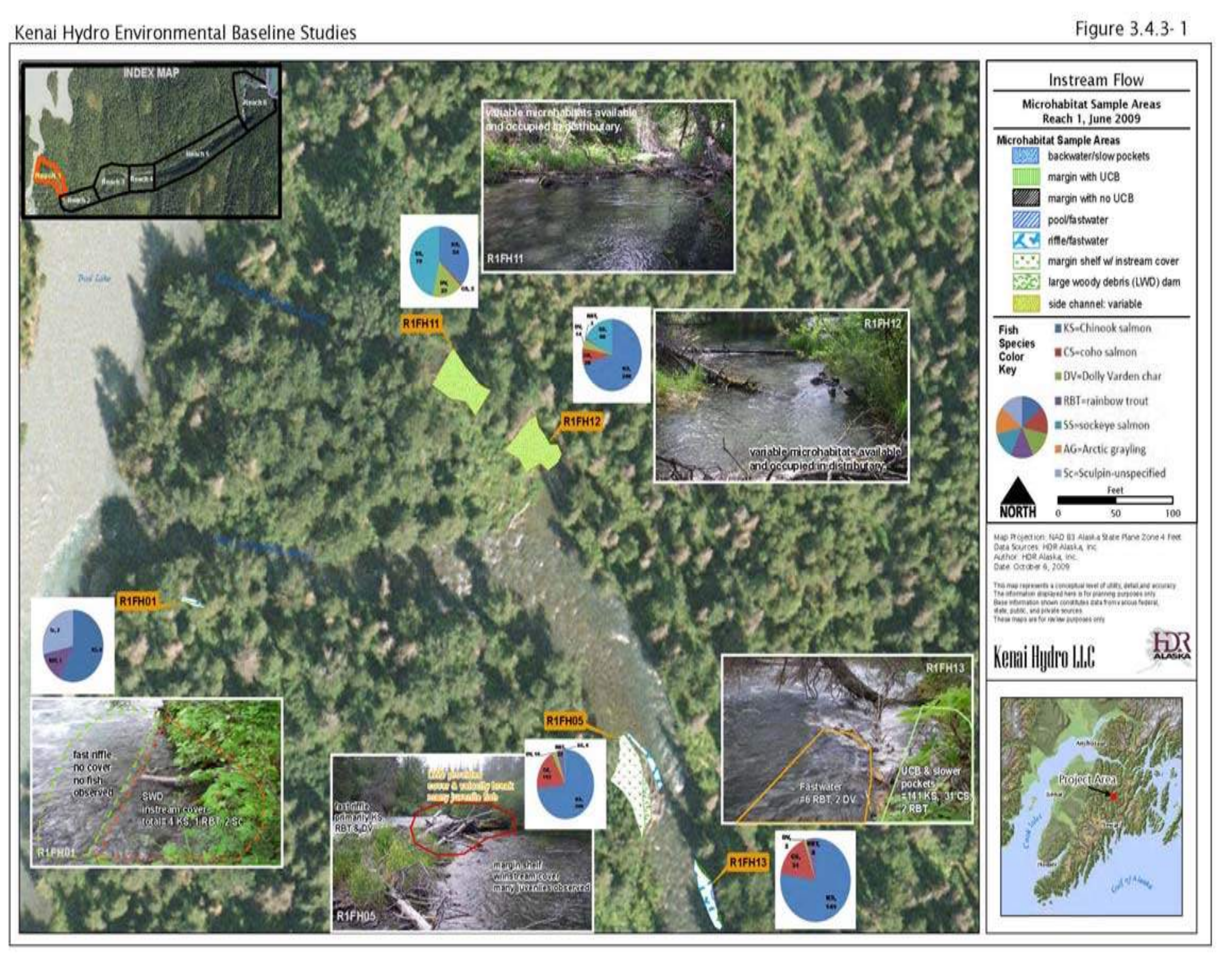
Feasibility Studies

- Grant Lake
- Falls Creek
- Ptarmigan Lake
- Crescent Lake

History

2009 Environmental Baseline Studies

- Examine Previous Studies
- Fill Data Gaps
- Develop Study Plans
- Joint Meeting



HISTORY

- 2010 Study Season
- FERC Scoping Process
- Quantitative modifications
- 2011 AEA Grant
- Preliminary Permit Expiration (Oct 2011)
- 2nd Preliminary Permit (March 2012)
- RFP Process
- Securing McMillen as Natural Resources/Engineering Consultant
- 2013 Successfully Executed NR Studies

Recent Consultation

- ✓ KHL meets with Stakeholders to present final study plans and re-integrate – December 12, 2012
- ✓ KHL incorporates informal comments from Stakeholders and files Final Study Plans with FERC – March 25, 2013
- ✓ Site visit with Stakeholders to Grant Creek – September 5, 2013
- ✓ KHL meets with Stakeholders to discuss natural resource study results – Week of March 19, 2014
- ✓ KHL forms Instream Flow Workgroup with Stakeholders to advance and collaborate on appropriate bypass flows – April, 2014
- ✓ KHL meets with Stakeholders to discuss and collaborate on engineering/design aspect of the Project – July 7, 2014
- ✓ KHL advances engineering design of the Project and meets with Stakeholders to collaborate and refine – July 7, 2014
- ✓ KHL files final natural resource study reports with FERC – August 25, 2014
- ✓ Development of Draft License Application – September, 2014 - Present

Key Natural Project Features

Waterfall

There is a natural anadromous barrier at the outlet of Grant Lake.

KEY NATURAL PROJECT FEATURES

Steep Topography

Vast majority of the potential energy occurs in the 1st half mile of stream.

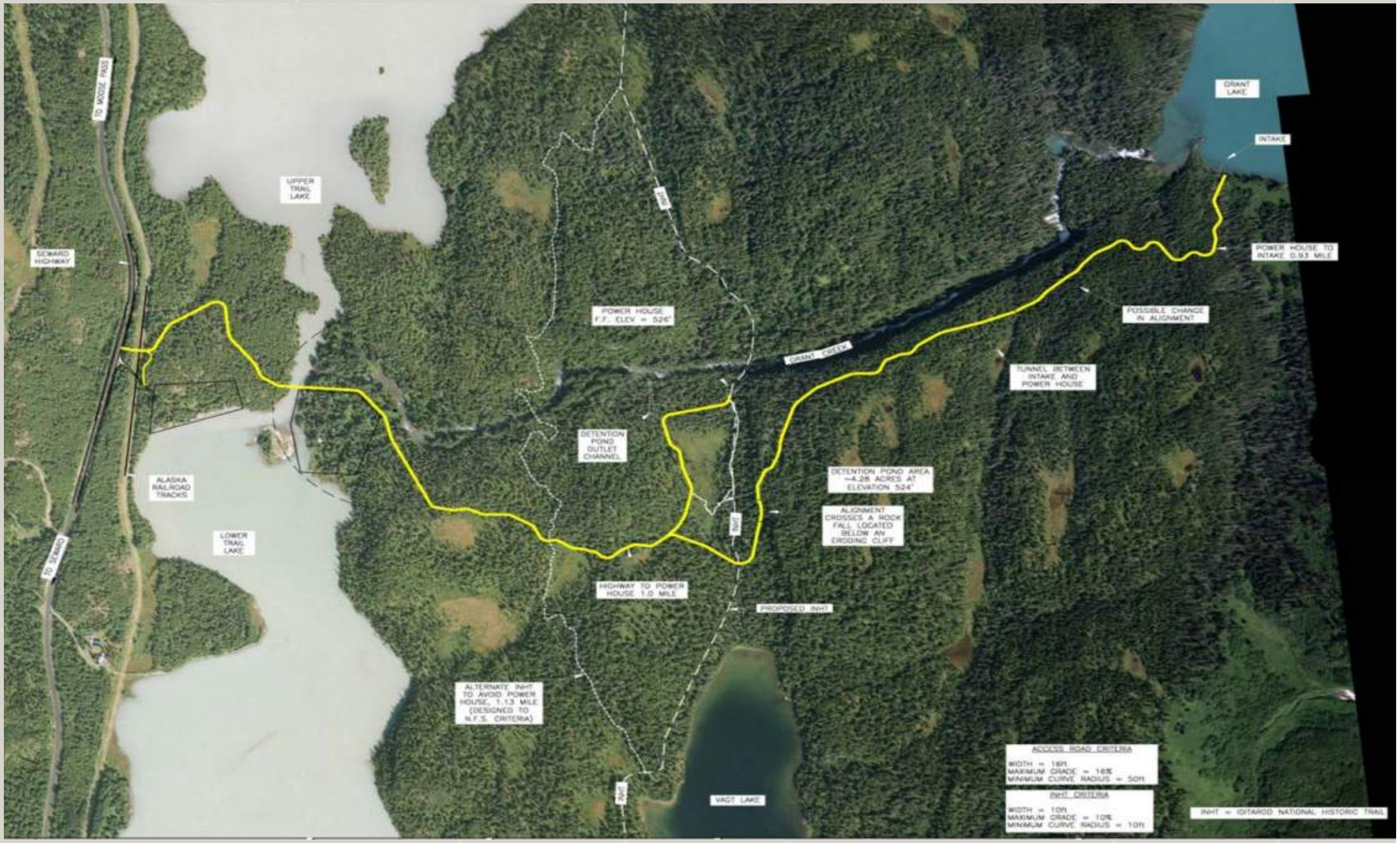
KEY PROJECT FEATURES

Short River

1. Approximately 1 mile of creek length.
2. Most valuable habitat continues to see full water flow.

Proximity to Existing Infrastructure

1. Two Miles of Road Construction
2. One Mile of Transmission Line
3. Access to the Seward Highway
4. Access to the Railroad



Natural Resource Studies

- Comprehensive, quantitative natural resource studies collaboratively developed for 5 disciplines:
  - Fisheries/Instream Flow
  - Water Quality/Quantity
  - Terrestrial
  - Cultural
  - Recreation and Visual

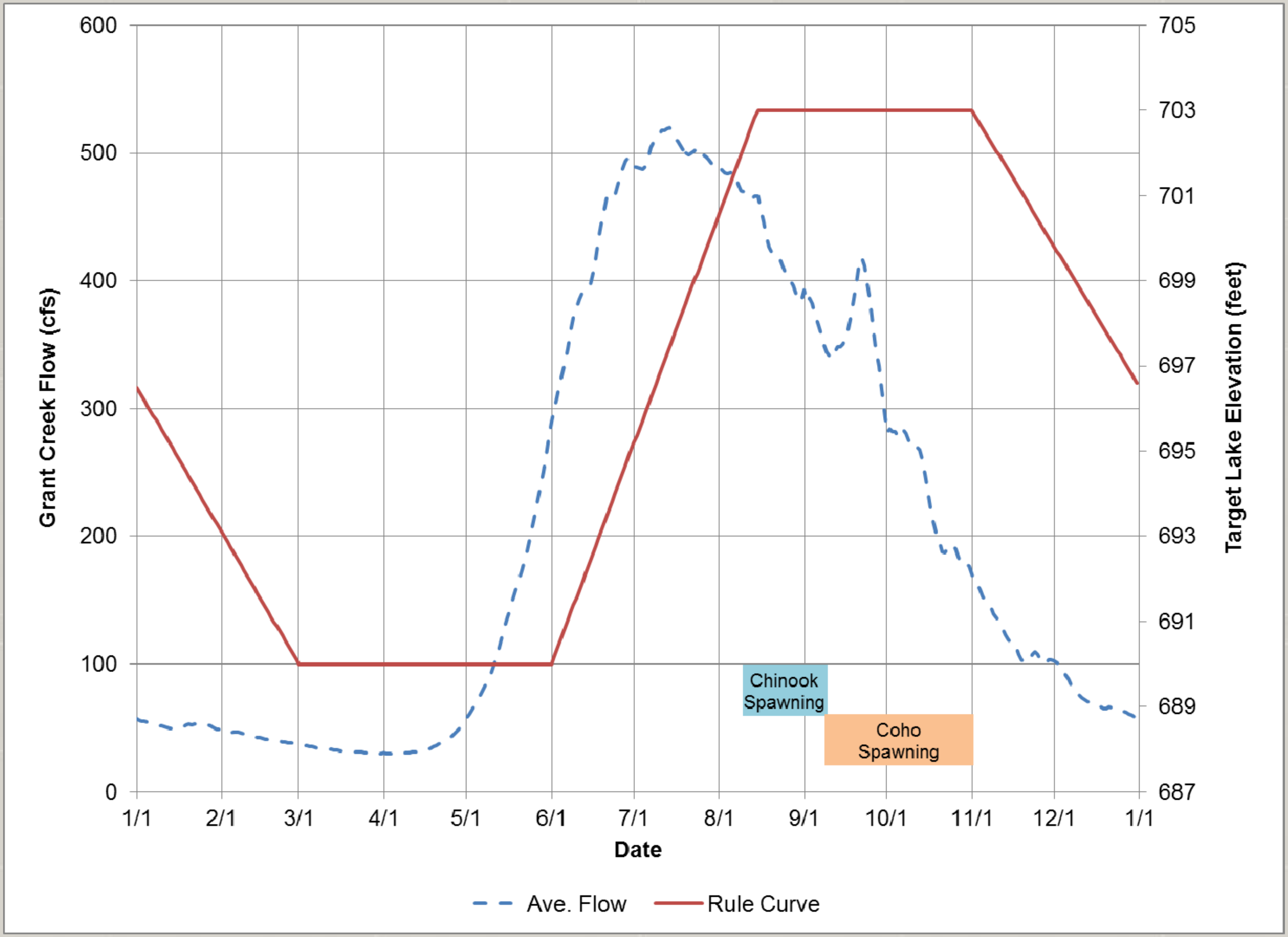
- Study Period – March 2013-July 2014
  - Stream gauging ongoing

- Study results integrated with all historical data collected in the Project Area and region
  - AEIDC
  - Ebasco

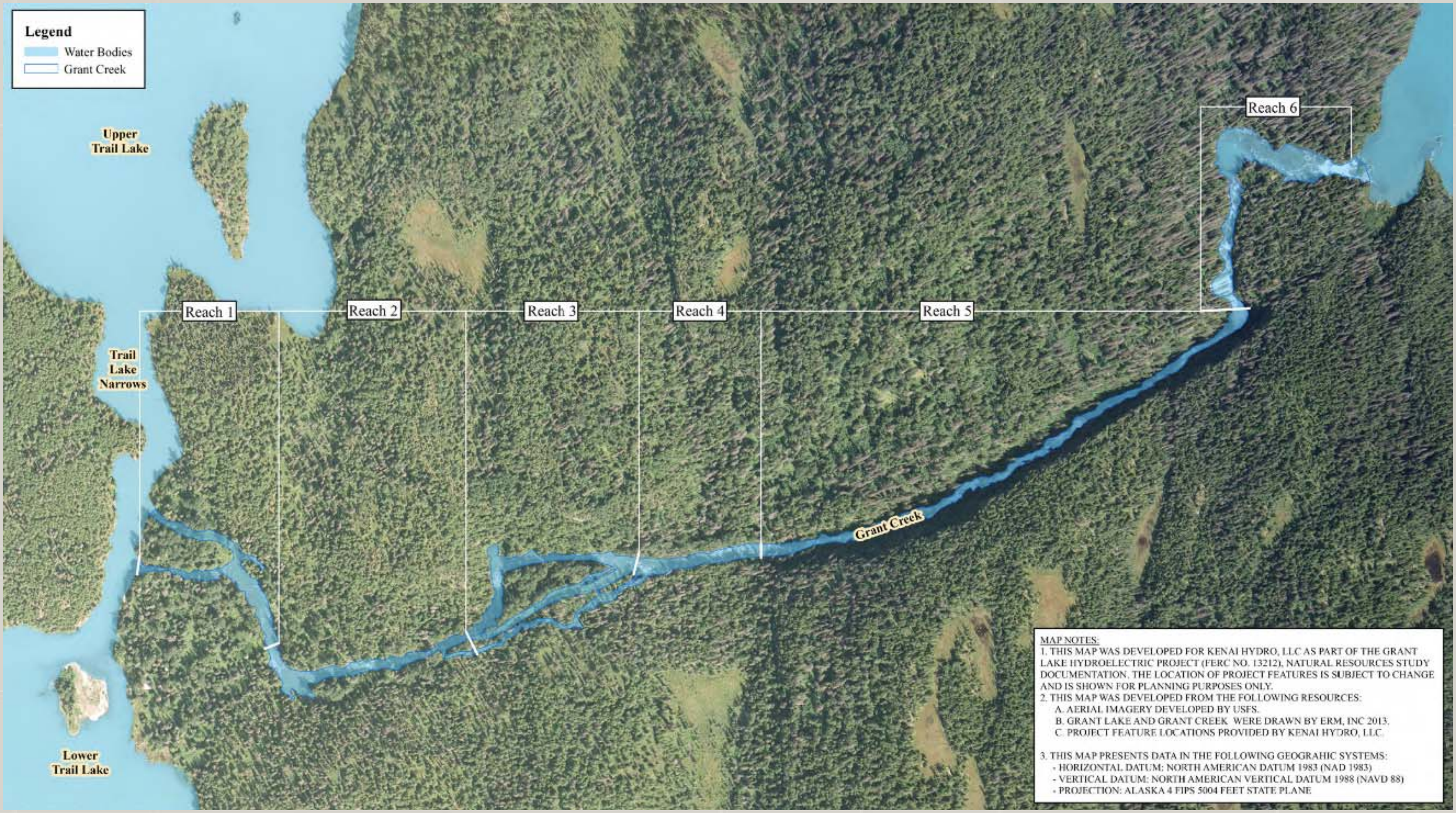
Operating Assumptions

No.	Assumption	Data
1	No Dam	Natural Storage Only
2	Reservoir Operating Range	703-690 feet (13 feet)
3	Approximate Tailwater Elevation	518 feet
4	Peak Powerhouse Discharge	385 cfs
5	Minimum Powerhouse Discharge	23 cfs
6	Turbines	2 - 2.5 MW Francis Units
7	Instream Flow Releases in Reach 5 and 6	10 cfs during Chinook spawning (Aug-Sept)
		7 cfs during Coho spawning (Sept-Oct)
		5 cfs for the remainder of the year

Operating Assumptions



Grant Creek Study Area

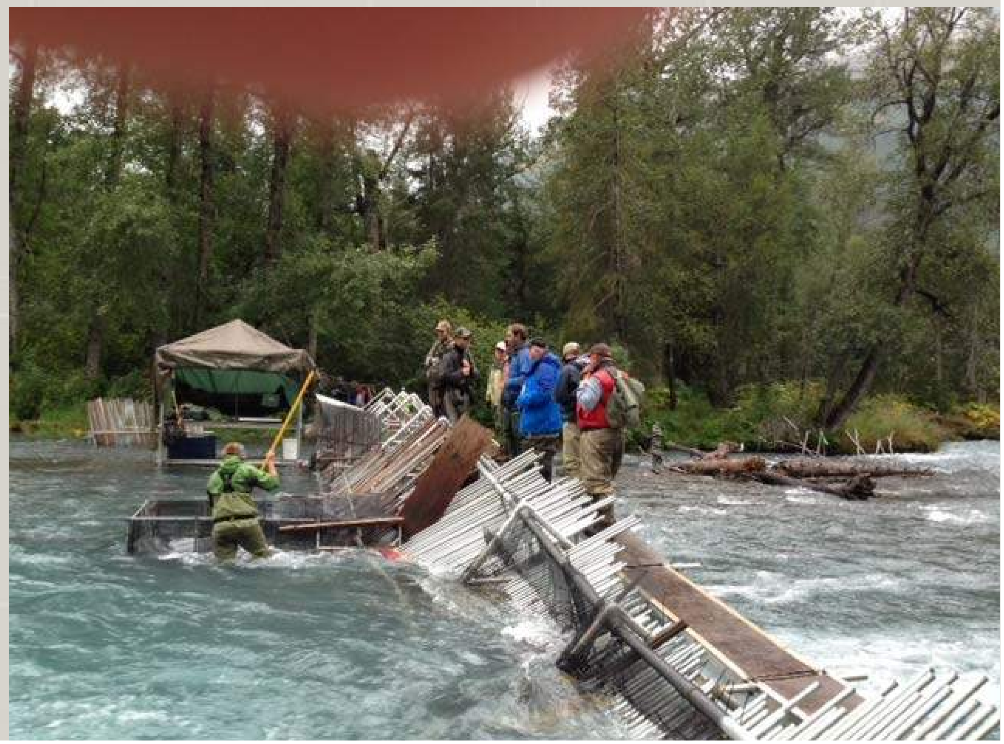


Fisheries

- ✓ Focus on Grant Creek and Narrows (no salmonids in lake due to anadromous barrier and failed historical plantings)

- ✓ Comprehensive study assessing:
  - ✓ Salmon spawning, distribution and abundance
  - ✓ Resident and rearing fish abundance and distribution
  - ✓ Instream habitat availability and abundance (Instream flow study)

- ✓ Fisheries staff on site daily from March – November implementing a variety of sampling methods including:
  - ✓ Weir operation
  - ✓ Radio telemetry
  - ✓ Floy tagging
  - ✓ Redd, carcass, and foot surveys
  - ✓ Incline plane trapping
  - ✓ Minnow traps
  - ✓ Beach seining
  - ✓ Snorkeling
  - ✓ Macroinvertebrate sampling



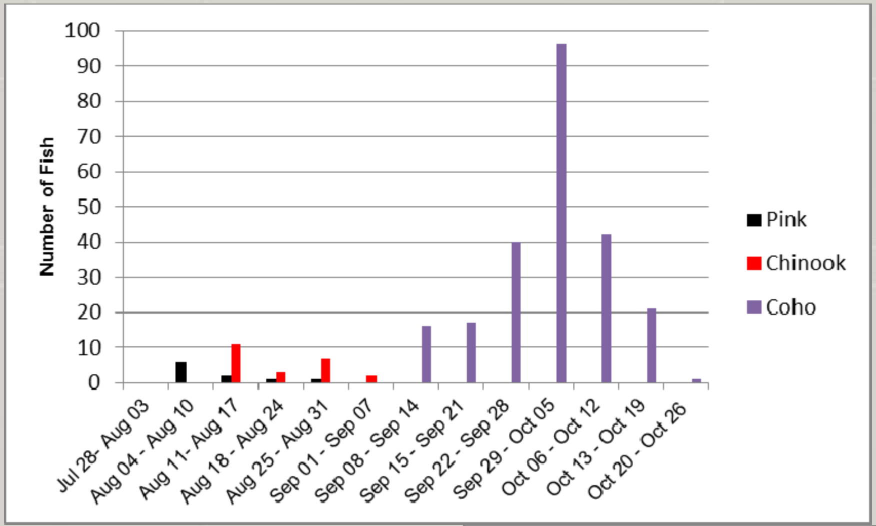
Fisheries Results

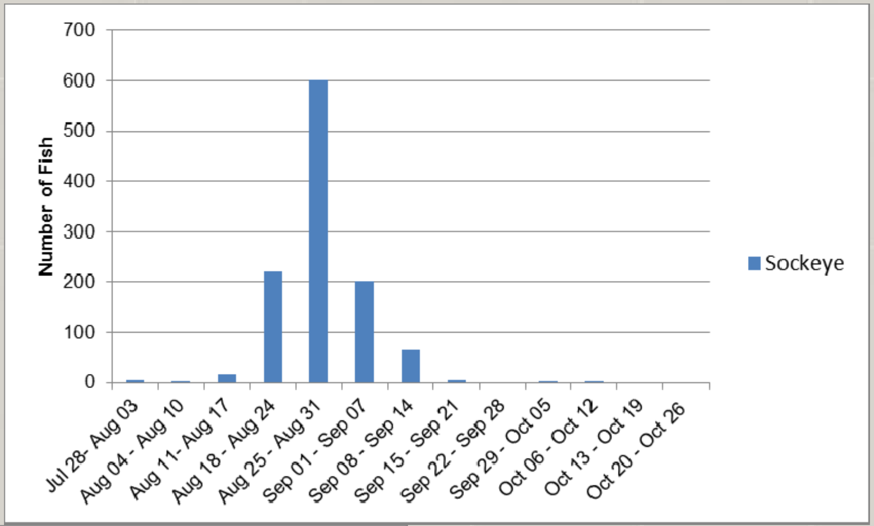
- Snapshot – Full details of all study elements in Aquatics Resource Study Report
- Species present:
  - Anadromous
    - Chinook
    - Sockeye
    - Coho
    - Pink
  - Resident
    - Rainbow Trout
    - Dolly Varden
    - Sculpin
    - Three-Spine Stickleback
    - Round Whitefish

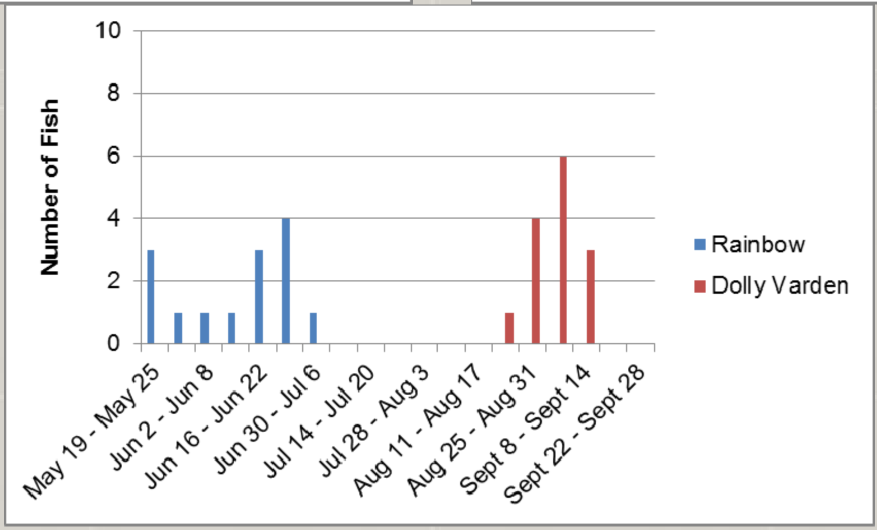
Fisheries Results
(Weir)

- ✓ Adult Weir Counts
  - – Total of 1,439 Salmon Migrated Upstream of the Weir
    - Chinook – 35 (Floy-Tagged 33; Radio-Tagged 9)
    - Sockeye – 1,153 (Floy-Tagged 533; Radio-Tagged 65)
    - Coho – 239 (Floy-Tagged 176; Radio-Tagged 50)
    - Pink – 12 (Did Not Floy- or Radio-Tag)
  - – Total of 27 Resident Salmonids Migrated Upstream of the Weir
    - Rainbow Trout – 13 (Floy-Tagged 13; Radio-Tagged 4)
    - Dolly Varden – 14 (Floy-Tagged 14; Radio-Tagged 1)
- ✓ Run timing – Adult Anadromous Salmon
  - – Pink – August 4 through August 25; Peak August 15
  - – Chinook – August 11 through September 5; Peak August 16
  - – Sockeye – July 29 through October 9; Peak August 29
  - – Coho – September 8 through October 26; Peak October 3

Fisheries Results
(Run Timing)

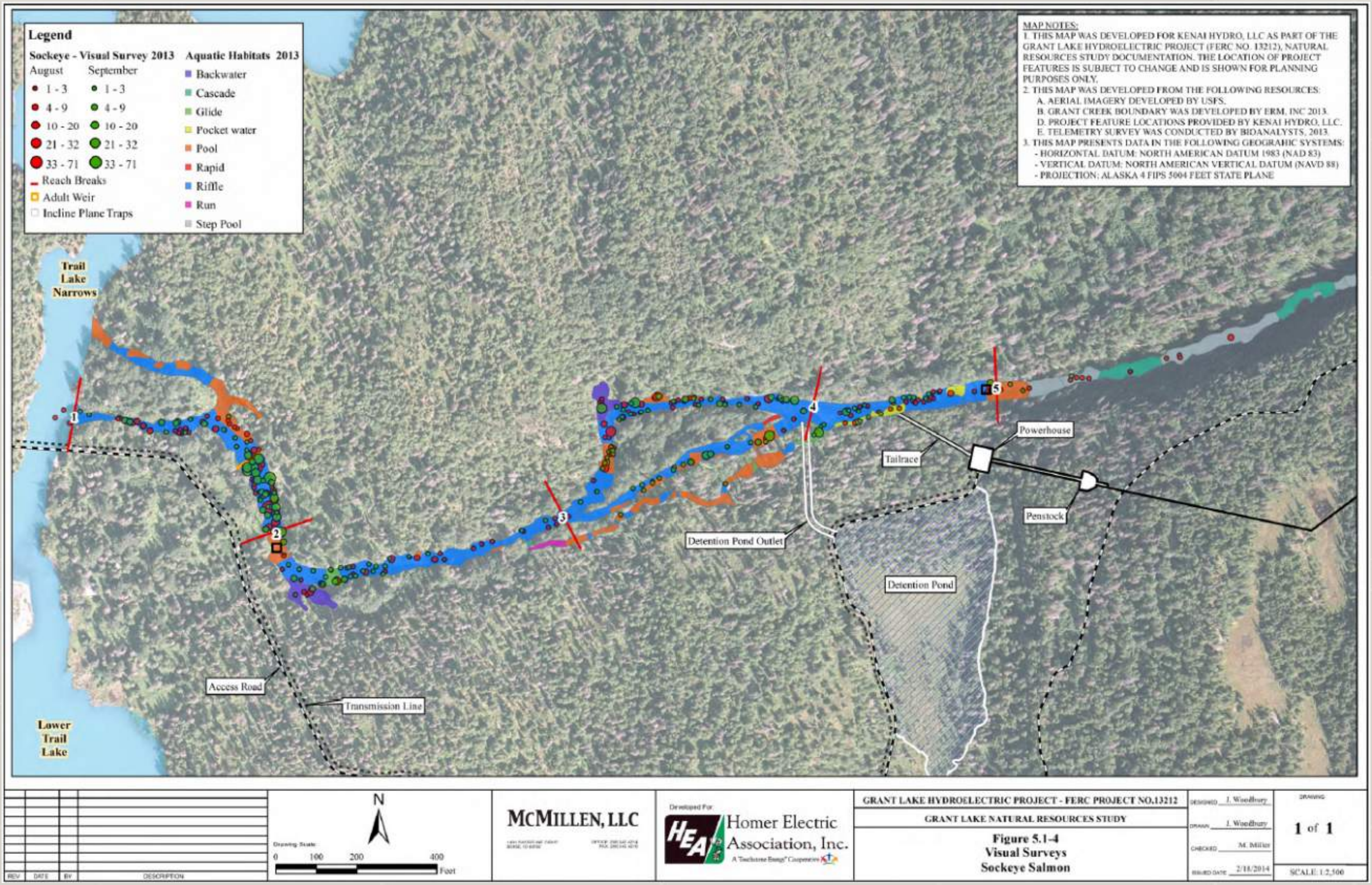




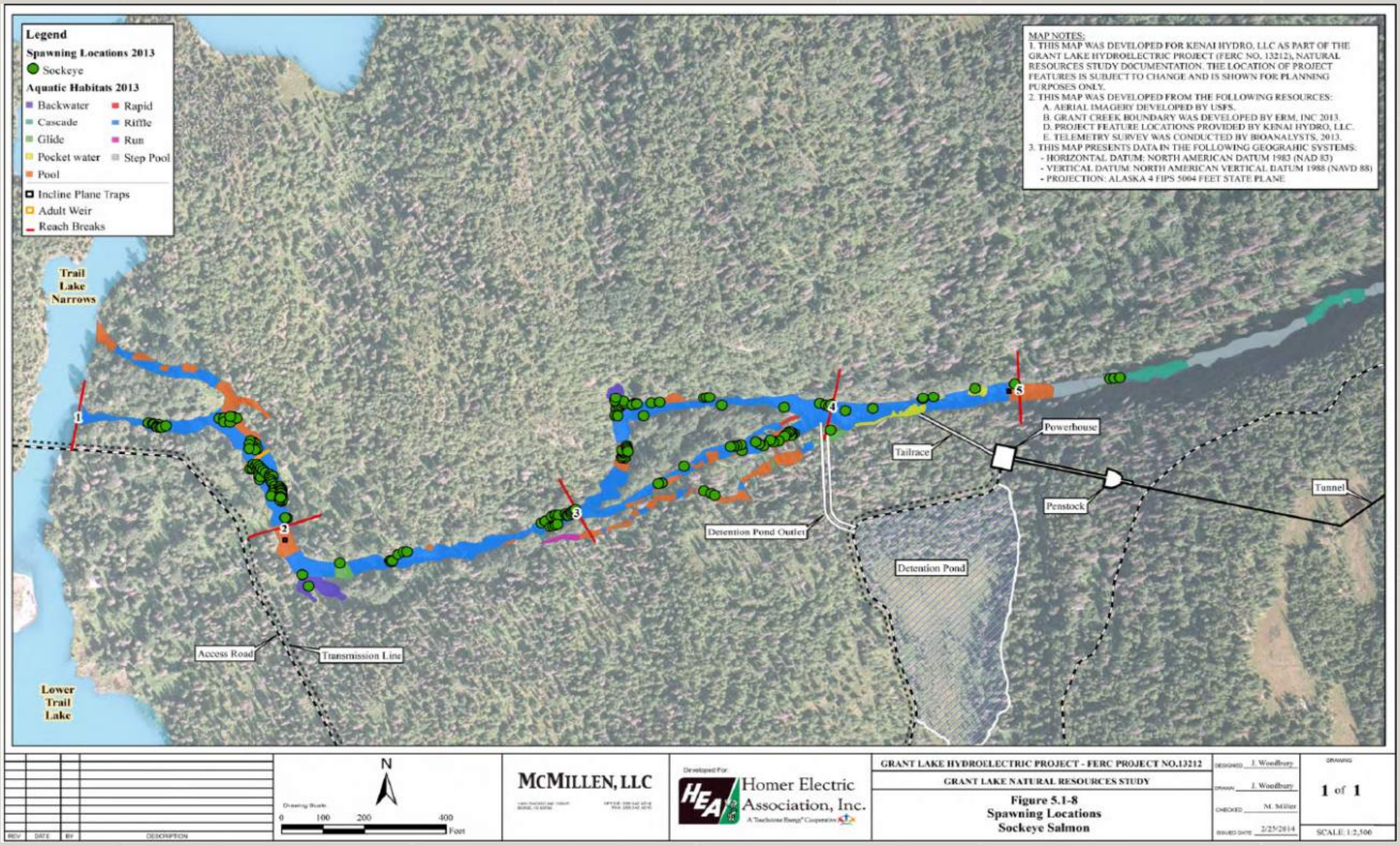


Fisheries Results

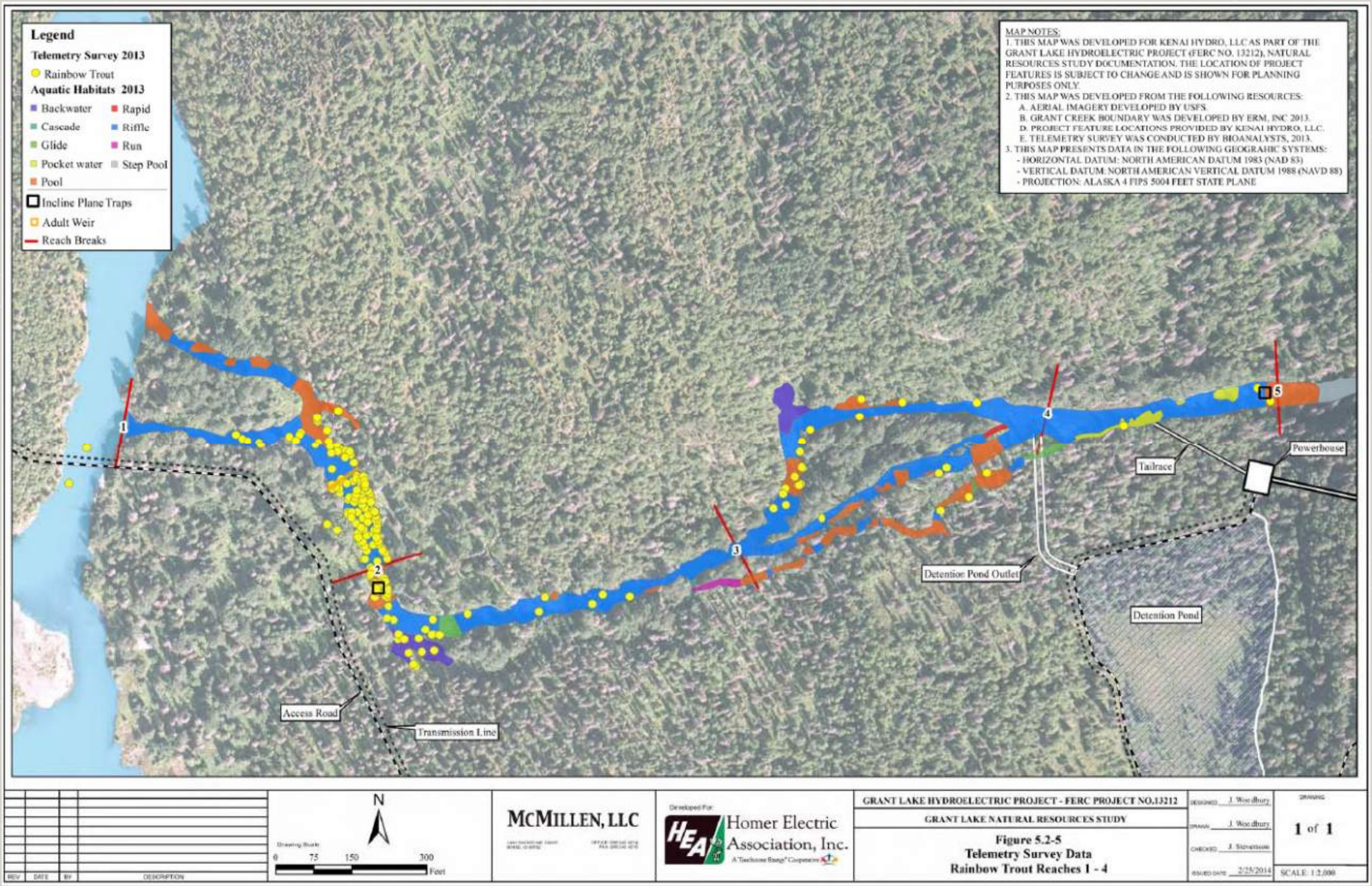
(Adult Sockeye Distribution – Visual Survey)



Fisheries Results
(Adult Sockeye Redd Locations)



Fisheries Results
(Rainbow Trout Radio Telemetry Detections)



Results

- Adult Salmonid Spawning – Number of Redds by Reach

Reach	Species				Total	Proportion
	Pink	Chinook	Sockeye	Coho		
1	2	4	144	18	168	0.433
2	0	0	52	7	59	0.152
3	0	1	102	38	141	0.363
4	0	1	7	7	15	0.039
5	0	0	3	2	5	0.013
Total	2	6	308	72	388	1.000

Note: No Rainbow or Dolly Varden Spawning was Observed

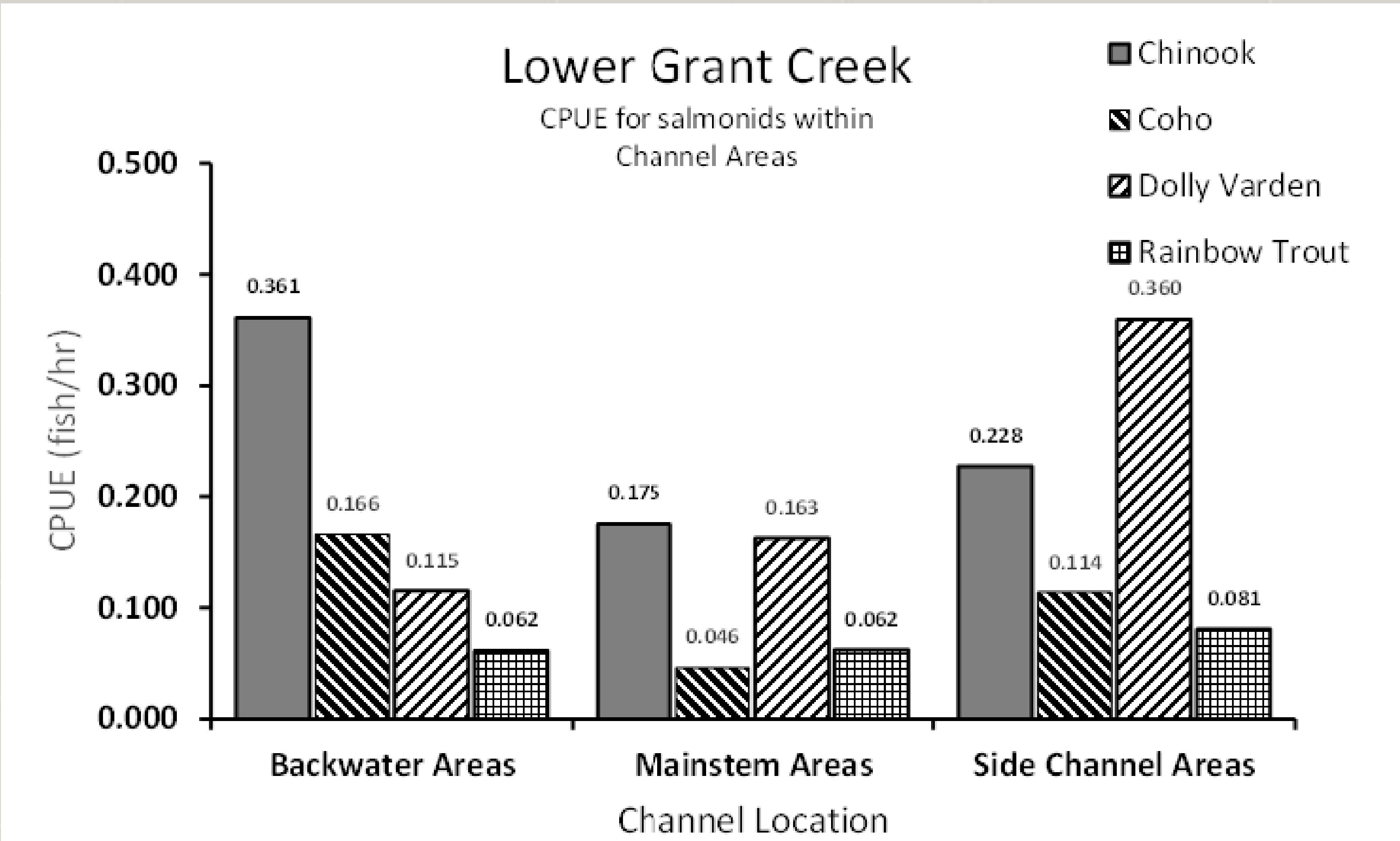
Fisheries Results

(Juvenile Distribution – Minnow Trap and Snorkel Surveys)

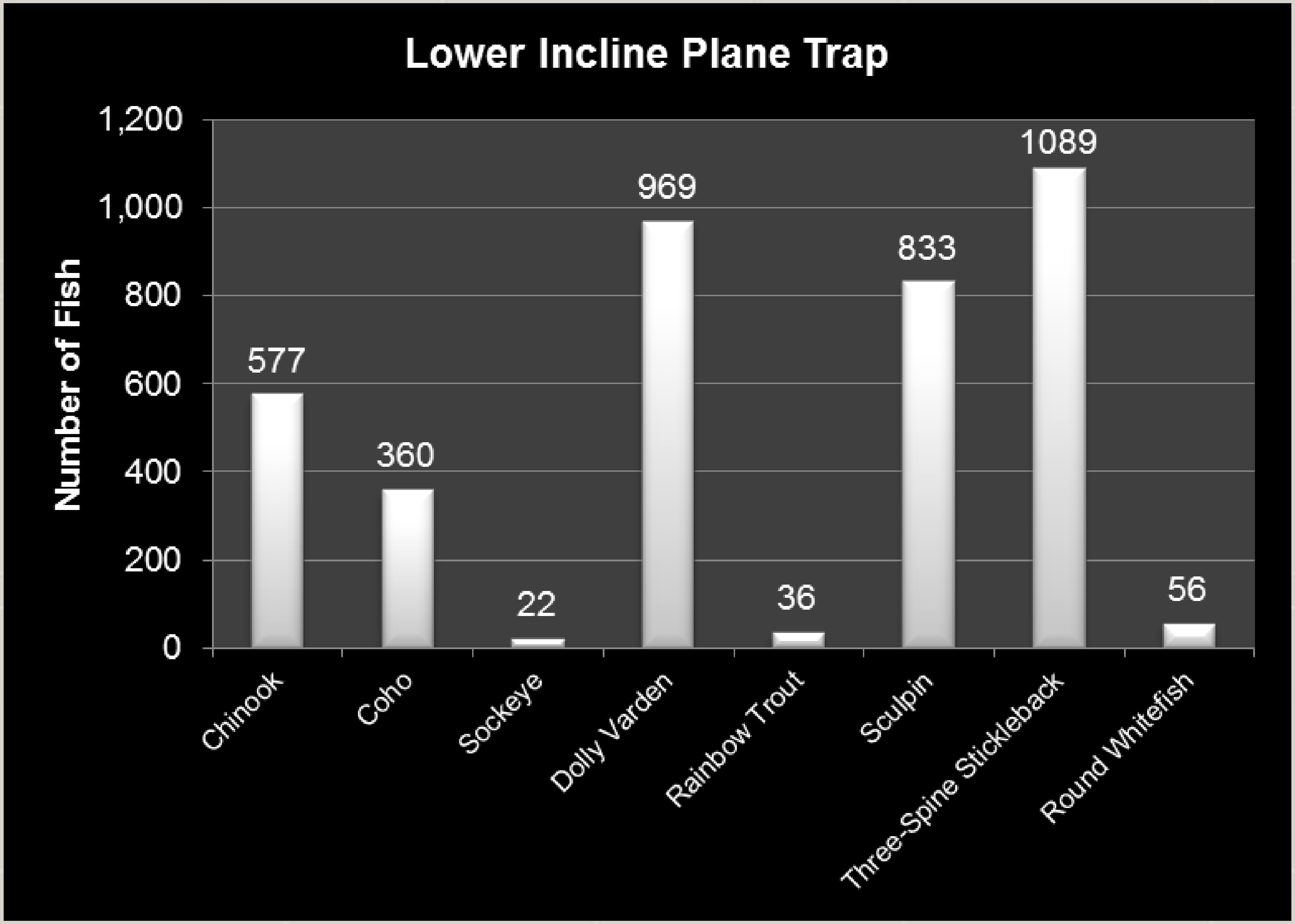
Species	Number	Proportion	CPUE (Fish/Hr.)
Chinook	31	0.15	0.024
Coho	5	0.02	0.004
Dolly Varden	102	0.50	0.077
Rainbow Trout	48	0.23	0.036
Sculpin	19	0.09	0.014
Total	205	1.00	0.156

		April 2013 Snorkel Results		
Channel	Habitat	No. Fish	Area Sampled (m^2)	Density (Fish/100 m^2)
Mainstem	Glide	42	933	4.50
	Pool	357	7,193	4.96
	Riffle	39	8,463	0.46
Backwater	Pool	83	794	10.46
	Total	521	17,382	3.00

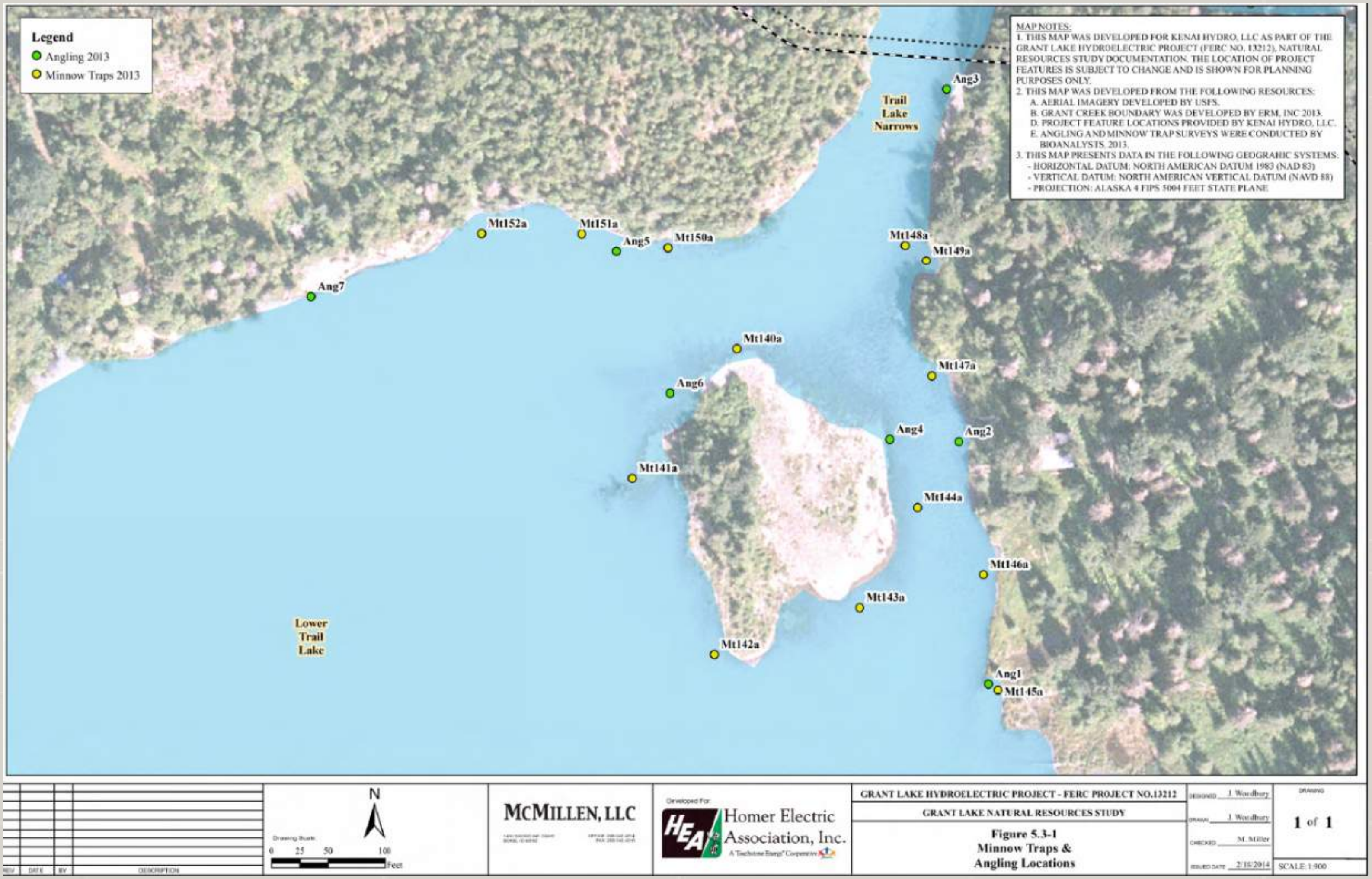
Fisheries Results
(Reach 1-4 Minnow Trapping)



Fisheries Results
(Incline Plane Trapping – N=3,942)



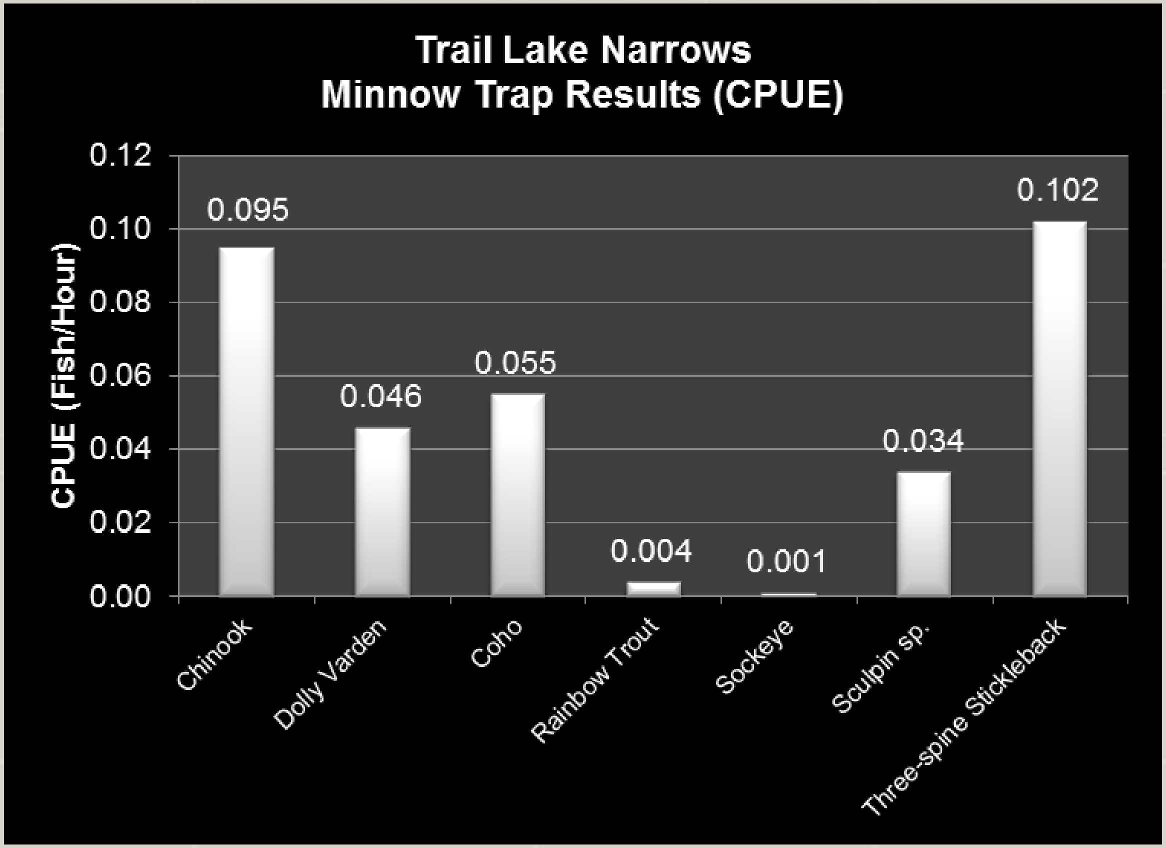
Fisheries Results
(Trail Lakes Narrows)



Fisheries Results

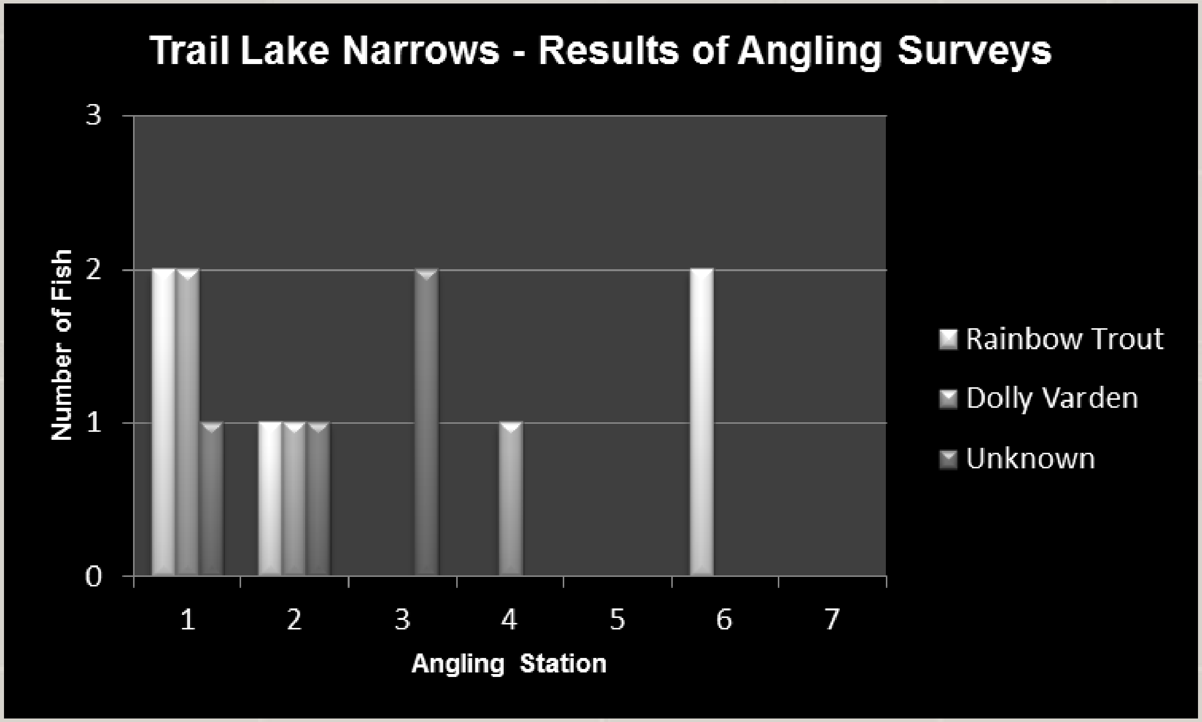
- Trail Lake Narrows – Minnow Trapping

Reach	Number of Traps	Total Effort (Hours)	Number of Fish	CPUE (Fish/Hour)
Trail Lake Narrows	52	1,133	381	0.34

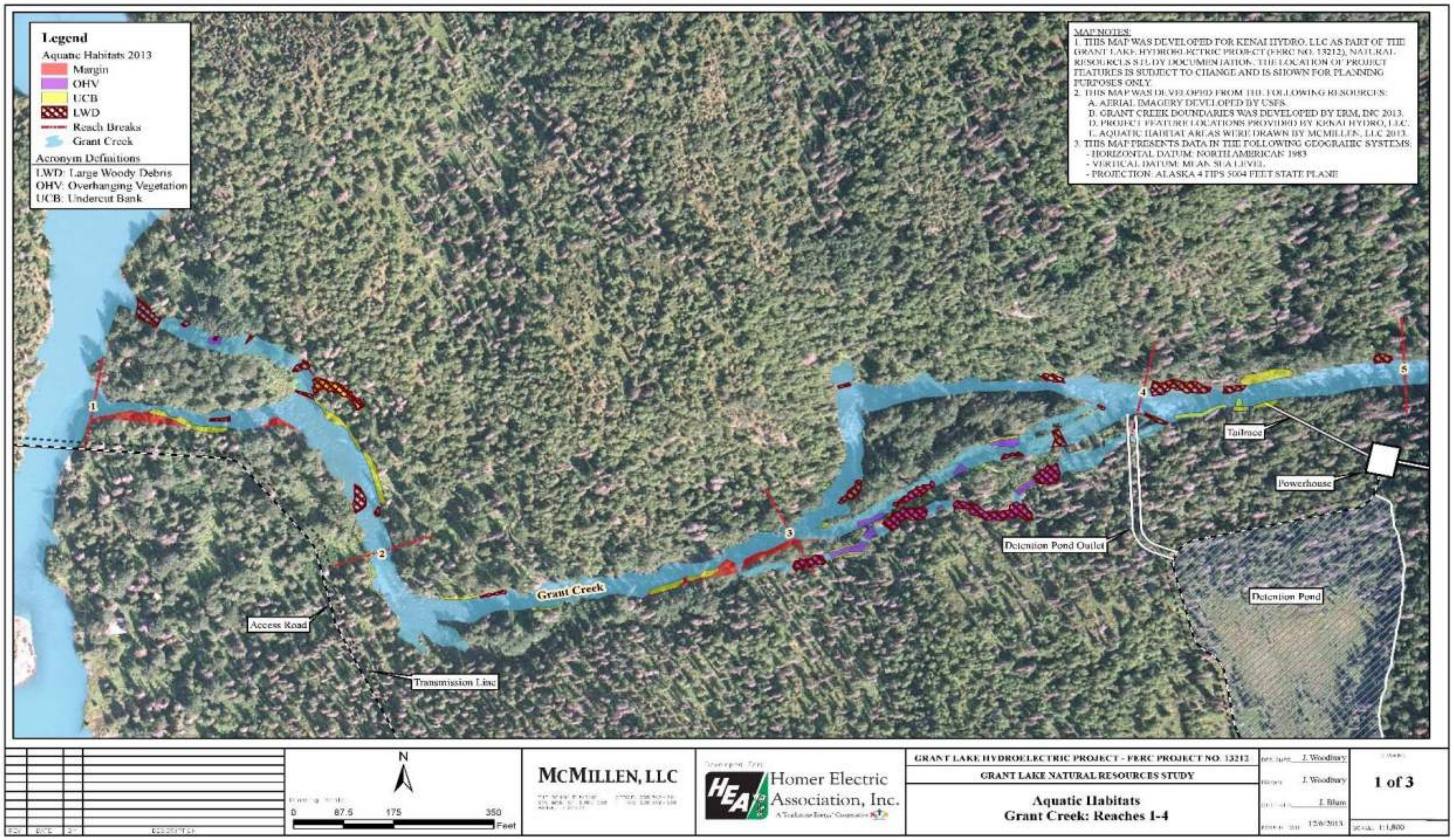


Fisheries Results

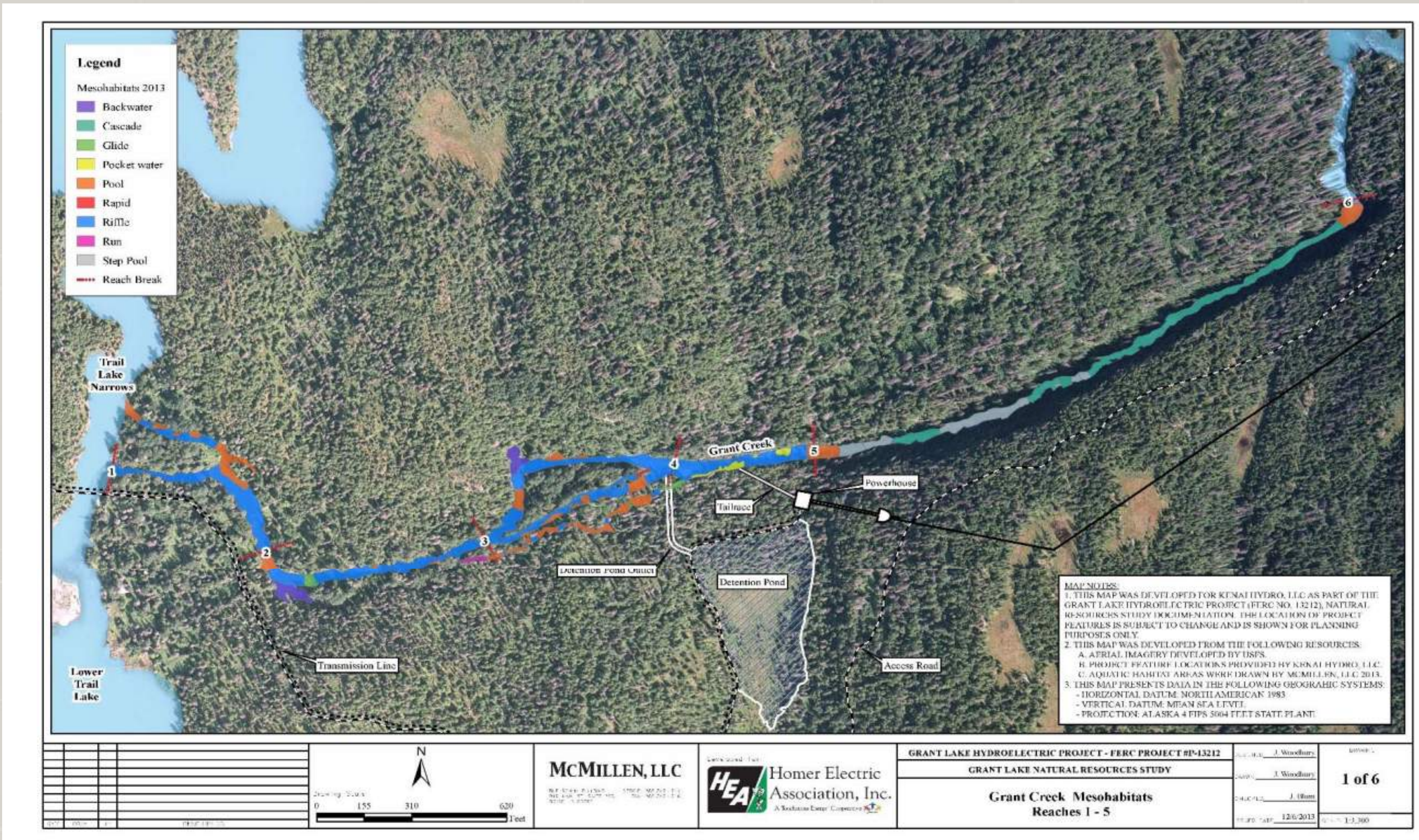
- Angling Surveys – Conducted at 7 Angling Stations (1 Hour per Station)
  - Dominant Species was Rainbow Trout (n = 5)
  - Dolly Varden were Second Most Abundant (n = 4)
  - Four Additional Fish Could Not Be Identified (Broke Off Before Landing)



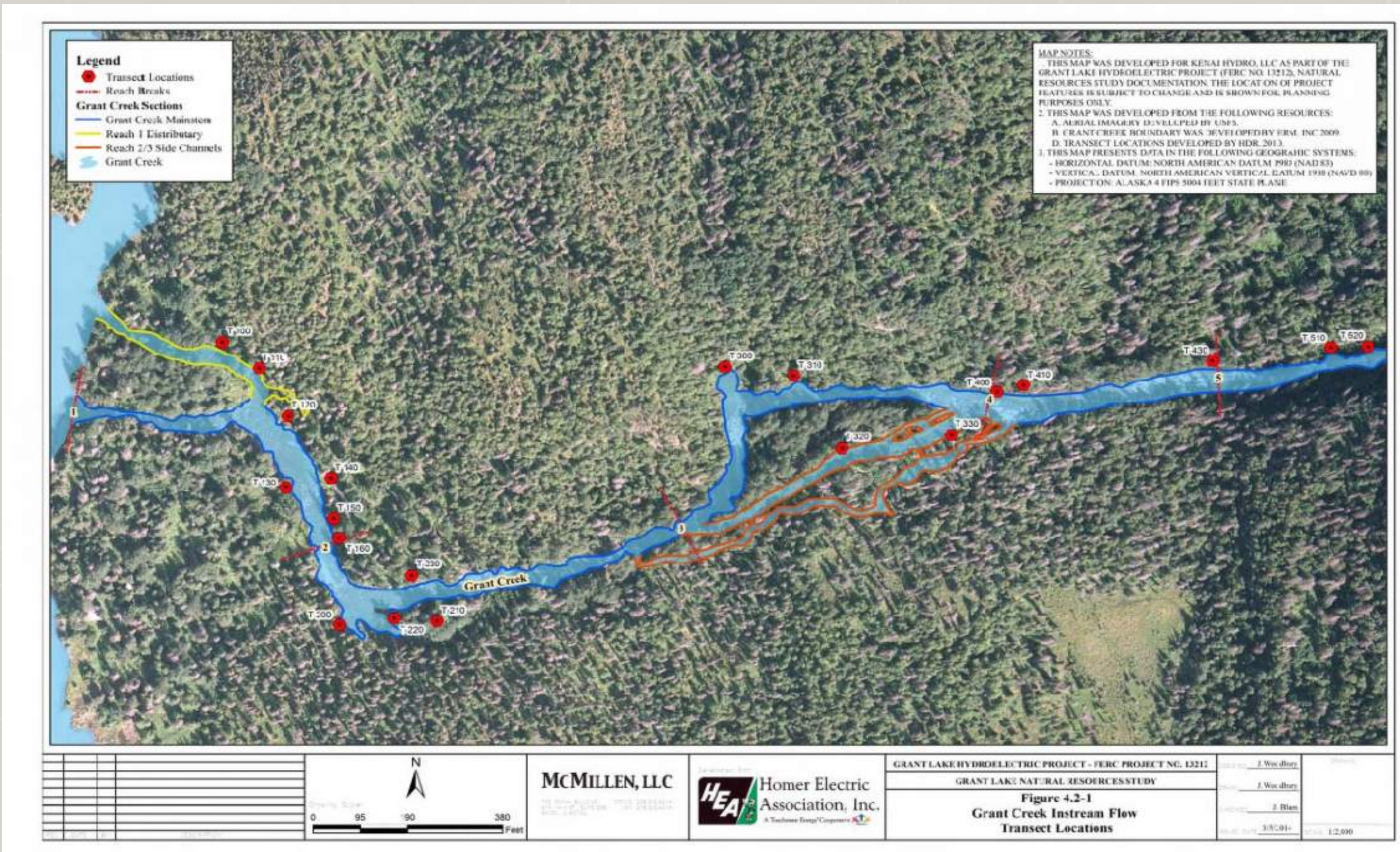
Habitat Mapping/Instream Flow Results
Aquatic Habitats



Habitat Mapping/Instream Flow Results
Mesohabitats



Habitat Mapping/Instream Flow Results
(Transect Locations)



Habitat Mapping/Instream Flow Results
(Flows Measured)

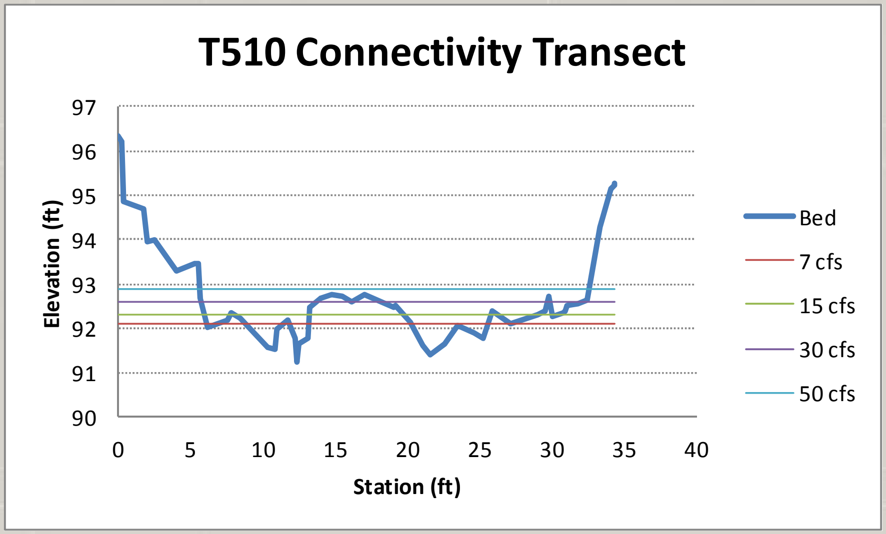
Area	Measured Flows (cfs)					
	17	**64**	**132**	**182**	**440**	**700**
Main Channel	✓	✓	✓	✓		✓
Distributary	Dry/Frozen	Dry	Dry	✓	✓	✓
Reach 3 Side Channels	Frozen	✓	✓	✓	✓	✓

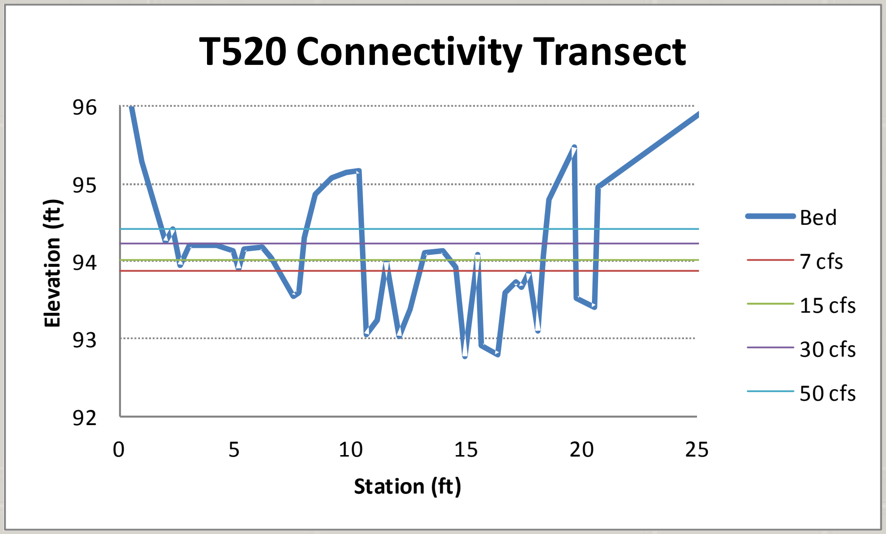
Habitat Mapping/Instream Flow Results
(HSI Data Collection)

Target species and life history stages modeled in the Grant Creek Instream Flow Study.

Species	Spawning	Fry Rearing	Juvenile Rearing	Adult Rearing
Sockeye Salmon	✓			
Coho Salmon	✓	✓	✓	
Chinook Salmon	✓	✓	✓	
Rainbow Trout	✓	✓	✓	✓
Dolly Varden Char	✓	✓	✓	✓

Habitat Mapping/Instream Flow Results
(Reach 5 Connectivity)

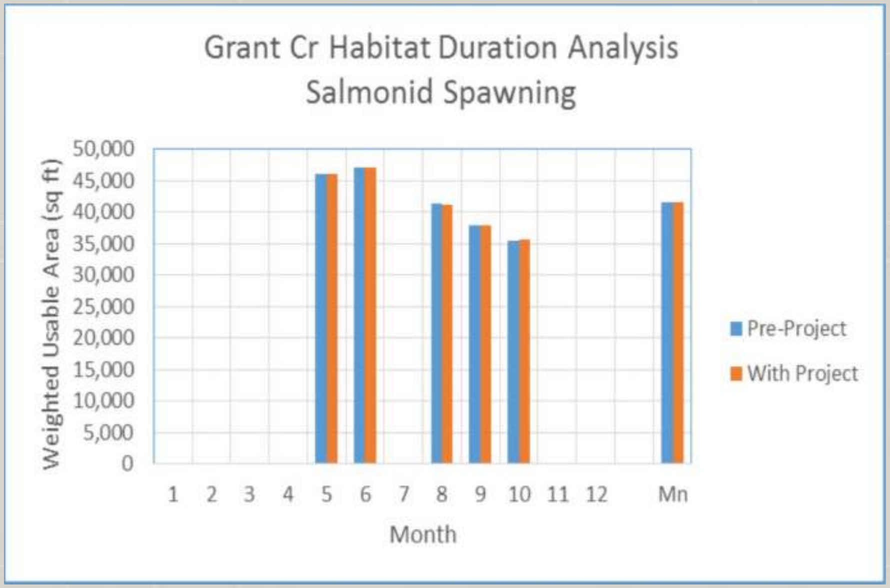


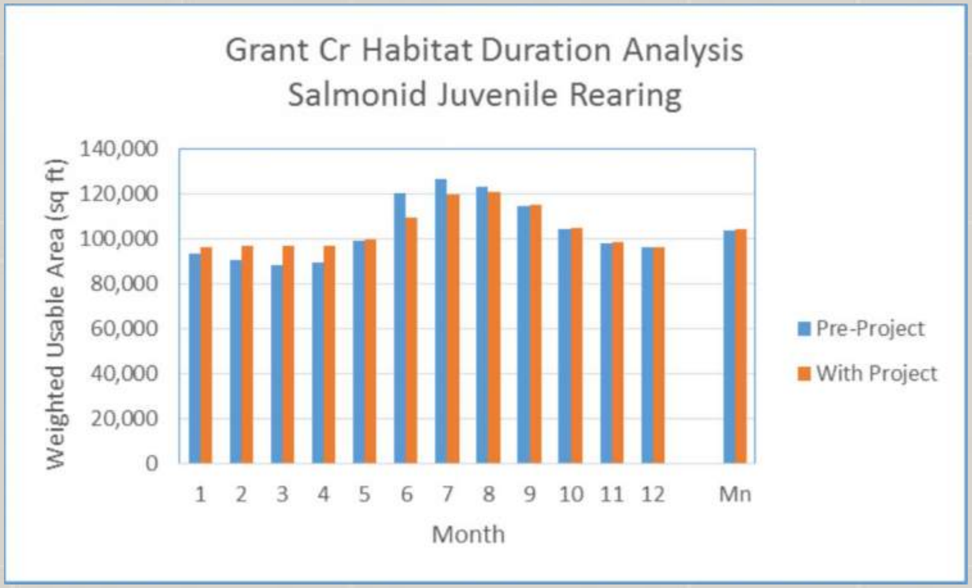


Habitat Mapping/Instream Flow Results
(Take Home)

- ✓ Extensive collaboration with technical experts from agencies
- ✓ With-Project Weighted Usable Area (habitat values, all species) are 99.8% of pre-Project numbers. This is without considering ***ANY*** enhancement measures
- ✓ Side channel habitat enhancement opportunities
  - ✓ Reach 2/3 side channels
  - ✓ Reach 1 distributary
- ✓ Operations take off "top end" flows and regulate quality habitat areas

Comparison of Pre- and With-Project Habitat Values





Potential Aquatic Impacts (Positive and Negative)

- ✓ Reduction in flows in bypass reach (Reach 5)
  - ✓ Less spawning habitat in Reach 5
- ✓ Less sediment recruitment from Reach 5
- ✓ Higher/more stable flows in quality reaches (1-4) during priority times (incubation and rearing)
- ✓ Decreased summer peak flows will maintain habitat and prevent stranding
- ✓ Operational flow regime will allow for high quality side channels to be more consistently wetted

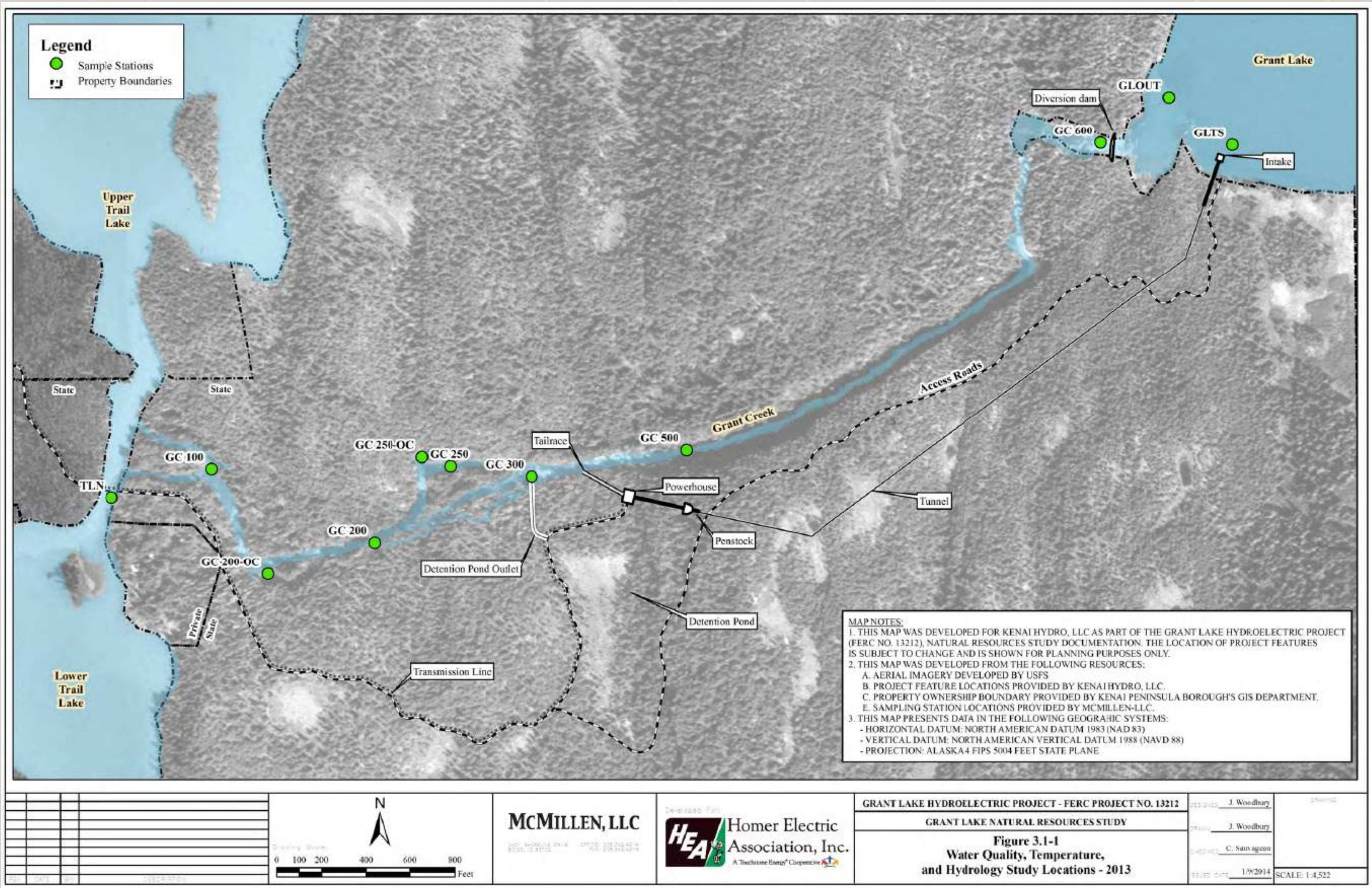
Water Resources

- ✓ Permanent Stream Gauge
  - ✓ Long term record

- ✓ Thermologgers
  - – Stream and Lake
  - – Near redds

- ✓ Grab Samples
  - – Lake
  - – Stream
  - – Narrows

Water Resources
(Sampling Locations)



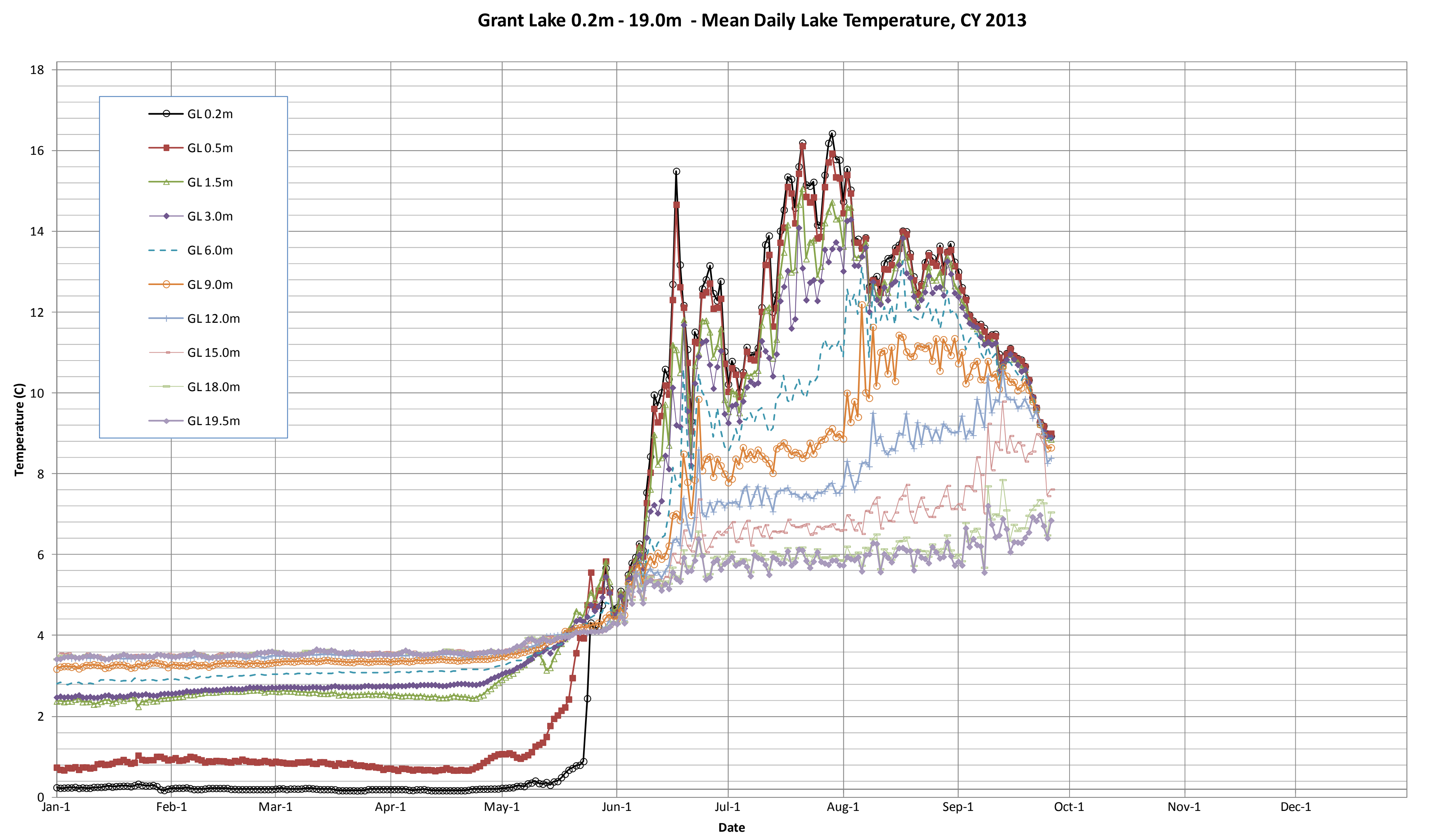
Water Quality Study Results – Grant Creek (Site GC 200)

Hydrolab Readings		Jun-09	Aug-09	Jun-10	Aug-13
Temp	°C	7.4	11.26	8.51	12.46
Sp. Cond	mS/cm	na	0.07	0.09	0.06
Dissolved Oxygen	% Sat	60.9	75.1	92.3	101.5
Dissolved Oxygen	mg/l	7.31	8.22	10.79	10.89
ORP	mV	na	na	216	408
pH	S.U.	7.66	7.39	7.39	7.02
Turbidity	NTU	0.75	11.10	1.17	4.00
Depth	m	na	na	na	1.9
Lab Analyses					
pH	S.U.	na	na	na	7.00
Turbidity	NTU	na	na	na	4.0
T. Alkalinity	mg/l	25.0	23.5	25.5	20.6
T. Hardness	mg/l	na	na	na	34.4
TDS	mg/l	60	44	50	51
TSS	mg/l	0.8	3.4	0.7	2.9
T. Nitrate/Nitrite	mg/l	0.455	0.292	0.269	0.190
K. Nitrogen	mg/l	ND	ND	ND	ND
Orthophosphate	mg/l	ND	ND	ND	ND
T. Phosphorus	mg/l	ND	ND	ND	ND
Chloride	mg/l	na	na	0.284	0.225
Fluoride	mg/l	na	na	ND	ND
Sodium	mg/l	na	na	1.14	1.18
Calcium	mg/l	na	na	13.3	11.7
Magnesium	mg/l	na	na	1.26	1.25
Potassium	mg/l	na	na	0.52	0.54
Sulfate	mg/l	na	na	17.9	15.1
Lead	µg/l	3.09	ND	ND	ND
LL Mercury	µg/l	ND	0.0016	ND	0.0013

na: not analyzed

ND: not detected

Water Temperature Results – Grant Lake Hydrograph

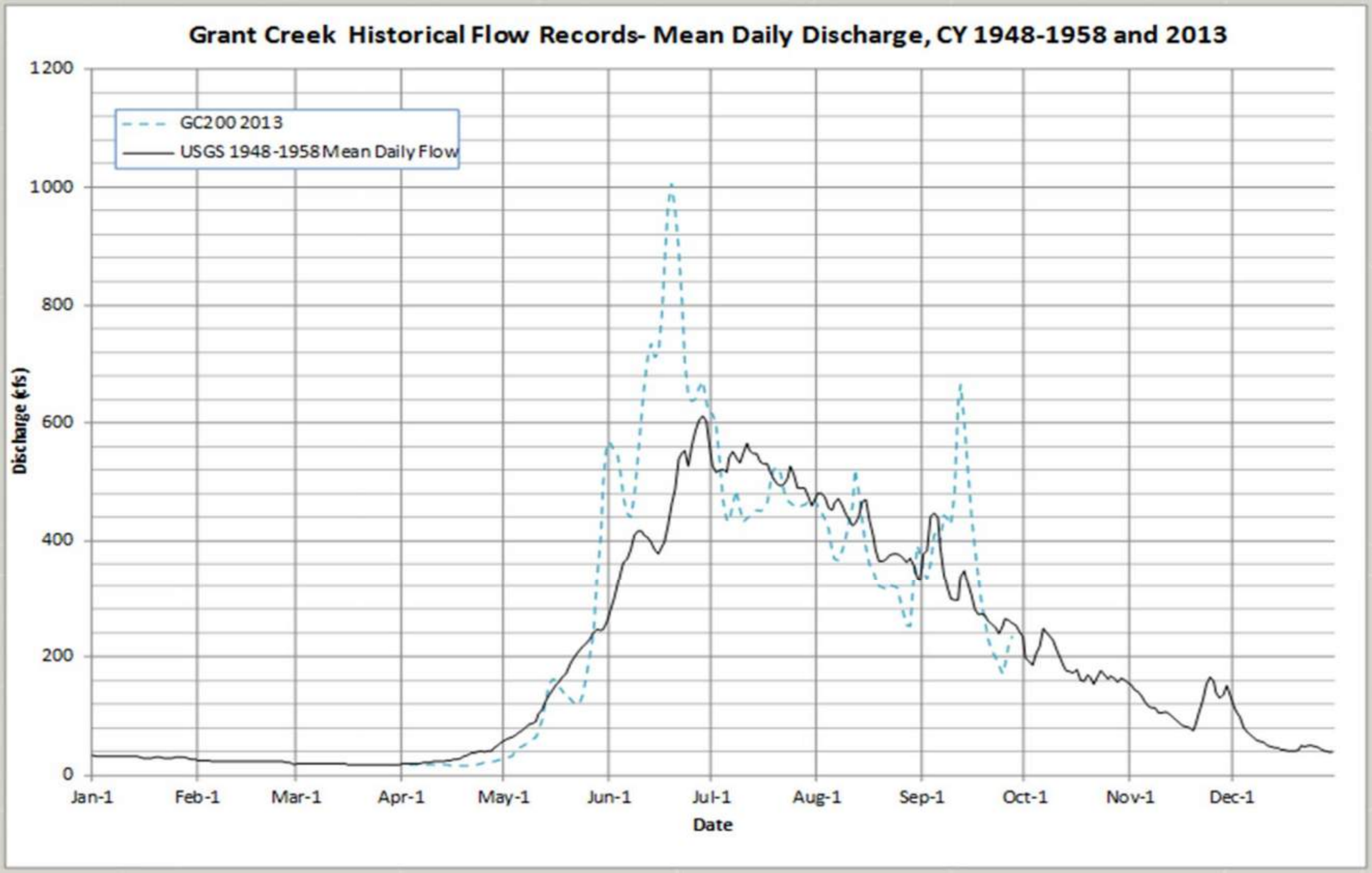


Water Quality – Conclusions

- ✓ Overall, Grant Lake, Grant Creek, and Trail Lakes have excellent water quality based on ADEC standards.
- ✓ Nearly all 2013 water quality parameters indicate stable and consistent values from the lower basin of Grant Lake (0.0 m to18.0 m depth range), downstream to the Trail Lakes Narrows. **slightly higher turbidity values at Trail Lakes Narrows is the exception to this trend*
- ✓ Most water quality parameters have remained stable based on historical sampling efforts from the early 1980's and 2009-2010.

Water Resources
(Hydrology)

Water Resources
(Hydrology)



Potential Water Resource Impacts (Positive and Negative)

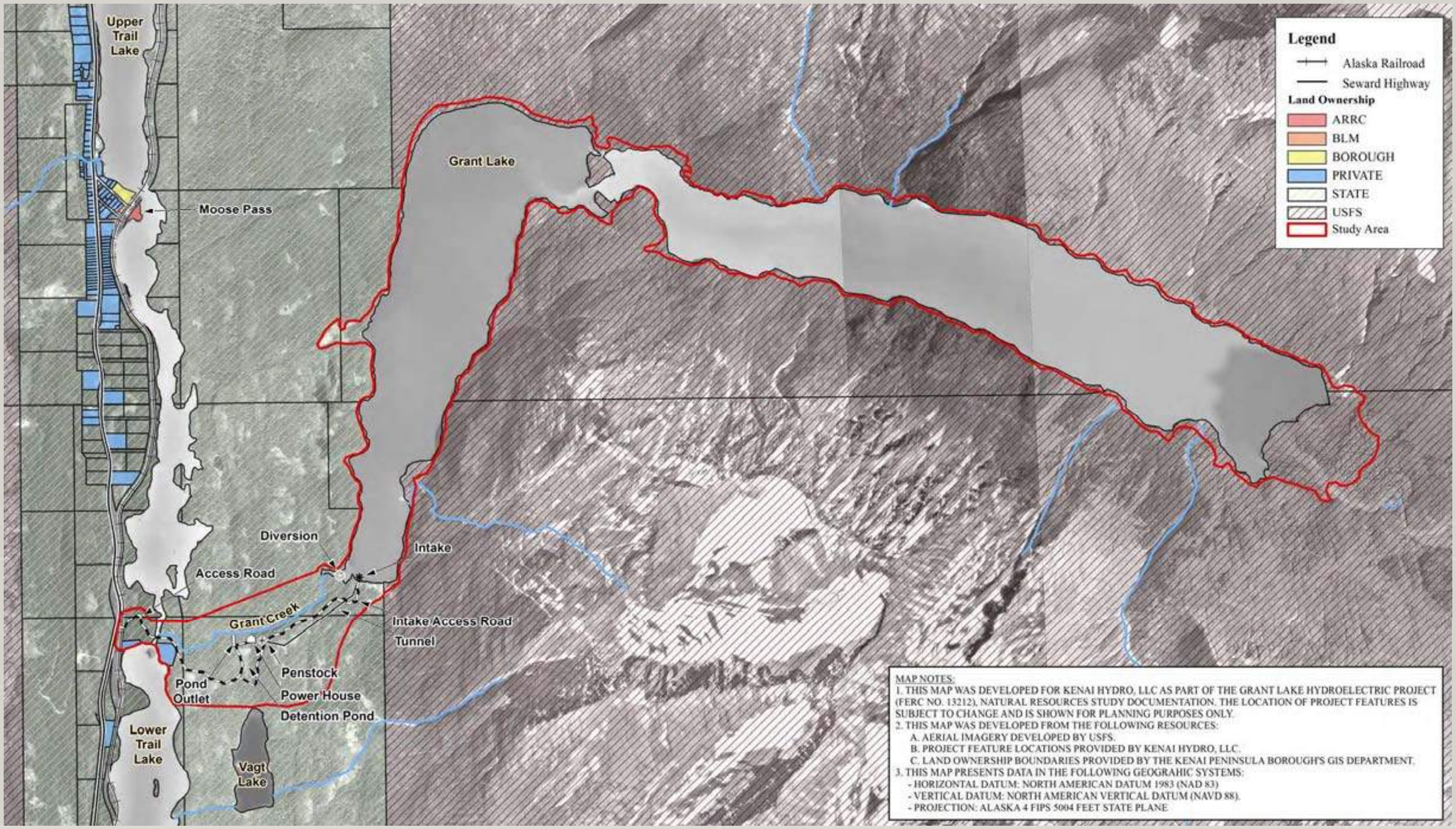
- ✓ The intake structure will be constructed to accommodate temperature lake vs. creek temperature differences during appropriate window
- ✓ Minimal impact associated with Project operations (positive or negative)

Terrestrial Resources

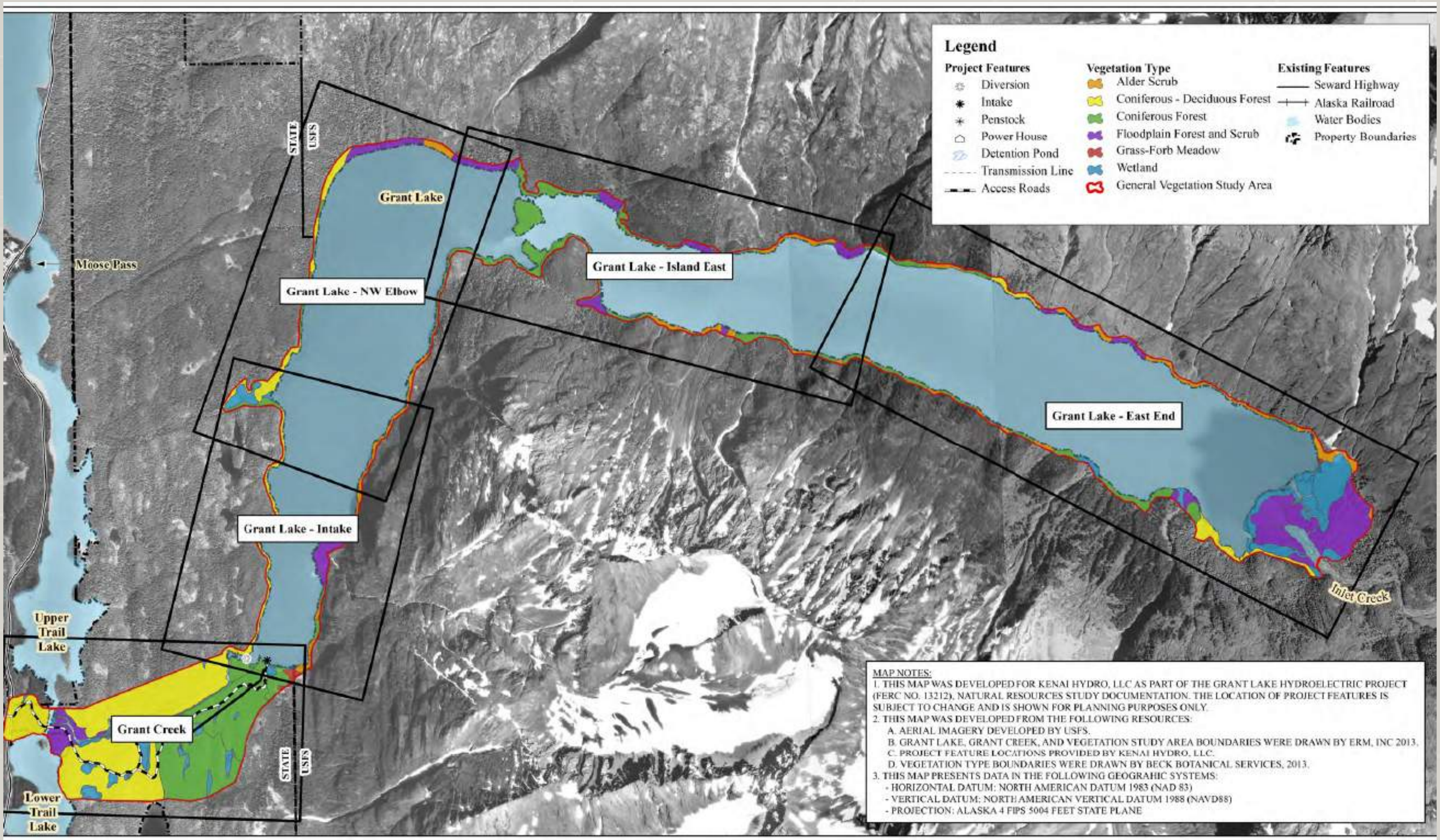
- ✓ Botanical
  - ✓ Vegetation mapping
  - ✓ Sensitive and invasives
  - ✓ Wetlands
- ✓ Wetlands
- ✓ Wildlife
  - ✓ Raptors
  - ✓ Breeding landbirds and shorebirds
  - ✓ Waterbirds
  - ✓ Terrestrial Mammals

Terrestrial Resources

(Study Area)



Botanical Results
(Vegetation Mapping)



Botanical Results
(Vegetation Mapping)

Botanical
(Invasive and Sensitive)

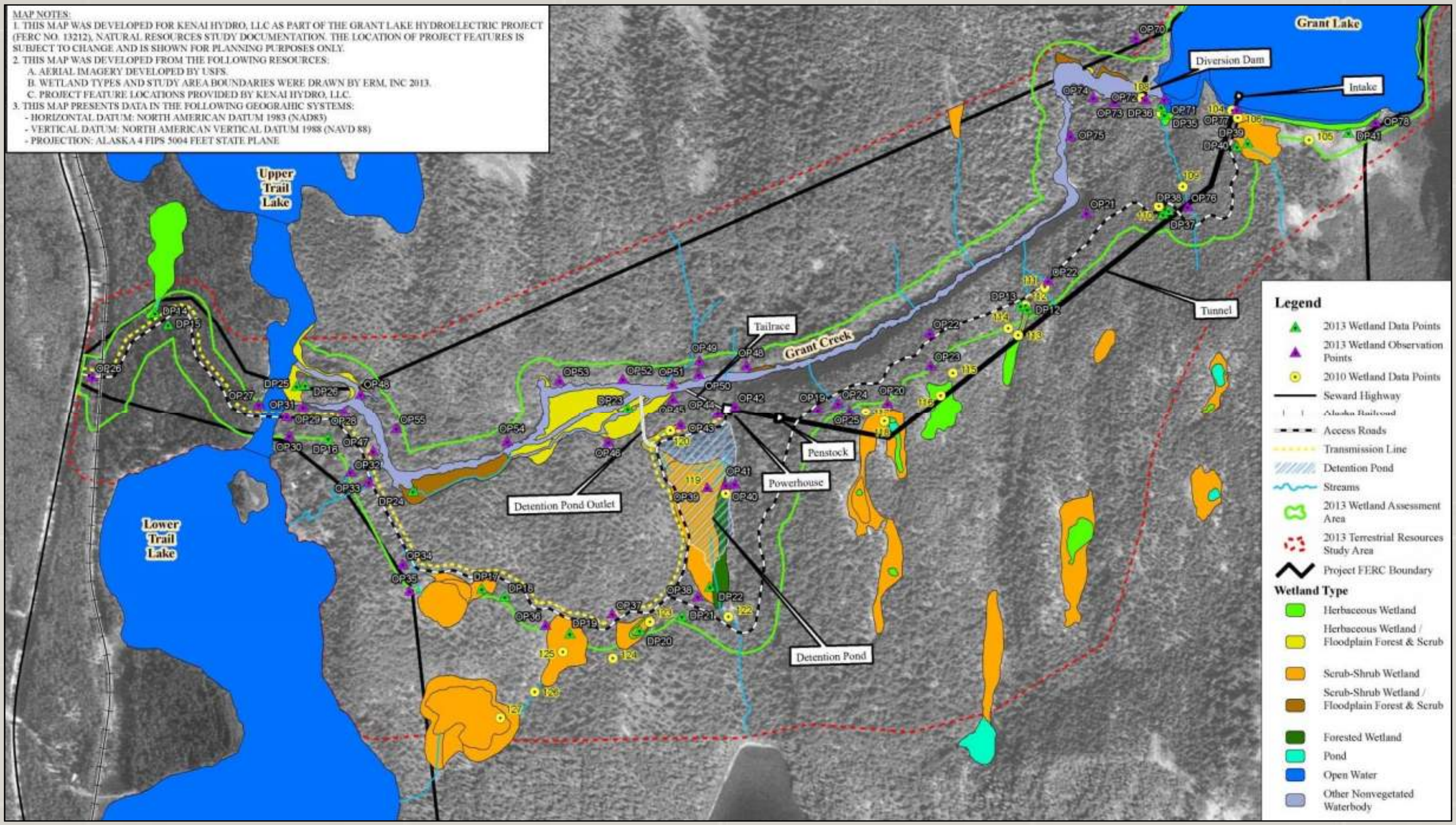
- ✓ Very few small populations of invasive plants
- ✓ All associated with previous disturbance and associated documented in the larger peninsula area
- ✓ Small population of the sensitive species pale poppy located along the lake shoreline (elevation 701 to 705)
- ✓ BE was conducted

Wetlands
(Mapping)

Vegetated wetland acres: 38 acres, 13% of vegetated area

Vegetated Wetland Communities	**Acres**	**% Wetland Area**
Herbaceous Wetlands	6	15%
Scrub-Shrub Wetlands	21	54%
Forested Wetlands	1	2%
Herbaceous Wetland / Floodplain Forest & Scrub	3	8%
Scrub-Shrub Wetland / Floodplain Forest & Scrub	8	21%
Vegetated Wetland Subtotals	**38**	
Non-Vegetated Waters	**Acres**	**% Waters Area**
Open Water - Lake	1650	99%
Open Water - Ponds	0	0%
Riverine	10	1%
Unvegetated Water Subtotals	**1660**	
WETLAND & WATER TOTALS	**1698**	

Wetlands
(Mapping)



Wetlands
(Mapping)




Wildlife
(Raptors)

- ✓ 1 female Northern Goshawk detected during surveys at 60 points over 4 survey periods
  - – Bald eagle, merlin and osprey also observed

Wildlife
(Breeding Landbirds and Shorebirds)

- ✓ 279 detections; 31 species

2013 Vegetation Types	Grass-Forb Meadow	Coniferous Forest	Birch (Original USFS Classification)	Coniferous Deciduous Forest	Scrub Shrub Wetland	Herbaceous Wetland / Floodplain Forest & Scrub
Number of points sampled in Vegetation Class (33 for 2010 and 2013)	1	16	1	12	2	1
Selected Species Detected						
Townsend's Warbler (1984, 2010, 2013)		X		X	X	
Varied Thrush (1984, 2010, 2013)	X	X	X	X	X	X
Additional Selected Species that may be Present in 2013 Vegetation Class						
Lesser Yellowlegs (1984)		X			X	
Olive-sided Flycatcher (2010)		X		X	X	
Solitary Sandpiper (2010)		X			X	
Townsend's Warbler (1984, 2010, 2013)			X			X
Wandering Tattler (1984)		X	X	X	X	X
Blackpoll Warbler		X		X	X	X
Marbled Murrelet		X				

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Wildlife
(Waterbirds)

2013 Winter Waterbird Surveys

Wildlife
(Waterbirds)

2010 Waterbirds Surveys

2010 Waterfowl Surveys	Adults	Pairs	Adult Females	Documented Broods
Barrow's Goldeneye	X		X	X
Common Goldeneye	X		X	X
Common Loon	X			
Pacific Loon	X			
Common Merganser	X			
Red-breasted Merganser		X	X	X
Harlequin Duck * Grant Lake			X	
Mallard			X	

Ebasco (1984) AMWI * GWTE

2013 Incidentals

HADU * COLO * RBME * TRUS

Wildlife
(Terrestrial Mammals)

2010 Terrestrial Mammals

- ✓ Bat Survey of the historic cabin on July 23 2010
- ✓ Coordinates and Shapefile for 1 brown bear and 1 wolverine den, provided by USFS
- ✓ Six mountain goats (5 adults, 1 kid) were noted
- ✓ Incidental sightings of 3 black bear, brown bear, moose, 3 beaver, a coyote, and a porcupine

2013 Winter Moose Surveys

- ✓ 2013 Methods
  - ✓ Aerial Surveys: Gasaway et al. (1986)
- ✓ 2013 Accomplishments
  - ✓ 1 survey completed
- ✓ Results
  - ✓ No Moose or trails detected

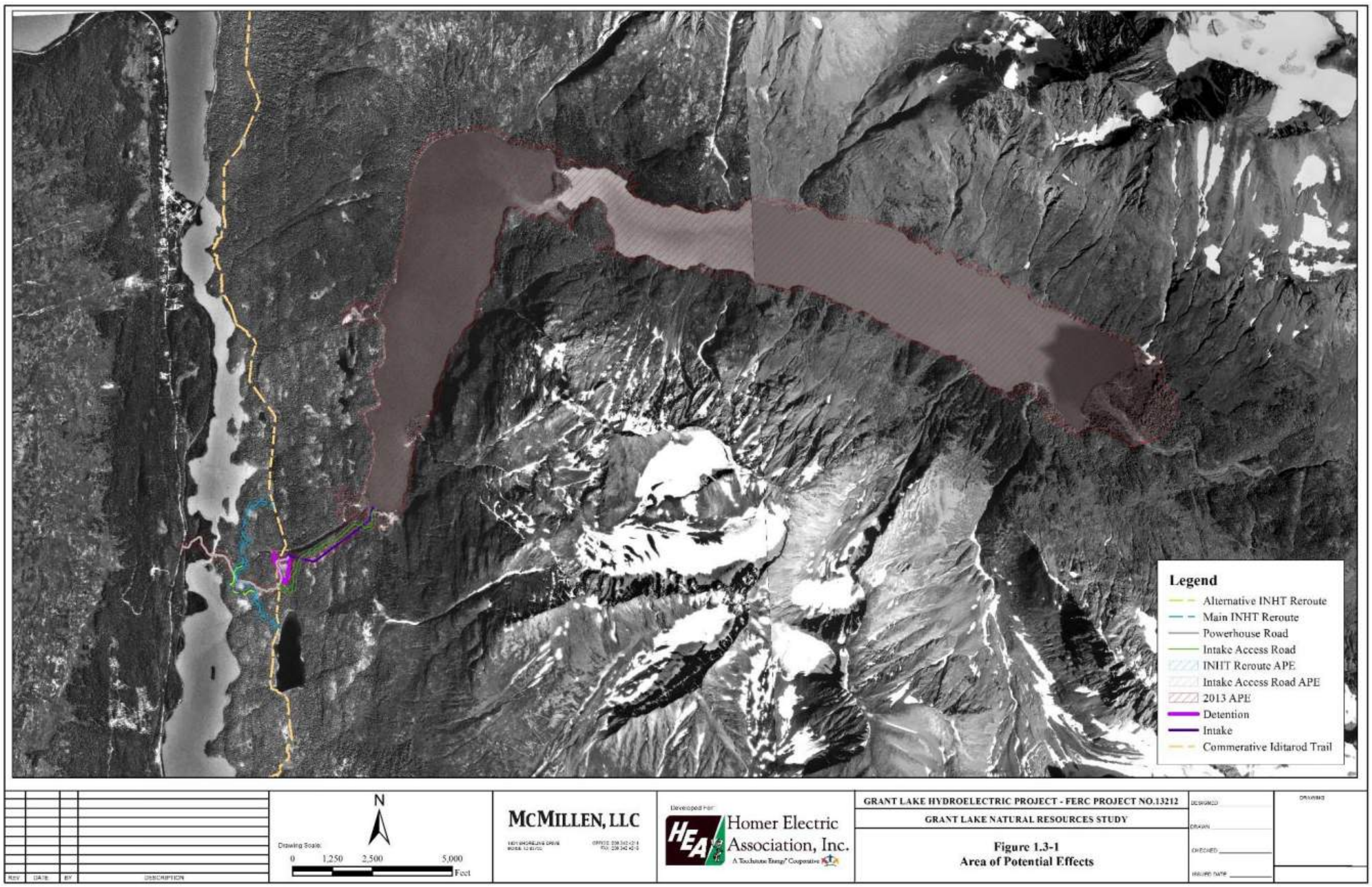
Potential Terrestrial Impacts

- ✓ Vegetation clearing associated with construction
- ✓ Potential for invasive plant species
- ✓ Wetland reduction
- ✓ Disturbance to avian species
  - ✓ Nesting
  - ✓ Foraging

Cultural Resources

- ✓ Literature Review
- ✓ Intensive Pedestrian Survey
  - ✓ Grant Creek
  - ✓ Grant Lake
- ✓ Report
  - ✓ Describes new properties
  - ✓ Updates site condition on known properties
  - ✓ Evaluates eligibility on all properties
  - ✓ Evaluates effect of the Project on all eligible properties
- ✓ Confidentiality precludes specific location photos/maps from being shown

Project Area of Potential Effects



Cultural
(Results)

- ✓ Eight geographic areas
- ✓ Nine previously known historic sites
  - ✓ Five previously determined eligible for the National Register
- ✓ Fourteen newly identified historic sites
  - ✓ One recommended as eligible for the National Register

Cultural
(Project Effects)

Property Name	AHRS Number	Recommendation of Effect
Alaska Railroad	SEW-00029	No Adverse Effect
Seward-Moose Pass Trail	SEW-00148	No Effect
Solars Sawmill	SEW-00285	Adverse Effect
Grant Lake Trail	SEW-01455	No Effect
Case Mine	SEW-00659	Adverse Effect
Case Mine Camp	N/A	Adverse Effect
Lakeside Trail	N/A	No Effect
Millsite	N/A	No Effect
Mine Workings	N/A	No Effect
Grant Lake Road to Case Mine	SEW-01454	No Effect
Case Mine Prospect Pits	SEW-01522	No Effect
North Grant Lake Cabin	SEW-00823	Adverse Effect

Cultural Resources

Potential Cultural Resource Impacts

- Given infrastructural design and operations, limited impact expected to existing culturally significant features

Recreation & Visual Resources

- ✓ Scope of Work
  - ✓ (1) Winter and (1) Summer site visit for data collection and observations
  - ✓ (1) Sight-seeing flight
  - ✓ Creation of (4) visual simulations
  - ✓ Evaluation of alternative route of Iditarod National Historic Trail (INHT).

Recreation & Visual Resources

Observed Winter Uses:

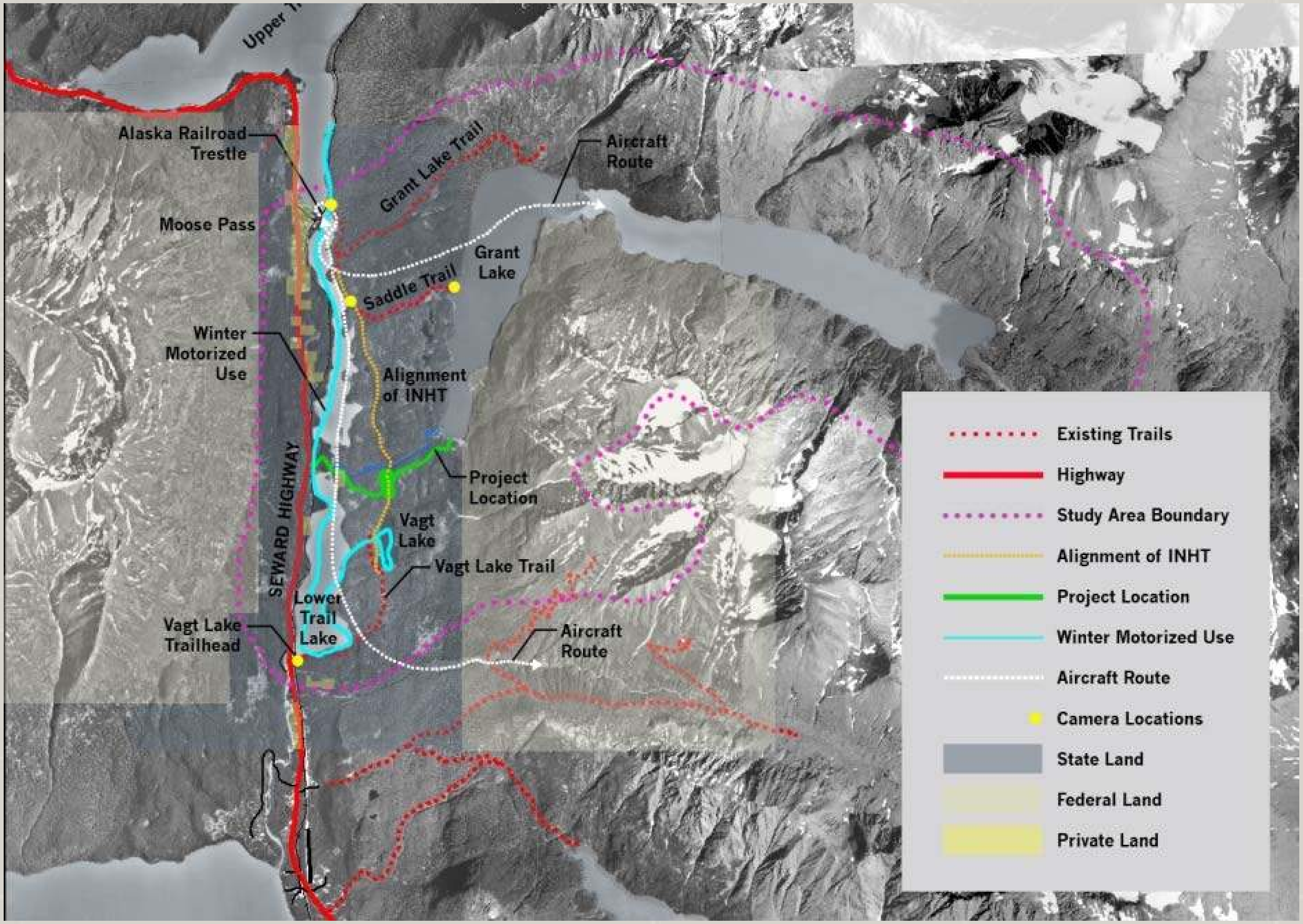
- ✓ Snow machine
- ✓ Snowshoeing
- ✓ Cross-country skiing
- ✓ Dog-walking

Recreation & Visual Resources

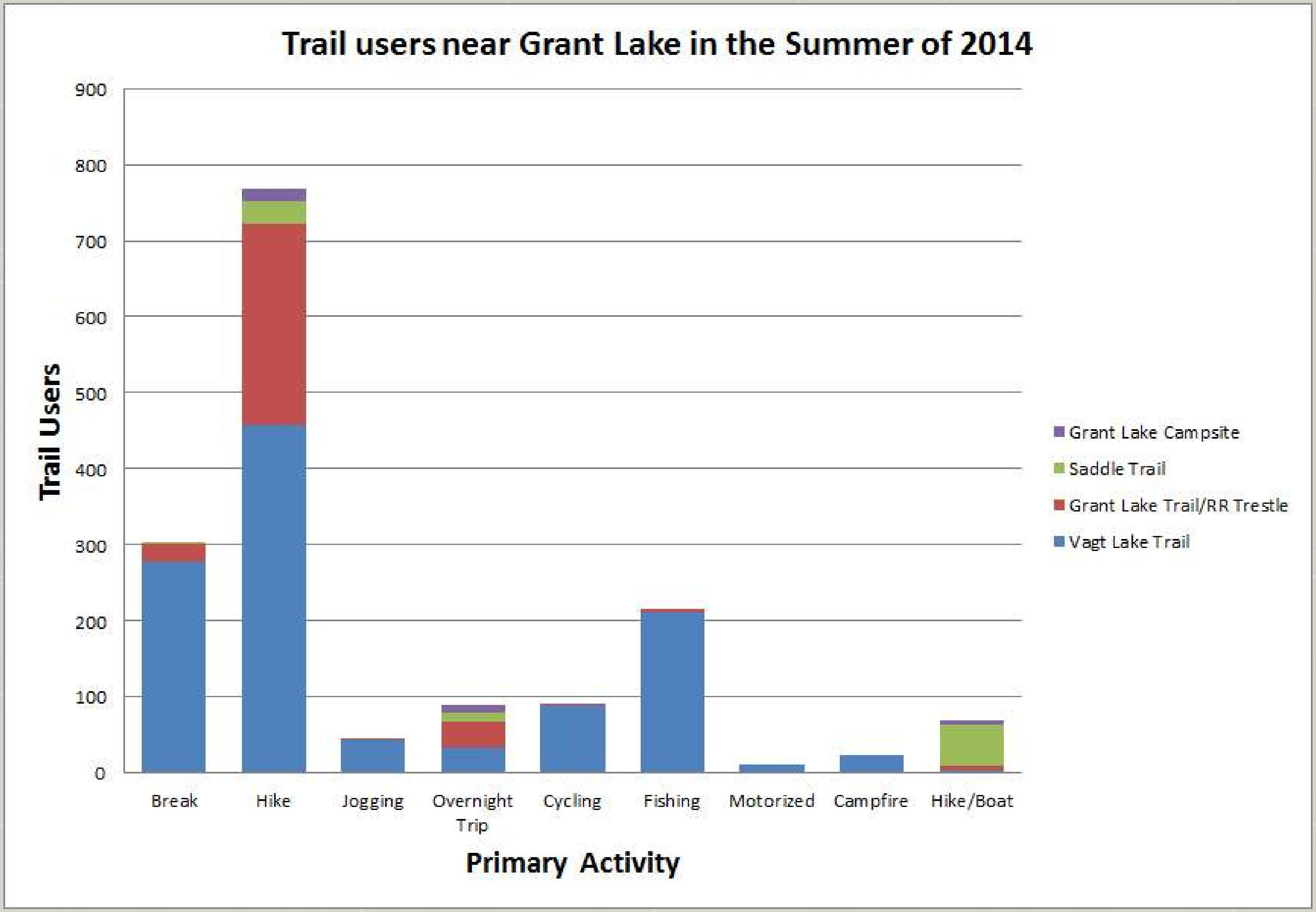
Observed Summer Uses:

- ✓ Fishing & boating
- ✓ ATV use
- ✓ Hiking
- ✓ Driving for pleasure & Sight-seeing
- ✓ Dog-walking

Summer Use Study



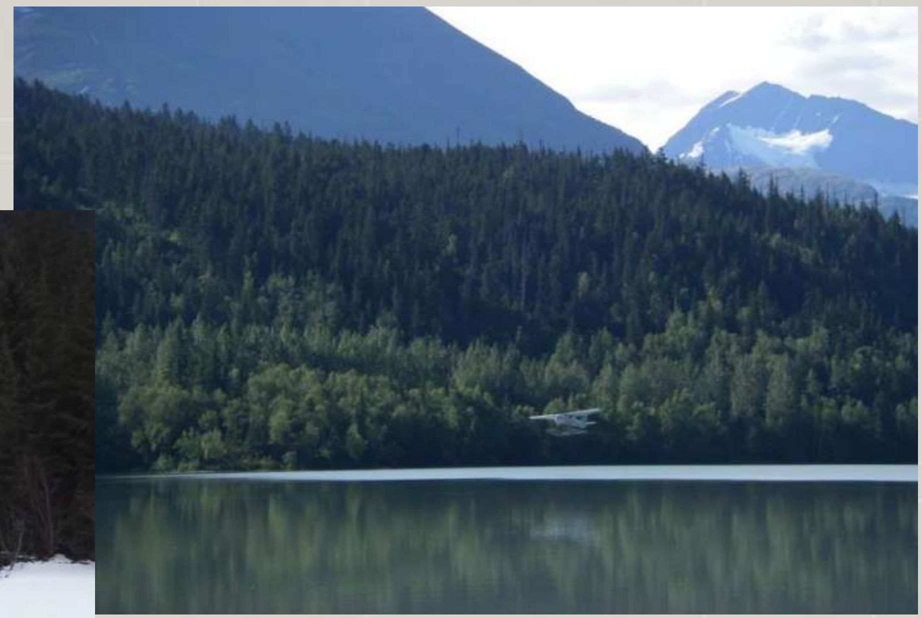
Summer Activities



Recreation & Visual Resources

Noise:

- ✓ Recorded levels 40db or less, background hum from highway
- ✓ Peak noises (80-90db) caused by aircraft take-offs and snow machine use



Recreation and Visual Resources

- Key View #1: Access Road from Seward Hwy MP 26.9

BEFORE:

Existing driveway

AFTER:

Driveway relocated to new access road

Recreation and Visual Resources Study

- Key View #2: View of Intake Structure and Lake Shoreline

BEFORE:

Existing creek outfall

AFTER:

Powerhouse, detention pond, spillover, seasonal access road, intake structure, drying of creekbed.

Recreation and Visual Resources Study

- Key View #3: View of Facilities from Seward Hwy

BEFORE:

Existing view toward facilities

AFTER:

Seasonal access road in distance, most exposed during winter conditions

Recreation and Visual Resources (Iditarod National Historic Trail)

- ✓ Currently proposed route; not yet constructed
  - ✓ Easement modification all that is needed for re-route

- ✓ Collaborative effort to re-route through the Project Area
  - ✓ Development of options
  - ✓ Meetings
  - ✓ Site Visits
  - ✓ MOA

- ✓ Effort ongoing
  - ✓ Public comment opportunity
  - ✓ MOA and refinement after acquiring FERC License

Potential Rec/Vis Impacts (Positive and Negative)

- ✓ Given the location of the Project, only minor visual or audible recognition would occur
  - ✓ Turn-off of highway
  - ✓ Lake intake
- ✓ INHT will need to be re-routed through the Project Area prior to it being constructed
- ✓ Project road to intake and powerhouse will be constructed creating possible access corridor
  - ✓ Preference for access?

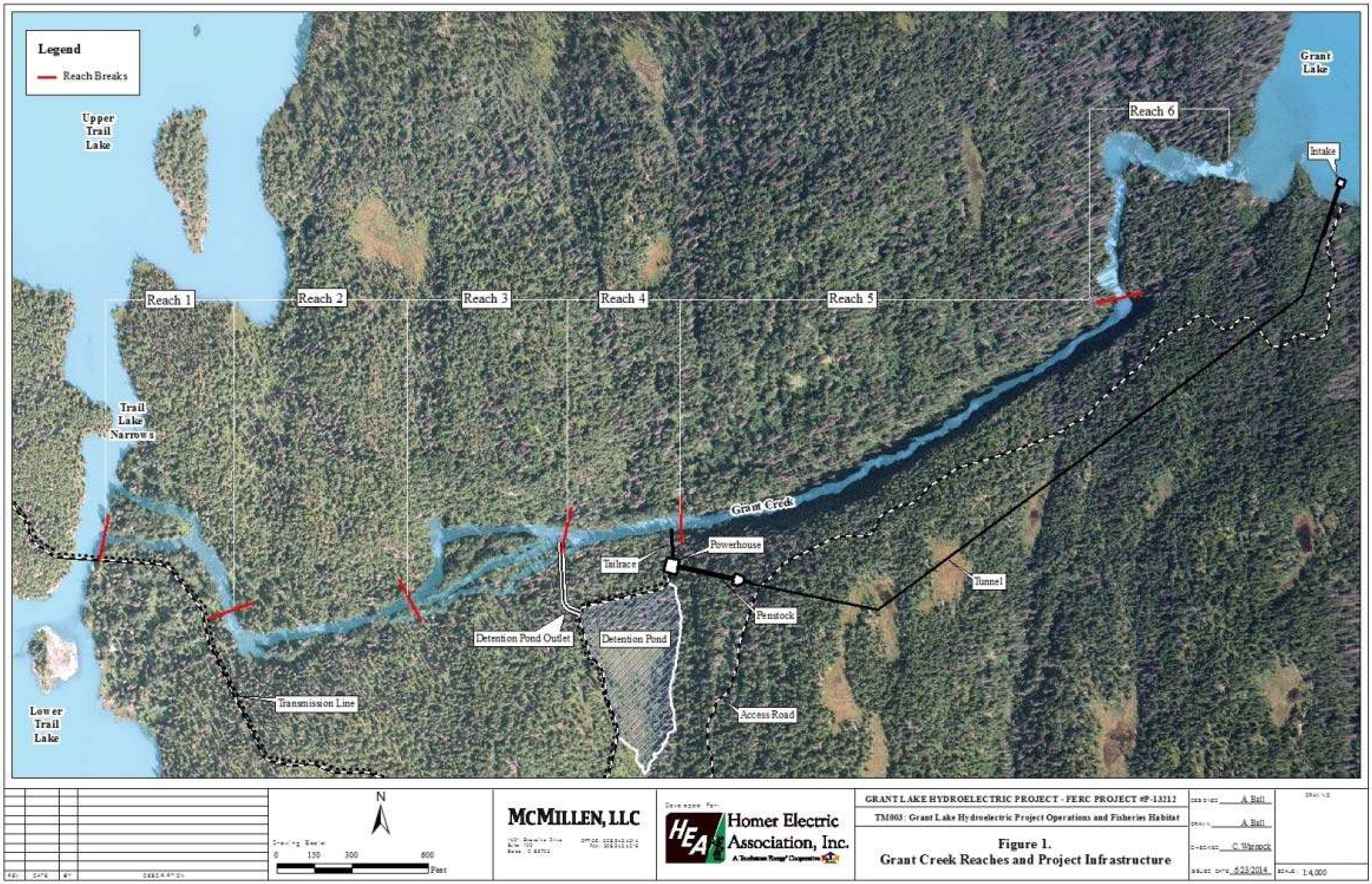
Proposed Infrastructure

- An intake structure in Grant Lake.
- A tunnel extending from the lake intake to just east of the powerhouse.
- A penstock and surge tank located at the west end of the tunnel.
- A powerhouse with two Francis turbines providing an anticipated combined 5-Megawatt output. The maximum design flow will be approximately 385 cfs.
- Tailrace channel returning powerhouse flow to Grant Creek.

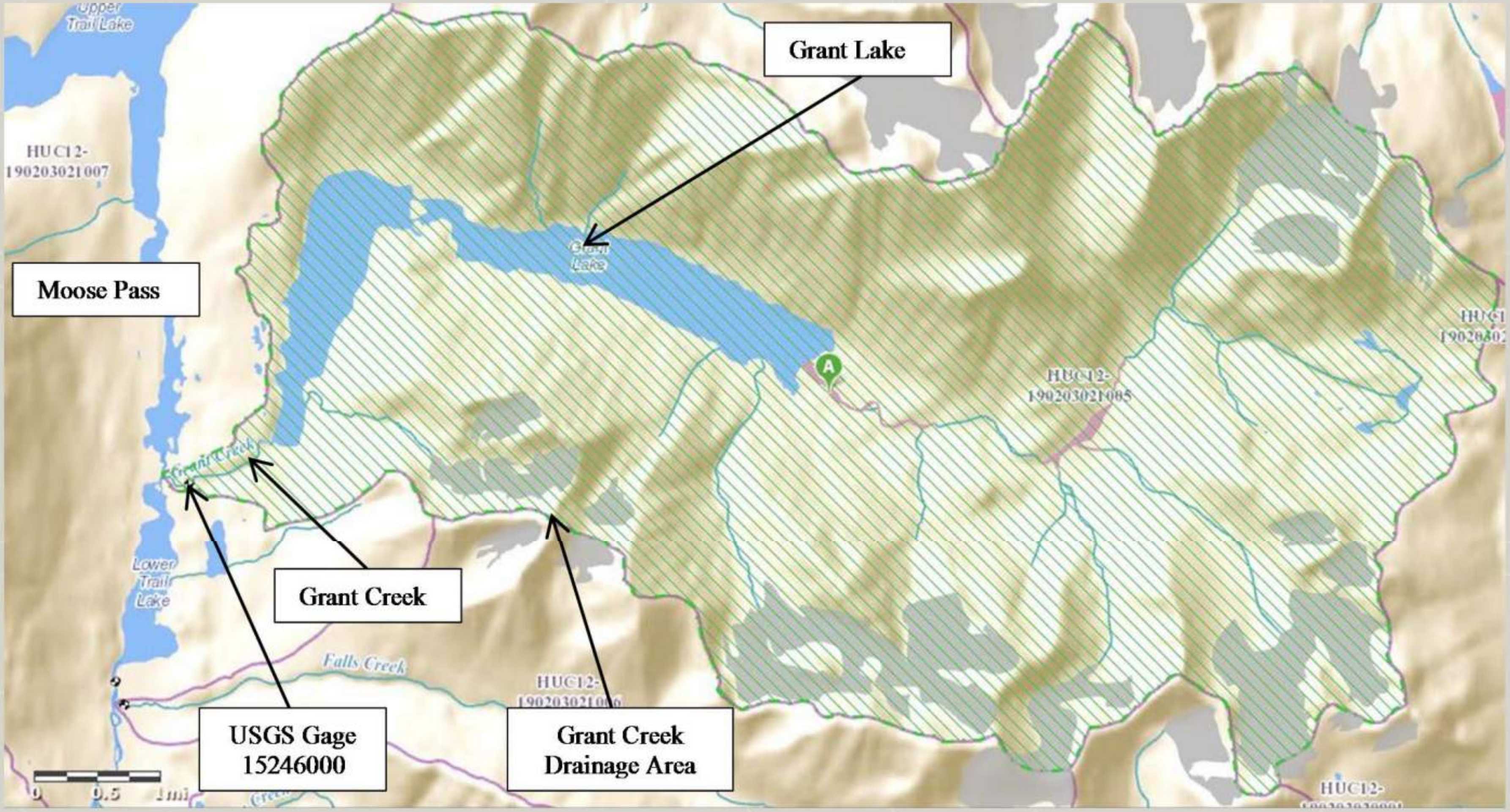
Proposed Infrastructure - continued

- Tailrace detention pond and return channel.
- Switchyard with disconnect switch and step-up transformer.
- A transmission line.
- A pole mounted disconnect switch where the transmission line intersects the main power distribution line.
- Access road from the Seward Highway to the powerhouse and extending up to the intake structure.

Grant Creek Project Layout



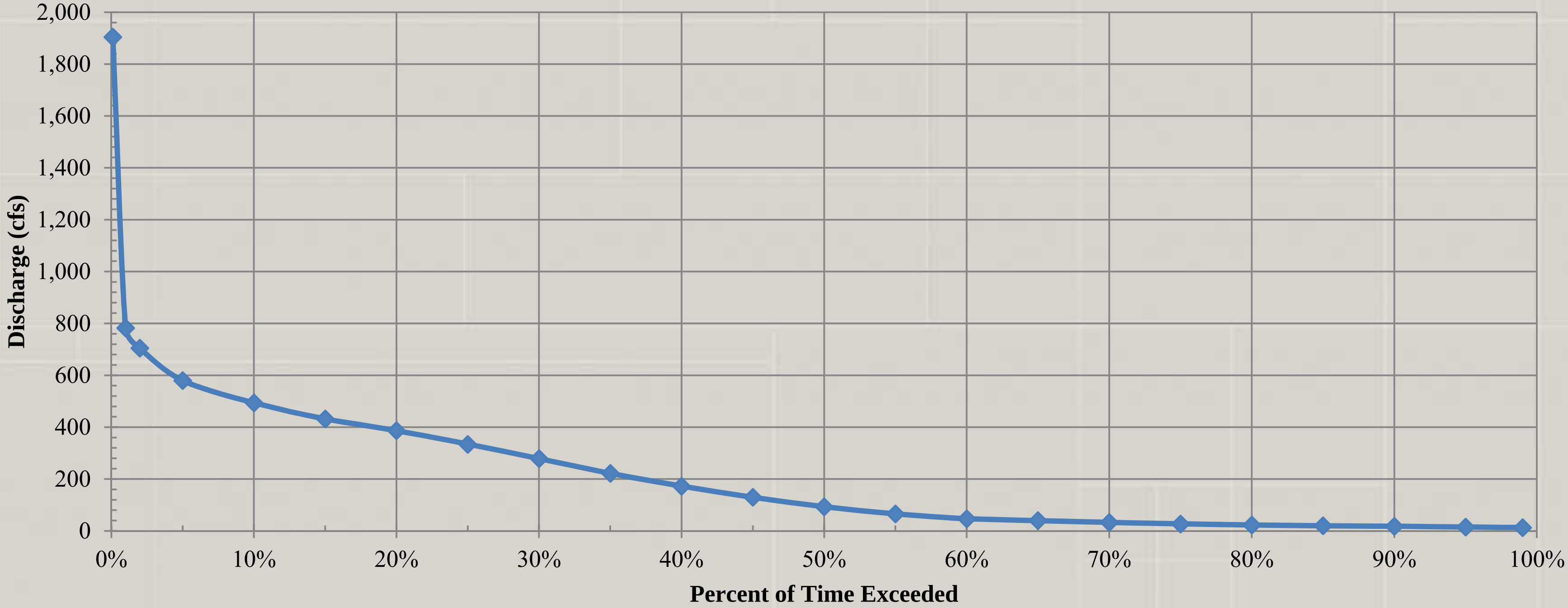
Hydrologic Review – Basin Map



Hydrologic Review – Characteristics

Item	Value
USGS Station No.	15246000
Station Name	Grant Lake near Moose Pass, AK
Drainage Area	44.2 square miles
Mean Basin Elevation	2,900 ft
Areas of Lakes and Ponds (storage)	10%
Area of Forest	20%
Mean Annual Precipitation	90 inches
Mean Min. January Temperature	10 o F

Hydrologic Review – Flow Duration

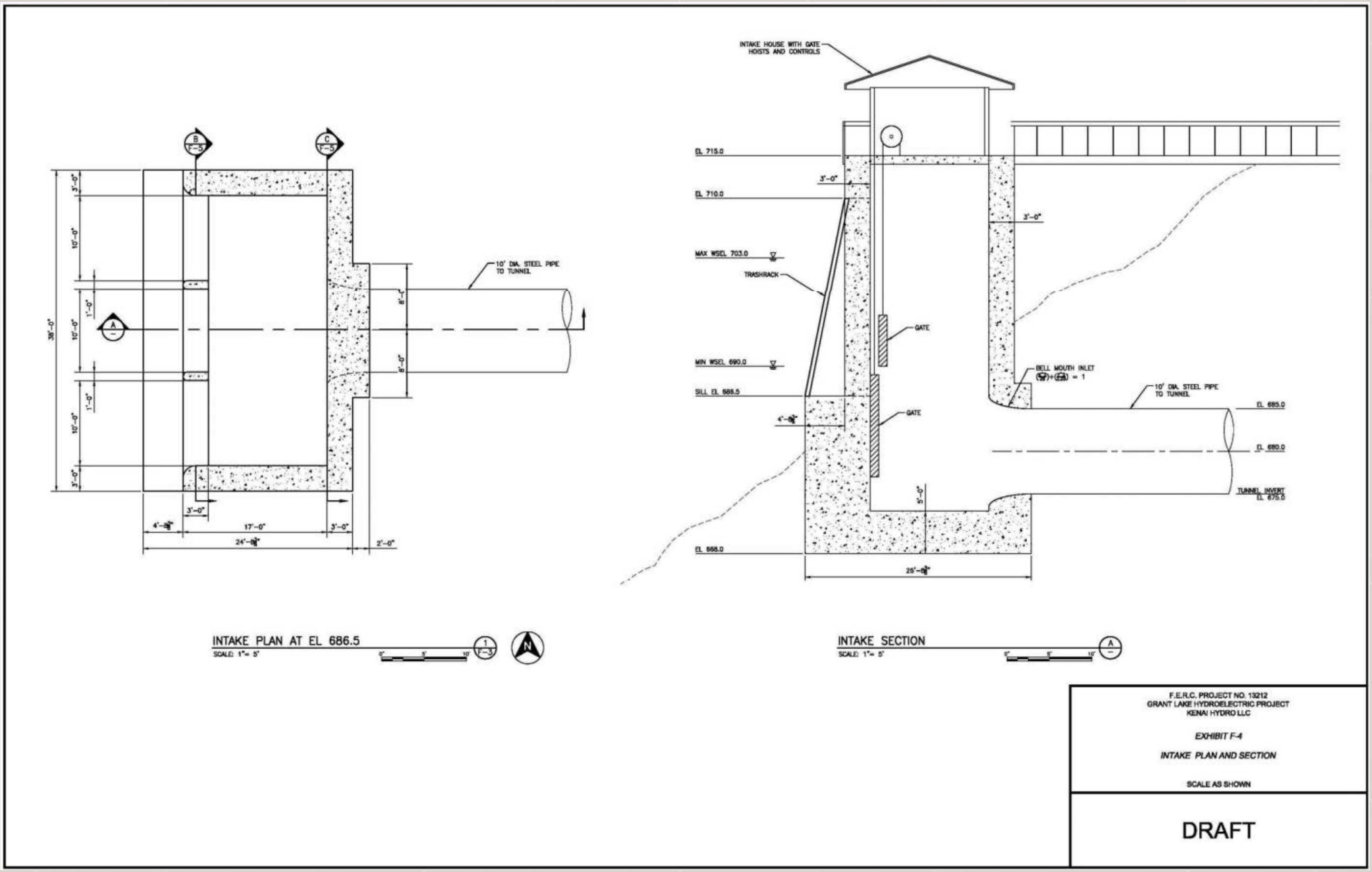


Grant Creek Flow Duration Analysis

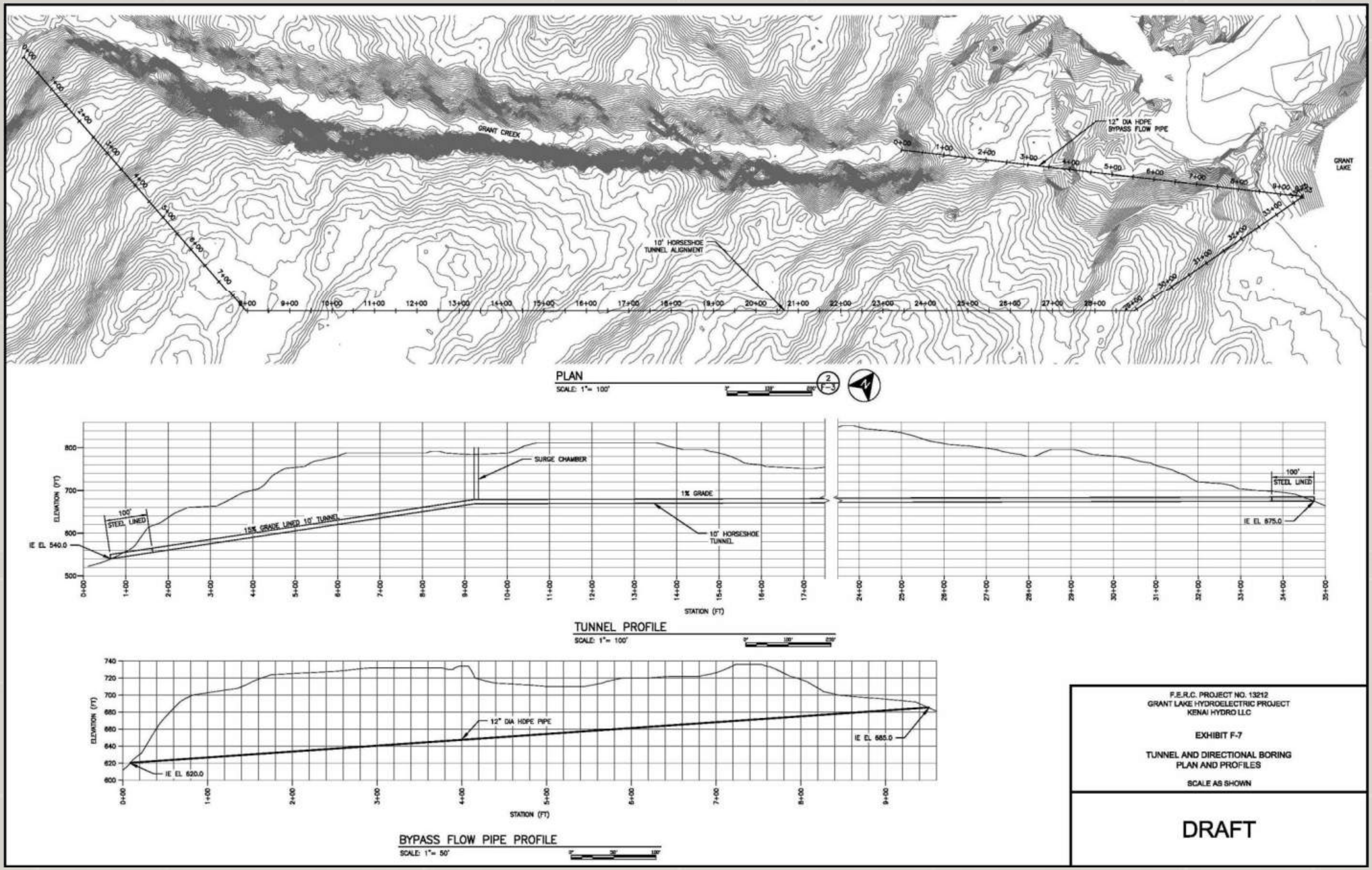
Hydrologic Analysis Review

- 66-year ‘composite’ daily streamflow record developed for Grant Creek
  - Calendar Years 1948-2013
  - USGS gage record
  - Intermittent streamflow records from engineering studies
  - Record extension based on Kenai River at Cooper Landing
- Used for Hydraulic, Generation, and Habitat Analyses
- Summarized in Technical Memo 001: Grant Creek Hydrologic Analysis

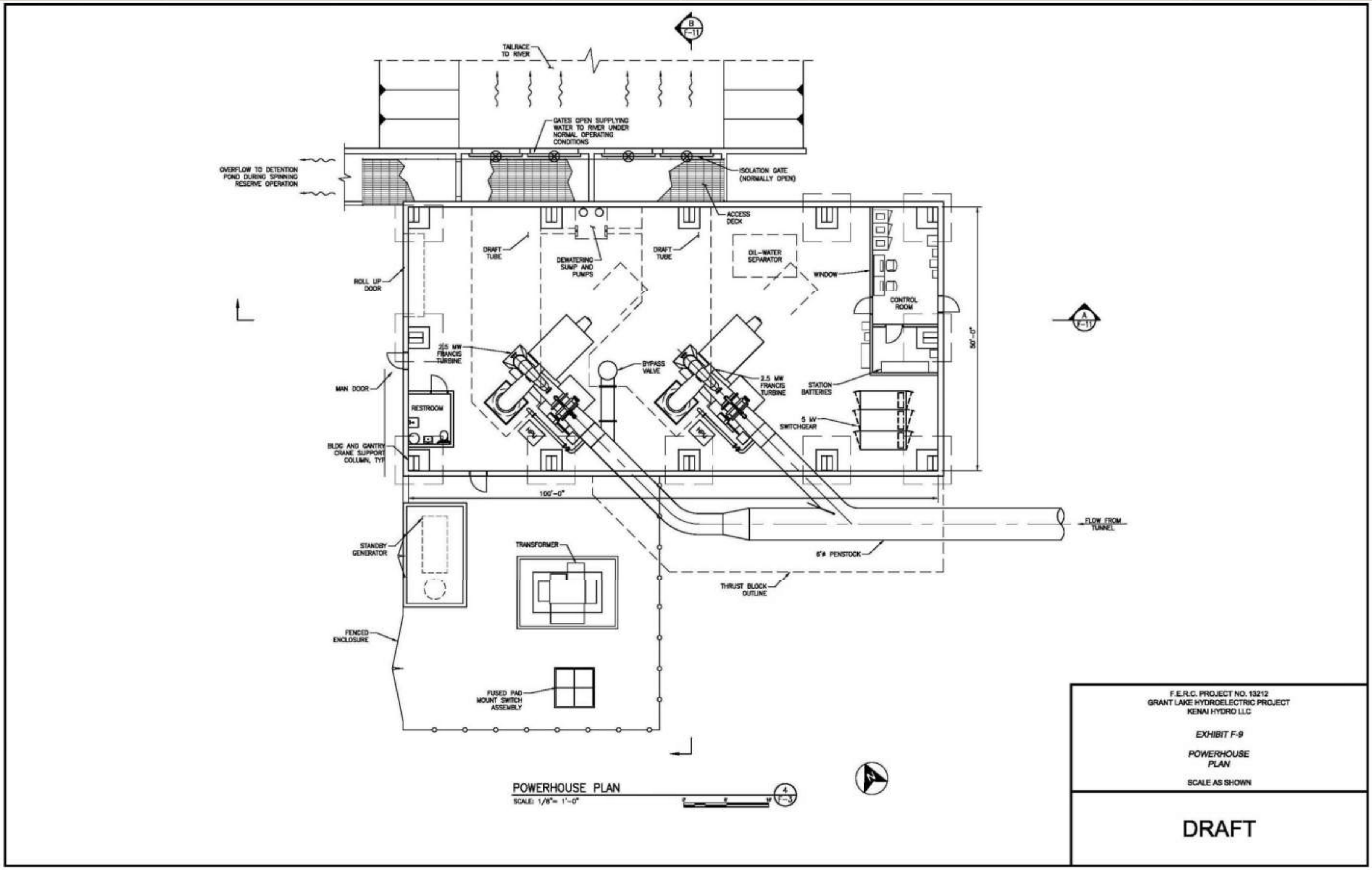
Intake Plan and Section



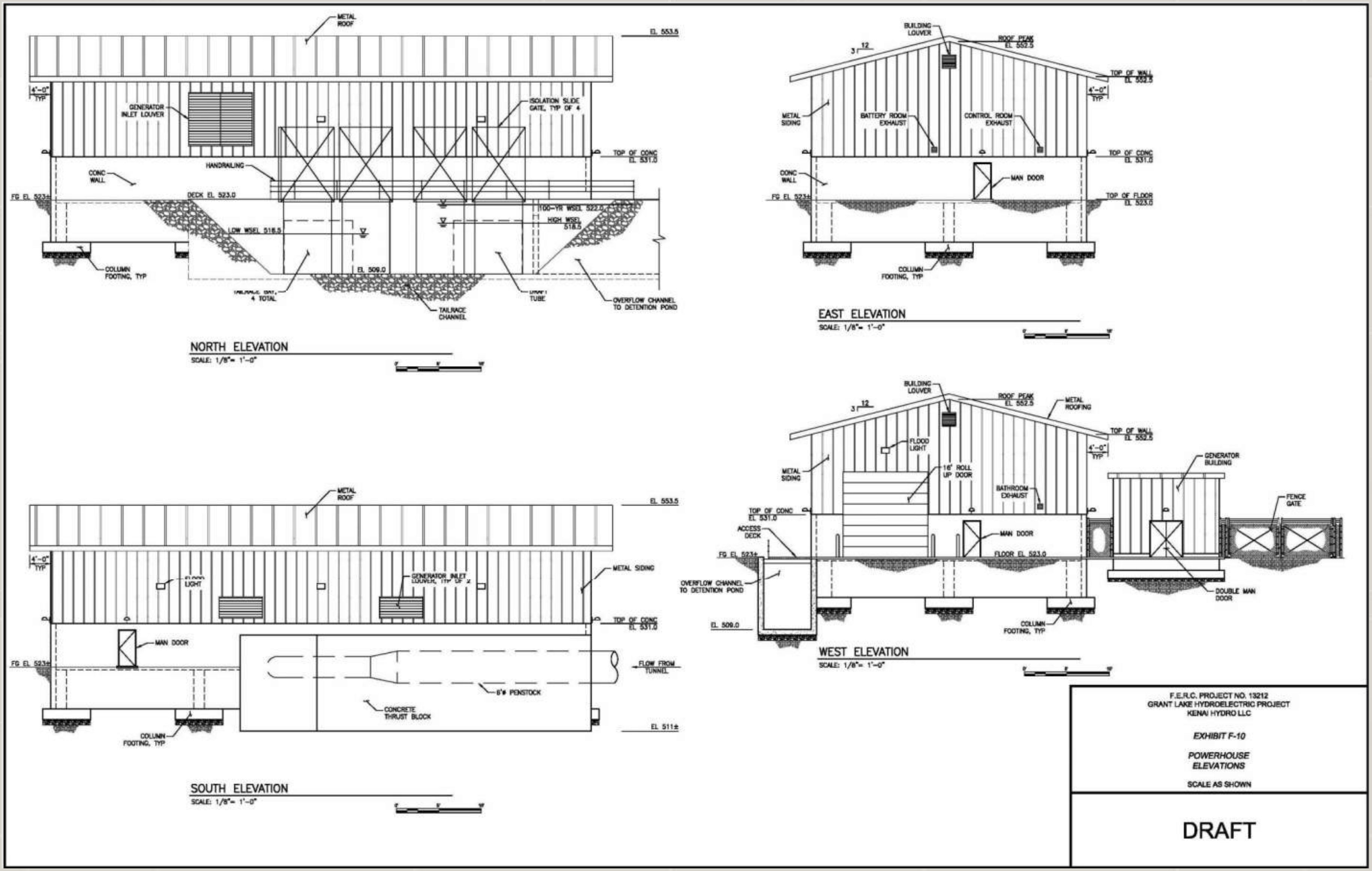
Tunnel Plan and Profile



Powerhouse Plan



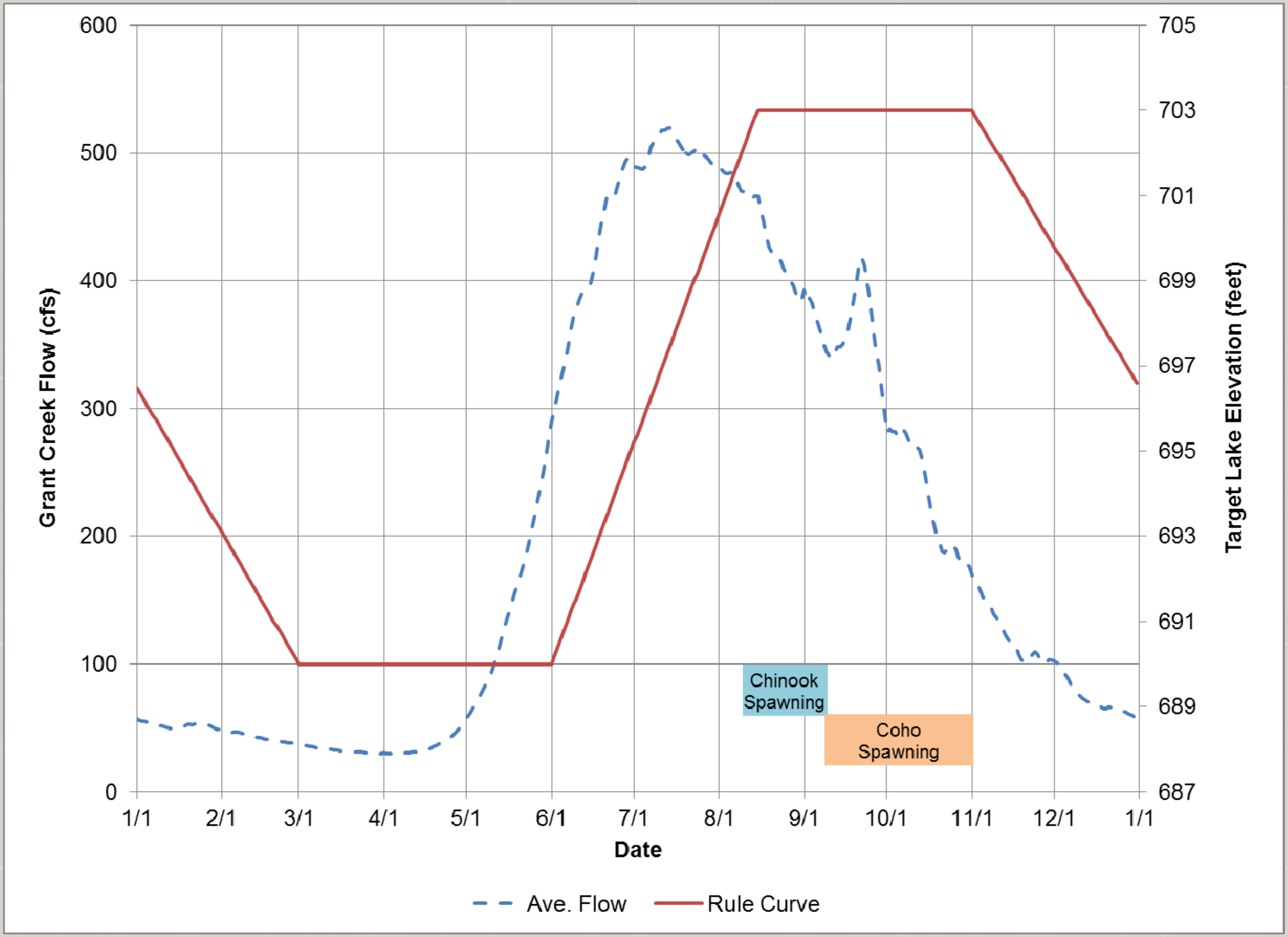
Powerhouse Elevations



Operating Assumptions

No.	Assumption	Data
1	No Dam	Natural Storage Only
2	Reservoir Operating Range	703-690 feet (13 feet)
3	Approximate Tailwater Elevation	518 feet
4	Peak Powerhouse Discharge	385 cfs
5	Minimum Powerhouse Discharge	23 cfs
6	Turbines	2 - 2.5 MW Francis Units
7	Instream Flow Releases in Reach 5 and 6	10 cfs during Chinook spawning (Aug-Sept)
		7 cfs during Coho spawning (Sept-Oct)
		5 cfs for the remainder of the year

Operating Assumptions

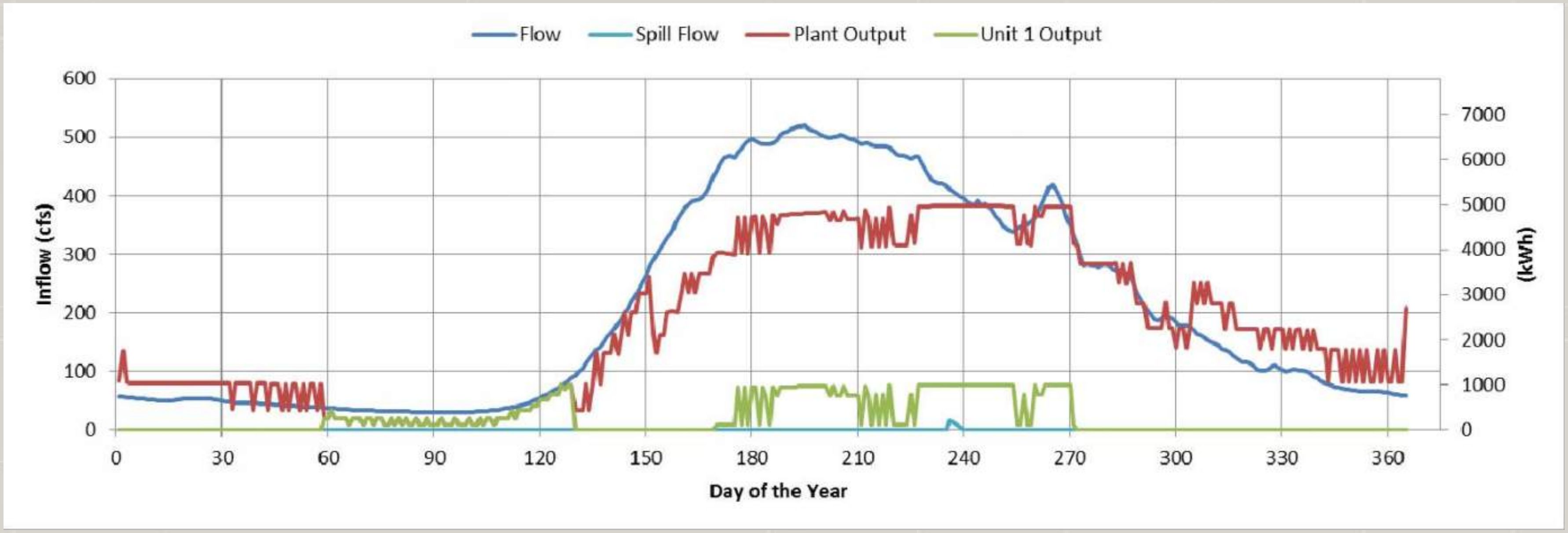


Operational/Generation Model

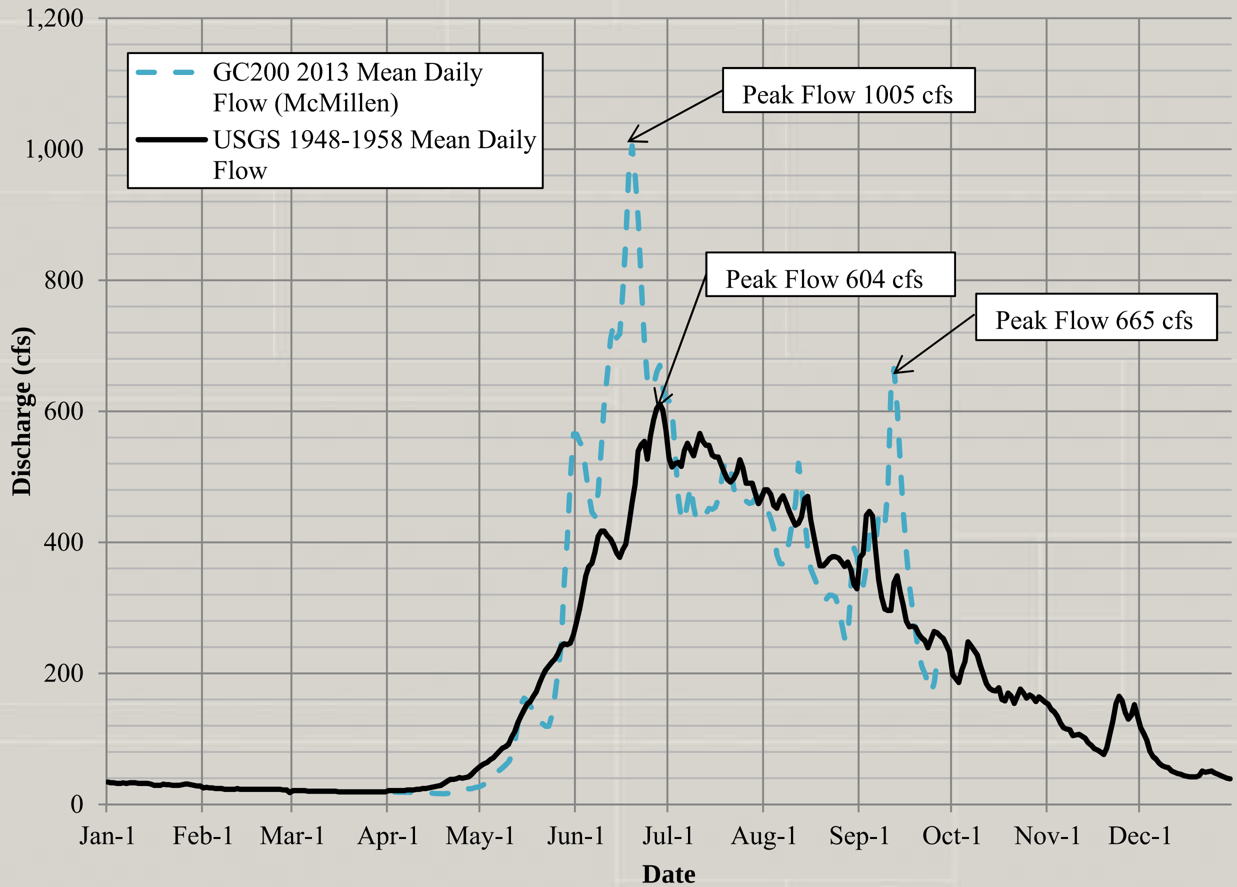
- Developed to estimate energy production under various operational scenarios
- Utilizes composite streamflow record to calculate daily power production
- Includes instream flow requirements
- Allows powerhouse size and unit configuration to be varied as well as tunnel and penstock size optimization

Generation Model Results

- Energy Production :19,500 MW-Hours Annually (based on Average Daily Flows)
- Plant Factor: 0.45



Hydrologic Review – Mean Daily Flow

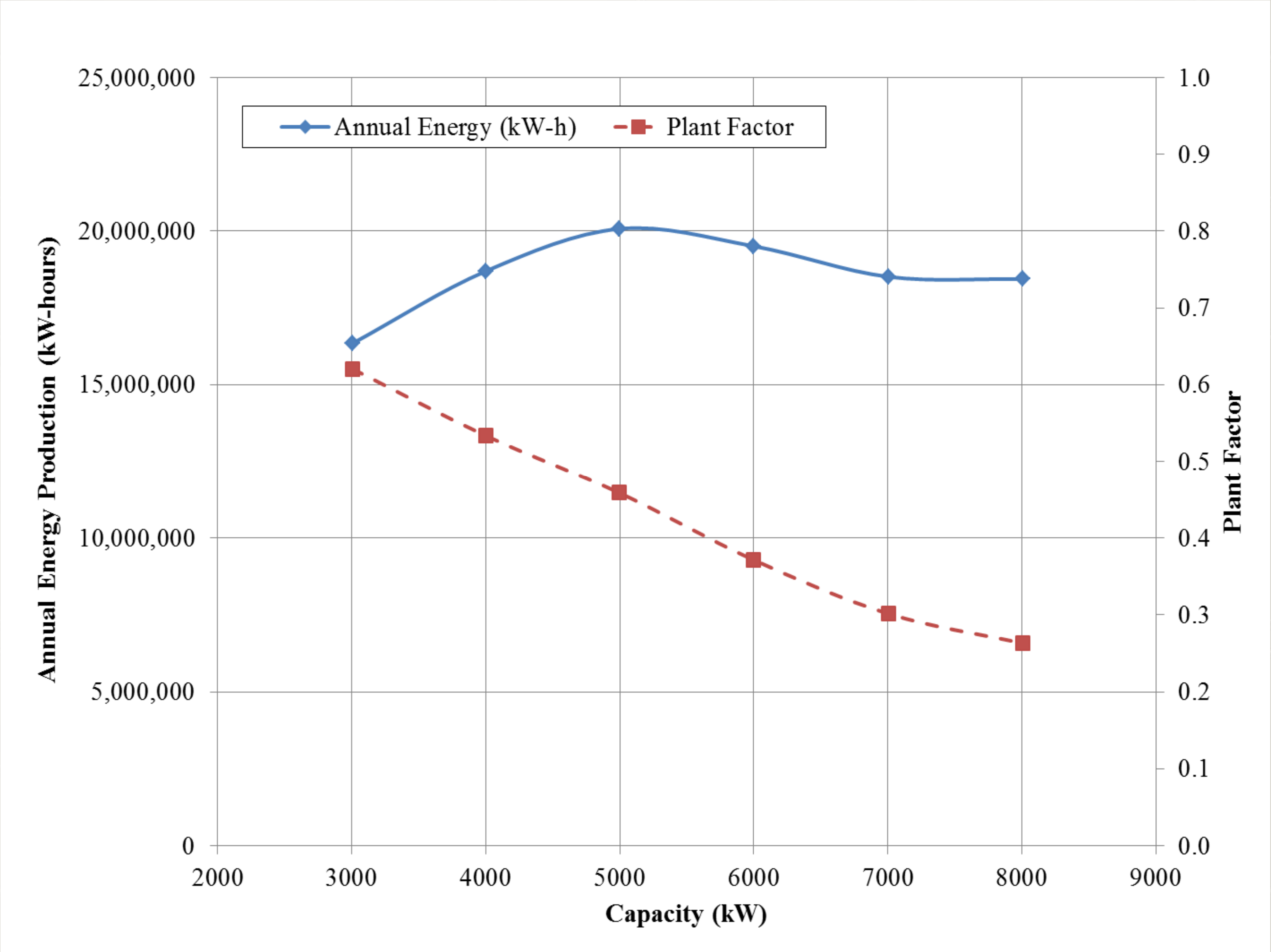


Grant Creek Mean Daily Flow - 1948-1958 and 2013 (Calendar Year)

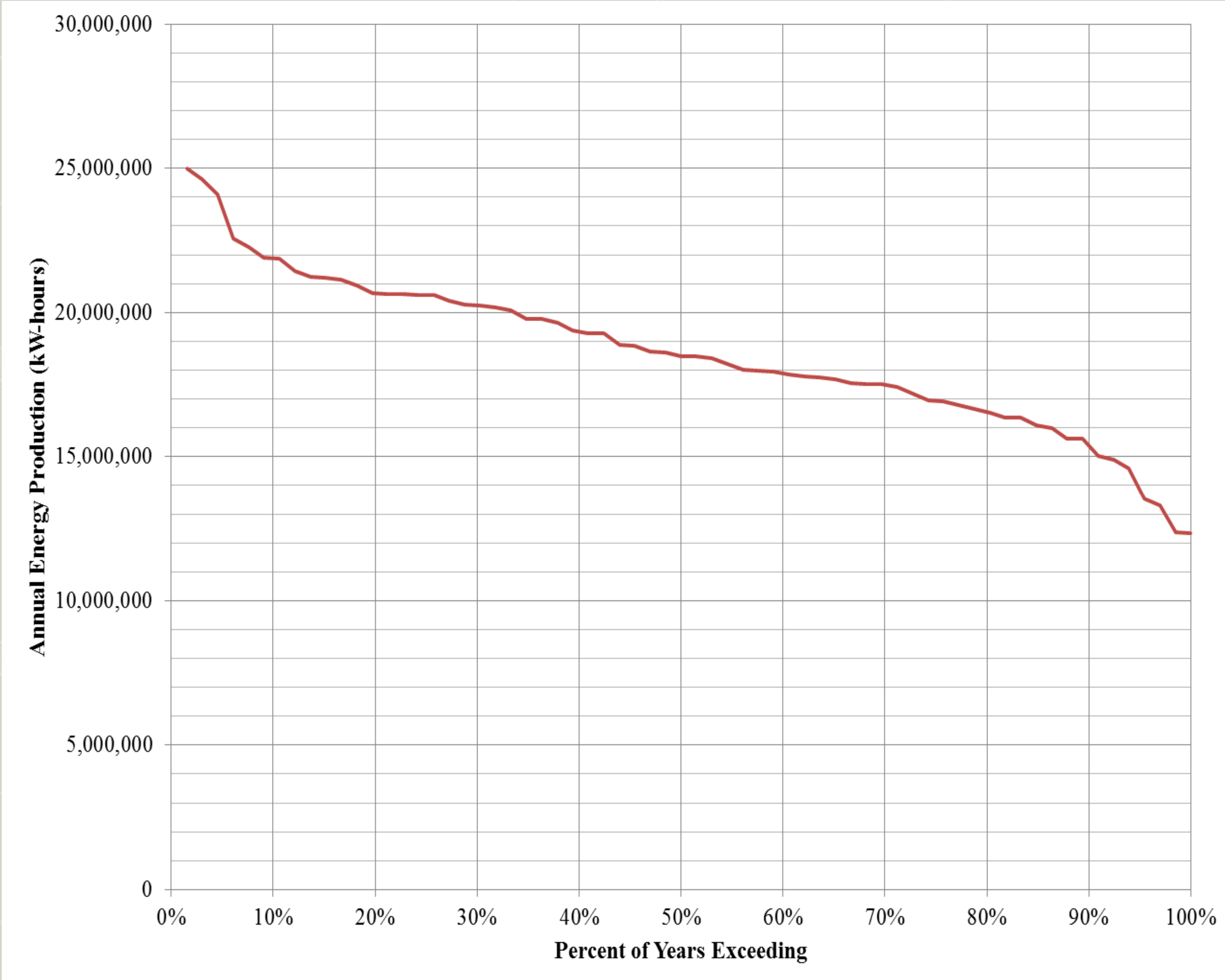
Hydrologic Review – Conclusions

- Current analysis results were consistent with previous analyses
- 95% exceedance flow of 15 cfs
- 5% exceedance flow of 580 cfs
- 20% exceedance flow of 387 cfs
- 100-year flood of 3,310 cfs for powerhouse flood protection

Power Plant Capacity Comparison



Annual Energy Production Exceedance Curve



Grant Creek Biology, Hydrology, Operations Table

	Stage	Species	January	February	March	April	May	June	July	August	September	October	November	December
Biology	Spawning	Chinook												
		Coho												
		Sockeye												
		Dolly Varden												
		Rainbow												
	Incubating	Chinook												
		Coho												
		Sockeye												
		Dolly Varden												
		Rainbow												
	Juveniles	Chinook												
		Coho												
		Sockeye												
		Dolly Varden												
		Rainbow												
	Fry	Chinook												
		Coho												
		Sockeye												
		Dolly Varden												
		Rainbow												
	Adult	Dolly Varden												
		Rainbow												
Hydrology	Composite Streamflow Record (CY 1948-2013) (cfs)	Maximum Flow	326	227	116	160	566	2140	1210	1383	1731	1295	851	570
		20% Exceedance	64	51	41	47	215	512	573	524	480	317	151	87
		Average Flow	52	43	33	36	146	409	503	444	367	233	123	73
		Median Flow	45	36	30	31	127	398	488	422	313	182	94	59
		80% Exceedance	32	25	21	22	62	290	419	346	215	115	67	42
		Minimum Flow	12	11	6	13	17	102	210	173	65	45	28	18
Operations	Typical Unit Operation	1 MW Unit (75 cfs)	Off	Off	Running	Running	Running	Off	Running	Running	Running	Off	Off	Off
		4 MW Unit (310 cfs)	Running	Running	Off	Off	Running	Running	Running	Running	Running	Running	Running	Running

Grant Creek Instream Flows under Natural Conditions

			January				February				March				April				May				June			
Biological Parameters	Instream Flow Release (Reach 5)	(cfs)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Main Channel Flow (Reach 1-4) - Natural		55	51	51	52	47	45	41	39	36	34	32	31	30	31	35	45	69	101	152	227	318	382	431	483
	Main Channel Flow (Reach 1-4) - with Project		133	128	128	128	124	119	115	106	36	34	33	30	30	30	35	46	68	97	155	224	199	260	310	360
	Approximate Reach 2/3 Side Channel Flow - Natural		9	8	9	9	8	7	7	6	6	6	5	5	5	5	6	8	12	17	25	38	53	64	72	81
	Approximate Reach 2/3 Side Channel Flow - with Project		22	21	21	21	21	20	19	18	6	6	5	5	5	5	6	8	11	16	26	37	33	43	52	60
Reservoir Rule Curve	Maximum Elevation																									
	Drafting/Filling		Drafting																				Filling			
	Minimum Elevation																									

			July				August				September				October				November				December			
Biological Parameters	Instream Flow Release (Reach 5)	(cfs)	5	5	5	5	10	10	10	10	10	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5
	Main Channel Flow (Reach 1-4) - Natural		494	517	507	496	484	469	440	402	379	347	379	364	280	272	216	184	159	133	109	99	92	74	67	63
	Main Channel Flow (Reach 1-4) - with Project		370	390	388	375	365	347	395	399	395	374	372	365	282	273	212	187	234	207	185	180	172	150	141	147
	Approximate Reach 2/3 Side Channel Flow - Natural		82	86	84	83	81	78	73	67	63	58	63	61	47	45	36	31	26	22	18	16	15	12	11	10
	Approximate Reach 2/3 Side Channel Flow - with Project		62	65	65	63	61	58	66	67	66	62	62	61	47	46	35	31	39	35	31	30	29	25	24	24
Reservoir Rule Curve	Maximum Elevation																									
	Drafting/Filling																		Drafting							
	Minimum Elevation																									

Mitigating Construction Impacts

- Work Execution is set up to protect natural resources.
- First Step is preparation of detailed environmental management plans; for example:
  - SWPPP
  - Erosion and Sediment Control
  - Bear Safety Program
  - Cofferdam and Dewatering
  - Vegetation Plans (Construction and Post-Construction)
  - Water Quality Monitoring
- Designate Environmental Compliance Manger (ECM) who is onsite during construction.
- Full Time Monitoring of Implemented Plan Measures and BMPs.


Allison Creek ECM in the field

Document Content(s)

From: Warnock, Cory <Warnock@mcmjac.com>
Sent: Monday, December 15, 2014 8:58 PM
To: 'jeavis@fs.fed.us'; 'Joe Klein'; 'Kevin Laves (klaves@fs.fed.us)'; 'Katherine McCafferty (katherine.a.mccafferty2@usace.army.mil)'; 'Monte Miller'; 'Jason Mouw'; 'Susan Walker'; 'Lesli Schick (lesli.schick@alaska.gov)'; 'rstovall@fs.fed.us'; 'Cassie Thomas'; 'Jeffry Anderson'; 'Patricia Berkhahn (patricia.berkhahn@alaska.gov)'; carl.reese@alaska.gov; 'Kim Sager'; 'dglass@ciri.com'; 'David Griffin (david.griffin@alaska.gov)'; 'pamela.russell@alaska.gov'; 'Schade, David W (DNR)'; 'kenailake@arctic.net'; 'Ken Hogan'
Cc: 'Mike Salzetti'; 'Emily Andersen'
Subject: Grant Lake Project (P-13212) Public Meeting Minutes

Grant Lake Hydroelectric Project (FERC No. 13212) Stakeholder Group:

Hi all,

Just dropping you a quick note to let you know that the Grant Lake Project Public Meeting minutes corresponding to the meeting held in Moose Pass on 11/6/14 have been filed with FERC and will be placed on the Kenai Hydro website (www.kenaihydro.com) by the end of the week. Upon your review, if you have any thoughts/questions, please don't hesitate to drop me an email or give me a call.

Thanks and Happy Holidays,

Cory

Cory Warnock
Senior Licensing and Regulatory Consultant

5771 Applegrove Ln |Ferndale, WA 98248
360.384.2662 p | 360.739.0187 c | Warnock@mcmjac.com

McMILLEN JACOBS ASSOCIATES

**Please note that Jacobs Associates and McMillen LLC have officially merged and my email address has changed.*

From: Warnock, Cory <Warnock@mcmjac.com>
Sent: Monday, December 15, 2014 9:00 PM
To: mike@alaska-energy.com; 'Mark Luttrell (prufrock@arctic.net)'; irene@arctic.net; dearimage.dw@gmail.com; Thomas, Ryan J (DNR); jherbert8000@gmail.com; katie.johnson@alaska.gov; hal.shepherd@tcfwa.org; pm99588@yahoo.com; 'Ricky Gease (ricky@krsa.com)'; 'mcooney@arctic.net'; peruprairie@hotmail.com; glaser@seward.net; dgease@gmail.com; 'David Griffin (david.griffin@alaska.gov)'; 'Shina Duvall'; andybacon20@yahoo.com; clairshipton@gmail.com; 'jjh@seward.net'; dyrkss@yahoo.com; bearimage.dw@gmail.com; claireshipton@gmail.com; andbacon2@yahoo.com
Cc: Salzetti, Mikel; 'Emily Andersen'
Subject: RE: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Hi again,

Please see note below for context. It appears that due to file size, a majority of you didn't receive the final meeting minutes and supplemental documentation via email as intended. Per below, they will also be made available via the Kenai Hydro website (www.kenaihydro.com) by the end of the week.

Thank you,

Cory Warnock
Senior Licensing and Regulatory Consultant

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360.384.2662 p | 360.739.0187 c | Warnock@mcmjac.com

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From: Warnock, Cory
Sent: Monday, December 15, 2014 8:50 PM
To: 'Cory Warnock'; mike@alaska-energy.com; 'Mark Luttrell (prufrock@arctic.net)'; irene@arctic.net; dearimage.dw@gmail.com; Thomas, Ryan J (DNR); jherbert8000@gmail.com; katie.johnson@alaska.gov; hal.shepherd@tcfwa.org; pm99588@yahoo.com; 'Ricky Gease (ricky@krsa.com)'; 'mcooney@arctic.net'; peruprairie@hotmail.com; glaser@seward.net; dgease@gmail.com; 'David Griffin (david.griffin@alaska.gov)'; 'Shina Duvall'; andybacon20@yahoo.com; clairshipton@gmail.com; 'jjh@seward.net'; dyrkss@yahoo.com; 'bearimage.dw@gmail.com'; 'claireshipton@gmail.com'; 'andbacon2@yahoo.com'
Cc: Salzetti, Mikel; 'Emily Andersen'
Subject: RE: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Grant Lake Project Public Meeting Attendees

Hi all,

Just a note to let you know that the Grant Lake Public Meeting minutes documenting the 11/6/14 meeting held in Moose Pass have been filed with FERC. I have attached them here but due to file size, there is some potential that you may not receive them. As such and consistent with our practice throughout the process, they will also be placed on the Kenai Hydro website (www.kenaihydro.com) by the end of this week. I'd like to thank you all once again for your participation at the meeting and your subsequent input into the draft meeting minutes. As always, if you have any thoughts/questions, please don't hesitate to drop me an email or give me a call.

Thanks and Happy Holidays,

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Senior Licensing and Regulatory Consultant

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360.384.2662 p | 360.739.0187 c | Warnock@mcmjac.com

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From: Warnock, Cory
Sent: Wednesday, December 17, 2014 9:50 AM
To: Katharine Glaser
Cc: Andersen, Emily
Subject: RE: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Hi Katharine,

You are on the contact list for notification when the Draft License Application (DLA) is distributed. Once distributed, you will have 60 days to submit your comments to FERC (and KHL). Our current plan is to distribute the DLA in the early spring of next year. Hopefully that answers you question but if you'd like further detail, don't hesitate to let me know.

Cory Warnock
Senior Licensing and Regulatory Consultant

5771 Applegrove Ln |Ferndale, WA 98248
360.384.2662 p | 360.739.0187 c | Warnock@mcmjac.com

McMILLEN JACOBS ASSOCIATES

**Please note that Jacobs Associates and McMillen LLC have officially merged and my email address has changed.*

From: Katharine Glaser [mailto:glaser@seward.net]
Sent: Wednesday, December 17, 2014 9:46 AM
To: Warnock, Cory
Subject: RE: DRAFT November 6th Grant Lake Project Public Meeting Minutes

Who do we write to voice our concerns about motorized vehicle access?

From: Warnock, Cory [mailto:Warnock@mcmjac.com]
Sent: Monday, December 15, 2014 8:00 PM
To: mike@alaska-energy.com; 'Mark Luttrell (prufrock@arctic.net)'; irene@arctic.net; dearimage.dw@gmail.com; Thomas, Ryan J (DNR); jherbert8000@gmail.com; katie.johnson@alaska.gov; hal.shepherd@tcfwa.org; pm99588@yahoo.com; 'Ricky Gease (ricky@krsa.com)'; 'mcooney@arctic.net'; peruprairie@hotmail.com; glaser@seward.net; dgease@gmail.com; 'David Griffin (david.griffin@alaska.gov)'; 'Shina Duvall'; andybacon20@yahoo.com; clairshipton@gmail.com; 'jjh@seward.net'; dyrkss@yahoo.com; bearimage.dw@gmail.com; claireshipton@gmail.com; andbacon2@yahoo.com
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To: 'Cory Warnock'; mike@alaska-energy.com; 'Mark Luttrell (prufrock@arctic.net)'; irene@arctic.net; dearimage.dw@gmail.com; Thomas, Ryan J (DNR); jherbert8000@gmail.com; katie.johnson@alaska.gov; hal.shepherd@tcfwa.org; pm99588@yahoo.com; 'Ricky Gease (ricky@krsa.com)'; 'mcooney@arctic.net'; perupraírie@hotmail.com; glaser@seward.net; dgease@gmail.com; 'David Griffin (david.griffin@alaska.gov)'; 'Shina Duvall'; andybacon20@yahoo.com; clairshipton@gmail.com; 'jjh@seward.net'; dyrkss@yahoo.com; 'bearimage.dw@gmail.com'; 'claireshipton@gmail.com'; 'andbacon2@yahoo.com'
Cc: Salzetti, Mikel; 'Emily Andersen'
Subject: RE: DRAFT November 6th Grant Lake Project Public Meeting Minutes

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Cory Warnock
Senior Licensing and Regulatory Consultant

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360.384.2662 p | 360.739.0187 c | Warnock@mcmjac.com

MCMILLEN JACOBS ASSOCIATES

From: Dwayne Adams
Sent: Monday, December 29, 2014 2:10 PM
To: Eavis, John -FS
Cc: Clark, Paul D -FS
Subject: Re: INHT Development Costs

Thanks much John. That in itself helps a lot.

Have a good New Year!

Dwayne Adams
Landscape Architect

From: Eavis, John -FS <jeavis@fs.fed.us>
Sent: Monday, December 29, 2014 2:07 PM
To: Dwayne Adams
Cc: Clark, Paul D -FS
Subject: RE: INHT Development Costs

Dwayne, Sorry so late in responding. Your email went to my spam folder and was not noticed there until today. The average cost for the INHT construction has been around $75K per mile in 2012 dollars. You could assume some inflation from that year. This would not include bridges but would include a mix of natural surface, puncheon and boardwalk trail. I do not have a specific cost estimate for the section north of Vagt Lake at this time. I would assume the section on the current alignment from Vagt Lake outflow to Grant Creek would be primarily natural surface with drainage and a section(s) of boardwalk across the end of the lake. At this point I am not clear on the needs of the existing alignment north of Grant Creek.

John Eavis
Recreation Staff

Forest Service
Chugach National Forest, Seward Ranger District

p: 907-288-7701
f: 907-288-2002
jeavis@fs.fed.us

PO Box 390
Seward, AK 99664
www.fs.fed.us

Caring for the land and serving people

From: Dwayne Adams [mailto:wdadams@earthscapealaska.com]
Sent: Friday, December 19, 2014 9:52 AM
To: Eavis, John -FS
Subject: INHT Development Costs

Hi John, Merry Christmas!

I was wondering if you had any best guesses at the costs to develop the INHT through the Grant Lake area. KHL would like to see what costs they would incur to relocate the trail should there be agreement to the alignment that they/we suggest and I'd like to make sure we compare apples to apples. So it would be good to know how much boardwalk you might have and what development costs you foresee for different soils/slope conditions.

Thanks much John for anything you might have--have a good holiday.

Dwayne Adams
Landscape Architect